

**ANALYSES
AND PROJECTIONS
OF ECONOMIC DEVELOPMENT**



III

**THE ECONOMIC
DEVELOPMENT
OF COLOMBIA**



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ANALYSES AND PROJECTIONS OF ECONOMIC DEVELOPMENT

III. The Economic Development of Colombia

*(Prepared by the secretariat of the Economic Commission
for Latin America)*



UNITED NATIONS

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EXPLANATORY NOTES

SYMBOLS USED

Three dots (...) indicate that data are not available or are not separately reported.

A dash (—) indicates that the amount is nil or negligible.

A blank space in a table means that the data are not applicable to the article concerned.

A minus sign (—300) indicates a deficit or a decrease.

A full stop (.) is used for decimals.

A comma (,) is employed to distinguish thousands and millions.

A stroke (/) indicates a crop year or fiscal year, e.g., 1953/54.

References to "tons" indicate metric tons, and to "dollars" United States dollars, unless otherwise stated.

Minor discrepancies in totals and percentages are due to rounding.

The initials "ECLA" refer to the Economic Commission for Latin America.

FIGURES

In some of the figures in this document numbers have been used to indicate particular countries, as follows : 1, United States ; 2, Canada ; 3, Switzerland ; 4, New Zealand ; 5, Sweden ; 6, United Kingdom ; 7, Australia ; 8, Denmark ; 9, Norway ; 10, France ; 11, Belgium and Luxembourg ; 12, Venezuela ; 13, Netherlands ; 14, Argentina ; 15, Western Germany ; 16, Israel ; 17, Ireland ; 18, Spain ; 19, Uruguay ; 20, Cuba ; 21, Finland ; 22, Italy ; 23, Chile ; 24, Costa Rica ; 25, Austria ; 26, Union of South Africa ; 27, Panama ; 28, Yugoslavia ; 29, Mexico ; 30, Colombia ; 31, Brazil ; 32, Turkey ; 33, Greece ; 34, Portugal ; 35, Egypt ; 36, Guatemala ; 37, Honduras ; 38, Dominican Republic ; 39, El Salvador ; 40, Nicaragua ; 41, Japan ; 42, Ecuador ; 43, Peru ; 44, Ceylon ; 45, Southern Rhodesia ; 46, Paraguay ; 47, Thailand ; 48, Haiti ; 49, Bolivia ; 50, India ; 51, Northern Rhodesia ; 52, Belgian Congo.

STATISTICAL APPENDIX

The *Statistical Appendix*, to which constant reference is made in the text, has been issued in a mimeographed version as document E/CN.12/365/Add.1, and may be obtained on request from ECLA, Providencia 871, Santiago, Chile.

INTRODUCTION

1. The present report was drawn up by the secretariat of the Economic Commission for Latin America in compliance with the terms of resolution 48 (V) on the technique of programming, adopted in April 1953 at the fifth session of the Commission. It also forms a part of the series of studies on the *Analyses and Projections of Economic Development* undertaken by the ECLA secretariat and, as far as methodology is concerned, follows the lines laid down in the first volume of this series.¹

2. With the approval of the Government of Colombia, and its invaluable co-operation through the Economic and Fiscal Programming Committee (*Comité de Planeación y Fiscal*), a group of ECLA economists went to Colombia in March 1954 to lay the foundations for the work. Thanks to the able assistance of local economists and experts, who collaborated with the members of the secretariat throughout the whole of their stay in Colombia, in some five months most of the background material was compiled for the subsequent preparation of the study at ECLA headquarters. The group from the secretariat thus enjoyed not only access to the statistical data available in Colombia, but also direct contact with a number of public officials, representatives of private economic activities, members of university circles and others with experience in different sectors, whose information, opinions and advice constituted a most important contribution to the task of drafting the present study.

The collaboration of Colombian experts was not, however, confined to this preliminary phase, but was also extended to the actual writing of the report in Santiago. During the final stages of the study the members of the secretariat group had the benefit of the valuable co-operation and constructive criticism of the Administrative Director of the Programming Committee, as well as of the permanent assistance of two experts from the Ministry of Agriculture, an economist from the secretariat of the Programming Committee, and an industrial engineer representing the National Association of Industrialists (*Asociación Nacional de Industriales*).

3. It is impossible to pay a full tribute to the individual collaboration of all the numerous Colombian organizations that helped in the preparation of this report.

The *Banco de la República* not only offered material facilities — offices, equipment, library, etc. — but also lent technical experts; furthermore, the ECLA economists were able to avail themselves of the basic studies on national income and the balance of payments which this Bank's Department of Economic Research had been preparing.

The enthusiastic co-operation of the secretariat of the Economic and Fiscal Programming Committee took the form of valuable assistance rendered by every member of its staff, as well as of permanent access to the important studies and background information compiled by this body.

The National Association of Industrialists also made a direct contribution by placing its technical specialists at the disposal of the ECLA group. The guidance and help derived from round table discussions with executives of the Association were of the greatest value in preparing the study. This expression of appreciation must also include a number of the Association's affiliates, which gave the members of the group an opportunity of first-hand acquaintance with many of the distinguishing features and problems of Colombia's industry.

The Budget Department (*Oficina del Presupuesto*) and the Revenue Department (*Dirección de Rentas*) of the Ministry of Finance; various departments of the Ministries of Agriculture, Public Works and Mines and Petroleum; the Office of the Controller-General (*Contraloría General de la República*); the *Caja Agraria*, and the Technical Department of Rural Social Security (*Departamento Técnico de la Seguridad Social Campesina*) of the Ministry of Labour; the Institute of Industrial Development (*Instituto de Fomento Industrial*); the Territorial Credit Institute (*Instituto de Crédito Territorial*); the National Institute of Water Utilization and Electricity Development (*Instituto Nacional de Aprovechamiento de Aguas y Fomento Eléctrico*); the National Institute of Supply (*Instituto Nacional de Abastecimientos*); the Directorate of Banks (*Superintendencia de Bancos*) and the Directorate of Stock Companies (*Superintendencia de Sociedades Anónimas*); the Paz del Río National Iron and Steel Enterprise (*Empresa Siderúrgica Nacional de Paz del Río*); the Coffee-planters' Federation (*Federación de Cafeteros*); and the universities, some of whose students helped to prepare part of the background material, are among the many other Colombian institutions and enterprises which never failed to respond to any request for help.

Special mention must also be made of the assistance rendered by the National Administrative Department of Statistics (*Departamento Administrativo Nacional de Estadística*), which at the earliest possible moment placed the results of its latest research at the disposal of the working party. Important aspects of the analysis in the present study could not have been covered if it had not been for the valuable data provided by the Industrial Census of 1953, the survey on income and expenditure of 1,500 urban families, the population and housing censuses, and the sample census of the agricultural sector.

¹ See *Analyses and Projections of Economic Development, I. Introduction to the Technique of Programming* (E/CN.12/363), United Nations publication, Sales No. : 1955.II.G.2.

Lastly, many individual participants in public activities or private enterprise will discover, as they turn the pages of this study, some contribution of their own ; an apology is tendered to them here and now for the omission of any more explicit acknowledgement of their aid.

4. It would be erroneous to interpret the content of this study as a development programme for Colombia. Its only aim was to continue methodological research in the field of analyses and projections, while making a maximum use of specific data on Colombia's national economy. Not only does this allow aspects of methodology to be illustrated by concrete examples, but it may also provide a foundation upon which technical organizations in Colombia can, if they so desire, undertake the building-up of an economic development programme proper.

Nevertheless, even within its essentially methodological character, the research carried out enables important general conclusions to be reached, which, should they prove acceptable, might also be of some immediate value to the economic authorities in Colombia.

5. At the risk of carrying simplification to an extreme, it seems advisable to provide a brief outline of the method followed in the present study, especially with respect to the alternative projections of future development.

Given reasonable hypotheses of the possible rate of growth of *per capita* income, it is feasible, in accordance with systematic and objective principles, to deduce the effects which such growth might have upon the composition of demand for consumer goods, of investment and of exports, as well as upon production and productive capacity. Projections of the volume and composition of the demand for consumer goods are based on an analysis of the income-elasticity of demand ; those relating to exports, on an examination of the world demand for Colombia's exportable products and on the prospects of expanding domestic production of these commodities ; and those concerning investment and the growth of productive capacity, on an analysis of capital coefficients and of possible modifications of the product-capital ratio. By taking into consideration the limited possibilities for the expansion of exports, import substitution requirements may be determined, so that estimates of the necessary increments in the production and productive capacity of the main sectors of economic activity may then be prepared. New production levels for consumer goods and services would in turn call for greater availabilities of intermediate products, services and capital goods ; this demand would have to be met partly from increased domestic production of such goods and services and partly from imports.

The analysis of demand can be more easily integrated with that of production of goods and services if research into inter-industrial relations is carried out, which facilitates an assessment of aggregate production needs, both direct and indirect, per unit of final demand. An examination of exports, combined with projections of the capacity to import, provides data on the limitations likely to affect supplies from foreign markets ; when these are in turn compared with the import requirements

deduced from the preceding projections, it becomes possible to measure how great an import substitution effort is called for, if the projected rate of development is to be attained.

An attempt is thus made to present a consistent picture of the modifications which the different variables will have to undergo if a specific rate of growth of *per capita* income is to be achieved, due regard being paid to the limitations that may be imposed by the capacity to import. In this way, as a final outcome of the analysis, definite estimates of production and productive capacity, investment requirements, manpower and other types of input, etc., can be prepared for each of the main sectors of economic activity.

6. In accordance with these guiding principles, Part One of the present study comprises analyses of the following main points :

(a) The history of Colombia's over-all economic development and the principal features of the present economic situation. This survey provides the background data on which reasonable alternative hypotheses of future growth can be based, and through which the differing consequences of each of these hypotheses can be assessed.

(b) The demand for consumer goods and services. This analysis covers the history of the growth and composition of the demand for consumer goods and services, in relation to rising income levels ; the present features of such demand ; and the influence exerted upon it by population shifts from rural areas to urban centres, as well as by changes in the distribution of income. From this summary of basic data, alternative projections of the volume and composition of the future demand for goods and services can be obtained ; these in turn constitute fundamental indications of the expansion required in each of the principal sectors of economic activity to provide a sufficient aggregate production of goods and services — final as well as intermediate and capital goods — to meet the future demand.

(c) The external sector of Colombia's economy. This section comprises an historical analysis of exports and the presentation of certain hypotheses as to their future prospects ; a study of the capacity to import, of the demand for imports and of the possibilities of replacing them by domestically-produced goods ; and an examination of the role of foreign investment in Colombia's economic development, as well as of the part played by tariff and exchange policies. Alternative hypotheses of the future capacity to import are also formulated and, from these, the proportion of final consumer goods, raw materials, intermediate products and capital goods that could be purchased on foreign markets is assessed. Finally, these factors enable the dimensions and scope of the necessary import substitution effort to be inferred.

(d) The historical development of production capacity in the principal sectors of economic activity, and the extent to which it would have to be expanded in the future to meet the increased demand for consumer goods, intermediate products and capital goods. Apart from demand prospects, the present degree of utilization of

productive capacity and subsequent import substitution requirements are also taken into consideration.

Part Two offers a detailed analysis of demand and production prospects for each of the main sectors of economic activity. Specific consideration is given to agriculture and industry, as well as to the energy, transport and construction sectors, and a study is made of the most important aspects of each, such as productive capacity requirements, labour, productivity, capital per employed person and product per unit of capital. Fiscal and economic policy in the public sector and product per unit of capital. Fiscal and economic policy in the public sector during the last thirty years is also examined, together with possible future needs. Here the responsibility of the Government for the provision of basic social capital and services, and for the mobilization and channelling of internal and external financial resources for development purposes, is taken into account. The nature of the contribution made by the public, private and foreign sectors to the financing of investment and production is likewise analysed; under this head is included a study of the sources and utilization of the funds belonging to enterprises, of the role enacted by financial institutions and of their influence on the distribution of credit, especially in connexion with working capital requirements.

Appended to the study are several annexes, in which certain specific points are discussed in greater detail. (See also page xii for a note on the *Statistical Appendix*, which contains the principal series utilized, together with the main methods and sources on which the calculations were based.)

7. Some of the most important conclusions to be drawn from the present study will now be outlined in very general terms.

(a) For the post-war rate of economic development to be maintained, the investment coefficient would have to rise above the relatively high levels reached during that period. This conclusion springs from the fact that the growth registered during the post-war years, thanks to the more satisfactory ratio between gross product and capital employed, is unlikely to continue. The substantial increase in the product-capital ratio after the war arose from a combination of several favourable factors—including an improvement in the terms of trade and in the capacity to import—which have now almost or entirely disappeared. Thus, to raise the product-capital ratio still higher would be much more difficult, because of the need to augment the capital used per actively employed person in agriculture and industry and the progressively greater relative importance of activities which require a higher capital density.

(b) The improvement in the terms of trade and in the capacity to import also brought about a considerable increase in the availability of goods and services during the post-war years; this in turn allowed the volume of *per capita* consumption to expand more than domestic production (about 60 per cent). Since the share of consumer expenditure devoted to manufactured goods and services becomes larger as *per capita* income rises, the increments in this latter had a dynamic effect on the

composition of production and productive capacity during the period in question. At the same time, the annual rate of growth of urban population rose to 5.2 per cent, reflecting an expansion of industrial production and of the provision of services. Such a transfer of marginal increases in the labour force and productive capacity to activities where productivity was higher also favoured the growth of demand. This was particularly true in the years preceding 1950, when the real income of wage-earners employed in industry and services increased more rapidly than productivity; from 1950 onward, however, the situation was reversed. An analysis of the characteristics of demand suggests that any future rise in the level of *per capita* income will tend to encourage consumption of manufactured goods and services. The income-elasticity coefficients of demand indicate that the more rapid is the growth of *per capita* consumption, the greater is the proportion corresponding to manufactured goods and services as compared with foodstuffs. Nevertheless, even with an elasticity coefficient of 0.6, the production of foodstuffs would have to expand considerably to meet demand and to provide the minimum *per capita* standard of nutrition that can be regarded as satisfactory. The continuance of the rate of growth registered during the post-war period by urban population and industry would imply that by 1965 more than half the population of Colombia would be settled in urban areas, with the consequent effects upon demand for manufactured goods and services.

(c) The features characterizing the demand for coffee in the United States (namely, a low income-elasticity of 0.55 and a negative price-elasticity of -0.25) and the limitations of world demand for other Colombian export commodities, might mean that the rate of growth of the capacity to import would tend to fall substantially below that of the over-all economy. On the other hand, foreign investment, which in 1953 accounted for only 8.4 per cent of Colombia's productive capacity, might enact a far more significant role. Thus one of the fundamental requisites for Colombia's future economic development is a programme for the replacement by domestic production of a larger share of the country's imports, 90 per cent of which represent manufactured consumer goods, intermediate products and capital goods. If no change took place in the proportion of the total availability of goods and services at present contributed by imports, by 1960 the demand for imported commodities would considerably exceed the capacity to import. The extent and rapid growth of the need for manufactured intermediate products, and the comparative ease with which many of these could be economically produced within the country, suggest that this is one of the fields where an intensive endeavour to achieve new import substitutions may be expected.

(d) Long-term changes in the composition of productive capacity by economic sectors were among the factors that raised the investment coefficient during the post-war period, contributing at one and the same time to the demand for capital goods and to their financing. The investment coefficients for manufacturing, transport and public services were much higher than that shown by agriculture, and determined a larger relative share

of machinery and equipment representing technological progress. This high post-war level of the investment coefficient, and the long-term trend towards more efficient utilization of productive capacity, were two of the decisive factors in the achievement of Colombia's rapid rate of economic development during the period under review. An examination of this process of economic growth reveals the importance and the high social cost of public investment in basic social capital, in transport, in energy and in municipal public services. The limited foundations on which industrial production was built up in the pre-war years are also apparent. The low investment coefficient, the consequent technical backwardness and the under-utilization of productive capacity and manpower in the agricultural sector, confirm the hypothesis that without industrialization and public investment of basic social capital it is impossible to attain a satisfactory investment coefficient and an adequate rate of development; and the magnitude of import substitution requirements emphasizes how important it is to develop domestic production of the capital goods required by the agricultural, industrial, energy and transport sectors.

(e) The part played by Government economic policy through the provision of basic social capital and services has been of vital importance for the industrialization, urbanization and economic integration of Colombia. The inflow of foreign capital made a decisive contribution to the financing of such public expenditure on consumption and investment during the 'twenties. Thenceforward, the development and perfecting of mechanisms for mobilizing and channelling resources enabled expenditure to be financed while at the same time relatively stable price levels were maintained. In recent years, public income and expenditure have shown a tendency to lag behind the country's economic growth. A continuance of rates of industrialization, urbanization and economic integration similar to those registered during the post-war period might call for a broadening of the base of public income, in order to finance the growing requirements of services and basic social investment.

(f) To maintain the post-war rate of development a substantial increase in the marginal rate of saving would be necessary. It seems reasonable to expect a higher level of saving and investment both on the part of the Government and on that of the private and external sectors. Though the manufacturing sector shows a high investment coefficient (25-30 per cent), it is not financially capable of undertaking heavy investment in basic industries. The volume of stocks is exceptionally large, being equivalent to more than two-thirds of the product generated in industry and to one-third of the fixed capital employed in this sector. The lack of adequate facilities for financing these heavy stocks reduces the capacity to undertake fresh investment in fixed capital. Nor does there seem to be satisfactory provision for medium and long-term credits to the manufacturing sector.

(g) For an adequate volume of foodstuffs to be produced, major changes would have to take place in the structure of agricultural production and the utilization of land and labour resources. Some of the heavier investment required might accrue from an improvement

in the productivity of the capital and manpower employed in this sector. The tracts of virgin soil suitable for cultivation and capable of economic exploitation are apparently not as extensive as is often supposed. This factor, combined with the high social cost implied in the provision of roads, housing and public services, suggests that the main effort should be directed towards more efficient utilization of the land at present under cultivation. It would seem that the large investments represented by such land could be used to greater advantage. To satisfy demand for agricultural products, by 1965 the area under cultivation would probably have to be increased by about 25 per cent. This would mean the absorption of all suitable land in cold climates. Substantial progress in the mechanization and techniques of agriculture would also be a pre-requisite for the attainment of a satisfactory level of productivity.

(h) The decisive factor in Colombia's economic development has been the rapid rate of growth of industrial production (an average annual rate of 8 per cent over the period 1935-54 and of 10 per cent in 1945-54). At present, it seems that the most urgent need is to broaden the still restricted basis of productive capacity. Moreover, the possible limitations of the capacity to import and the consequent need to reinforce the import substitution process might require a rapid development of new branches of production, chiefly covering a number of activities which would contribute to the supply of intermediate products and capital goods.

(i) Although generating capacity and the output of energy expanded rapidly in the post-war period, the heavy deficit in the *per capita* availability of energy, combined with the continuance of industrialization and urbanization at a rapid pace, may mean a further considerable increment in future demand for energy and necessitate substantial investment in this sector. Even if they are more efficiently utilized, the capital goods required, which are costly in relation to the value added, represent a heavy burden for the country. Nevertheless, any delay in expanding the capacity to generate energy might gravely affect the prospects of industrial production and urban growth. The seriousness of the present shortage may be illustrated by the fact that about one-fifth of Colombia's aggregate installed capacity belongs to individual enterprises and is used exclusively by them, despite the excessive investment this implies.

(j) From the 'twenties onward, heavy public investment in roads, railways and ports facilitated the subsequent industrialization, urbanization and economic integration of Colombia. The chief need, from the point of view of both present and future conditions, seems to lie in the improvement and maintenance of works already in existence and in the integration of the main urban centres, whereby market operations could be extended from the local to the national sphere. Transport material requirements constitute a serious drain on public investment, total investment and capital goods imports; hence it would seem important to develop domestic production of some of the elements and equipment which would enable part of these imports to be replaced.

(k) The present housing deficit is equivalent to 15 per cent of all urban dwellings. A policy aimed at meeting

this deficiency and, simultaneously, at providing housing for the urban centres in process of rapid expansion (at an annual rate of 4 per cent for the aggregate urban population and of 6 per cent for the 26 largest towns), would mean a considerable increase, by 1960, in the proportion of total investment devoted to residential building. The volume of other investment required seems to suggest that a programme of this scope would be too ambitious to be completed earlier. Again, an improvement in housing conditions is necessary to facilitate the process of industrialization and urban growth. The fact that a high proportion of the necessary intermediate products are produced within the country itself may also redound to the benefit of a broadly-conceived housing programme. The high social cost which residential building involves is clearly indicated by the low gross product accruing from housing services, in relation to the capital utilized. In any programme of this kind, it would be necessary to take into consideration investment and production requirements in the industrial sectors which supply the necessary intermediate products. As regards methods of financing housing schemes, intermediary financial institutions which adequately fulfil this purpose have been developed in Colombia.

Economic integration, together with the fact that current programmes for roads and railways are nearing completion, will probably tend to encourage local specialization in industrial production. It is thus to be expected that the process of expanding the productive capacity of the manufacturing industries will be accompanied by changes in their distribution over the various districts. Given the scanty resources available for investment, and the limitations imposed by the capacity to import, it would seem that local plans and programmes should be drawn up with an eye to the requirements and prospects of Colombia's over-all economic development, so as to ensure that the resources concerned are distributed according to the priorities that can best satisfy the country's needs.

8. It will be observed in due course that the present study includes certain original estimates relating to important new statistical and economic series, the preparation of which was greatly facilitated by the participation and collaboration of various departments of the Colombian Government and by valuable preliminary studies previously carried out in Colombia. Among these new series and data the following may be mentioned:

(a) Long-term estimates (for the period 1925-53) of the gross product, investment and stock of capital, by sectors of economic activity, valued at constant prices ;²

(b) Long-term estimates (for the period 1925-53) of Colombia's balance of payments ;³

² In the preparation of these estimates ample use was made of the research on national income for the period 1945-52 carried out by the Department of Economic Research of the *Banco de la República*, and of that on the stock of capital in 1950 carried out by the secretariat of the Programming Committee.

³ In this connexion there was an opportunity of using the preliminary estimates prepared by the International Monetary Fund and the Department of Economic Research of the *Banco de la República* for the year 1938 and the period 1945-53. In addition, the same Department took an active part in the preparation of the estimates for the periods 1925-37 and 1939-44.

(c) An assessment of the level and composition of consumption of goods and services in 1953 and an estimate of its fluctuations during the period 1937-53 ;⁴

(d) Long-term estimates (for the period 1923-53) of the consolidated income and expenditure of the public sector ;⁵

(e) Estimates of the gross product generated in the agricultural sector, of the gross value of agricultural production, of the productive capacity of the sector in question, and of the structure of production costs and input of labour and materials, by types of product ;⁶

(f) Long-term estimates of industrial production, of the gross product generated in the manufacturing sector, and of the availability of manufactured goods, distinctions being drawn between durable and non-durable consumer goods, intermediate products and capital goods ;⁷

(g) A table of inter-industrial relations for 1953, and the tables of coefficients derived from this basic matrix ;⁸ and

(h) Long-term estimates of the volume of saving and gross investment.

9. One last aspect which it seems desirable to stress is the nature of the present version of the study, and the discrepancies that may be noted between it and the preliminary text presented to the sixth session of the Commission at Bogotá, in August 1955.

As was pointed out at the time, because so much was owed to the co-operation of Colombians themselves, it was essential that, before the study was given its final form, it should be submitted to the consideration of the local authorities, entrepreneurs and scientific experts, so that an opportunity of benefiting from their valuable suggestions might once more be available. Such an opportunity was provided by the round table discussions on the economic development of Colombia arranged by the National Programming Committee of the Government of Colombia and the secretariat of the United Nations Economic Commission for Latin America and held at Bogotá from 16 to 27 August 1955. The criticisms and comments formulated in the course of these discussions enabled many of the conclusions reached in the provisional version to be revised, the final outcome being the present more satisfactory and comprehensive text.

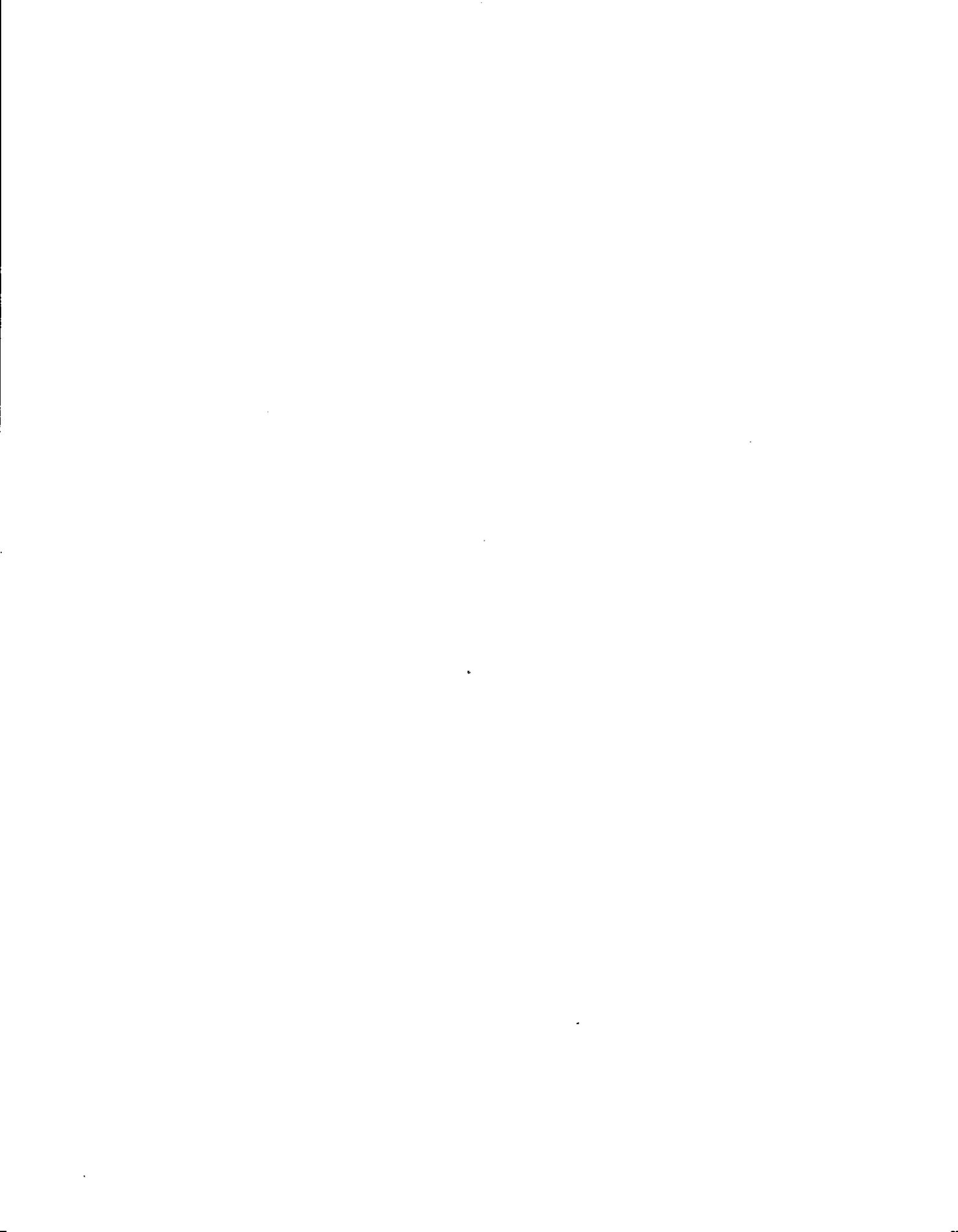
⁴ Among other data, the findings of the surveys on income and expenditure of urban and rural families carried out by the National Administrative Department of Statistics and the Ministry of Labour were used for the preparation of these estimates.

⁵ These estimates were calculated on the basis of statistics compiled by the Office of the Controller-General.

⁶ These estimates are the result of active collaboration with experts from the Ministry of Agriculture.

⁷ Important contributions to the preparation of these estimates were made by economists and statisticians of the National Administrative Department of Statistics, the secretariat of the National Economic and Fiscal Programming Committee and the National Association of Industrialists.

⁸ This input-output analysis constitutes the first experiment in the utilization of an instrument of this kind in the study of a Latin American country's economy.



PART ONE

**CHARACTERISTICS AND PROSPECTS
OF THE ECONOMIC DEVELOPMENT OF COLOMBIA**



Chapter I

MAIN FEATURES OF THE HISTORICAL DEVELOPMENT OF THE COLOMBIAN ECONOMY

GENERAL CONSIDERATIONS

The object of the present chapter is to discuss, in general terms, the intensity of the economic development registered in Colombia since the second half of the 'twenties, to analyse the circumstances attending this development and to note the changes that have taken place in the basic characteristics of the country's economy.

For the purposes of this study, the most reliable indicator of the rate of economic development will be taken to be the growth of the *per capita* gross product, that is, the ratio between the increase in the volume of production of goods and services and the growth of the population. However, in many aspects of the analysis other factors will have to be taken into consideration, such as gross income, available goods and services, stock of capital and active population, as well as a number of derived relationships.¹

The general interest which may attach to a historical survey of the intensity and characteristics of Colombia's economic development is not the only justification for this chapter. The ultimate aim of the analysis is to enable certain basic deductions to be made as to the development prospects that can be expressed in terms of reasonable hypotheses, and to present some background data on the ways and means of ensuring their effective materialization. Hence the importance of making, for example, a careful study of those structural changes which development itself has brought about, and of the extent to which future growth may be affected thereby; the interest of analysing the evolution of consumption and the changes in income distribution, as grounds on which to base an appraisal of the possible impact of demand on the subsequent distribution of productive resources; and the need to assess the part played by the external sector in past development, for purposes of comparison with the weight it may carry in the future.

An attempt will be made, in short, to diagnose the Colombian economy, as an essential first step towards the presentation of what may be considered realistic alternative hypotheses of future development, and to discuss the general conditions necessary for the attainment of the projected rates of growth, as well as the main obstacles that can be foreseen.

¹ For a detailed explanation of these concepts, see the *Economic Survey of Latin America, 1951-52*, United Nations publication, Sales No. : 1953.II.G.3.

I. RATE OF GROWTH OF THE ECONOMY AS A WHOLE

Up to 1925, average *per capita* gross income amounted to only about 310 pesos, approximately equivalent to 115 dollars.² Of the country's 6.7 million inhabitants, more than three-fourths represented rural population. Agriculture — an activity in which the level of productivity was low and technology behind the times — absorbed 69 per cent of the active population, generated 53 per cent of the gross product and utilized 40 per cent of the available capital resources.

The nucleus of industry was very small, although development of a few important projects was beginning in Medellín, Bogotá and other large towns, under the stimulus of the need to use in new activities certain capital resources to which agriculture offered no immediate opportunities because of the limited amount of land suitable for export crops. The difficulties inherent in the geography of the country and the lack of adequate transport facilities, while on the one hand serving to protect local industries, on the other constituted formidable obstacles to the economic integration of Colombia.

The low level of domestic income was accompanied by an almost negligible inflow of foreign capital, mainly confined to a few investments in petroleum. The product per unit of capital was extremely small, both on account of the actual composition of the stock of capital, which consisted mainly in agricultural improvements, housing and municipal services, and because of the rudimentary production techniques employed and the limitations imposed by the insignificant level of *per capita* income and demand. From the point of view of capital per employed person, moreover, the ratio registered was very low.

An opportunity will later arise for gradual consideration of the radical changes that took place during the next three decades in the situation thus outlined. A few examples may suffice here. The average annual rate of growth of the *per capita* gross product was 2.5 per cent during the period 1925-54, so that the figure for 1925 was more than doubled; the proportion of the active

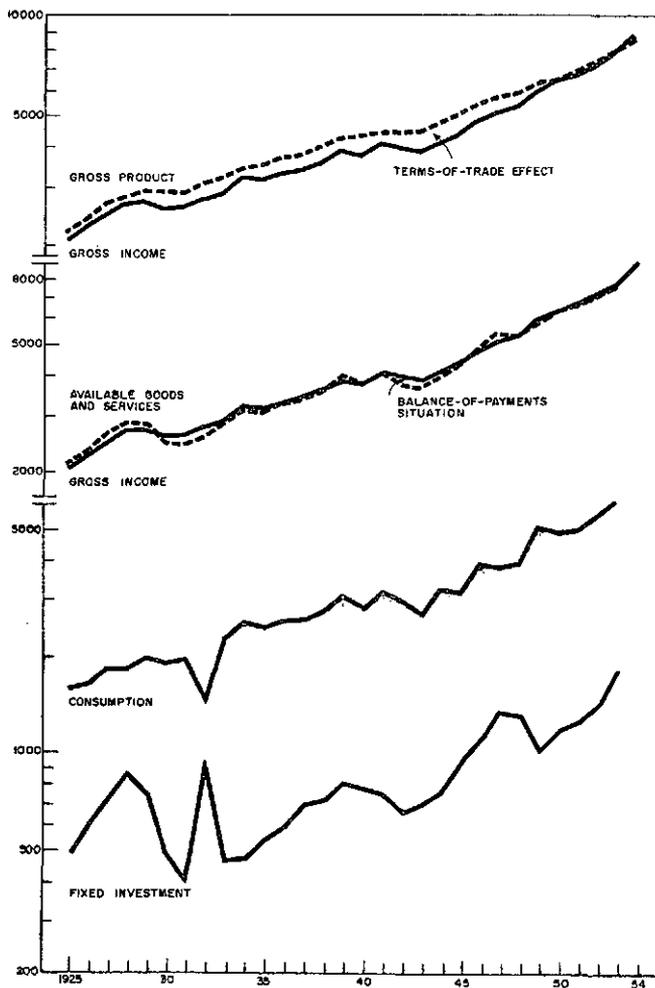
² As a general rule, the figures in national currency to which reference is made in this study correspond to pesos with a purchasing power equivalent to that of 1950. As regards figures in dollars, an exchange rate of 2.70 pesos to the dollar, calculated on the basis of purchasing power parity, has been utilized. For details of the calculation in question, see the *Economic Survey of Latin America, 1951-53*.

population employed in agriculture was reduced to a little over 50 per cent of the total ; and the joint contribution to the gross product made by the industry, transport, communications and public utilities sectors rose from one-tenth in 1925 to one-fourth in 1953.

This progress, however, was not achieved through a regular process of growth. If the main trends displayed by the Colombian economy between 1925 and 1953 are examined, at least three clearly differentiated periods can be distinguished, namely, the quinquennium 1925-29, the interval between 1930 and 1944, and the post-war years³ (see table I and figure I).

FIGURE I. COLOMBIA : GROSS PRODUCT, INCOME AND AVAILABLE GOODS AND SERVICES

(Millions of pesos at 1950 prices)
(Semi-logarithmic scale)



³ This is in reality a very rough distinction, mainly based on the intensity of the growth of the *per capita* gross product. The period 1930-44 in particular embraced conditions and characteristics which differed widely from several other points of view, so that in a stricter investigation a further break-down would have been necessary. However, since all that it aimed at is to describe development during the last thirty years, it was considered preferable to keep to the broad divisions mentioned, while at the same time the figures and rates for 1930-38 and 1939-40 are given separately in table I.

The first and last of these were periods of rapid expansion, whereas the middle phase was characterized by a marked falling-off in the rate of development. Of course, no conclusion can be drawn from this fact as to the greater or lesser degree of efficiency with which productive resources were utilized. In the final issue, the explanation is mainly to be found in the widely differing basic conditions under which the development concerned took place, especially if it is taken into account that the middle period included the years of the depression and of the Second World War.

The differences mentioned largely derive from the incidence of the external sector.

During the short period 1925-29, a substantial inflow of foreign capital, equivalent to some 200 million dollars, was financed by means of an increase in the external public debt ; but it came to an abrupt end with the advent of the world depression of the 'thirties, and save in exceptional years was not renewed on any considerable scale until the post-war period. This factor operated in conjunction with the terms-of-trade effect, which followed trends that fit exactly into the phases defined, maintaining relatively high levels during the quinquennium 1925-29, dropping sharply between 1931 and 1944, and rapidly improving as from 1945 (see figure II).

FIGURE II. COLOMBIA : RATE OF ECONOMIC GROWTH AND INCIDENCE OF THE EXTERNAL FACTOR

(Semi-logarithmic scale)

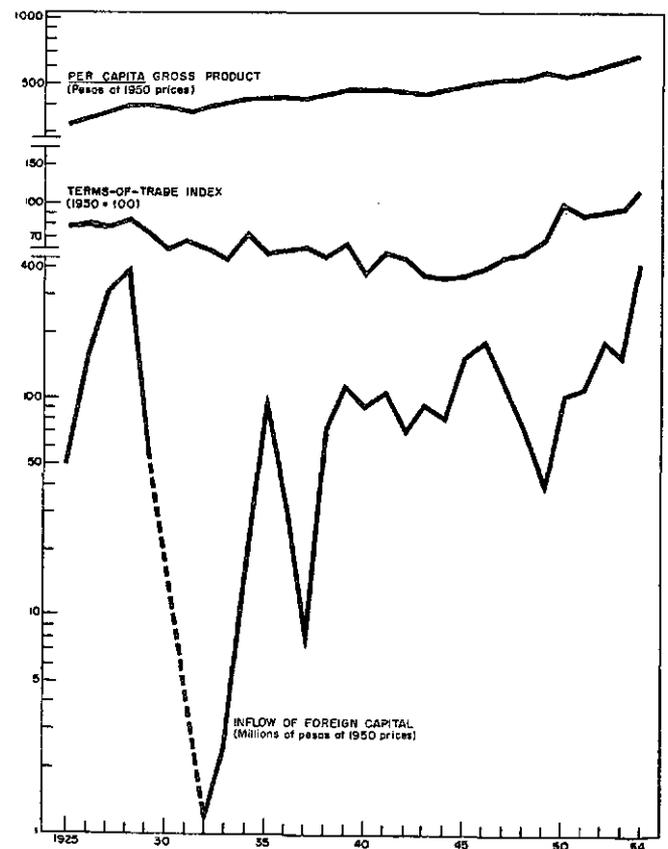


TABLE I. COLOMBIA : RATE OF ECONOMIC GROWTH, 1925-53

(Values in millions of pesos at 1950 prices)

	1925-29	1930-44			1945-53
		1930-44	1930-38	1939-44	
Population (Thousands of persons)	5,543	8,592	8,049	9,406	11,106
Gross product	2,583	3,765	3,350	4,388	6,203
Terms-of-trade effect	-133	-374	-318	-459	-312
Gross income	2,450	3,391	3,032	3,929	5,892
Balance-of-payments situation	98	-84	86	80	11
Available goods and services	2,548	3,308	2,946	3,849	5,903
Consumption	1,774	2,564	2,333	2,985	4,532
Investment	679	641	531	729	1,137
Changes in inventories	95	103	82	135	134
Investment coefficient	26.1	16.1	15.8	16.7	19.9
Stock of capital	11,317	14,036	13,046	15,522	19,457
Product-capital ratio	0.23	0.27	0.25	0.28	0.32
Inflow of foreign capital	198	61	33	94	126
Capacity for external payment	737	634	600	686	1,126
Imports	637	496	486	512	1,011
<i>Per capita rates of growth :</i>					
Gross product	5.2	1.4	2.0	—	3.6
Gross income	4.6	1.3	2.0	-1.2	5.2
Available goods and services	4.9	1.3	2.6	-2.4	5.1
Consumption	3.4	1.7	2.6	-1.4	6.2

SOURCE : See *Statistical Appendix*, tables 4, 9, 10 (part C), 12 and 15.1. *The period 1925-29*

From the point of view of the growth of the gross product, this was the period of most rapid development. In fact, the annual rate of growth of the *per capita* gross product reached 5.2 per cent. *Per capita* availabilities of goods and services, on the other hand, increased at an annual rate of only 4.9 per cent, as the result of an expansion in the volume of exports which exceeded the increment in imports. *Per capita* consumption rose at the even more moderate rate of 3.4 per cent, while *per capita* investment almost doubled.

The external resources at the country's disposal during this period permitted the attainment of a high level of public investment in basic social capital, which in turn encouraged a yet larger volume of private investment. Consequently, the investment coefficient stood on an average at 26 per cent, a figure never afterwards equalled, and still much higher than the average registered during the post-war years (20 per cent). It was also by virtue of these resources that the economic policy of the public sector was able to fulfil a new function, that of establishing basic utilities aimed at facilitating the economic integration of the territory, the growth of urban population and the development of industry, territory, the growth of urban population and the development of industry.

The high investment coefficient determined a significant increase in the amount of capital, which in addition was more efficiently utilized, thanks to the introduction of more advanced production techniques. This explains why the gross product expanded more rapidly than the

stock of capital, with the result that the product-capital ratio improved from 0.21 in 1925 to 0.24 in 1929.

It should be noted that foreign investment, despite the important role played during this period by both its direct and its indirect effects, was equivalent to only 15 per cent of the country's total availabilities of capital. This is important because the relatively small proportion represented by foreign investment helped to keep down expenditure on amortization of the external debt and left the country more freedom than others enjoyed in the channelling of future investment.⁴

2. *The period 1930-44*

From 1930 onwards, the abrupt suspension of the inflow of foreign capital caused by the world depression of the 'thirties, together with a deterioration in the terms of trade, substantially reduced the capacity for external payment,⁵ which dropped during 1931-34 to levels 50 per cent lower than those registered in 1928 and 1929, despite the fact that the volume of exports remained unchanged. The reduction in question was still further aggravated by the continuous flight of capital abroad throughout the 'thirties, mainly attributable to the repatriation of capital invested in petroleum. Imports

⁴ As foreign investment, and, as a general rule, reinvestment, is concentrated mainly in export activities, it is more difficult to redirect investment into different channels when capital from abroad represents a high proportion of the total.

⁵ The capacity for external payment includes the volume of exports of goods and services, the inflow of foreign capital and the terms-of-trade effect.

thus decreased to a notable extent, not merely in the years of the depression, but yet again, and with similar intensity, during the Second World War, so that only in the post-war period did they regain a level comparable to that recorded in 1928.

It is readily understandable that such severe restrictions as had to be imposed on imports of capital goods meant that the possibilities of economic growth were seriously limited. Again, industrial enterprise in the early 'thirties was mainly concerned with textiles, foodstuffs and beverages, and cement. Although in these sectors of industry a substantial degree of import substitution was possible and was in fact achieved, the productive capacity of industry was too low for production designed to effect import substitution to be diversified to as great an extent as in some of the other Latin American countries.

Thus, over the whole of the period 1930-44, the investment coefficient attained an average of only 16 per cent. Between 1930 and 1938 the *per capita* gross product increased at an annual rate of no more than 2 per cent, which was still further reduced between 1939 and 1945, when virtually no increment was recorded. Available goods and services, in their turn, again registered an expansion even smaller than the already insignificant increase in the gross product, for two reasons previously mentioned. In the first place, the deterioration in the terms of trade counteracted the effect of the larger quantum of exports, the purchasing power of which considerably decreased; secondly, the net outflow of capital prevented a substantial proportion of the capacity for external payment from being utilized for imports.

The growth of the product, slow as it was, nevertheless outstripped that of the stock of capital, the expansion of which was accounted for mainly by certain basic social services, such as transport facilities and municipal public works. The industries which had already been in existence at the beginning of the period increased their output at an accelerated rate, thus intensifying the utilization of installed capacity. Up to a point, agriculture also followed a similar trend. Consequently, a further substantial improvement was registered in the product-capital ratio, which rose from 0.24 in 1929 to 0.29 in 1945.

Although the rate of growth attained during this period was low, the significant structural changes that took place in the economy paved the way for the intensive post-war rate of economic development. Continued investment in basic social capital, this time mainly financed with domestic resources, permitted the rapid growth of the urban population and helped to further the country's economic integration. Moreover, the effort to substitute domestic production for imports of many manufactured goods meant the transfer of capital and active population to activities in which productivity was higher, in particular industry and services.

It is of interest to point out — although only in passing, as the topic is dealt with in a special chapter of the present study⁶ — another of the principal characteristics of this period, namely, the utilization of more and better

⁶ See Part Two, chapter I.

instruments of economic policy with respect to current expenditure and investment, taxation, mobilization of savings and channelling of credit, as well as the maintenance of monetary stability. The expenditure policy applied by the public sector in the 'thirties and during the war played an important part in safeguarding and even raising the level of economic activity. While public investment was at first confined to transport services and municipal public works, it was afterwards extended to agriculture, industry and energy. The adoption of the 1931 customs tariff constituted the first manifestation of a protectionist attitude towards the incipient domestic industries. Furthermore, an effort was made to seek out new sources of financing for the expenditure and investment of the public sector; among these may be mentioned the expansion of the internal public debt at the beginning of the 'thirties, the introduction of a direct and progressive income tax in 1935, the subsequent reform of the tax system and its administration, and the establishment of parastatal institutions and financial intermediaries to facilitate the mobilization of savings. Such progress in the institutional field and in organization made it easier for expenditure and investment to be maintained at a high level without recourse to any major expansion of the internal debt. The stability of the currency itself, which is relatively greater in Colombia than in other Latin American countries in process of industrialization and economic development, is partly attributable to the use of satisfactory techniques for the mobilization and channelling of financial resources.⁷

3. *The post-war period*

The structural changes that had taken place during earlier periods, and the coincidence of several favourable factors, enabled the Colombian economy to develop at a notable rate during the post-war years, in contrast with the situation in other Latin American countries, whose rate of growth, rapid to begin with, gradually declined between 1948 and 1952.

The *per capita* gross product increased at an annual rate of 3.9 per cent between 1945 and 1954. How satisfactory was this rate of growth can be judged from the fact that, were it kept up, it would lead to a noteworthy improvement in the standard of living of the population in so relatively short a time that by 1970 a standard comparable with that currently prevailing in the countries of Western Europe would be attained.

Still more spectacular was the expansion of *per capita* gross income, which rose during the period 1945-54 at an annual rate of 5.8 per cent. Approximately one-third

⁷ There are, of course, many other important factors that have contributed to the achievement of relative price and currency stability, among which may be mentioned (a) the lesser relative importance of the external sector in Colombia than in other countries, which means that Colombia's fiscal revenue system is not so vulnerable to fluctuations in world market prices and demand for raw materials; (b) the fact that the rate of growth of *per capita* income and the rate of industrial development were slow in Colombia up to 1945, and the pressure of demand on price levels was consequently limited, and (c) the existence of relatively abundant under-utilized manpower resources, which in recent years has facilitated a greater increase in productivity than in real wages.

of this increment is directly attributable to the improvement in the terms of trade from 1945 onward, a circumstance which explains why the growth of income was much more intensive than that of the gross product. It should be pointed out, however, that in the brief interim between July 1954 and March 1955 the fall in the world price of coffee had already brought down Colombia's terms of trade to their 1950 level, and had reduced by one-tenth the rate of expansion registered for *per capita* gross income since the end of the war.

The improvement in the terms of trade, in combination with a moderate enlargement of the volume of exports and a small inflow of capital, permitted a considerable expansion both of the capacity to import and of the imports actually effected, even before the substantial rise in world coffee prices in 1949. Since it was possible, thanks to the better terms of trade, to finance this increment with a very limited increase in the volume of exports, the growth of available goods and services also greatly exceeded that of the gross product.

Between 1945, when the level of imports was already relatively high, and 1953, purchases abroad increased by 154 per cent,⁸ which represented an annual *per capita* rate of growth of 9.9 per cent, while the volume of exports expanded at an annual rate of barely 1.5 per cent. On the other hand, the rise in the purchasing power of the latter was proportionally much higher, and, consequently, available goods and services registered a 50 per cent increment, which implied an annual rate of growth of 5.1 per cent.

Per capita consumption levels, which had remained practically unchanged between 1929 and 1945, rose very rapidly during this period, from 308 pesos in 1945 to 499 pesos in 1953 (a total increase of 62 per cent, corresponding to an average annual rate of 6.2 per cent). Higher income and growing demand also brought about marked changes in the composition of consumption, both because of the differing income-elasticity of demand for foodstuffs, manufactured goods and services, and on account of the easier supply conditions prevailing with respect to certain consumer goods and services.

One of the decisive factors in the attainment of the remarkable post-war rate of growth was the rise in the investment coefficient, which reached the relatively high average of 20 per cent. This represented a striking improvement upon the coefficient registered during the 'thirties and the Second World War, which had fluctuated around 16 per cent only. The various factors contributing to this increase were the improvement in the terms of trade and the capacity for external payment; the public sector's investment policy and its action with respect to the mobilization of savings and the channelling of credit; the results of the import substitution policy adopted during the 'thirties and the Second World War, which left a wider margin for capital-goods imports; and the accelerated process of urbanization and industrialization, which provided a considerable incentive to private investment.

⁸ The continuance of this growth in 1954 gave rise to a surplus of imports—the first registered since 1928—in the physical balance of exports and imports, calculated at 1950 prices.

But the comparatively high and constant investment coefficient was not in itself enough to account for the rapid growth recorded during the post-war period. What rendered this possible was not, in fact, the additional investment alone, but also a more efficient utilization of productive capacity. The product-capital ratio underwent a further improvement; its rise from 0.29 in 1945 to 0.35 in 1953 completed one of the most significant aspects of Colombia's economic development in the past thirty years, characterized as it was by the steady and almost uninterrupted upward trend of the ratio in question.

In this connexion it is of interest to point out that Colombia's experience is in contrast with that of other Latin American countries during the war and the post-war years. Several of these countries witnessed an improvement in their product-capital ratio during the war as the result of an increase in industrial production for import substitution purposes and a reduction of the investment coefficient deriving from the restriction of capital goods imports. In subsequent years, the product-capital ratio deteriorated, because productive capacity grew relatively faster than production. In Colombia, on the other hand, no significant increase in the product-capital ratio was noted during the war, since the falling-off in agricultural and petroleum production for export lowered the product-capital ratio in these activities, thus offsetting the larger output of the manufacturing industries and the more intensive utilization of their productive capacity, of which the positive influence on the economy was in any case limited by the relatively slight importance of this sector. Here too a large-scale expansion of productive capacity was registered in the post-war period, but the incentives deriving from the steady increase in *per capita* income and total demand—in turn largely determined by the improvement in the terms of trade—enabled the product to grow more rapidly still.

The post-war growth described was uninterrupted, except that in 1950 and 1951 a minor decrease in economic activity, which had no very far-reaching consequences, was brought about by the application of a restrictive and deflationary economic policy. In view of the substantial rise in the price of coffee in 1949, measures to restrict credit, public investment and imports were adopted with the aim of controlling the inflationary pressure which it was assumed might derive from that event. The measures in question caused a decrease in private investment and building activities, and their influence was even reflected in a reduction of the *per capita* gross product.

4. The over-all picture

It may be concluded that, during the period 1925-53 as a whole, the Colombian economy reached an annual rate of growth of 4.6 per cent, measured in terms of the gross product. Over the same period the rate of growth of the population was 2.1 per cent, so that the *per capita* gross product increased by 2.4 per cent yearly (see table 2). This rate of development is satisfactory in comparison with that of other Latin American countries, but the difference it represents is not very substantial

TABLE 2. COLOMBIA : GROSS PRODUCT, ACTIVE POPULATION AND STOCK OF CAPITAL

	1925	1929	1945	1953
Active population (Thousands of persons)	2,505	2,693	3,647	4,118
Gross product (Millions of pesos at 1950 prices)	2,189	2,907	4,911	7,751
Stock of capital (Millions of pesos at 1950 prices)	10,553	12,185	16,776	22,262
Product-capital ratio	0.21	0.24	0.29	0.35
Gross product per active person	874	1,079	1,346	1,882
Capital per active person	4,213	4,525	4,600	5,406

SOURCE : See *Statistical Appendix*, tables 4, 5 and 6.

compared with that registered during the same interval in the United States.

The long-term improvement in the terms of trade, which followed a series of prolonged and marked deteriorations, enabled gross income to rise even more rapidly. It was owing to this improvement in the post-war years, and to external contributions in 1925-29, that during the periods of accelerated growth available goods and services also increased faster than the product; the situation was reversed in 1930-44, when the purchasing power of exports decreased and the country was confronted with a net flight of capital abroad.

Again, a study of the functional allocation of production of goods and services shows that, within the over-all process of growth, private investment (as well as government expenditure) increased more rapidly, at the expense of private consumption and exports. However, these also expanded considerably in absolute terms.

One of the most striking features of Colombia's economic development after 1925 was the fact that the growth of the stock of capital did not keep pace with that of the gross product. Thus the product-capital ratio steadily improved, and by 1953 was almost 70 per cent higher than in 1925. Since the active population also increased much less than the product, as well as more slowly than the stock of capital, the productivity of both labour and capital rose, while at the same time an increment was registered in available capital per employed worker.

As has already been pointed out, development during the post-war years was much more rapid than over the period 1925-53 as a whole, and should the same pace be kept up, there would be a speedy improvement in the standard of living of the Colombian population. However, if the problem of the country's economic development were to be stated at the present time in terms of the need and possibility of maintaining this rate of growth, much greater difficulties can be foreseen and would have to be taken into account. On the one hand, the fall in the price of coffee has already had an adverse effect on the capacity to import and, consequently, on the investment coefficient and public income; a future evolution of the terms of trade as favourable as that recorded between 1945 and 1954 could thus hardly be expected. In the second place, development in the past was proportionally greater than the investment effort expended, thanks to the rise in the product-capital

ratio, but it is also doubtful whether further improvement of this ratio can be hoped for, after so prolonged and steady an upward movement.

In this sense, Colombia's economic development may be said to be passing through a decisive phase, which seems to impart a more urgent character to the need for endeavouring after optimum utilization of the flow of investment, foreign exchange availabilities and other resources.

II. CHANGES IN THE COMPOSITION OF PRODUCTION AND THE DISTRIBUTION OF PRODUCTIVE RESOURCES

The foregoing pages describe the general characteristics of Colombia's over-all economic development since 1925. This growth was of course bound to be accompanied by radical changes in the composition of production, in view of the varying degrees of intensity with which expansion took place in the different sectors, and consequently by a substantial redistribution of capital and labour resources among the sectors in question. The purpose of the present section is to give a brief account of the scope and extent of these modifications, with the twofold aim of making a fuller historical analysis of the country's economic development and obtaining some indication of the possible direction and magnitude of the changes that future growth may be expected to bring about.

1. Sectorial growth rates and structural changes in the production of goods and services

The activities whose rate of growth was most rapid during the period 1925-53 were industry, transport, and energy and public utilities. The gross product of each of these sectors increased at annual rates of 7.7 per cent, 9.1 per cent and 8.7 per cent, respectively.⁹ Thanks

⁹ The gross product is the measure of the value added in the production of goods and services, including depreciation and indirect taxation affecting enterprises. The gross product of industry includes all the activities and establishments taken into account in the 1953 industrial census, which embraced some artisan industry, especially in the production of ready-made clothing. Such artisan production as was not included in the industrial census is classified for the purposes of this study under the heading "Artisan Industries". The gross product of transport includes railways, omnibuses, passenger cars, lorries, aeroplanes and cable and oil pipe transport. That of energy and public utilities comprises the production of electric energy, communications and gas and water services. All values are expressed in 1950 prices.

to such high rates of growth, the gross product generated in these activities was doubled three times over, once between 1925 and 1936, again between 1936 and 1945, and yet again between 1945 and 1953 (see table 3 and figure III).

The sectors just enumerated expanded very fast during the period 1925-29, thanks to heavy government investment and to a considerable quantity of imports of the capital goods required for industrial development. During the following decade and the war years the rate of growth of these activities remained very high, despite the decline in the over-all investment coefficient, the reduction in the capacity to import and the falling-off in the gross product. A variety of circumstances account for this. The need for import substitution encouraged intensive utilization of the production capacity of industry; an expansion was achieved in transport and energy activities, since it was possible for public investment to be financed through the mobilization of domestic resources; and a final contribution was made by the growing relative importance of investment in roads, where development was facilitated by an increase in the domestic production of cement and asphalt. During the post-war years, the stimulus provided by demand and urban growth, the country's greater economic integration, the improvement in the capacity to import and the increment in public investment combined to bring about a further rapid expansion of the gross product of the industry, transport and energy and public utilities sectors. Their annual rates of growth were 9.2, 13.7 and 12.7 per cent respectively.

The mining sector followed a similar trend, though along more moderate lines. The gross product of this activity, which includes the mining of petroleum, coal, precious metals and other ores, increased between the years 1925 and 1933 at an annual rate of 8.1 per cent. It was during the 'twenties that mining activity expanded most intensively, thanks to the discovery and working of new oilfields; during the next ten years, and until the end of the war, the production of petroleum declined, in the first part of the period because of demand conditions on the world market, and later, during the war, for lack of means of transport. The output of coal also increased during the period under review, but only at a moderate rate, because of the paralysing of railway transport; in recent years, however, a significant increment was to be noted.

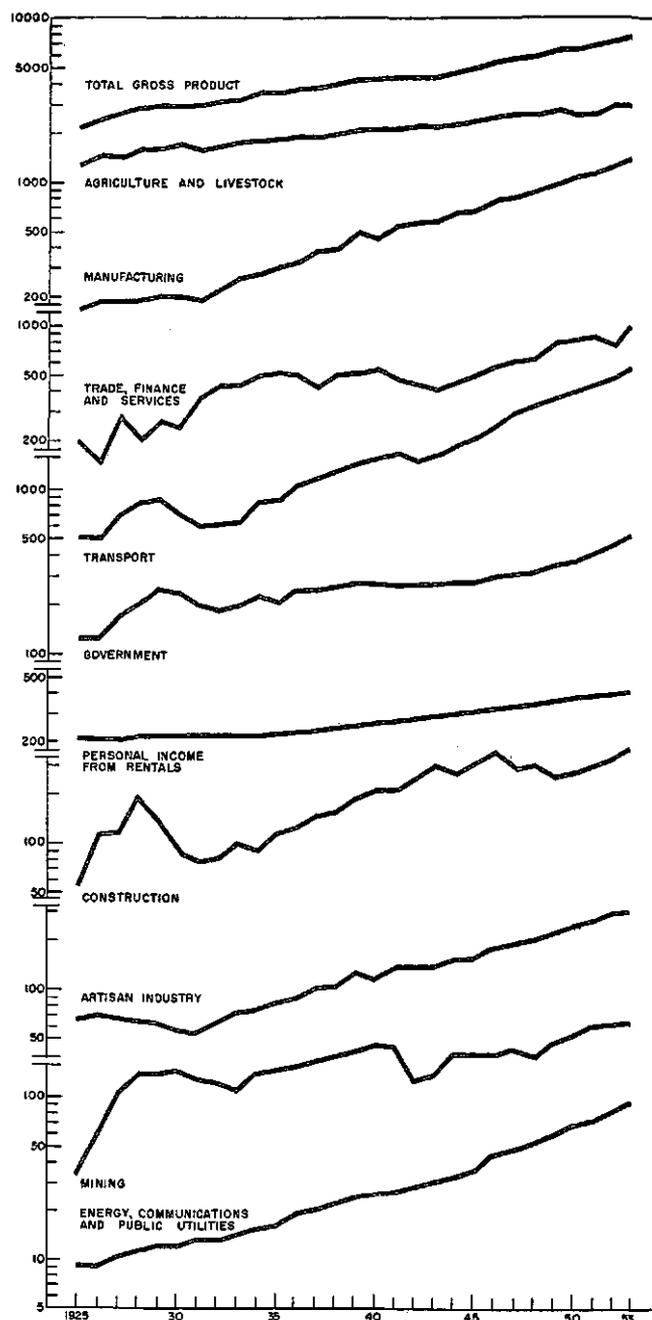
Throughout the period 1925-53, other important activities also expanded, though on a smaller scale. The average annual rate of growth in construction was 7 per cent; in trade, finance and services, 6.1 per cent; in governmental services, 5.4 per cent; and in personal income from rentals, 2.3 per cent.¹⁰ However, these activities remained at a standstill between 1930 and the Second World War.

¹⁰ The gross product accruing from construction includes building, roadmaking and other public works, as well as improvements in the agricultural sector. That of trade includes financial activities and wholesale and retail trade. The gross product originating in public utilities takes in salaries and wages of employees and workers in central, departmental and municipal administration; and that of the sector "Other services" embraces public health and medical services, education and other professional services.

FIGURE III. COLOMBIA: GROWTH AND COMPOSITION OF THE GROSS PRODUCT

(Millions of pesos at 1950 prices)

(Semi-logarithmic scale)



It is important to point out the wide fluctuations in the construction sector, which constitutes one of the main branches of investment. These variations resulted from the action of various factors, including the boom in public investment in basic social capital from 1925 to 1929, the depression of the next few years, the compensatory fiscal policy (consisting mainly in the financing of investment in road-building) adopted throughout the 'thirties and the war years, and the speeding-up of

TABLE 3. COLOMBIA : GROWTH AND COMPOSITION OF PRODUCTION OF GOODS AND SERVICES

	Composition of the product by activities			Average rates of growth	
	1925	1945	1953	1925-1953	1945-1953
Total	100.0	100.0	100.0	4.6	5.9
Agricultural and livestock	58.8	47.0	36.9	2.9	2.7
Mining	1.5	3.7	3.7	8.1	5.7
Manufacturing	7.6	13.4	17.2	7.7	9.2
Artisan industry	2.9	3.1	3.8	5.6	8.4
Construction	2.6	6.1	4.8	7.0	2.7
Transport	2.3	4.2	7.4	9.1	13.7
Energy, communications and public utilities	0.4	0.7	1.2	8.7	12.7
Government	5.7	5.5	6.9	5.4	8.9
Trade, finance and services	8.7	10.2	12.9	6.1	9.0
Personal income from rentals	9.5	6.1	5.2	2.3	3.8

SOURCE : See *Statistical Appendix*, table 1.

urban building activities. All sectors of construction continued to expand during the post-war period, but owing to the high level reached in previous years, the annual rate of growth for this activity as a whole was only 2.7 per cent. The policy of restricting credits and public investment pursued during 1949 and 1950 caused a brief interruption of the trend described.

Public utilities and communications and the sector "Other services" also grew rapidly between 1945 and 1953. During this period their gross product increased at annual rates of 12.7 and 6.4 per cent respectively. This process reflected the growing need and demand for services on the part of a rapidly-increasing urban population with a rising *per capita* income.

In contrast with the accelerated rate of expansion of the gross product in the activities mentioned hitherto, agricultural production developed very slowly. During the period 1925-53 its total gross product increased at a rate of only 2.9 per cent yearly, which implied an annual *per capita* rate of less than 1 per cent. This relative stagnation may be partly attributed to the low income-elasticity of demand for foodstuffs, and in part also to the moderate growth of world demand for Colombia's agricultural exports. But it is also clear that institutional problems, and others connected with organization, which imparted great rigidity to the agricultural supply, must have had some bearing on the fact that agricultural production failed to expand sufficiently despite the considerable deficit in *per capita* standards of nutrition. In conditions favourable to over-all economic development, agricultural production in Colombia, notwithstanding the low elasticity of demand for foodstuffs and the modest rate of growth of agricultural exports, should develop substantially, in order to attain minimum nutrition targets and to meet both consumer demand and industry's growing requirements of raw materials from this source.

Some importance still attached to artisan activities, which apparently increased during the period under review even more intensively than the total gross product

of Colombia's economy. Estimates based chiefly on the censuses of active population taken in the years 1918, 1938 and 1951 suggest that production in this sector expanded at an annual rate of 5.6 per cent over the period 1925-53, or, in other words, at approximately two-thirds the rate of growth of the gross product of industry.

The gross product generated from housing facilities remains to be considered. Building activities and the provision of urban housing facilities barely kept pace with the rate of growth of the urban population, while in rural areas both these activities patently lagged behind demographic growth. An analysis of the housing censuses taken in the years 1938 and 1951 indicates that the annual rate of increase of the total number of dwellings (1.1 per cent) was lower than the corresponding rate of growth of total population (2.2 per cent), and that the urban had an advantage over the rural population. In fact, during the same period the number of urban dwellings rose at an annual rate of 3.6 per cent, while the urban population grew by 5 per cent yearly. In the 26 largest towns, while the number of dwellings increased at an annual rate of 6 per cent, the annual rate of demographic growth was 5.6 per cent.

In rural areas, on the other hand, there was practically no net increment in the number of dwellings, whereas the population increased at an annual rate of 1.3 per cent. Consequently, the over-all coefficient of persons per dwelling rose from 6 in 1938 to 7 in 1951. At the same time, the gross product of housing facilities expanded at an annual rate of barely 2.3 per cent between 1925 and 1953, although this rate increased to 3.7 per cent in the years following the war.

The varying rates of growth of the gross product by activities brought about radical changes in the structure of the Colombian economy within a relatively short space of time. Although agriculture was still the most important sector, its contribution to the total gross product dropped from nearly 60 per cent in 1925 to not much more than one-third in 1953. The manu-

facturing sector, on the other hand, rose to second place, with a share of 17.2 per cent corresponding to industry proper, and 21 per cent if artisan activities are taken into account. However, the most considerable expansion was registered in the transport, communications and public utilities sectors, whose aggregate contribution, amounting to only 2.7 per cent of the total gross product in 1925, increased to 4.9 per cent by 1945 and 8.6 per cent by 1953.

2. Population growth and distribution of the active population

The country's over-all economic development, and the considerable changes in the sectorial origins of production to which reference has already been made, were inevitably accompanied by modifications — likewise substantial — in the composition of the population by urban and rural sectors, and in the distribution of the active population (see table 4).

Demographic growth in Colombia has been swift and progressive. As from 1938 the annual rate of growth was 22 per mil. At present the birth rate stands at 36.6 per thousand inhabitants and the death rate a 13.7, which determines a vegetative rate of growth of 22.3 per mil. While slight decreases in the birth and death rates may be expected in the next twenty years as a result of urbanization, of the rise in *per capita* income and of the improvement in sanitary conditions, it is felt to be unlikely that this development will have adverse repercussions on the vegetative rate of growth.

One of the most striking aspects of Colombia's economic development is the great impetus given to urbaniza-

tion in the last twenty-five years. Over the period 1918-53, the rate of growth of the urban population was 4.2 per cent, as compared with only 1.2 per cent for the rural population and 2.2 per cent for the population as a whole. Between these years the proportion of urban population increased from 21.0 to 42.8 per cent, while that of rural population consequently declined from 79.0 to 57.2 per cent. Of even greater significance were the trends registered in more recent years. In 1945-53 the rate of growth of the urban population was higher still, an annual rate of 5.2 per cent having been recorded, whereas the growth of the rural population came practically to a halt, the annual rate of increase having been only 0.4 per cent. (See figure IV.)

The heavy basic social capital investment in municipal and transport services during the 'twenties; the subsequent rapid process of industrialization; the agrarian reform law of 1936, which helped to increase the mobility of the labour force; and the state of public unrest prevailing in country districts throughout the period 1948-53, were all factors that influenced this exceptional rate of urbanization.

On the basis of the data obtained from the population censuses of 1918 and 1938, and the preliminary findings of the 1951 census, it is estimated that the proportion of the total population represented by the active population has been slowly declining over the last three decades, falling from 37 per cent during the 'twenties to 36 per cent in 1945 and 34 per cent in 1953.

The active population employed in agriculture, which in 1925 comprised 69 per cent of the total active population, had been reduced to 60 per cent by 1945 and was estimated at only 54 per cent in 1953. Stress must be

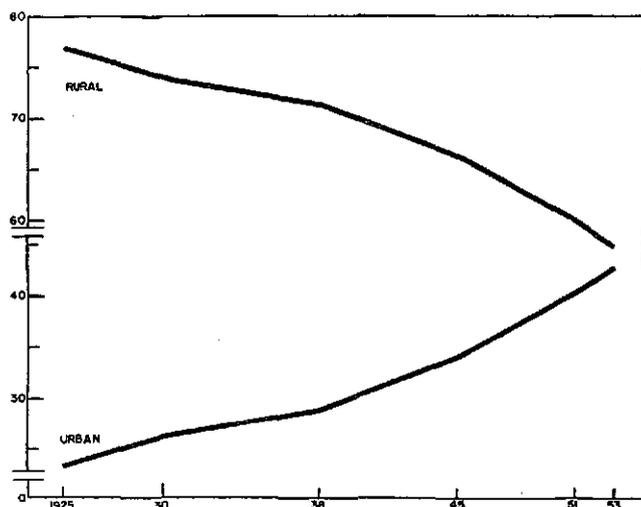
TABLE 4. COLOMBIA : POPULATION GROWTH AND DISTRIBUTION BY ECONOMIC ACTIVITIES

	Percentage distribution			Average rates of growth	
	1925	1945	1953	1925-53	1945-53
Total population	100.0	100.0	100.0	2.1	2.2
Active population	37.2	35.9	34.0	1.6	1.5
Inactive population	62.8	64.1	66.0	2.3	2.6
Urban population	23.2	34.0	42.7	4.4	5.2
Rural population	76.8	66.0	57.3	1.1	0.4
Active population	100.0	100.0	100.0	1.6	1.5
Agriculture	68.5	59.9	53.8	1.4	1.7
Mining	1.6	2.1	2.0	2.5	0.6
(a) Mining proper	0.4	0.5	0.5	0.3	—
(b) Artisan mining	1.2	1.6	1.5	2.5	0.6
Manufacturing	3.4	5.2	6.4	4.1	4.2
Artisan industry	7.9	7.3	8.5	2.1	3.5
Construction	1.8	2.7	3.6	4.3	5.1
Transport, communications and energy		2.5	3.2		4.9
Trade and finance		5.8	6.4		2.8
Government		2.4	3.7		7.2
Services	16.8	12.1	12.4		1.8

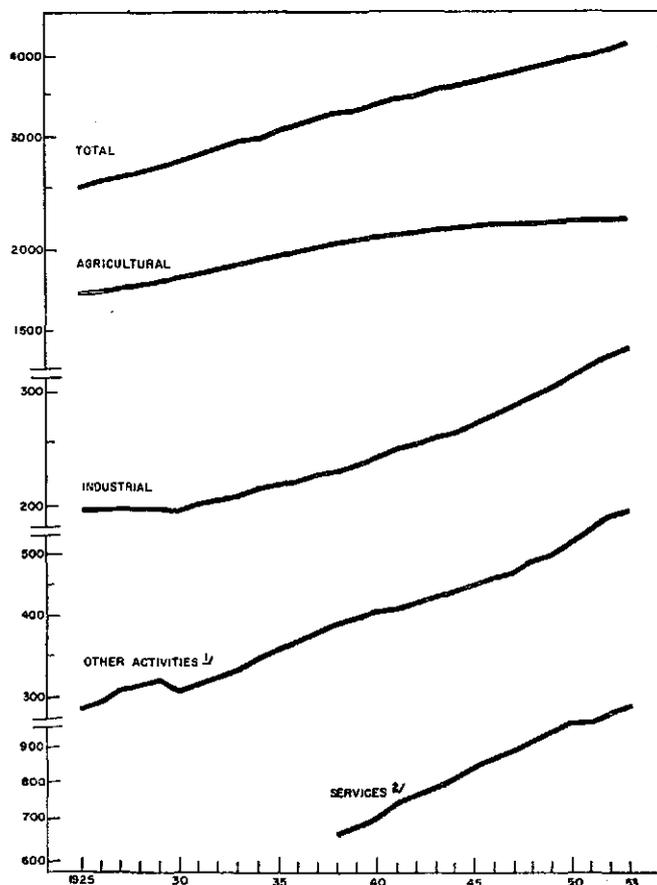
SOURCE : See *Statistical Appendix*, tables 5 and 17.

FIGURE IV. COLOMBIA : POPULATION GROWTH AND DISTRIBUTION BY ACTIVITIES

(Natural scale)



ACTIVE POPULATION
(Thousands of persons)
(Natural scale)



¹ Including mining, construction and artisan activities.

² Including population employed in transport, communications and energy, trade and finance, government and other services.

laid on the fact that, at any rate from 1945 onward, it was not only a question of a decrease in the relative importance of the labour employed in agriculture; this remained practically unchanged in absolute terms.

On the other hand, the relative importance of the active population employed in the industrial sector doubled during the period 1925-53, increasing from 3.4 per cent of the total at the beginning of the period to 6.4 per cent in 1953. In absolute terms this meant that the manpower employed in industry was trebled. Nevertheless, this proportion is still very small, so that the trend of future development is certain to be towards enlarging it rapidly and substantially. In this connexion, it is important to note that the relative share of labour employed in artisan industry increased from 7 per cent of the total labour force in 1940 to approximately 8.5 per cent in 1953. It would seem, then, that the accelerated growth of the gross product and the labour force in the manufacturing sector was accompanied by a similar, though less rapid, development of artisan industries. The labour employed in these is of a low technological standard and the proportion of capital per artisan is extremely small. Consequently, it is to be expected that as the average volume of capital per active person increases, the group of artisan workers will gradually be absorbed and incorporated into industrial activity.

Alongside the process of industrialization and urbanization there was, in addition, an expansion, both in absolute and in relative terms, of the labour employed in services. The manpower engaged in such activities as transport, communications, energy, public utilities, trade, public health, education and personal services represented 17 per cent of the total labour force in 1940, and an estimated 26 per cent in 1953.

Government provision of basic social services was also extended to meet the growing requirements bred of the processes of urbanization and industrialization. The proportion of the labour force employed in central, provincial and municipal public administration rose from 2.4 per cent in 1940 to a figure estimated at 2.7 per cent in 1953.

3. The stock of capital and its distribution by activities

The conclusion to be drawn from the foregoing observations on the growth of the country's productive capacity since 1925, as compared with the increase in the gross product registered in the various periods, is, then, that one of the most significant characteristics of Colombia's economic development was the steady improvement in the product-capital ratio.

As in the case of the structure of production and the distribution of the active population, the proportions of available capital allocated to the various economic activities also underwent substantial modification. (See table 5.)

In 1925, 84 per cent of the total stock of capital was represented by agricultural improvements, housing and services. Manufacturing industry, mining, transport and energy, on the other hand, comprised barely 16 per cent of total productive capacity. By 1953, the stock of capital in the Colombian economy as a whole had been doubled;

TABLE 5. COLOMBIA : STOCK OF CAPITAL AND COEFFICIENTS OF GROSS INVESTMENT, BY ACTIVITIES

	Stock of capital			Investment coefficient	
	(Millions of pesos at 1950 prices)			1925-29	1945-53
	1925	1945	1953		
Total	10,553	16,776	22,262	26.1	29.9
Agriculture	4,287	7,008	7,924	13.4	12.3
Mining	206	360	483	24.3	10.0
Industry	845	1,445	3,183	48.1	23.8
Transport	620	1,748	2,723	321.2	61.5
Energy	•	208	424	609.1 ^b	199.4 ^b
Housing	1,823	2,624	3,521	18.0	45.1
Services	2,762	3,383	4,004	7.6	10.5

SOURCE : See *Statistical Appendix*, tables 1, 6 and 7.

• Not available.

^b Energy, communications and public utilities.

but in the former group of sectors it had increased by only 70 per cent, whereas in the remainder it was four times greater. The share of total capital used in agriculture, housing and services thus decreased from 84 to 69 per cent. This represented not only a quantitative but also a qualitative change in the distribution of the stock of capital, since a larger proportion corresponded to activities in which the level of technology is higher (see figure V).

Such considerable changes in the distribution of the stock of capital by activities were the result of widely divergent trends in the investment coefficients for the various sectors of the economy. It should be recalled that the average over-all investment coefficient amounted to 26.1 per cent in the quinquennium 1925-1929, 16.1 per cent between 1930 and 1934,¹¹ and 19.9 per cent in 1945-53; whereas the investment coefficient for agriculture was only 13.4, 12.8 and 12.3 per cent in the respective periods mentioned. So low a rate of investment allowed of only a moderate increment in the capital available in the latter sector, as is logical, especially in view of the fact that a substantial proportion had to be used for replacing and maintaining agriculture's existing stock of capital.

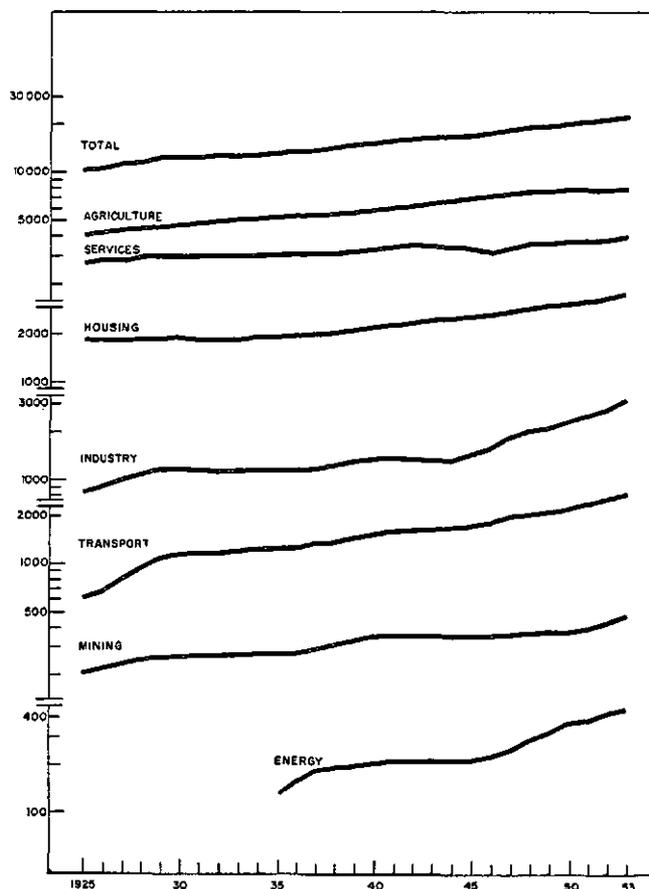
On the other hand, it must be borne in mind that if the investment coefficient for agriculture was certainly much lower than that registered for other activities, the absolute level, as well as the relative importance, of agricultural investment was far from insignificant. During the period 1945-53, investment in agriculture accounted for 25.8 per cent of total investment, while the corresponding percentages were 23.2 for industry, 24.8 for transport, communications and public utilities, 11.5 for services, 12.7 for urban housing and 2.0 for mining.

In contrast with the figures recorded for agriculture, the manufacturing sector, transport and energy showed

very high investment coefficients; a substantial increase in the productive capacity of these activities thus became possible.

FIGURE V. COLOMBIA : THE STOCK OF CAPITAL AND ITS DISTRIBUTION BY ACTIVITIES

(Millions of pesos at 1950 prices)
(Semi-logarithmic scale)



¹¹ In actual fact, this average conceals wide variations, as within the period mentioned the investment coefficient fluctuated between a minimum of 14 per cent (in 1931) and a maximum of 19 per cent (in 1939).

In the case of industry, the average investment coefficient was as high as 48 per cent in the period 1925-1929. During the 'thirties and the war years, industrial investment was severely affected, first by the reduction in the capacity to import and later by the restriction of maritime transport and the difficulties of purchasing goods on foreign markets. The investment coefficient then underwent a considerable decline, falling to as low a figure as 13 per cent. In the following period it recovered, attaining an average of 24 per cent, whereby the productive capacity of industry was more than doubled.

Although the topic is discussed in detail in other chapters of the present study, it is worth noting here that investment in industry was financed mainly from the reinvestment of profits and the utilization of private savings, since the industrial sector had insufficient access to long-term credit for investment purposes. Neither were public resources mobilized to any significant extent for the financing of manufacturing activities until the post-war years. Nevertheless, investment in this sector was vigorously stimulated by various factors, among which may be mentioned (a) prospective profits, and profits actually made, as a consequence of the growth of demand and productivity; (b) the provision of an increasing flow of basic social services and social capital through government economic policy; (c) the anti-cyclical policy of the public sector, aimed at maintaining economic activity at its normal levels in times of "recession"; and (d) the incentives to domestic production of substitutes for imports provided by the restriction of these latter during the 'thirties and throughout the war years.

The high industrial investment coefficient was vital to the rapid progress made by Colombia's economy. It is possible, however, that despite incentives to investment and the high rate of reinvestment of profits, the manufacturing sector may in itself alone be capable of contributing to the expansion of its own productive capacity to the full extent which the over-all growth of the economy demands. This must be attributed not only to the lack of long-term credits for this sector, but also to the high cost of financing its exceptionally large stocks, the volume of which approximately equals half the annual value of production, and to industry's insufficient capacity to undertake heavy investment projects, which, by their very nature, would not be economically sound on a smaller scale.

In comparison with the sector just analysed, transport and energy activities attained substantially higher investment coefficients, mainly on account of the heavy public investment in these branches. In 1925-44 more than two-thirds of total investment in transport — including roads, railways, ports, oil pipelines, airports, and also rolling-stock and railway equipment — were financed by the Government. During the post-war period, such outlays amounted to more than half the investment in the sectors mentioned, and represented over 40 per cent of total public investment. Public investment in installations for the generation of energy, and in other services, also assumed considerable dimensions in the later years of the period under review.

The role of public investment is dealt with in a special section of chapter I of Part Two of the present study. However, it seems important to touch here in anticipation upon some of the chief aspects elucidated in the analysis in question, of which the most outstanding is the dynamic function fulfilled by public investment. In the first place, it can be seen that investment by the public sector constituted a considerable proportion of total investment throughout the period 1925-53, although its share fluctuated between extremes as far apart as a minimum of 17.8 per cent in 1946 and a maximum of 47.2 per cent in 1942 (see table 6). The role of such investment was largely compensatory; it declined less intensively, or even increased, in periods when total investment contracted, and rose less than this latter in periods of expansion.

TABLE 6. COLOMBIA: SHARE OF PUBLIC INVESTMENT IN TOTAL INVESTMENT, BY ACTIVITIES

(Percentages)

	1925-29	1930-38	1939-44	1945-53
Total	29.4	27.1	36.4	21.9
Agriculture	0.3	3.1	25.5	13.5
Industry	—	—	4.6	7.1
Transport	74.9	77.9	82.2	50.9
Energy	—	0.6	9.0	52.7
Other activities	32.6	44.9	33.4	21.7

SOURCE: See *Statistical Appendix*, table 18.

The most characteristic example of the part played by public investment is constituted by its share in total investment during the war years. At that time a substantial decrease was registered in private investment, mainly owing to the difficulty of importing capital goods. This contraction was, however, to a large extent offset by fairly heavy public investment in agricultural improvements, road-building and even certain important industrial projects. Consequently, public investment represented on an average 36.4 per cent of total investment in 1939-44, and over 47 per cent in 1942. During earlier periods, the corresponding proportion had amounted to 29.4 per cent in the quinquennium 1925-29 — principally on account of the contribution supplied by external resources — to a little over 30 per cent between 1930 and 1933, and to about 24 per cent from 1934 to 1938. The post-war phase witnessed a further reduction of the share of public in total investment, which averaged under 22 per cent over the period 1945-53.

Attention must be drawn to the way in which public investment was distributed among the various activities. In 1925-29, 75 per cent of the whole was assigned to transport, the sector which invariably absorbed a major share of such investment, although from this point of view its relative importance declined considerably after the period mentioned. Most of the rest of the public sector's investments were placed in municipal works and housing. Public investment in development proper

TABLE 7. COLOMBIA : COMPOSITION OF FIXED GROSS INVESTMENT BY TYPE OF INVESTMENT AND BY ACTIVITY, 1925-53

(Annual averages, in millions of pesos at 1950 prices)

	1925-29	1930-38	1939-44	1945-53
<i>Total gross investment (fixed)</i>	680	532	730	1,236
<i>Machinery and equipment</i>	247	117	118	427
Agriculture	22	15	12	23
Mining	20	14	18	24
Industry	103	49	50	181
Transport	57	22	25	112
Communications and energy	23	8	3	12
Services	22	9	11	76
<i>Building</i>	83	87	169	298
Urban dwellings	38	51	112	156
Rural dwellings	2	2	4	6
Factories and workshops	17	5	12	81
Offices and commercial premises	2	3	10	18
Other buildings	24	27	30	35
<i>Other construction activities and improvements</i> ..	349	328	443	511
Agricultural	150	184	247	273
Transport facilities	160	73	107	110
Miscellaneous	39	71	89	128

SOURCE : See *Statistical Appendix*, tables 20, 21 and 22.

may be said to have begun only as from 1937, with the first substantial investments in agriculture and energy ; in manufacturing, it was barely incipient in 1941, and up to 1948 this activity accounted for less than 1 per cent of total public investment. By 1953, about 21 per cent of total investment was represented by that of the public sector, or about 14 per cent in the case of investment in agriculture and industry, over 43 per cent in that of transport, 75 per cent where energy was concerned and 16 per cent for other sectors.

Another factor still remains to be mentioned which had a decisive influence on the size of the investment coefficients for the different sectors, and which ultimately brought about striking changes in the composition of the stock of capital, from the standpoint of its distribution between machinery and equipment on the one hand, and construction and improvements on the other. This factor was constituted by the fluctuations in the capacity to import. The pattern as well as the volume of investment was affected, owing to the low level currently reached by domestic production of machinery and productive equipment, supplies of which were therefore fundamentally dependent upon imports.

Such a situation had different effects in the various sectors. In the case of agriculture, for example, less than one-fifth of total investment corresponded to machinery and equipment, while the major share was absorbed by the direct employment of labour for clearing and weeding, for soil conservation and improvement and for the establishment and renewal of perennial plantations. This was in sharp contrast with the position in the manufacturing sector, where machinery and equipment accounted

for a substantial proportion of total investment. Obviously, under such conditions the extreme vulnerability of imports of machinery and equipment to fluctuations in the capacity to import was bound to exert a powerful influence on the variations in the investment coefficient for the industrial sector.

Again, the proportion of total investment represented by machinery and productive equipment has a decisive influence on the degree of technological progress which such investment may signify, and may also considerably affect the changes in the product-capital ratio. In 1925-29 the proportion in question amounted to 36 per cent ; later, as a result of the contraction of the capacity to import, it decreased to 22 per cent in 1930-38 and to only 17 per cent in 1939-45. So marked a decline largely accounts for the fall of the aggregate investment coefficient from 26 per cent in the first of the five-year periods mentioned to an average of 16 per cent over the years 1930-44. The substantial post-war improvement in the capacity led to an increase in the proportion of total investment assigned to machinery and equipment, the average figure for 1946-53 once again rising above 35 per cent (see table 7).

The close correspondence between the fluctuations in the proportion under consideration and the distribution of investment by sectors is worth noting. Investment in machinery and equipment for the manufacturing sector represented approximately 15 per cent of total gross investment in 1925-29 and 1946-53, but fell to little more than 9 and only 7.5 per cent in 1930-38 and 1939-45, respectively. Much the same was true of transport. Investment in rolling-stock comprised 8.4 per cent

TABLE 8. COLOMBIA : STOCK OF CAPITAL, BY TYPE OF CAPITAL AND BY ACTIVITY, 1925-53

(Millions of pesos at 1950 prices)

	1925	1929	1938	1945	1953
Stock of capital	10,553	12,185	14,093	16,776	22,262
Livestock	1,609	1,760	2,205	2,833	3,076
<i>Machinery and equipment</i>	1,384	1,996	2,232	2,393	4,335
Agriculture	104	129	110	92	144
Mining	154	199	238	270	362
Manufacturing	590	880	935	999	1,926
Transport	122	330	375	421	1,094
Communication and energy	—	—	96	104	212
Services	414	459	478	507	596
<i>Construction and improvements</i>	7,560	8,429	9,656	11,550	14,851
Agriculture	2,574	2,777	3,351	4,083	4,704
Mining	52	66	80	90	121
Manufacturing	255	313	313	446	1,257
Transport	498	765	1,016	1,327	1,629
Communication and energy	—	—	96	104	212
Urban housing	1,833	1,899	2,084	2,624	3,521
Services	2,348	2,609	2,716	2,876	3,407

SOURCE : See *Statistical Appendix*, tables 23, 24 and 25.

of total investment in 1925-29 and 9.5 per cent in 1946-53, but the corresponding figures for the two intervening periods mentioned above were only 4.1 and 3.6 per cent.

Necessarily, of course, these trends also affected the composition of the stock of capital by types of assets. Thus the structural modifications in productive capacity over the whole of the period 1925-53 represented not only differences in the distribution by activities but also basic qualitative changes (see table 8).

The proportion of the total stock of capital which consisted of machinery and equipment was only 13.2 per cent in 1925. After rising to 16.4 per cent in 1929, it fell again to 15.9 per cent in 1938 and 14.3 per cent in 1945, because of the contraction in the capacity to import. Finally, in the post-war years, it rapidly increased, so that by 1953 machinery and equipment had come to represent 19.5 per cent of the total stock of capital.

The role of industrial development can be accurately appraised if investment in machinery and equipment in this sector is considered in relation to the stock of capital for the economy as a whole, since the corresponding proportion rose from 5.6 per cent in 1925 to 8.7 per cent in 1953. Spectacular too was the increase in the relative importance of rolling-stock for transport, which in 1925 represented only 1.2 per cent of the total stock of capital, whereas by 1953 its share stood at 4.9 per cent.

The growing importance of investment in machinery and productive equipment as against construction and improvements was a vital element in raising the standard of efficiency with which the stock of capital was utilized, as well as its productivity.

4. Utilization and efficiency of productive resources

The changes described in the composition of production and the distribution of capital and labour by activities also implied a vast improvement in the utilization and efficiency of the productive resources. The increased productivity of labour was reflected in the ever-higher figures registered for the gross product per active person, and that of capital in the steady rise of the product-capital ratio. Again, available capital per employed person constituted one of the basic factors determining the level reached by the gross product per active person.

Allusion has already been made to the fact that the long-term increment in the productivity of the Colombian economy as a whole was chiefly attributable to the relative transfer of resources — both active population and capital — to activities where the standard of technology and the productivity of manpower were higher. However, this was not the only explanation. Due account must also be taken of the improvements — substantial in some instances — which were gradually achieved in each of the main activities.

Agriculture may be taken as a case in point. This was the sector where productivity was lowest ; yet here too a similar increment was recorded in the productivity of labour and the investment coefficient, which in turn contributed to the improvement in over-all productivity. The figures for the gross product per active person rose from 750 pesos (at 1950 prices) in 1925 to over 1,000 pesos in 1945 and more than 1,200 in 1953 ; in the same years, the product-capital ratio increased from 0.30 to 0.33 and 0.36.

TABLE 9. COLOMBIA : GROSS PRODUCT AND STOCK OF CAPITAL PER ACTIVE PERSON, BY ACTIVITIES

	Total	Agriculture	Mining	Industry	Artisan, industry	Transport, communications and public utilities	Other services
<i>Gross product per active person</i> (Pesos at 1950 prices)							
1925	874	750	800	1,930	325	...	...
1945	1,347	1,055	2,390	3,489	581	2,678	1,628
1953	1,882	1,293	3,575	5,057	842	5,061	2,141
<i>Stock of capital per active person</i> (Pesos at 1950 prices)							
1925	4,213	2,497	5,150	2,986	...	...	...
1945	4,600	3,206	4,675	3,190	...	21,733	7,143
1953	5,406	3,577	6,038	5,201	...	23,841	6,974
<i>Product-capital ratio</i>							
1925	0.21	0.30	0.16	0.27	...	0.08 ^a	0.13 ^b
1945	0.29	0.33	0.51	0.56	...	0.12 ^a	0.23 ^b
1953	0.35	0.36	0.59	0.51	...	0.21 ^a	0.30 ^b

SOURCE : See *Statistical Appendix*, tables 1, 5, 6 and 9.

^a Transport only.

^b Including communications and public utilities, trade, finance, housing and other services.

This development was partly due, in the first place, to the enlargement of the stock of capital per active person in the agricultural sector. In the economy as a whole, the stock of capital per active person grew by 28 per cent between 1925 and 1953;¹² in agriculture, on the other hand, the increase amounted to almost 43 per cent. Apart from the capital increment in absolute terms which this implied, a slight modification of the disproportion between the capital available per employed person in agriculture and the corresponding figures for other activities was also possible. In 1925 the stock of capital per active person in the agricultural sector amounted to only 59.3 per cent of that registered for the economy as a whole, but by 1953 this proportion had risen to 66.2 per cent.

The improvement in the product-capital ratio resulted mainly from the growth of demand for agricultural commodities, which permitted more intensive utilization of the stock of capital (see table 9).

The greater relative importance acquired by the industry, mining, construction, transport, energy, trade, public utilities and other services sectors, where the level of technology is above the average, made a very substantial contribution to the increase in the mean gross product per employed person. In 1953, the gross product per active person employed in industry was four times greater than in agriculture, and average productivity was more than twice as high in the whole of the non-agricultural than in the agricultural sector. It should be noted, moreover, that the disparity between the pro-

ductivity of the manufacturing and of the agricultural sectors gradually widened; in 1945, productivity in the former was 3.3 times higher than in agriculture, whereas in 1953 it was 3.9 times greater.

By 1925 the product-capital ratio in industry had reached a level similar to that prevailing in agriculture (0.27 and 0.30 respectively); but it subsequently improved so much more rapidly that in 1945 figures as strikingly different as 0.56 and 0.33 were registered for the two sectors. From that year onward, industrial productive capacity increased even faster than the gross product in the same sector; hence there was a slight decline in the product-capital ratio, which had fallen to 0.51 by 1953. However, it was higher even so than in the other sectors of the economy, with the exception of mining, which explain why in any case industrial expansion helped to raise the average ratio for the economy as a whole.

Transport, energy and other public services are activities in which capital density is very high and the product per unit of capital is in consequence relatively low, which implies a heavy, though inevitable, social cost. If it is taken into consideration that investment in these sectors accounted for more than one-fourth of total investment throughout the whole period 1925-53, while the gross product accruing from such activities contributed only 8.4 per cent of the aggregate gross product even in 1953, a better idea will be obtained of the magnitude of the effort involved in expanding investment in basic social capital. Hence the importance that must be attributed to the doubling of the product-capital ratio in these activities during the period under review.

It is clear from the foregoing observations that any study of future prospects for the gross product per active

¹² It should be noted that this expansion took place chiefly in the post-war years, since from the 'twenties to 1945 total productive capacity barely kept pace with the growth of the active population.

person and the product-capital ratio in the economy as a whole must take into account not only the effect of relative transfers of resources to activities in which productivity is higher, but also possible changes in the intensity with which the available manpower and capital are utilized in each of the activities in question. Past experience shows that varying degrees of progress were being achieved in all sectors, and the maintenance of similar trends may constitute one of the vital factors in the future development of the Colombian economy.

III. EVOLUTION OF CONSUMPTION AND CHANGES IN THE DISTRIBUTION OF INCOME

Colombia's economic development and the alternative prospects for its future growth are closely bound up with the expansion and composition of final demand for consumer goods and services. Hence it is of interest to analyse the increase and the structural changes in consumer income and expenditure so as to obtain an adequate grasp of the trends of production and productive capacity. Still more important, however, is the purpose that a study of this kind may serve in providing valuable background data on which to base estimates of the future channelling of investment and available resources. Thus the analysis and projection of consumer demand constitute a first step towards the evaluation of the increase in production, the expansion of productive capacity, and the additional import substitution effort that will be needed in the future; and thence in turn are deduced considerations that may affect the formulation of the public sector's economic policy.

Thanks to the statistical research carried out for purposes of the present study, problems of this kind can to some extent be viewed in their true historical perspective. Moreover, the fact that in 1953 several related studies of various fundamental aspects of economic activity were carried out at the same time affords an unusual opportunity for a detailed analysis of the composition of family income and expenditure, as well as of the elements on which an appraisal of future trends can be based. During that year interesting research on the income and expenditure of sample urban families was conducted alongside a similar survey on rural families, though this latter was on a smaller scale; industrial and mining censuses were taken, and special studies on agriculture, transport, energy and public utilities were also prepared. Apart from this, the year 1953 particularly lends itself to over-all analysis, as it falls within a period in which a high level of industrial and agricultural production was recorded — except in the case of stock-breeding — as well as a considerable volume of imports.

1. Consumption and income distribution trends

A rapid survey of developments during the period 1925-53 reveals that it was not until the post-war years that any considerable improvement in *per capita* consumption levels could be achieved. Before that time, they had risen moderately in the quinquennium 1925-29, and very slightly between 1930 and 1945. Broadly

speaking, such trends were very like those registered for the *per capita* gross product, which were ultimately reflected in annual rates of growth of *per capita* consumption of 2.7 per cent for the period as a whole, and 2.2 and 4.4 per cent in 1925-45 and 1945-53 respectively.

Since the trends they followed were so similar, the relationship between consumption and the total gross product underwent little change, except during some of the war years. This relative stability is attributable partly to the fact that standards of *per capita* consumption were very low, and could therefore hardly be reduced to any significant extent. Thus, the fluctuations in the terms of trade and in the movement of external capital principally affected the investment coefficient, which did vary considerably throughout the period under review.

It should be noted that the relatively minor share of consumption of goods and services in the gross product reflected not so much a high national investment coefficient — which was achieved only in specific periods — as the adverse effect on the growth of available goods and services produced by the deterioration in the terms of trade during 1929-49, as well as by the net outflow of capital on account of foreign investment in petroleum over the same period. On the other hand, the improvement in the terms of trade after 1949, and the moderate inflow of foreign capital, permitted a proportionally greater increase in availabilities of goods and services than in the gross product.

While the increment in the latter meant a substantial rise in *per capita* income and consumption, it would seem that within this long-term trend no very considerable improvement in the distribution of income was registered. Moreover, partial data on the over-all trends of real wages in industry and services would seem to justify the inference that the disparity in income distribution became more marked in the later years of the period under consideration. The total volume of real wages paid in the urban sector was maintained only as a result of the accelerated rate of urbanization, of industrialization and of the increase in total employment in these activities, as well as of the more efficient utilization of manpower. With respect to nominal wages, official measures were adopted, covering a wide range of sectors (manufacturing, mining, construction, transport, energy and other services). If the figures for the nominal wages thus determined are taken as a starting-point, and are adjusted so as to take into account the changes in over-all price levels, the conclusion will be reached that real wages were lower in 1953 than in the three preceding years, though higher than in 1938 and in the period 1946-49 (see table 10).

The most important means of appraising distribution trends, however, consists in comparing the growth of productivity — gross product per worker — with that of real wages per worker in industry and services. Such a comparison reveals that the increase in productivity far exceeded the rise in real wages during the period 1938-53, since the rate recorded for the former reached 3.0 per cent, and that of the latter only 1.8 per cent. If the years 1950-53 alone are taken into consideration, these two factors show opposing trends. While pro-

TABLE 10. COLOMBIA : REAL REMUNERATIONS OF SKILLED AND UNSKILLED WORKERS EMPLOYED IN INDUSTRY AND SERVICES ^a

Year	Day-wages		Real annual remuneration ^c (Pesos at 1953 prices)	Gross product per active person	Remunerations as a percentage of the gross product (Percentage)	Number of skilled and unskilled workers (Thousands)	Total remunerations (Millions of pesos at 1953 prices)
	Nominal (Pesos)	Real ^b					
1938	1.37	5.04	1,240	2,274	54.5	753	934
1946	2.63	4.95	1,327	2,649	50.1	983	1,304
1947	3.19	5.18	1,347	2,659	50.7	1,017	1,370
1948	3.55	5.06	1,316	2,751	47.8	1,051	1,383
1949	4.14	5.48	1,523	2,892	52.7	1,087	1,656
1950	5.49	6.40	1,722	3,018	57.1	1,124	1,936
1951	5.61	6.00	1,668	3,181	52.4	1,144	1,908
1952	5.43	5.69	1,610	3,161	50.9	1,197	1,927
1953	5.59	5.59	1,632	3,531	46.2	1,253	2,045

SOURCE : ECLA, on the basis of official statistics.

- ^a Including mining, industry, construction, transport, energy and services.
- ^b Nominal wages deflated by the implicit deflating index of the gross product.
- ^c Real daily wages adjusted by the average number of days worked per year.

ductivity expanded at an annual rate of 5.4 per cent, real wages decreased by 1.7 per cent yearly. As a result of these divergencies, the proportion of the gross product corresponding to wages per worker increased from 54.5 per cent in 1938 to 57.1 per cent in 1950, and fell to 46.2 per cent in 1953. It would thus appear that during recent years wages not only failed to share in the benefits of higher productivity, but their level per worker actually declined in absolute terms.

From the point of view of aggregate demand, however, due consideration must be given not only to the trend of real wages, but to the fact that the number of workers employed in the activities listed increased at the considerable annual rate of 3.5 per cent between 1938 and 1953. The number of days worked also seems likely to have risen, to judge from the increment in the gross product per unit of capital. It is, then, these factors in conjunction — real wages, total employment and the average number of days worked — that account for the appreciable increase in the total real remunerations of the labour force employed in industry and services during the period 1938-53, when this total rose on an average by 5.4 per cent yearly. Furthermore, if attention is confined to developments in recent years, a considerable decline may be noted in the rate of growth of total remunerations, which fell to 1.8 per cent between 1950 and 1953. Thus an analysis of the future prospects of the Colombian economy should take into account how far a continuance of this regressive trend in income distribution might adversely affect the level of demand for consumer goods and services on the part of workers' families.

2. Composition of consumption of goods and services

Alongside the improvement in the total volume of *per capita* consumption of goods and services, significant changes were taking place in its composition. A study

of the growth of total consumption and of the way in which it tended to be distributed among the various types of goods and services may provide valuable basic data whereby the modifications of the country's structure can be accounted for and an estimate can be made of the future variations in composition that may reasonably be expected as *per capita* consumption attains progressively higher levels.

An analysis of events between 1937 and 1953 shows that the rise in *per capita* income, and the consequent increase in total *per capita* consumption, promoted the consumption of processed foodstuffs, beverages and tobacco, durable consumer goods, fuels and electricity, and transport services. Of course, growth was not regular in all these cases. For example, wartime restrictions on imports of intermediate products and final consumer goods particularly affected the supply of processed foodstuffs, durable consumer goods and transport facilities, which recovered very speedily during the post-war years.

In contrast with what happened in the case of the foregoing groups, the relative share of foodstuffs for direct consumption, clothing and housing in total *per capita* consumption decreased between 1937 and 1953. In absolute terms, however, *per capita* consumption increased in these three cases.¹³

The relative stability in the consumption of direct foodstuffs despite the rise in *per capita* income and the very low nutritional standards of the population's diet, simultaneously reflected the low income-elasticity of demand for foodstuffs and the inelasticity of supply on the part of the agricultural sector. This latter in its turn had its origin in institutional factors and in backward technology.

¹³ The chapters in Part Two on the agricultural and industrial sectors include a detailed analysis of these trends, for which reason only the most important conclusions are mentioned here.

TABLE 11. COLOMBIA : BREAK-DOWN OF CONSUMPTION IN URBAN AND RURAL FAMILIES, 1953

(Pesos at 1953 prices)

	Total consumption (Millions of pesos)	Per capita consumption				
		Total estimates			Sample of urban families	
		Total	Rural*	Urban	Employees	Workers
Total consumption	7,048	582	326	924	1,193	623
Direct foodstuffs	2,590	214	166	278		
Manufactured goods	2,767	229	118	377		
Services	1,691	139	42	269	428	168
Foodstuffs	3,411	282	205	384	462	306
Direct	2,590	214	166	278		
Processed	821	68	39	106		
Manufactured goods	2,767	229	118	377		
Foodstuffs	821	68	39	106		
Non-foodstuffs	1,946	161	79	272	303	148

SOURCE : ECLA, on the basis of official statistics.

* Including public consumption.

Obviously, the changes in the composition of consumption were determined not only by the higher *per capita* income levels, but also by other factors. Changes in the supply situation, variations in the relative prices of the different types of goods and services, and the process of industrialization and urban growth itself, were bound to affect the composition of consumer demand in greater or lesser degree. Hence it seems important that the study of past events should be accompanied by an analysis of the characteristics of such demand in a recent period, comprising a break-down of consumption in various sectors of the population.

Sufficient data are available with respect to 1953 for the level and composition of *per capita* income and expenditure in urban and rural families to be analysed, and for a distinction to be drawn in the former group between their characteristic features in workers' families and in those of employees. The level of *per capita* consumption among the rural population (326 pesos) was not quite one-third that of the urban population in the year in question. Within the urban group, the figures for the workers' families were approximately half as high as those for employees' households. The survey showed that the share of foodstuffs in total *per capita* consumption decreased so remarkably as such consumption increased, that it attained 63 per cent in the case of rural families, and only 46 per cent in that of the urban group. This observation was in line with the conclusions reached on the basis of historical data. Among the urban households, those of the workers allotted 49 per cent of total *per capita* consumption to expenditure on foodstuffs, as compared with the 39 per cent recorded in the employees' families. Nevertheless, the absolute level of *per capita* expenditure on foodstuffs rose with income, from 205 pesos in the case of the rural households to 384 pesos for urban families; within

these latter, again, it fluctuated between 306 pesos (among those of workers) and 462 pesos (among those of employees). (See table 11.)

But if the proportion of total expenditure allotted to foodstuffs declined as income grew, the same did not apply to all the components of expenditure on foodstuffs. While purchases of direct foodstuffs increased more slowly than *per capita* income, the reverse was true of expenditure on processed foods. As *per capita* income rose from the level prevalent among rural families to that enjoyed by urban families, the share of expenditure assigned to the purchase of foodstuffs for direct consumption fell from 51 to 30 per cent. In contrast, the proportion of expenditure on processed foodstuffs remained practically the same among families at different income levels, since it was 12 per cent for the rural families and 11 per cent for the urban families. *Per capita* expenditure was in both cases much higher in the urban than in the rural sector.

The survey of the expenditure of urban workers' and employees' families also showed that the demand for high-quality foodstuffs tended to rise more rapidly than *per capita* income. While the share of expenditure assigned to cereals and vegetables (low-quality foodstuffs) was 18.5 and 12.1 per cent in the workers' and employees' families respectively, the corresponding proportions reached 9.2 and 10.2 per cent in the case of milk and milk products and fruit.

Again in contrast to the situation with respect to direct foodstuffs, the proportion of total consumption represented by expenditure on manufactured goods other than foodstuffs and on services displayed a tendency to increase faster than *per capita* income, in both the urban and the rural sectors. In the case of the urban families, the shares of non-alimentary manufactured goods and

of services were 29 per cent in 1953, as compared with 24 and 13 per cent, respectively, among the rural families.

Particularly deserving of mention is the marked difference in the relative proportions of total consumption represented by services in the two cases described. *Per capita* expenditure on services was 6 times as high in the urban as in the rural sector, so that the former absorbed 83 per cent of total private expenditure on services. This reflected not only the difference in *per capita* income levels, but also conditions limiting supply, with respect to electricity, public health and education services, and recreation, and where housing was concerned, the land tenure system, apart from other differentiating factors, such as expenditure on transport and on personal services.

It is also interesting to note how the relative importance of expenditure on manufactured products other than foodstuffs and on services increases when workers' and employees' families are compared within the urban sector. Among the latter, such expenditure amounted to 25.4 and 35.9 per cent of their income, respectively, whereas among the workers' families the corresponding figures were only 23.8 and 27.0 per cent.

The foregoing analysis of the composition of income and expenditure among urban and rural families emphasizes the dynamic function of the process of urbanization and of the rise in *per capita* income levels. To sum up, their influence took the form of enlarging the relative share of the demand for processed foods, for manufactured goods other than foodstuffs and for services, while reducing the proportion of expenditure allotted to foodstuffs for direct consumption; nevertheless, this latter also increased in absolute terms.

3. Break-down of the urban and rural population, by income and employment

The great discrepancies noted above between the levels of *per capita* consumption in urban and rural areas (924 and 326 pesos respectively), reveal the dynamic effect exerted on demand by urbanization and industrialization.¹⁴ They also give some idea of the limited stimulus represented by the low level of *per capita* income in the rural sectors, attributable to the prevalent characteristics of productivity, the composition of production and social organization in the areas concerned. A somewhat more detailed study of the differences in the *per capita* income levels of various sectors of the population is thus fully warranted.

Complete estimates of the distribution of net national income by type of employment and sectors of economic activity in the year 1953 (see table 12) showed that 51.8 per cent of workers' and smallholders' families derived their income from agricultural and artisan occupations. Nevertheless, this group received only 31.5 per cent of net national income. Average *per capita* income amounted to 363 pesos, that is, 54.3 per cent of *per capita* income in the over-all economy. It is of interest to stress that while the average *per capita* income of families of workers engaged in coffee production was a great deal higher than any attained in other agricultural and artisan sectors, it represented only 71.1 per cent of average *per capita* income in the country as a whole.

¹⁴ It should be noted that figures for consumption by the public sector were arbitrarily allocated to urban consumption, which leads to a slight exaggeration of the discrepancy between *per capita* consumption in urban and in rural areas.

TABLE 12. COLOMBIA : BREAK-DOWN OF NET NATIONAL INCOME, BY TYPE OF EMPLOYMENT AND ACTIVITY, 1953^a

(Pesos at 1953 prices)

	Number of persons (Thousands)	Per capita remuneration (Pesos)	Total remuneration (Millions of pesos)	Per capita remuneration (Index: Average=100)
Total net national income	12,111	668	8,093	100.0
Income tax-payers' families	555	5,923	3,287	886.7
Skilled and unskilled workers' and small-scale entrepreneurs' families	11,556	416	4,806	62.3
Coffee-planting	884	475	420	71.1
Other crops	2,163	364	787	54.5
Livestock production	2,779	356	989	53.3
Mining (excluding petroleum)	35	657	23	98.4
Petroleum	22	2,387	52	357.3
Individual mining activities	176	370	65	55.4
Manufacturing	727	580	422	86.8
Artisan industry	1,026	282	289	42.2
Construction	415	441	183	66.0
Transport and communications	365	515	188	77.1
Government	453	1,024	464	153.3
Other services	2,512	368	924	55.1

SOURCE : ECLA, on the basis of official statistics.

^a Net national income is equivalent to gross income minus remittances of profits and interest abroad, indirect taxation and depreciation.

TABLE 13. COLOMBIA : DISTRIBUTION OF *per capita* NET NATIONAL INCOME, BY TYPES OF EMPLOYMENT AND ACTIVITY, 1953

(Pesos at 1953 prices)

Employment and activity *	Number of persons (Thousands)	Per capita remuneration (Pesos)	Number of persons (Thousands)	Remuneration (Millions of pesos)	Number of persons	Total remuneration
			(Cumulative sum)	(Cumulative sum)	(Cumulative percentage distribution)	(Cumulative percentage distribution)
Workers' and operatives' families :						
Artisan industry	1,026	282	1,026	289	8.5	3.6
Livestock production	2,779	356	3,805	1,278	31.4	15.8
Crops other than coffee	2,163	364	5,968	2,065	49.3	25.5
Other services	2,512	368	8,480	2,989	70.0	36.9
Individual mining activities	176	370	8,656	3,054	71.5	37.7
Construction	415	441	9,071	3,237	74.9	40.0
Coffee-planting	884	475	9,955	3,657	82.2	45.2
Transport and public utilities	365	515	10,320	3,845	85.2	47.5
Manufacturing industries	727	580	11,047	4,267	91.2	53.7
Mining (excluding petroleum)	35	657	11,082	4,290	91.5	53.0
Government	453	1,024	11,535	4,754	95.2	58.7
Petroleum	22	2,387	11,557	4,806	95.4	59.4
Income tax-payers' families	555	6,276	12,111	8,093	100.0	100.0

SOURCE : ECLA, on the basis of official statistics.

* Arranged in accordance with methods of *per capita* remuneration.

In 1953 the families in this category comprised 7.3 per cent of Colombia's total population, and received 5.2 per cent of net national income.

It is easy to demonstrate that the main causes of the low *per capita* income level prevailing among rural workers' families were a high degree of under-utilization of labour, land and capital resources, linked to the backward state of technology and of the organization of production. In fact, even if the families of agricultural workers were to receive the *whole* of the value added in agricultural production, without any deduction whatsoever for the owners of the land or for the maintenance and amortization of equipment, average *per capita* income in agriculture would rise only to 79.2 per cent of average *per capita* income in the economy as a whole. It should also be pointed out that production of coffee for the world market is based on an extremely low income for the families employed in this activity. In 1953, the average annual *per capita* income of workers employed in coffee production and of smallholders stood at only 164 dollars.

Among those workers' families whose earnings came from the manufacturing sector, average *per capita* income was 53.8 per cent higher than that of the agricultural workers' families, but amounted to only 86.8 per cent of average national *per capita* income. The families of workers employed in industry comprised 6 per cent of total population and received 5.2 per cent of net national income. If the difference between the income of agricultural workers and that of workers in manufacturing industry was not greater still, this was due to the small availabilities of capital per worker employed in the latter, while a further implication is that certain important branches of industry, such as, for instance, ready-made

clothing and the processing of foodstuffs, are only just beginning to emerge from the artisan stage.

If the population and the corresponding *per capita* income were arranged in ascending scale, by income steps, it would be seen that the 49 per cent of the population comprised in the lowest group received an average *per capita* income of 364 pesos and accounted for 25.5 per cent of net national income. The next group would consist of 46 per cent of the population, with an average *per capita* income of 490 pesos, so that it would receive 34 per cent of net national income. The highest income group, represented by the families of income-tax-payers, would cover 5 per cent of the population and would absorb 41 per cent of net national income (see table 13).

These statistics reveal how very unequally income was distributed in 1953 and how limited was the basis of demand for consumer goods, while at the same time they enhance the importance of the role enacted by urbanization and industrial development; they also indicate the extent of the changes in the level and composition of demand which may be entailed by the continuance of economic growth and an improvement in the distribution of income.

IV. ROLE OF THE EXTERNAL SECTOR

Foreign trade and investment have consistently played an important and occasionally a decisive role in the economic development of Colombia. From colonial times until the end of the first quarter of the present century, Colombia's was a typically export economy, in which foreign demand was the main determinant of the level of domestic income and economic activity. During

the period covered by the present study (1925 to 1953), profound changes have taken place in the structure of this economy. Its exceptional dependence on the external sector was modified after 1929, when an abrupt decline in foreign exchange income deprived the country of an adequate inflow of imported goods and services and foreign investment, which had financed a large share of domestic capital formation. Thenceforward, substantial encouragement was given to primary and industrial production for domestic consumption, and a sustained effort had to be made to mobilize domestic funds to finance budgetary and capital expenditure. This effort to reduce the vulnerability of the national economy to external factors has continued up to the present time.

To understand the significance of more recent trends, it is essential first to grasp the importance of the changes which occurred after 1929. During the period immediately preceding the depression of the 'thirties, Colombia was enjoying the full benefits of world economic prosperity and international mobility of capital. Imports of goods and services had attained a level which was not to be reached again until after the Second World War, and the inflow of foreign capital was sufficient to finance approximately one-half of total domestic investment. In spite of the fact that during each of these years imports exceeded exports by an ample margin, gold and foreign exchange reserves increased to a significant extent. In 1930-34 the quantum of imports¹⁵ dropped by one-half, in consequence of the fall in export earnings and foreign capital receipts. The net balance of foreign investment transactions became negative, absorbing over 20 per cent of the total capacity for external payment during the period in question. As a result of the combination of this circumstance with the substantial decrease in the purchasing power of exports determined by the deterioration of the terms of trade, the volume of imports had to be cut down considerably. The reduction did not, however, suffice to prevent a rapid decrease in gold and foreign exchange reserves, from 73 million dollars in 1929 to 17 million by the end of 1931.

The Government of Colombia was obliged to adopt severe measures to check the loss in reserves; quantitative and foreign exchange controls were imposed on imports, and payments on the external debt had been suspended by 1933. These measures set the pattern for the economic development of the country thereafter.

As will be described in detail later, Colombia's exports have been very little diversified. Its dependence on a single commodity and a single export market has tended to increase in recent years, so that since 1950 over 80 per cent of sales abroad has consisted of coffee, and the United States has accounted for about the same share of Colombia's total foreign trade. This lack of diversification has had the advantage of eliminating the problem of exchange convertibility in the balance of payments, but it has also rendered the Colombian economy extremely susceptible to fluctuations in demand and prices for one primary commodity. These fluctuations have had serious repercussions on the general level of export prices, although they have not prevented a steady

expansion of the quantum of exports. The 1925-29 unit value of exports was not regained until after the Second World War, but the export quantum increased during each five-year period between 1925-29 and 1945-49, since gold and, later, coffee offset reductions in other exports.

In 1953 and 1954, there was an unprecedented boom in exports of goods and services, and the quantum of imports rose to over two-and-a-half times the 1925-29 level. On a *per capita* basis, exports amounted to 135 pesos in 1954, as compared with an average of 95 pesos during the period immediately preceding the great depression.¹⁶ The post-war expansion in the capacity to import enabled Colombia to devote a large share of exchange availabilities to the purchase of capital goods and raw materials for the expansion of domestic production, without restricting demand for imported consumer goods. The immediate benefit for the country's economic development was immense, but by 1955 the capacity to import showed signs of falling considerably below the level of the previous two years. Although temporary market factors were the immediate causes of this decline, a basic change has gradually been taking place in the relation of world coffee supply to demand which might have a more lasting influence on Colombia's exports. In fact, a substantial part of the post-war expansion in the capacity to import has been due to abnormal factors, which have distorted the world coffee supply and demand situation to the benefit of Colombia and which cannot be expected to continue. Under these circumstances, the recent decline has far-reaching implications for economic development policy, and increases the urgency of the need to continue and intensify import substitution and to secure the more effective mobilization of domestic resources, if the post-war rate of growth is to be prevented from falling abruptly.

In these brief remarks are summed up a few of the most important aspects of the part played by the external sector in Colombia's economic development over the last three decades. A more detailed analysis may now be usefully made, with special emphasis on the contribution of foreign investment; on export and import trends, distribution by areas and composition by types of commodity; and on the evolution of the capacity to import, together with its incidence on the country's rate of economic growth.

1. *Contribution of foreign investment*

Between 1930 and 1950, foreign investment was of relatively little importance in financing the economic development of Colombia, except in regard to petroleum. This period was in marked contrast with the five years immediately preceding the great depression, when almost one-half of total domestic investment was financed from abroad, mainly through official loans floated in the New York market. By 1930 the value of foreign investment had risen to approximately 540 million dollars (at 1950 prices), which represented about one-eighth of the country's total stock of capital. This value

¹⁵ Physical volume at 1950 prices.

¹⁶ Both figures at 1950 prices.

TABLE 14. COLOMBIA : FOREIGN INVESTMENT IN DOMESTIC CAPITAL FORMATION

(Millions of dollars at 1950 prices)

	1925	1930	1945	1950	1953
Stock of capital	3,908	4,559	6,213	7,480	8,245
Foreign investment	230	540	440	544	654
Foreign investment as a percentage of the stock of capital	5.9	11.8	7.1	7.3	7.9
	1925	1945-50	1950-53		
Capital formation	651	1,267	765		
Increase in foreign investment	310	104	110		
Foreign investment as a percentage of capital formation	48	8	14		

SOURCE : ECLA estimates based on censuses of foreign investment in Colombia for 1946 and 1950 ; official information on the public debt ; balance-of-payments statistics ; United States Department of Commerce, *Handbook of American Underwriting of Foreign Securities* ; and United States statistics on investment in Colombia.

NOTE : Dates refer to end-of-the-year figures, although the periods do not correspond exactly for the two series.

was 2.3 times greater than the figure for 1925, but subsequently decreased, so that only by 1950 was a level regained similar to that reached in 1930.¹⁷ (See table 14.)

With the advent of the great depression the inflow of foreign capital virtually ceased, until the revival of interest in petroleum investment in the late 'thirties. Between 1930 and 1945 the external public debt declined by nearly 50 million dollars and United States private non-petroleum investment by almost 40 million (both values at 1950 prices). There was also a probable falling-off in non-petroleum investment of other origins. The only significant inflow of foreign capital during this period was accounted for by petroleum companies in 1938-39 and again in the late war years. But their contribution was insufficient to offset the reduction of investment in other activities, with the result that from 1930 to 1945 net foreign investment played a minor if not negative role in the financing of Colombian economic development. This factor, in conjunction with the deterioration in the terms of trade, was decisive in reducing the investment coefficient from the high levels of the late 'twenties to the more moderate figures registered during the following fifteen years. Since foreign financing accounted for about half of the 1925-30 rate and was negligible thereafter, the coefficient of 16 per cent really signified an increase in the domestic savings rate.

¹⁷ As is explained in the text and table notes, statistics on the value of foreign investment in Colombia are rough estimates which are merely intended to give an idea of approximate magnitudes. The figures are particularly weak as regards their comparability with stock-of-capital statistics, especially between 1930 and 1945. During this period, a substantial part of the reduction in the book value of foreign investment was due to "writing off" unprofitable investments and to lower valuations placed on capital equipment when prices declined in the 'thirties. Figures for the stock of capital, on the other hand, do not represent book values but physical capital equipment valued at 1950 prices. Thus, no attempt is made to relate changes in the two series between 1930 and 1945.

After the end of the Second World War, interest in foreign investment in Colombia revived, although the scale of activity has not yet approached the level of the late 'twenties. From 1945 to 1950, foreign capital to a value of over 100 million dollars (at 1950 prices) entered the country, accounting for about 8 per cent of total domestic capital formation during the period ; and between 1950 and 1953, a similar sum was invested, which raised the contribution of the external sector at 14.0 per cent. Although the share of the total stock of capital represented by foreign investment rose from about 7.1 to 7.9 per cent between 1945 and 1953, this latter proportion was still far below the corresponding figure for 1930. Furthermore, in recent years foreign capital receipts have not averaged more than 2 per cent of Colombia's gross product, as against about 10 per cent in the late 'twenties.

Fundamental changes also occurred in the composition of foreign investment in Colombia. In 1930, the external public debt accounted for between one-half and two-thirds of the total, while petroleum represented less than 20 per cent. By 1950 there had been a radical alteration in the relative importance of the two categories ; petroleum accounted for about 50 per cent and the external public debt had fallen to nearly 25 per cent. The steady twenty-year decline in the foreign debt came to an end in 1950, however ; as from that year the share of official capital in foreign investment again tended to increase, and represented approximately 30 per cent by the end of 1953. In the short period of three years the net inflow of long-term official capital amounted to over 60 million dollars (see table 15).

The sources of such official capital are now quite different from what they were 25 years ago. The major part has been supplied in recent years by public and private banks for specific projects, while non-banking funds have been composed mainly of loans from foreign industrial firms to finance the purchase of capital goods

TABLE 15. COLOMBIA : COMPOSITION OF FOREIGN INVESTMENT IN 1951-53

(Millions of dollars at current prices)

	1951	1952	1953	Total
<i>Capital receipts</i>				
<i>A. Official capital</i>				
Export-Import Bank	6.8	12.5	4.9	24.2
International Bank	5.6	12.3	9.1	27.0
Banque de Paris et des Pays-Bas	0.4	21.4	6.0	27.8
Miscellaneous	3.8	12.8	9.1	25.7
TOTAL	16.6	59.0	29.1	104.7
<i>B. Private capital</i>				
Petroleum sector	—	7.0	10.9	17.9
Private loans	2.6	1.9	—	4.5
Foreign investment in the <i>Flota Grancolombiana</i>	2.8	0.9	0.5	4.2
Miscellaneous	17.1	7.5	4.9	29.5
TOTAL	22.5	17.3	16.3	56.1
<i>Capital outflow</i>				
<i>A. Official capital</i>				
.....	8.2	11.8	23.3	43.3
<i>B. Private capital</i>				
Purchase of Tropical Oil Company assets	15.0	—	—	15.0
Compensation to Venezuela on withdrawal from the <i>Flota Grancolombiana</i>	—	—	10.1	10.1
TOTAL	15.0	—	10.1	25.1
<i>Net capital inflow</i>				
<i>A. Official capital</i>				
.....	8.4	47.2	5.8	61.4
<i>B. Private capital</i>				
.....	7.5	17.3	6.2	31.0

SOURCE : Data based on official balance-of-payments statistics.

NOTE : The official and private sectors were not added together to obtain total investment, since the figures for petroleum investment are net exchange transactions which include dividend remittances. Investments in the *Flota Grancolombiana* are listed under private capital, because the fleet is treated in balance-of-payments statistics as a resident company of Colombia in which Venezuela and Ecuador have made direct investments.

by public enterprises in Colombia.¹⁸ In 1951-53, private foreign investment probably fell considerably short of official capital receipts, but it is interesting to note that some of the same foreign banks and firms which made loans to government agencies also supplied funds to private companies in Colombia. For example, the *Banque de Paris et des Pays-Bas*, which was very active in financing the Paz del Río steel enterprise and the national railways, lent 1.43 million dollars to a private cement plant in 1952. Thus, recent foreign investment activity in Colombia is significant not only because it is increasing, but also because of the new sources of long-term funds to which the country can resort.

The trends described had a special impact on Colombia's balance of payments. While gross foreign capital receipts continued to constitute a decreasing proportion of the total capacity for external payments, after 1950 the incidence of profits and debt servicing increased.

¹⁸ During the period 1951-53, the most important non-banking loans to official agencies were granted by the International Petroleum Company to the *Empresa Colombiana de Petróleos*, by the Ericsson Company to several municipalities for telephone installations, and by German, French and Belgian firms to the national railways.

But the proportion in question remained smaller than before 1945, owing to the great expansion in exports of goods and services. During the most active period of foreign investment in Colombia, namely, the late 'twenties, foreign capital receipts contributed about 27 per cent of the country's total capacity for external payments, as compared with 15 per cent for remittances of profits and amortization of the debt. When exports declined after 1930, foreign investment fell still more abruptly, providing only about 1 per cent of the payments capacity, while over 21 per cent was required for servicing. The petroleum companies' remittances alone absorbed more than 13 per cent of the country's total payments capacity during the years 1932-34.¹⁹ In the

¹⁹ Present legislation in Colombia is probably adequate to prevent a recurrence of so heavy a drain on foreign exchange resources should the capacity for external payments again decline abruptly. Although foreign petroleum companies are not required to surrender exchange receipts to the Exchange Control Office, the Government is empowered to require these companies, should the balance-of-payments situation make it advisable, to surrender up to one-quarter of the value of oil exports, which would later be returned free of taxes when the balance-of-payments position became normal.

TABLE 16. COLOMBIA : FOREIGN INVESTMENT AND THE TOTAL CAPACITY FOR EXTERNAL PAYMENTS

(Annual averages : percentages of value in dollars at current prices)

	1925-29	1932-34	1935-39	1940-44	1945-49	1950-53
Foreign capital receipts as a percentage of total payments capacity	27	1	10	14	11	7.5
Capital outflow and remittances of profits and interest as percentage of payments capacity	15.1	21.2	10.8	9.5	4.7	8.4
Petroleum sector	6.9	13.4	5.5	2.0	0.3	2.2
Public debt servicing	18.2*	6.5	2.5	5.4	2.9	3.4
Rest of the private sector	*	1.3	2.8	2.1	1.5	2.8

SOURCE : Based on official calculations and ECLA estimates of Colombia's balance of payments.

* Remittances of capital and profits of the rest of the private sector are included with public debt servicing for the years 1925-29, but are estimated to have been small.

late 'thirties the capital account ceased to give rise to a net outflow of foreign exchange, and by 1945-49 the gross inflow of capital was more than twice as great as the outflow of capital and remittances. In spite of the absolute increase in investment from abroad in 1950-53, its share of the payments capacity diminished to 7.5 per cent, while the outflow of exchange on both the counts mentioned rose to an average of 50 million dollars a year, or 8.4 per cent of the capacity for external payments (see table 16).

This very substantial rise in investment income remittances and debt servicing was largely the result of recent changes in the composition and sources of foreign investment. Private investment, which earns a higher rate of return than that of the public sector, at present accounts for over two-thirds of total foreign capital in Colombia, instead of about one-third as was the case twenty-five years ago. In addition, a significant proportion of official borrowing from abroad in recent years was financed with medium- rather than long-term loans. As a result, amortization payments rose to a notable extent, from 8.2 million dollars in 1951 to 23.3 million in 1953. Furthermore, according to estimates, during 1953-55, 60 per cent of external debt payments were constituted by amortization of medium and short-term loans, even though these accounted for only 37 per cent of the total debt.²⁰

2. Exports of goods and services

Primary agricultural commodities have long occupied a predominant position in Colombia's total commodity export trade. Mining production, for years based principally upon gold, received a considerable impetus from the exploitation of crude petroleum deposits during the past quarter of a century, and since 1925 Colombia's exports of unrefined oil have increased substantially. The production of the small but rapidly expanding

²⁰ Economic and Fiscal Programming Department, *Informe sobre la Deuda Pública Externa* (Report on the External Public Debt), Bogotá, 1954, p. 35.

manufacturing sector has, so far, consisted mainly of consumer goods for the domestic market ; industrial exports have therefore accounted for a negligible proportion of total sales abroad. Thus, during the past three decades there has been a marked lack of diversification in Colombia's exports, among which by far the most important have been coffee and crude petroleum (see table 17).

TABLE 17. COLOMBIA : COMPOSITION OF EXPORTS BY MAIN COMMODITIES

(Percentages of total value of exports)

	Average	Coffee	Petroleum	Bananas	Others*
1925-29		70.9	14.2	6.1	8.8
1932-34		67.8	20.5	7.0	4.6
1935-39		64.4	23.3	6.1	6.2
1940-44		71.8	19.2	1.4	7.6
1945-49		76.2	15.2	1.7	6.9
1950-53		79.6	15.1	2.1	3.2

SOURCE : See *Statistical Appendix*, table 27.

* Excluding gold.

As a general rule, the proportion of total exports represented by coffee has fluctuated between 65 and 80 per cent, averaging about 72 per cent over the three decades under review ;²¹ its share contracted considerably during the depression of the 'thirties, but thanks to a subsequent gradual recovery its relative position is higher at present than at any previous period in the history of Colombia, save in a few exceptional years during the Second World War. Petroleum has contributed between 15 and 20 per cent of total exports, the average for the period as a whole having been 18 per

²¹ The percentages of the composition of exports mentioned in this chapter refer to exports excluding gold, unless otherwise noted, in conformity with the manner of presentation of official statistics.

TABLE 18. COLOMBIA : PRINCIPAL EXPORT INDICES

(1925-29 = 100)

Average	Quantum		Current dollar values		Dollar unit values	
	Total	Coffee	Total	Coffee	Total	Coffee
1925-29	100.0	100.0	100.0	100.0	100.0	100.0
1930-34	121.8	128.4	72.0	66.8	58.3	52.0
1935-39	149.8	160.5	84.1	68.1	55.6	42.4
1940-44	158.9	178.1	108.0	96.2	67.6	54.0
1945-49	190.8	221.5	227.6	231.7	118.1	104.6
1950-53	202.6	213.5	443.6	463.9	216.5	217.3

SOURCE : ECLA, on the basis of official statistics.

cent. To a very large extent, the role of oil exports has been compensatory ; their volume, insignificant in 1925, increased considerably during the 'thirties, but later declined during and after the war. It is of interest to point out that the relative importance of coffee as a direct source of export earnings has been even greater than the figures given might seem to indicate, since petroleum exporters can retain their foreign exchange receipts abroad without a prior permit from the exchange control authorities. Thus, for instance, in 1950-53 coffee contributed about 95 per cent of the foreign exchange directly accruing to the Exchange Control Office (*Oficina de Control de Cambios*) from commodity exports, while during the same period it accounted for slightly less than 80 per cent of total registered exports.²² Exports of bananas, which are traditionally third in importance among Colombia's export products, have seldom exceeded 8 per cent of total sales abroad. Moreover, during the Second World War banana shipments began to decrease in both absolute and relative terms, and at present provide only between 1 and 2 per cent of total commodity exports. The remaining minor exports of primary commodities have at times included cattle, platinum, emeralds, tobacco, rubber and rice, while semi-manufactured or finished products such as textiles, cement, leather goods and sacks have been of very little relative importance.

As a result of these trends, the quantum of Colombia's exports more than doubled between 1925-29 and 1950-53. Of the total increase, nearly half took place before 1945 and half during the post-war years. Variations in the dollar value of exports differed from those of the quantum in two main respects. For one thing, the dollar values showed a much larger over-all expansion, more than quadrupling in the period under review ; for another, they fluctuated to a far greater degree, falling sharply in the early depression years, but recovering slightly during the remainder of the 'thirties and substantially during and after the Second World War. In any case, pre-depression levels were not significantly exceeded until the post-war years ; thus, it was during

²² This was due not only to the special situation of petroleum exports, but also to the system of exchange certificates applicable to the proceeds from minor exports. Moreover, trade in gold was freed in 1953.

this period that the over-all quadrupling took place. (See table 18.)

It is natural that these trends should have been mainly determined by the fluctuations in the volume and price of coffee exports. Thus, for example, the cyclical decline in export earnings during the early years of the depression was almost entirely due to an unprecedented drop of about 50 per cent in the price of coffee. This decrease, which was great enough to outweigh a substantial increase in the quantum of exports, was a consequence not only of the unfavourable over-all conditions created by the world depression, but also of the accumulation of huge surpluses of Brazilian coffee during the years of the decade 1920-29. Despite the efforts of producers to halt the precipitous price decline after 1930 — by measures which even included the large-scale destruction of stocks — the output of the extensive Brazilian plantings of the late 'twenties still exceeded demand in the years that followed. United States prices for Colombian coffee therefore continued to weaken during 1935-39. This falling-off, however, unlike that registered in the immediately-preceding period, was more than offset by the expansion in the quantum of exports, and export earnings improved up to the outbreak of the Second World War.

The immediate effect of the war was a still further reduction in the world price of Colombian coffee, which, however, doubled between 1940 and 1942 ; from the latter year until 1945 it remained stationary, as a result of the United States ceiling prices policy. Despite the loss of the European markets,²³ Colombia's advantageous geographical position with respect to the United States, and the substantial quota assigned to it under the 1940 Inter-American Coffee Agreement, enabled it to raise its export quantum during the war. Thus the wartime value of exports reached a figure only 8 per cent below its pre-depression level.

After 1945, coffee exerted an even greater influence upon Colombia's aggregate sales abroad. The continued excess of world coffee demand over exportable production led to the exhaustion of Brazil's accumulated stocks

²³ Germany alone accounted for approximately 15 per cent of Colombia's total coffee exports in 1937-38, as against less than 1 per cent in 1940-49.

and to an unprecedented rise in world coffee prices. Thus, thanks to the combined effect of a sharp price increase and a steady expansion of the export quantum as from 1945, the value of Colombia's exports has more than quadrupled since the end of the war. In any case, of the two factors mentioned, it has been the improvement in the unit value of exports, deriving chiefly from the price of coffee, which has played the greater part in determining this increment in export values, the largest registered over so short a time in the history of Colombia's economic development.

The United States has always been the largest single market for Colombia's exports, of which it has steadily absorbed from 70 to 80 per cent, except for a few years at the end of the 'thirties.²⁴ The importance of Europe, the second largest market for exports from Colombia, was drastically affected during and after the Second World War; despite the significant, though gradual, improvement noted in more recent years, Europe still buys only some 10 per cent of Colombia's exports, that is, less than half the proportion for which it accounted immediately before the war (see table 19). As a rule, Germany and the United Kingdom have constituted the most important individual markets for Colombia's exports to Europe.

TABLE 19. COLOMBIA : AREA DISTRIBUTION OF EXPORTS ^a

<i>Average</i>	<i>Europe</i>	<i>United States</i>	<i>Latin America</i>	<i>Others</i>
1925-29	12.9	80.4	4.7	2.0
1932-34	18.5	71.4	1.6	8.5
1935-39	24.6	56.2	0.7	18.5
1940-44	3.4	76.7	3.6	16.3
1945-49	5.2	81.6	2.9	10.3
1950-53	9.4	81.2	1.3	8.1

SOURCE : See *Statistical Appendix*, table 28.

^a Excluding gold, which is exported mainly to the United States.

Among other areas, the Netherlands Antilles and Canada have sometimes jointly absorbed (the former for re-export purposes) over 15 per cent of Colombia's sales abroad. Their post-war share, however, has been only about 10 per cent. Intraregional trade with neighbouring Latin American republics, while offering a promising outlook, has hitherto been of secondary importance.

The similarity in the distribution of Colombia's export trade by commodities and by areas is not, of course, accidental, but is almost entirely due to the fact that the United States has been the chief market for Colombia's Manizales coffee. Before the Second World War, the bulk of Colombia's exports of crude petroleum was sent to the Netherlands Antilles for

²⁴ Europe's highest share in Colombia's export market was recorded in 1935-39; this was mainly due to the considerable expansion of exports to Germany, consequent upon the signing of various bilateral clearing agreements by Germany and Colombia between 1934 and 1938.

refining and trans-shipment to the United States and Western Europe. In more recent years, however, the proportion of total exports of crude petroleum shipped directly to the United States and Canada has increased substantially. The United States has always been a major market for Colombia's banana exports, although at times Germany and the United Kingdom have been important buyers. As regards the remaining commodities of minor significance, their distribution by regions among the United States, Europe and Latin America has undergone irregular fluctuations. Exports to the neighbouring Latin American countries, especially to Peru, Venezuela and Argentina, have frequently included cattle, coffee, crude petroleum and certain textile products.

To sum up, Colombia's exports have been very little diversified, coffee having constituted the principal commodity and the United States the most important market. Thus coffee has represented as a rule about three-fourths of the country's total commodity trade, and the United States has absorbed the same percentage of the whole. In recent years, moreover, these proportions have attained the highest average level in the history of Colombia.

3. Imports of goods and services

The foregoing trends in exports and those displayed by the other determinants of the capacity to import have naturally entailed changes of similar intensity in the quantum and value of imports during the last thirty years. Thus, in 1925-29 the quantum of imports reached a level which was not to be exceeded until after the Second World War, although during these five years the capacity to import was not fully utilized for purchases abroad. Owing to the great inflow of foreign capital at that time, a striking excess of imports over exports of goods and services was recorded during each of the years immediately preceding the depression, while gold and foreign exchange reserves increased despite the equally heavy transfers abroad of profits and interest.

TABLE 20. COLOMBIA : PRINCIPAL IMPORT INDICES

(1925-29 = 100)

<i>Average</i>	<i>Quantum</i>	<i>Current dollar values</i>	<i>Dollar unit values</i>
1925-29	100.0	100.0	100.0
1930-34	52.7	38.5	72.0
1935-39	92.7	66.8	71.3
1940-44	64.1	65.5	104.0
1945-49	128.4	211.3	160.6
1950-53	186.3	339.0	180.1

SOURCE : ECLA estimates, based on official statistics.

During 1930-34 the quantum of imports fell almost 50 per cent below the level registered in the previous period, while their value was reduced by over 60 per cent. Furthermore, gold and foreign exchange reserves dropped from a 1929 peak value of 73 million dollars

TABLE 21. COLOMBIA : BALANCE OF PAYMENTS, 1925-50

(Millions of pesos at 1950 prices)

	1925-29	1930-34	1935-39	1940-44	1945-49	1950
Quantum of exports of good and services	672	812	991	1,062	1,271	1,191
Quantum of imports of goods	-569	-300	-527	-365	-731	-980
Quantum of imports of services *	-68	-112	-90	-94	-89	-160
Quantum of balance	35	400	370	603	451	52
Terms-of-trade effect	-133	-275	-360	-487	-509	—
Balance on current account ^b	-98	125	10	116	-58	52
Movement of gold and foreign exchange, and official short-term credit	15	-3	13	101	-12	-68
Errors and omissions	-27	20	-11	41	8	65
Balance of payments ^b	-12	17	2	142	4	-3

SOURCE : See *Statistical Appendix*, table 31.

* Excluding investment income remittances.

^b The difference between the balance on current account and the balance of payments is equal to the net inflow of capital minus remittances of profits and interest.

to only 17 million by the end of 1931, despite the large current-account surplus. In face of so sharp a decrease in the value of exports and the need to meet substantial contractual commitments relating to the amortization of the external public debt, Colombia found itself compelled to adopt various measures designed to ease the growing pressure on its foreign exchange reserves. As from 1931, import and exchange restrictions were introduced, as well as subsidies to promote the production and export of gold. In the same year, moreover, provincial and municipal servicing of the external debt was suspended and by 1933 the same had happened in the case of the national external debt.²⁵ As a result of this series of measures aimed at the restriction of imports and foreign exchange remittances, the country's gold and dollar reserves slowly began to recover. Nevertheless, by the end of the 'thirties, they still totalled only about 26 million dollars, a figure almost two-thirds lower than their pre-depression peak.

The gradual recovery of exports during the remainder of the 'thirties permitted a slight increase in official reserves and a relaxation of previous import restrictions, by virtue of which the quantum of imports substantially expanded. As prices abroad remained practically stationary, the total value of imports rose in proportion to the increase in the quantum. It is of interest to note that, despite this increment, during the period in question a very close balance was maintained between the capacity to import and actual imports.

During the Second World War, the lack of supplies from Europe and the shortage of maritime transport, in conjunction with United States export controls, which restricted purchases from that market, were responsible

for a second sharp decline in Colombia's import quantum. However, such commodities as could be imported were much more expensive than at any time during the 'thirties, and consequently the aggregate value of imports differed very little from what it had been just before the war. About one-sixth of the country's capacity to import had to be used for building up gold and foreign exchange reserves, which increased during this period by over 500 million pesos (at 1950 prices).

After the war, in spite of an almost 50-per-cent rise in the unit value of imports, two factors combined to produce an unprecedented increment in the quantum of total imports. First, the large surplus on current account that was maintained throughout the war had resulted in reserves which amounted by the end of 1945 to 180 million dollars. Secondly, the steady growth of the quantum of coffee exports after 1945 and the extremely rapid rise in coffee prices contributed to a considerable expansion of Colombia's capacity to import. In view of the substantially greater exchange availabilities, Colombia's pent-up demand for consumer goods and the large-scale increase in public and private investment combined to raise the value of imports more than five-fold between the war years and 1950-53. Most of this expansion took place in the early post-war years, and, owing to the rapidity with which imports increased, reserves fell by 50 per cent between 1945 and 1948. In order to restore the balance between the demand for imports and the capacity to import, the peso was depreciated in 1949 and fresh import and exchange controls were adopted. Since then, the high foreign exchange income deriving mainly from coffee sales has enabled imports to pursue their upward trend and official reserves to reach the highest level on record in the country.

²⁵ From 1935 to 1941, payments amounting to nearly 2.5 million dollars were effected on contractual obligations of nearly 135 million. A mutual debt settlement programme came into effect in 1941.

Special mention should be made at this point of the significant role played by outlays on non-financial

services in the balance of payments.²⁶ After representing less than 11 per cent of total imports of goods and services in 1925-29, imports of the latter rose to over 27 per cent during the years of the depression, which reduced the amount of foreign exchange available for the purchase of goods. Thenceforward, the quantum of payments on services remained stable until a few years ago, when a further increase was registered. Owing to the decrease in imports during the war, however, payments on the services account again exceeded 20 per cent of total imports during this period. The most abrupt rise in service payments ever recorded has occurred during the interval between 1949 and the present time, when such payments amount to about 100 million dollars yearly (nearly 250 million pesos at 1950 prices). Most of this increment is attributable to expenditure on foreign travel and miscellaneous outlays abroad, including some foreign currency outlays by the *Flota Mercante Gran-colombiana*. Payments in the last two categories alone increased from only 14 million dollars in 1948 to over 40 million in 1953.

It is very likely that so exceptional an expansion was caused by the abundance of foreign exchange deriving from the coffee boom, but it is questionable whether this represents the most productive way of using the available foreign exchange. In view of the recent decline in the country's payments capacity, such payments can probably be considerably reduced, without obstructing the normal flow of the more essential services.

TABLE 22. COLOMBIA : AREA DISTRIBUTION OF IMPORTS
(Percentages of total value of imports)

Average	Europe	United States	Latin America	Others
1925-29	49.1	46.2	1.9	2.8
1932-34	51.9	40.5	2.4	5.2
1935-39	46.3	47.6	2.6	3.5
1940-44	9.2	68.1	20.5	2.2
1945-49	13.2	70.5	12.8	3.5
1950-53	23.0	65.8	5.2	6.0

SOURCE : See *Statistical Appendix*, table 29.

As far as the geographical distribution of imports is concerned, the share of the United States has been much less important than in the case of exports (see table 22). Nevertheless, since the depression, a major part of Colombia's imports has come from the United States, whose relative importance has increased steadily and substantially until it has now reached the point where it accounts for approximately two-thirds of the total, as against two-fifths in the early 'thirties.

²⁶ Since c.i.f. values are recorded for Colombian imports, freight and insurance payments on imports to foreign companies are not included in the services account. The main items registered on this account are foreign travel, the national mercantile marine's expenditure abroad as well as that of government representatives, and miscellaneous services which include management fees, film rentals and royalties.

As was to be expected, fluctuations in the share corresponding to western Europe were generally compensatory in character. In 1925-29 almost half Colombia's imports came from that area, and during the early 'thirties this proportion increased, reaching peak levels by the middle of the decade in question. As from 1939, and throughout the war years, Europe's position among foreign suppliers was seriously affected by the Atlantic blockade and by shipping restrictions, so that by the end of the war it made only an insignificant contribution to Colombia's imports. Since the war there has been a considerable and persistent improvement in European sales to Colombia ; nevertheless, Europe's share in total imports between 1950 and 1953 was still almost 50 per cent smaller than in 1925-29.

It is of interest to note the sudden increase in Colombia's imports from other Latin American countries during the war, when European supplies were cut off and the volume of imports from the United States was also reduced. Between 1941 and 1946, Colombia's imports from Argentina, Brazil, Mexico and Peru increased considerably, and included agricultural raw materials and foodstuffs (raw cotton and cereals), semi-manufactured goods (processed fibres and yarns) and even certain finished manufactured goods (textiles and pharmaceutical preparations). Venezuela, which in 1938 had been Colombia's main Latin American source of supply, fell to fifth place in 1942. Although the impetus given to such intra-regional trade continued for some years after the war, the recovery of United States and European exports registered from 1945 onward meant that Latin America's share in Colombia's import trade decreased from almost 30 per cent between 1942 and 1943 to an average of only 5 per cent in more recent years.

These trends in the geographical distribution of exports and imports illustrate the problem of the chronic disequilibrium in Colombia's trade with the various countries. In the past, its trade with western Europe has always shown an excess of imports over exports. The consequent deficit was substantial in 1925-29, when it reached an annual average of close to 50 million dollars. During the 'thirties, increased efforts at stabilization through bilateral agreements reduced this debit balance by more than 50 per cent. Throughout the war years, the reduced level of trade with Europe resulted in a smaller, though still negative, trade balance, and since then the traditional pre-war pattern has reasserted itself. For example, in 1950-53 Colombia's excess of imports over exports in its trade with Europe resulted in an average deficit close to that registered in the late 'twenties. On the other hand, Colombia has always had a favourable trade balance with the United States, to which most of its exports of unminted gold have been directed. Thus, its surplus with the United States and Canada has normally supplied the foreign exchange necessary to finance the trade deficit with Europe. Again, while fluctuations in its foreign exchange reserves have often necessitated the adoption of strict measures of control, Colombia has not been affected by exchange convertibility problems such as have hindered balance-of-payments adjustments in many other Latin American republics.

TABLE 23. COLOMBIA : IMPORT STRUCTURE AND COEFFICIENTS, 1925-53

	Percentage distribution				
	1925-29	1930-38	1939-45	1946-53	1953
<i>Import structure</i>					
Total	100.0	100.0	100.0	100.0	100.0
Consumer goods	43.5	45.4	30.1	22.5	19.7
Machinery and productive equipment	32.2	21.4	21.6	36.6	38.2
Raw materials and intermediate products *	24.3	33.2	48.3	40.9	42.1
<i>Import coefficients</i>					
Imports ^b as a percentage of available goods and services	25.0	16.5	13.4	17.4	20.1
Imports of consumer goods as a percentage of total consumption of goods and services	14.0	7.5	4.3	4.4	4.3
Imports of machinery and productive equipment as a percentage of gross investment	23.6	13.5	10.3	24.1	31.3
Imports of raw materials and intermediate products * as a percentage of the value of production and construction	5.1	3.9	4.4	5.5	6.8

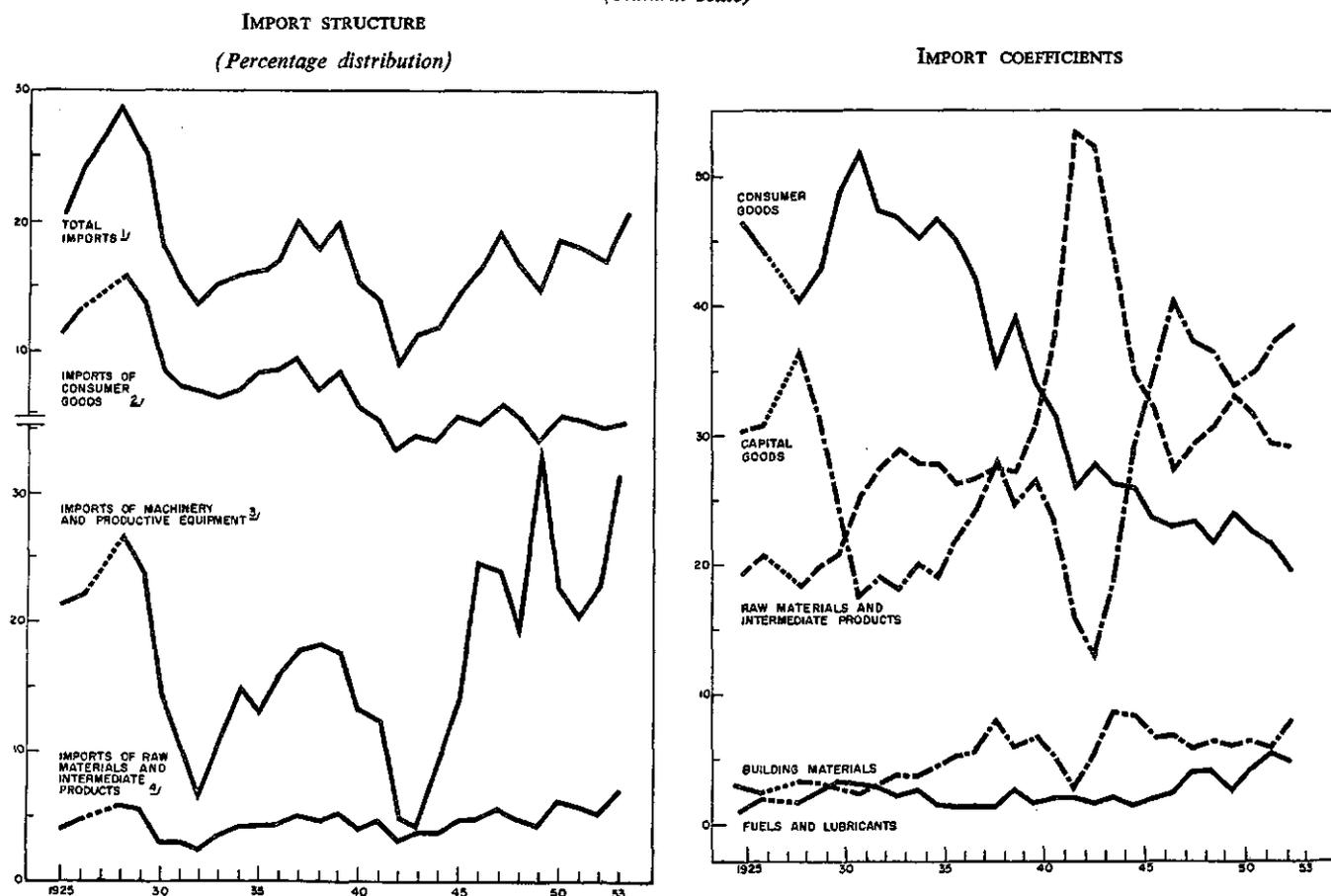
SOURCE : See *Statistical Appendix*, tables 12 and 30.

* Including fuels and building materials.

^b Including imports of services.

FIGURE VI. COLOMBIA : IMPORT STRUCTURE AND COEFFICIENTS, 1925-53

(Natural scale)

¹ As percentage of available goods and services.² As percentage of total consumption of goods and services.³ As percentage of total gross investment (fixed).⁴ As percentage of total value of production and construction.

Another important aspect is constituted by import structure and the fluctuations in the import coefficients for the various types of commodities.²⁷ Colombia's economic growth during the last three decades has considerably altered the composition of imports as well as their share in total availabilities of various categories of goods. The extent of the changes brought about can be assessed from the statistics given in table 23 (see also figure VI).

The first important conclusion to be emphasized is that there has been a steady decline in the share of total imports accounted for by consumer goods, and in the coefficient for imports of this type in relation to total availabilities of consumer goods and services. During the five-year period 1925-29, imports of consumer goods represented more than half of total purchases abroad; this proportion remained unchanged during the 'thirties, but in 1939-45 it fell to a little under one-third, and in 1953 to less than one-fourth. Still more significant, however, were the fluctuations in the relationship between these imports and total consumption of goods and services. In 1925-29, 14 per cent of the aggregate availabilities of consumer goods and services was contributed by imports; this coefficient was abruptly reduced during the 'thirties, dropping to an average of 7.5 per cent in 1930-38, and was finally stabilized during the war and post-war years at about 4 per cent. This is one of the clearest indications of the magnitude of the effort to substitute domestic production for imports of consumer goods, which was such as to enable the Colombian economy simultaneously to meet the growing requirements of domestic demand and overcome the limitations imposed by the capacity to import.

The second significant fact is the persistent increase in the proportion and coefficient of imports of raw materials and intermediate products. The high income-elasticity of demand for manufactured goods and the consumer goods import substitution needs already mentioned, called for a considerable expansion of manufacturing output, which in turn implied increased requirements of raw materials and intermediate products. Domestic enterprises tended to direct their efforts mainly towards expanding their capacity for production of final goods, and, therefore, to rely more on imported raw materials and intermediate products. Hence the share of the latter in total imports rose from little more than 24 per cent in 1925-29 to 42 per cent in 1953, reaching nearly 50 per cent during the intervening period 1939-45. The significance of these imports in relation to total availabilities of raw materials and intermediate products was relatively slight throughout the whole of the period under review, but also increased considerably, from 5 per cent in 1925-29 to about 7 per cent in 1953. From this point of view, Colombian industry may be said to have become more vulnerable to the adverse effects of a decline in the capacity to import, notwithstanding the fact that there was also a sizeable expansion of domestic production of raw materials and intermediate goods, and that during the last decade of the period a minor

degree of import substitution was achieved for commodities of this type.

In the third place, the proportion and coefficient of imports of machinery and productive equipment were characterized by considerable elasticity in relation to fluctuations in the capacity to import, with every improvement or deterioration in which they rose or fell sharply. Such imports represented almost one-third of total purchases abroad in 1925-29, declined to levels fluctuating around 20 per cent during the periods 1930-38 and 1939-45, and recovered rapidly in the post-war years, until by 1953 they amounted to almost 40 per cent. Equally significant was the share of imports of machinery and equipment in total gross investment. In this proportion also marked fluctuations were registered. During the quinquennium 1925-29, 24 per cent of total gross investment consisted of machinery and productive equipment from abroad; when the capacity to import declined, the corresponding coefficient also decreased, falling to 10 per cent during the period 1939-45; but it too made a speedy recovery during the post-war years, and finally, in 1953, reached a level much higher than in the years immediately preceding the depression. As has already been mentioned, these fluctuations in imports of machinery and equipment largely explain the variations in the aggregate investment coefficient for the Colombian economy.

The chapters on agriculture and industry contain a detailed analysis of the trends observed in imports of specific commodities; only their most important aspects, therefore, need be mentioned here. As regards foodstuffs, beverages and tobacco, a major part of consumer requirements was naturally supplied by domestic agricultural production, although the country's degree of self-sufficiency fluctuated considerably in the course of the years. Coffee and bananas were the only staple commodities of which Colombia was able to meet its own needs completely. The output of certain other agricultural and livestock commodities was also sometimes sufficient to satisfy local demand and allow for the export of a small surplus; but in most cases production fell short of domestic requirements, and the primary commodities mentioned, together with imports of spirituous liquors and tobacco products, exerted heavy pressure on total foreign exchange availabilities. It is of interest to point out that domestic agricultural production and selective import controls helped to reduce the share of such commodities in total imports by 50 per cent between the late 'twenties and the present time.

As in the case of foodstuffs, beverages and tobacco, the share of textiles in total imports nowadays corresponds to only half the proportion registered in the period preceding the depression, despite the remarkable expansion of domestic consumption. Furthermore, finished manufactured goods currently represent only 25 per cent of total imports of commodities of this type, as against about 90 per cent in 1925-29.

Ores and mining products were exploited mainly for the export trade, and imports were especially confined to light petroleum derivatives and other goods not produced within the country. After 1925 a noteworthy

²⁷ The term "import coefficient" is applied here to the proportion of total supplies of a given type of commodity which is represented by imports.

increment was to be observed in imports of fuels and lubricants, a fact which reflected the growing demand for such products to meet the needs of industry and transport; moreover, everything seems to suggest that demand will continue to increase in the future, in both absolute and relative terms. Although it is estimated that the output of Colombia's refineries will help to reduce, and in time to eliminate, current imports of fuels and lubricants, the growth of their share between 1925 and 1953 was one of the most significant trends in Colombia's import trade. The relative importance of commodities of this type in total purchases abroad rose from 1.8 per cent in 1925-29 to 4.4 per cent in 1928-52 and 5.5 per cent in 1953, so that they came to represent a proportion very close to that recorded for foodstuffs, beverages and tobacco products in the aggregate, or to that of textiles and textile manufactures.

These changes in the proportions and coefficients of imports provide a very clear indication of some of the most important features of Colombia's economic development during the last quarter of a century. Nevertheless, it would be as well to add a few supplementary remarks on certain factors which must also have influenced the extent and nature of the import substitution effort during the period under discussion.

In the 'twenties, the high relative prices of Colombia's exports enabled *per capita* income and demand to rise at a rapid rate, while the heavy portfolio investment from abroad contributed to the financing of a far-reaching programme of public investment in basic social capital, which expedited the process of urbanization and economic integration. The operation of these factors, in combination with the high elasticity of demand for manufactured goods, resulted in a progressive consolidation of markets sufficiently large for domestic production of certain consumer goods to be undertaken on an economic scale, rendering import substitution possible. On the other hand, heavier imports had to be effected in the case of those commodities where the size of the market precluded economic production, as well as because of the increase in requirements of raw materials and intermediate products.

A course of action aimed at domestic production of both final and intermediate goods would have required, at an early stage of industrial development, a costly type of vertical integration. Indeed, the mere fact of the market's being large enough to permit of economic production of a given final good does not necessarily mean that it will also justify the manufacture of an intermediate good needed for the process of production. And even if one such intermediate good (cement, for example) were successfully produced on an economic scale, it might well happen that the size of the market proved inadequate to warrant domestic manufacture of some other intermediate good or goods used in the same process of production (steel and glass, for instance).

To a still greater extent than in the case of raw materials and intermediate products, the characteristics of derived demand for machinery and productive equipment, which call for a much larger volume of demand before economic-scale production is possible, have hitherto militated

against the attainment of any significant degree of domestic production and import substitution where goods of this type are concerned. Furthermore, consideration would also have to be given to other important factors affecting the possibilities for domestic production of machinery and equipment, such as, for instance, the wide cyclical fluctuations to which investment is subject, and which deprive the market of stability; the much more advanced technology entailed in the manufacture of capital goods; and the heavy investment required. Nevertheless, as will be shown elsewhere in this study, the Colombian economy has reached a stage at which some degree of domestic production and import substitution of machinery and productive equipment is not only possible, but also, in all likelihood, necessary.

It seems needless to lay further emphasis on the outstanding importance of these changes in the structure and coefficient of imports as a decisive factor in the achievement of Colombia's rate of economic growth. A few hypothetical estimates of what might have happened if these changes had not taken place will suffice for illustrative purposes. If the coefficient of consumer goods imports had not fallen from 14.2 per cent in 1925-29 to 7.9 per cent in 1930-38, the demand for imports would have exceeded their actual level during the same period by 42 per cent; similarly, if the coefficient in question had not subsequently decreased to 5.0 per cent in 1946-53, demand would have been 15 per cent in excess of the purchases effected abroad. Still more striking would be the results of analogous calculations based on the assumption of a static coefficient for imports of raw materials and intermediate products. If the proportion of total imports represented by such commodities had not risen from 17 per cent in 1925-29 to 37 per cent in 1946-53, and, consequently, the corresponding coefficient had not increased from 4.0 to 5.7 per cent during the same interval, the value of production and construction in the later period would have been 30 per cent below the level in fact attained.²⁸

4. *The capacity to import*

The joint effect produced on foreign exchange availabilities by trends in the export of goods and services and by foreign investment is reflected, in the final issue, in the capacity to import. This concept may be defined as the equivalent of exports of goods and services, plus gross foreign capital receipts and minus the outflow of capital and remittances of profits and interest.²⁹ The resulting figure thus represents the amount of exchange income which is available for imports of goods and

²⁸ These estimates are of course given for purely illustrative purposes, as in both instances a change in income levels is implied, which would also have affected the volume of demand for consumer goods imports, domestic production requirements, etc.

²⁹ In the previous section on the role of foreign investment in the Colombian economy, foreign investment was compared with the total capacity for external payments. The latter is equal to the capacity to import without deduction of the outflow of capital and remittances of profits and interest. The capacity to import analysed in this study should not be confused with another measurement — the export quantum multiplied by the terms of trade — which sometimes bears the same name, but which in the present study is more correctly called the "purchasing power of exports".

TABLE 24. COLOMBIA : TOTAL CAPACITY FOR EXTERNAL PAYMENT AND CAPACITY TO EXPORT

(Millions of pesos at 1950 prices)

	1925-29	1932-34	1935-39	1940-44	1945-49
Exports	672.1	799.5	991.4	1,062.1	1,270.5
Inflow of foreign capital	197.6	7.7	65.5	89.6	115.0
Terms-of-trade effect in relation to 1950	-132.8	-275.3	-959.6	-487.2	-508.8
Total capacity for payment	736.9	531.9	697.3	664.5	876.7
Remittances of profits and interest ...	96.6	96.2	50.0	38.7	25.1
Outflow of foreign capital	21.2	19.8	23.6	25.3	36.1
Capacity to import	625.1	415.9	623.7	600.5	815.5

SOURCE : ECLA, on the basis of official statistics.

services. Imports, of course, cannot exceed the capacity to import for any great length of time, as in such an event gold and foreign exchange reserves would be exhausted and foreign creditors would not be willing to continue extending import credits. Over the long term, therefore, this concept fairly accurately reflects the external sector's net contribution to the national economy.

The description of the actual trends displayed by Colombia's capacity to import as from 1925, and the analysis of its influence on the country's rate of economic development, may usefully be preceded here by a brief parenthetical indication of certain methodological points. In the first place, a distinction should be drawn between the capacity to import at current prices, which would be covered by the definition given in the preceding paragraph, and the same concept expressed in terms of constant values. In the latter case, fluctuations in the capacity to import are dependent upon the quantum of exports of goods and services, the terms-of-trade effect and the net movement of foreign capital valued at prices for a specific year. For purposes of the present study, estimates of the capacity to import have been expressed in constant pesos at 1950 prices, obtained by application of a purchasing power parity exchange rate for that year.³⁰ This rate is used with the aim of eliminating the effect of over- or under-valuation of the real exchange rate, so that trends in the external and internal sectors may be compared with greater accuracy. The quantum of exports represents the physical volume of exports valued at 1950 prices. To express service receipts in constant prices, current values have been divided by the index of the unit value of imports. The inclusion of the terms-of-trade effect³¹ in the calculation of the capacity to import makes it possible to adjust the latter for changes in relative prices with respect to the base

³⁰ The purchasing power parity exchange rate for 1950 has been estimated at 2.7 pesos per dollar. For a description of the methods employed in calculating this rate, and for a more detailed explanation of the terminology used in this section, see *Economic Survey of Latin America, 1951-52*, appendix to chapter I.

³¹ Estimated as the difference between the purchasing power of exports (the export quantum multiplied by the terms-of-trade index) and their quantum.

year, so that the relative roles of the export quantum and the terms of trade in the formation of the capacity to import can be assessed separately. Capital movements and investment income remittances, like service receipts, are also deflated by the index of the unit value of imports.

Exports of goods and services, the main trends in which have already been discussed, are, of course, the chief item contributing to Colombia's capacity to import. Nevertheless, its fluctuations have been determined principally by investment trends and by variations in the terms of trade, and only to a minor extent by changes in the export quantum.

During the period 1925-29, the capacity to import reached the comparatively high average annual level of 630 million pesos, which was in fact exceeded only in the post-war years. At the same time, it was in this quinquennium that the quantum of exports of goods and services was lowest, a circumstance which was, however, offset by the substantial inflow of foreign capital and the relatively slight adverse influence of remittances of profits and outflows of capital, as well as of the terms of trade.

In 1930-34, the depression did not put a stop to the growth of the export quantum, which registered a moderate increase in relation to the preceding five years. On the other hand, export prices declined considerably, and between the two periods the unit value index underwent a reduction of 42 per cent.³² In import prices there was a much smaller decrease, so that the deterioration in the terms of trade was less severe — about 20 per cent. Some degree of compensation between the increment in the quantum of exports and the deterioration in the terms of trade having thus taken place, the purchasing power of export was in a measure stabilized. But with the foregoing factors was combined the almost total disappearance of foreign investment, which dropped from an annual average of 198 million pesos in 1925-29 to only 8 million in 1930-34, so that in the final outcome

³² It should be noted that the reduction would have been even greater had not this period witnessed a sudden increase in the importance of sales of gold, the world price of which rose from 21 to 35 dollars per ounce.

the capacity to import was reduced by one-third, from 625 to 416 million pesos.

The quinquennium 1935-39 witnessed a further increment in the quantum of exports of goods and services ; the terms of trade continued to deteriorate, although not very seriously. Moreover, there was evidence of renewed interest in foreign investment, and remittances of profits and interest markedly decreased.³³ Consequently, the capacity to import underwent a substantial improvement, attaining a level practically as high as that recorded in 1925-29.

During the next five years, on the other hand, the capacity to import suffered another setback, this time entirely attributable to the deterioration in the terms of trade. This latter was, indeed, the only negative factor, since the quantum of exports expanded slightly, a further increment — though still within very moderate limits — was registered in the inflow of foreign capital, and remittances of profits were again reduced. The deterioration in the terms of trade was not due this time, as in the preceding five-year period, to a fall in the unit value of exports, which, on the contrary, improved a little, although at a low level, mainly on account of the wartime price controls applied in the United States ; it was determined by a much sharper rise in import prices. It should also be noted that the reduction in the purchasing power of imports was in actual fact much greater than was directly indicated by statistics, as a considerable proportion of the foreign exchange received during the war could not be used until after the termination of hostilities, when an even more marked increase was registered in over-all world price levels.

Only after the end of the Second World War did Colombia's capacity to import exceed the figure it had reached twenty years earlier. The quantum and prices of exports increased considerably in 1945-49, and foreign investment also attained higher levels. Nevertheless, owing to the sudden rise in world prices, the terms of trade remained lower than before the war, and their adverse effect (in relation to 1950) represented 500 million pesos yearly, that is, about 40 per cent of the export quantum. In other words, during the period 1945-49 Colombia found itself in the position of having to export 40 per cent more than in 1925-29 in order to be able to purchase the same quantity of goods. This situation altered radically in 1950, when the unit value of exports rose to double what it had been in the late 'twenties. Although the quantum of exports decreased in the year in question, and there was apparently a substantial net outflow of exchange in foreign investment transactions, the capacity to import considerably increased, until it exceeded 1,000 million pesos.

The terms of trade again began to deteriorate in the years that followed, but in 1953, when the bags of coffee

shipped numbered a million more than were produced in that year, a major increment in the quantum of exports easily offset the adverse effects of price trends. In 1954 this situation was reversed, since it was the marked rise in the price of coffee that more than compensated for the decline in the export quantum. The steady growth of foreign investment as from 1950 also facilitated the expansion of the capacity to import, which in 1954 amounted to 2,000 million pesos.

A joint evaluation of the trends described might give the impression that the growth of the capacity to import had been satisfactory over the long term. However, the problem cannot be judged in such absolute terms, and a stricter appraisal of the part played by the external sector in Colombia's development could be made only by comparing the evolution of the capacity to import with the growth of the gross product. In 1925 the capacity to import stood at some 65 pesos *per capita* (at 1950 prices), which corresponded to about one-fifth of the figure for the *per capita* gross product. Between 1925 and 1928, the capacity to import expanded by 106 per cent, whereas the increment in the gross product was only 28 per cent. In other words, for every 1 per cent of increment in the product, the capacity to import increased by 38 per cent. Again, over the period 1925-29 the capacity to import amounted on an average to nearly 25 per cent of the figure for the gross product. During the depression of the 'thirties, this proportion was reduced by almost one-half, averaging only 13 per cent in the quinquennium 1930-34 ; the ratio between the capacity to import and the gross product was thus substantially modified. In other words, during this latter period the country had to maintain a much lower ratio between capacity to import and gross product than in the late 'twenties.

From 1930 to 1950 no further radical change took place, and, somewhat surprisingly, the proportion of the gross product represented by the capacity to import fluctuated between rather narrow limits (from 12 to 15 per cent). Thus, the influence of the external sector on Colombia's economic development after 1929 does not seem to have been progressive ; it was simply that each increment in the capacity to import was accompanied by a larger increase in the national income than before 1930. For example, between 1930-34 and 1945-49 every 1-per-cent increment in the capacity to import corresponded to an increase of 1.2 per cent in the gross product, instead of only 0.25 per cent, as would seem to have been the case between 1925 and 1929. The Colombian economy thus became gradually less dependent on the external sector, in the sense that fluctuations in the capacity to import affected national income less than in the 'twenties. This change in the relative importance of the external sector is very clearly shown in figure VII. As can be seen, the ratio between the capacity to import and gross income follows two different curves, one relating to the years before and the other to those after 1930. The sharper slope of the latter is a reflection of just that greater elasticity in the growth of income, as compared with the variations in the capacity to import, which was described above. The elasticity in question seems to have been higher still during the war years (when the ratio between capacity to import

³³ What largely accounted for this decrease was the change in the movement of the petroleum companies' net transactions. As was previously stated, in 1930-34 the net outflow of the foreign exchange deriving from transactions effected by the petroleum companies represented about 10 per cent of the total capacity for external payment, while during the late 'thirties the figure for net investment was positive, once investment activities had been renewed on a considerable scale.

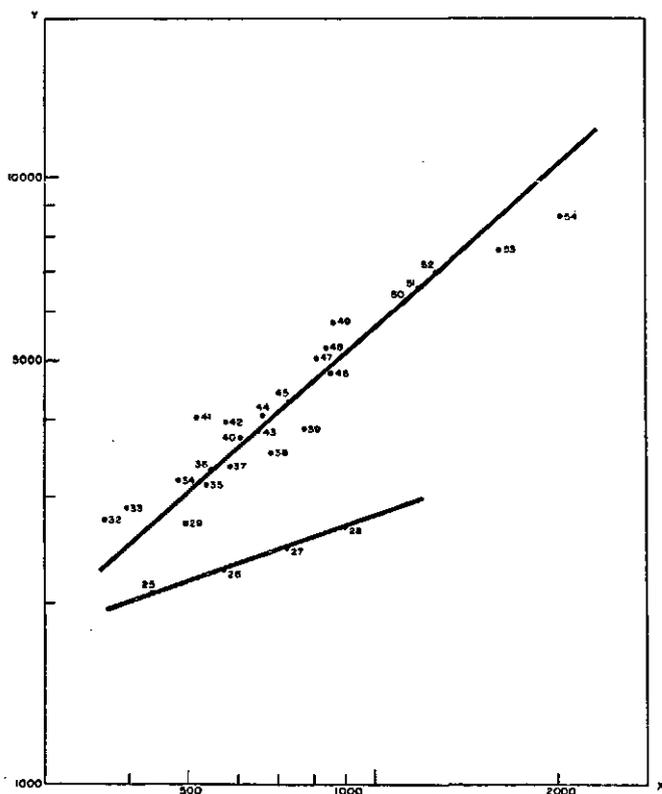
and gross product once again fell to much the same levels as in 1930-34), in consequence of the cutting-off of traditionally imported supplies and the incentive thus given to domestic production. In contrast, the situation was reversed during 1953 and 1954, when the gross product increased more slowly than might have been warranted by the increment in the capacity to import; an explanation can be found, however, in the abruptness of the latter's expansion, which did not produce its full effect upon the level of income until late in 1945.

FIGURE VII. COLOMBIA : CORRELATION BETWEEN CAPACITY TO IMPORT AND GROSS INCOME

(Millions of pesos at 1950 prices)
(Logarithmic scale)

Y = Gross income

X = Capacity to import



These considerations must not, of course, be allowed to obscure the basic fact that in recent years the country has attained a ratio between capacity to import and gross product considerably lower than that registered before the depression. Herein, precisely, lies the fundamental importance that must be attributed to the development of domestic activities for import substitution purposes, exemplified particularly in the growth of the industrial sector. The net substitutions achieved in this way, as well as the changes in import structure thus rendered possible, enabled the ever-greater demand deriving from income expansion to be satisfied, and, at the same time, an increasingly large proportion of foreign exchange resources to be earmarked for imports of capital goods. What is more, given the background

data currently available, it seems inconceivable that a more or less constant ratio can be maintained between the capacity to import and the gross product, as has been happening since 1930, without a substantial reduction of the rate of economic development. The country will thus find itself confronted with a further significant modification of its degree of dependence on the external sector, and import substitution will once again come to the fore as one of the key elements in the achievement of a satisfactory rate of growth.

It is also of interest to study the problem of the effect produced by the evolution of the terms of trade on production for the export market. The foregoing remarks have shown that, save in exceptional years, the quantum of exports expanded even in those periods when the terms of trade were most unfavourable. In other words, since 1930 there does not seem to have been any tendency to divert a share of export production resources towards activities primarily serving the domestic market; if anything, the reverse has been the case.

The explanation of this apparently contradictory phenomenon must be sought in the way the losses resulting from negative fluctuations in the terms of trade have been distributed among the various sectors. A deterioration in the terms of trade does not, in fact, necessarily imply a decrease in exporters' real income, since it may happen — and actually did in Colombia after 1930 — that the fall in export prices is not as sharp as the decline in over-all price levels on the domestic market. At the end of 1932, the Government adopted certain measures with a view to directly assisting exporters, and initiated a series of devaluations, such that by 1935 the value of the peso in foreign currency had been reduced by almost 70 per cent. While prices on the domestic market rose much more rapidly than export prices in foreign currency as from 1932, the devaluations mentioned more than compensated exporters for this disparity. Indeed, during the period under consideration the external sector's income in pesos at current prices seems to have increased far more than internal prices and costs, so that the Government's policy provided a real stimulus to production for export, despite the depression of the world markets.

It must not be inferred from this analysis that Colombia succeeded in escaping the consequences of the decline in its capacity to import during the depression. All that is implied is that exporters' income was spared the full impact of this decline, since part of the burden was shifted on to the rest of the economy, by means of changes in relative prices. In effect, the economy granted exporters, especially after the depreciation, a subsidy in the shape of higher prices in national currency, as a result of the devaluation of the peso. The longer-term effects of the depreciation were of course beneficial for the economy as a whole, not only because they prevented the depression of the external sector, but also because of the strong incentive given to domestic production for import substitution purposes; the result was that the economy entered upon a new phase, during which the export multiplier increased and the growth of national income was no longer so highly dependent on the fluctuations of the external sector.

The effect of changes in internal and external relative prices, and in exchange policy, can be clearly grasped if an estimate is made of the over- or under-valuation implicit in the official exchange rate over the course of the years. As has already been explained, in order to evaluate external and internal activities in comparable terms, the exchange rate used is the purchasing power parity rate for 1950. Changes in the parity rate in the course of the years can be calculated by multiplying the 1950 rate by the ratio between the variations in internal and external prices. From the differences between the official exchange rate and the parity rate computed in this way, an index of over-valuation can be deduced. Calculations of this latter indicate over-valuation of the official rate in 1925-29; after 1930, the official rate became under-valued, and by 1935 was 25 per cent below parity.³⁴ This under-valuation was gradually eliminated as the exchange rate remained constant, while there was a greater increase in internal than in external prices, with the result that by 1948 the exchange rate was already about 30 per cent above parity. This over-valuation had distinctly serious repercussions on the minor exports, since their world prices rose less than internal prices and costs. Apparently this discrepancy did not affect producers of coffee, the price of which increased more rapidly than over-all prices during the

period referred to. In 1948, the Government adopted measures to counteract over-valuation, but despite the series of devaluations applied up to 1951, the index again began to rise with renewed intensity.³⁵

The exchange reform of 1955 and the general results of exchange policy as a means of encouraging minor exports and import substitution are discussed in detail in other chapters of this study. Let it suffice to point out here that official exchange policy has played a very important part in the distribution of the impact of fluctuations in the capacity to import among the various sectors of the Colombian economy. During the 'thirties, the aim of exchange policy was to protect the income of the external sector and industries producing for the domestic market; in more recent years, it has had the opposite effect, since it has tended to encourage imports at the expense of the external sector. Although coffee producers have been protected against this trend by the marked improvement in the terms of trade for coffee, other exporters have apparently been operating at a loss, despite the adoption of partial exchange bonus programmes for the benefit of minor exports.

³⁵ The tendency towards over-valuation of the exchange rate noted since the end of the war had no adverse effects on the production of goods competing with imports, thanks to the application of direct quantitative and exchange controls, which also served to protect domestic industries against the steady decrease in the efficiency of customs tariffs.

³⁴ See annual statistics in *Statistical Appendix*, table 32.

Chapter II

ECONOMIC DEVELOPMENT PROSPECTS IN COLOMBIA

GENERAL CONSIDERATIONS

In the preceding chapter an attempt was made to analyse the basic factors which influenced the development of the Colombian economy during the period 1925-53. The object of this analysis was not confined to the search for an historical explanation of the course of events, but consisted, first and foremost, in assembling the data required for the projection of alternative hypotheses of future economic growth, the presentation of which constitutes the purpose of the present chapter.

By means of an analysis of the characteristics of economic development in the past and a diagnosis of the present situation, the limits within which the future rate of growth might fluctuate can be realistically assessed, and a few reasonable alternatives selected. Such alternative hypotheses are not, of course, forecasts, nor specific and inflexible programmes, but initial working assumptions on which to base the analysis of two outstandingly important aspects of the question. These are (a) what would be the specific requisites for their fulfilment, in terms of future variations in the investment coefficient, the product-capital ratio, the capacity to import, etc. ; and (b) what structural changes in the Colombian economy would be necessitated by the differing rates of growth of each of the main sectors of economic activity, if these were to prove compatible with a balanced over-all development. Consequently, by virtue of the hypotheses in question, not only can total investment requirements in each case be quantified, and a distinction drawn between those financed with domestic saving and those covered by the inflow of capital from abroad, but the way in which such resources would have to be distributed among the several sectors can also be indicated. A full account of the methodology utilized in the formulation of the hypotheses has been given in earlier ECLA studies.¹ It is enough here, therefore, to describe the main stages of the analysis contained in the following sections. The first of these sections discusses the several alternative hypotheses of the future rate of growth of *per capita* income which might be considered reasonable, with due regard to the analysis, in preceding chapters, of the past development and present situation of the economy. In the second, prospects for exports and for the other determinants of the capacity to import are examined, and data on the possible behaviour of the external sector are thus assembled, with the twofold aim of assessing the extent to which the sectors producing for the external market would have to expand and the

import substitution effort that would be called for in other sectors. Thirdly, consideration is given to the demand for consumer goods and services, and its growth and structure are projected in accordance with each of the over-all hypotheses as to the rise in income. Once this stage has been reached, it is possible to calculate how far each sector would have to develop in order to produce the supplies needed for export and domestic consumption. Nor is this all, for derived requirements of raw materials and intermediate products and of domestic development of capital goods industries must be added, so that, lastly, an estimate can be made of the total expansion in each sector that would prove compatible with the over-all hypotheses of the growth of income and the predictable evolution of the capacity to import. At the end of the chapter come the projections of total requirements and of the distribution of investment, as well as final conclusions as to the changes that might be expected in the structure of production, the distribution of the active population, the composition and coefficients of imports, etc.²

Generally speaking, the projections cover the intervals between 1953 and 1960 and between 1960 and 1965. However, for some important magnitudes projections up to 1970 are formulated, for the purpose of illustrating the possible incidence of certain factors whose influence is not always clearly apparent when relatively short periods are considered, as well as of giving a broader view of the lines that Colombia's economic development might follow in the course of the next fifteen years.

I. ALTERNATIVE HYPOTHESES OF ECONOMIC GROWTH

As was shown in the preceding chapter, the *per capita* gross product increased over the period 1925-53 at an average annual rate of 2.4 per cent, its growth having been strikingly intensified during the post-war years, when the average annual rate registered was 5.9 per cent. It should also be recalled that, to judge from the foregoing analysis, this rapid post-war development seems to have been promoted by a conjunction of several favourable factors, some of which have now disappeared or are exerting a considerably weaker influence.

² Since the purpose of Part One of the present study is to trace in broad outline the main features of the past development and future prospects of the Colombian economy, this chapter sums up the most important conclusions reached in the more specific analysis contained in the chapters on the individual sectors in Part Two, where a more detailed discussion of these conclusions must therefore be sought.

¹ See *Introduction to the Technique of Programming*.

TABLE 25. COLOMBIA : ALTERNATIVE PROJECTIONS OF ECONOMIC GROWTH, 1953-60

	1953 Current	Projections 1960			
		A	B	C	D
(Millions of pesos at 1950 prices)					
Population (Thousands)	12,111	14,162	14,162	14,162	14,162
Gross product	7,751	12,060	10,548	9,340	12,789
Terms-of-trade effect	-63	0	-202	-202	0
Gross income	7,688	12,060	10,346	9,138	12,789
Net inflow of foreign capital	-22	85	—	—	85
Available goods and services	7,666	12,145	10,346	9,138	12,874
Consumption	6,045	9,290	8,115	7,638	9,524
Total investment	1,621	2,855	2,231	1,500	3,350
Fixed investment	1,777	2,738	2,110	1,401	3,197
Changes in inventories	-156	117	121	99	153
Stock of capital	22,262	30,923	30,137	27,471	32,792
(Pesos at 1950 prices)					
<i>Per capita</i>					
Gross product	640	852	745	660	903
Gross income	635	852	731	645	903
Available goods and services	633	858	731	645	909
Consumption	499	656	573	539	672
Fixed investment	146	193	149	99	226
Rate of growth of <i>per capita</i> gross product 1953-60		4.2	2.2	0.4	5.2
Average 1953-60					
Coefficient of investment (fixed) * . . .	20.0	22.7	20.0	15.0	25.0
Coefficient of net investment (fixed) *	16.2	16.7	13.0	8.1	19.0
Product-capital ratio	0.35	0.39	0.35	0.34	0.39

SOURCE : ECLA estimates.

* In relation to the gross product.

* Average 1951-53.

It seems reasonable to assume, as a preliminary hypothesis, that maintenance of the post-war rate of development would be the highest rate of growth that could be expected over the next few years. Major problems would stand in the way of its achievement, but it might not be entirely beyond the capacity of the Colombian economy to solve them. Again, if the possible influence of the adverse factors were exaggerated, a minimum estimate might be reached, which would assume that the next few years hold out no very substantial prospects of an improvement in the level attained by the *per capita* gross product throughout the course of the post-war period. Between these two extremes there would, of course, be room for a number of intermediate hypotheses, depending upon the degree of optimism colouring the projection of each of the various factors that determine the rate of growth.

For the purposes of this study, four alternatives were selected to begin with, which for brevity's sake will be called hypotheses *A*, *B*, *C* and *D*. All four fall within the limits mentioned above, and are the result of different combinations of assumptions as to the investment coefficient, the product-capital ratio, exports and the terms of trade, capital receipts and the capacity to import (see table 25). An examination will next be made

of the main consequences of each of these hypotheses, and the assumptions on which they are based.

The projections included in hypothesis *A* imply an annual increase in the *per capita* gross product of 4.2 per cent. From the standpoint of income, this would mean a lower rate of growth than during the post-war years, but in absolute terms the increment would still be so considerable that by 1960 *per capita* gross income would be equivalent to 15 per cent of that at present registered in the United States. Moreover, even this relatively moderate rate (as compared with that attained in recent years) entails several favourable assumptions with respect to world economic conditions and the degree of domestic effort that would be called for.

In the first place, hypothesis *A* would require moderate increases in the investment coefficient and the product-capital ratio over those of the post-war period, although the former had already reached a high level during the years referred to, and the latter had shown a long-term improvement which it would be hard to keep up. This is largely because more capital is needed per person employed in agriculture and industry, and because of the growing relative importance of services, where capital density is very high.

A continuance of the post-war of growth of the product-capital ratio is therefore unlikely. If this latter were to rise to a level of 0.39, the investment coefficient would have to increase to 22.7 per cent, as against the 19.9 per cent registered in 1945-53. Only an abundant inflow of foreign investment could enable so high an investment coefficient to be attained, and a significant increase to take place at the same time in *per capita* consumption, at a rate which even then would represent no more than 60 per cent of that prevailing during the post-war period. On an average, the annual requirements of new foreign capital during the period 1953-60 would amount to over 100 million dollars. This would be equivalent to 2.7 per cent of gross income, or the difference between the average value of the investment coefficient in 1953, which stood at 20 per cent, and the figure of 22.7 per cent which would be the necessary target for the period 1953-60.

Such heavy foreign capital requirements can be accounted for by the recent deterioration in the terms of trade of the Colombian economy. Moreover, there would have to be a substantial expansion of exports if the minimum import needs deriving from the growth under consideration were to be satisfied. This would still be necessary even if a radical change were to take place in the composition of imports and the replacement of imported by domestically-produced intermediate goods were to increase on a considerable scale.

If it is assumed that the terms of trade will not fall below their 1950 level, an annual inflow of foreign capital of 85 million pesos, which would finance an equivalent imports deficit, would mean that annual rates of growth of 4.4 per cent and 4 per cent could be achieved for *per capita* available goods and services and for *per capita* consumption, respectively. It must be borne in mind that the terms of trade would remain at their 1950 level if import prices did not rise and the export price of coffee did not fall below 60 dollar cents per pound. The level in question would thus be higher than that prevailing in any year within the period 1925-53, but approximately 20 per cent lower than that recorded in 1954.

An analysis of the movements of capital and foreign investment during the process of development both in the past and in the immediate future suggests that it would be perfectly possible to absorb and service, during the period 1953-60, the annual net capital inflow of 85 million pesos to which allusion was made in the preceding paragraph. However, this would imply a gross inflow of foreign capital of 105 million dollars—approximately double the post-war annual rate—an outlay of 75 million dollars in amortization, dividends and interest, and a net inflow of 30 million dollars.

The rate of growth envisaged on hypothesis *A* could thus be achieved only by means of a considerable inflow of foreign capital, the maintenance of relatively high terms of trade and the raising both of the investment coefficient and of the product-capital ratio. If any of these were to fail to reach the levels defined above, the rates of growth projected in hypothesis *A* could not be attained, notwithstanding the fact that they are substantially lower than those prevailing in the post-war period.

Hypothesis *B* assumes a less favourable world situation, and at the same time, a powerful internal development effort. The annual rate of growth postulated for the *per capita* gross product is 2.2 per cent during the period 1953-60, or a good deal lower than the post-war rate, and very similar to that registered for the period 1925-53 as a whole. It is further assumed that the product-capital ratio will remain at its 1953 level of 0.35 throughout the whole period 1953-60. This figure, however, is considerably higher than the average for 1925-53.

Given the assumptions adopted in the hypothesis under consideration, the investment coefficient would have to reach 20 per cent, a figure comparable to the average recorded during the post-war years. The terms of trade would be lower than in 1950 but would remain higher than in 1949, provided that Colombia's import prices were maintained at the same level as in 1954, and if the price of coffee fell to 50 dollar cents per pound. It is also assumed that the inflow of foreign capital would be just sufficient to counterbalance payments on amortization, dividends and interest, and that there would therefore be no net inflow of foreign capital.

The annual losses resulting from the deterioration in the terms of trade would amount to 202 million pesos in relation to the 1950 level. The volume of exports would have to exceed that of imports, in order to offset the decrease in their purchasing power consequent upon the deterioration in the terms of trade. As a result, the annual rate of growth of available goods and services, as well as that of *per capita* consumption, would be 2 per cent, that is, lower than the rate corresponding to the *per capita* gross product, which would reach 2.2 per cent. It must be noted that the assumptions enumerated imply the existence of better conditions than during the period 1930-49. In these circumstances, should the investment coefficient fall below an average level of 20 per cent between 1953 and 1960, even the moderate rate of growth projected on hypothesis *B* would be out of reach. If the decline in the investment coefficient were to bring it close to that prevailing during the period 1930-45, the rate of growth of Colombia's *per capita* product would be reduced practically to zero.

This is, in essence, what is assumed to occur in hypothesis *C*, according to which the *per capita* gross product and *per capita* gross income would increase at annual rates of 0.4 per cent and 0.2 per cent respectively, while the product-capital ratio would fall to 0.34 and the investment coefficient to 15 per cent. However, the features characterizing hypothesis *C* may be considered somewhat unrealistic, since, although world economic conditions may gravely deteriorate, Colombia's economy is less vulnerable now than it was during the 'thirties and the Second World War. The foregoing statement is grounded on the fact that the productive capacity of industry is now much larger and allows of a wider range of output, while, in addition, there has been an improvement in the instruments of economic policy for the mobilizing and channelling of domestic resources.

Lastly, it is useful to consider the requisites and assumptions involved in the attainment of an annual rate of growth equal to that registered for *per capita* income during the post-war years. This rate, which was

5.2 per cent yearly, corresponds to hypothesis *D*. If the terms of trade did not fall below their 1950 level and Colombia received an inflow of foreign capital of a little over 100 million dollars a year, and if at the same time the gross product per unit of capital increased to 0.39, an investment coefficient of 25 per cent would be necessary for the attainment of the projected increment in the *per capita* gross product. While this would allow the same annual rate of growth as in the post-war years in terms of the gross product, the annual rise in *per capita* consumption would still be equivalent to only 70 per cent of that registered after the war. The domestic savings and investment effort would in this case be substantially greater than in any year within the period 1925-63, and consequently this hypothesis may be regarded as unrealistic. It should also be pointed out that the possibilities of financing such a rate of growth from external sources are apparently limited by presumable prospects for exports and the capacity for external payments. According to hypothesis *D*, outlay on amortization, dividends and interest would be equivalent to 9 per cent of the capacity for external payments in 1960, on the doubtless optimistic assumption that this latter would increase by 42 per cent between 1953 and 1960.

Given the inflow of foreign capital thus postulated, the proportion of the total stock of capital represented by that accruing from external sources would increase substantially, rising from 7.9 per cent in 1953 to 10.6 per cent in 1960. In 1930, this proportion attained its peak of 11.8 per cent. It is clear that any considerable additional increase in foreign investment, or a change in the composition of such investment which raised the rate of remittances abroad, would seriously limit the Colombian economy's capacity to import. This is only another way of saying that the servicing of foreign investment must be financed with exports; but as these are unlikely to expand as quickly as the internal economy, there is a limit to the capacity for servicing investment from external sources, which would very soon be reached if external gross investment substantially exceeded the annual average of 105 million dollars postulated in hypotheses *A* and *D*. It is also important to stress that in the circumstances corresponding to hypothesis *A*, so great an inflow of foreign capital would permit of a significant increase in *per capita* consumption. As the investment coefficients for hypotheses *A* and *B* would exceed the post-war figure, high though it was, the margin for the expansion of consumption would be reduced unless the Colombian economy received an inflow of foreign capital capable of financing an excess of imports over exports. This would happen even if there were no deterioration in the terms of trade.

Hence it would appear that hypotheses *A* and *B*, which assume annual rates of growth for the *per capita* gross product of 4.2 and 2.2 per cent respectively, may be regarded as realistic and feasible. Hypotheses *C* and *D*, on the other hand, would call for a combination of requisites that it would be difficult to fulfil, and consequently do not seem worth more detailed consideration. On these grounds, the only working hypotheses used throughout the study will be *A* and *B*.

As a supplement to the foregoing comments, the principal projections corresponding to these two hypotheses, and covering 1965 and 1970, may usefully be examined (see table 26).

It was previously shown that hypothesis *A* postulates annual increments of 4.2 per cent in the *per capita* product and 4.0 per cent in *per capita* consumption. However, in order to maintain the latter after 1960, the annual rate of growth of the product, according to these projections, would have to be raised still further, to 4.6 per cent between 1960 and 1965 and to 5.0 per cent between 1965 and 1970. The reason is that so long as no improvement in the product-capital ratio over its 1953-60 average is assumed, the increasing incidence of capital outlays on the amortization and servicing of foreign investment in the later period would necessitate a higher investment coefficient.

Hypothesis *B* also assumes a considerable — proportionally, indeed, a much greater — subsequent acceleration of the rate of growth of the *per capita* gross product in relation to that postulated for the initial period (1953-60). It is estimated that as a result of the expansion of industrial capacity and, in general, of the vigorous development effort that would have to be put forth between 1953 and 1960, a moderate increment in the resources mobilized for investment could be achieved as from the latter year. On this basis, the investment coefficient would rise from 20.0 per cent in 1953-60 to 21.4 per cent in 1960-65 and 25.0 per cent in 1965-70. This in turn, together with the additional assumption of an improvement in the product-capital ratio that would bring it up to 0.39, would enable the annual rate of growth of the *per capita* gross product to increase from 2.2 to 3.6 and 5.0 per cent in each of the periods mentioned. In these circumstances, it would be possible for *per capita* consumption to expand by 3.0 per cent annually in 1960-65 and by 4.0 per cent annually during the following five-year period. Apart from the widening of the margin of resources utilizable for domestic investment, there would also be a slight exportable surplus, enough to finance the net outflow of capital. The greater increase in the volume of exports, moreover, would offset the adverse influence exerted on the capacity for payment by the moderate deterioration assumed to take place in the terms of trade.

In the case of this second hypothesis, it is of interest to note how the unfavourable effects of various factors, mainly external, would determine a rate of growth considerably below post-war levels; but it can also be deduced that by means of a well co-ordinated internal effort the rate of development might recover in the course of some few years, which would mean that in this case it would depend chiefly upon the adequate mobilization of the country's own resources.

These, then, will be the two groups of aggregate projections that will be taken as a basis for the analysis contained in the following sections. Emphasis must be laid, however, on the provisional nature of these hypotheses, and a warning given that in the light of a more detailed study of each of the main sectors of economic activity, many of the estimates involved will have to

TABLE 26. COLOMBIA : ALTERNATIVE PROJECTIONS OF ECONOMIC GROWTH, 1953-60-65-70

	Current 1953	Hypothesis A			Hypothesis B		
		1960	1965	1970	1960	1965	1970
<i>(Millions of pesos at 1950 prices)</i>							
Population	12,111	14,162	15,867	17,758	14,162	15,867	17,758
Gross product	7,751	12,060	16,914	24,170	10,548	14,115	20,170
Terms-of-trade effect	-63	0	0	0	-202	-232	-265
Gross income	7,688	12,060	16,914	24,170	10,346	13,883	19,905
Net inflow of foreign capital	-22	0	-53	-135	—	-140	-270
Available goods and services	7,666	12,145	16,861	24,035	10,346	13,743	19,635
Consumption	6,045	9,290	12,646	17,780	8,115	10,567	14,413
Investment	1,631	2,855	4,215	6,255	2,231	3,176	5,222
Fixed investment	1,777	2,738	4,042	6,042	2,110	3,021	5,042
Changes in inventories	-156	117	173	213	121	155	180
Stock of capital (fixed)	22,262	30,923	43,369	61,974	30,137	36,192	51,718
<i>(Pesos at 1950 prices)</i>							
<i>Per capita</i>							
Gross product	640	852	1,066	1,361	745	890	1,136
Gross income	635	852	1,066	1,361	731	875	1,121
Available goods and services	633	858	1,063	1,353	731	866	1,106
Consumption	499	656	797	1,001	573	666	812
Total investment	134	202	266	352	158	200	294
		53-60	60-65	65-70	53-60	60-65	65-70
<i>(Averages)</i>							
Coefficient of gross investment (fixed) *	20.0	22.7	23.9	25.0	20.0	21.4	25.0
Coefficient of net investment (fixed) *	13.0	16.7	17.9	19.0	13.0	15.4	19.0
Product-capital ratio	0.35	0.39	0.39	0.39	0.35	0.39	0.39
<i>Annual per capita growth rates</i>							
Gross product		4.2	4.6	5.0	2.2	3.6	5.0
Gross income		4.2	4.6	5.0	2.0	3.7	5.0
Available goods and services		4.4	4.4	4.9	2.0	3.4	5.0
Consumption		4.0	4.0	4.6	2.0	3.0	4.0
Total investment		4.1	5.6	6.0	2.0	4.8	8.4

SOURCE : ECLA.

* In relation to the gross product.

* Average 1951-53.

be corrected later. In other words, the method that will be followed entails two clearly differentiated stages. In the first, the aggregate projections are determined to begin with, as the basis for a consistent analysis by sectors ; in the second, it is the findings of the sectorial analysis that must be taken into account as a means of correcting the provisional aggregate projections initially established.

II. THE DEMAND FOR EXPORTS AND THE CAPACITY TO IMPORT

The projections described include a series of assumptions as to the role that might be played by the external sector in the country's future economic development. Since these hypotheses to a very large extent determine the possible rate of growth, a detailed examination must be made of their justifiability and general validity.

Again, projections of exports in turn constitute a significant pointer to prospective changes in the structure of domestic production, because of the expansion they call for in the sectors producing exportable goods and services.

Some general anticipatory remarks on the nature of the alternative projections for the external sector will not be out of place at this point. In this case, too, various possibilities are taken into account, and two hypotheses, one maximum and the other minimum, are ultimately adopted. These, however, constitute extremes within which the variables under consideration may reasonably be expected to fluctuate, rather than specific estimates of potential values. Furthermore, the projections of the external sector, mainly based on a survey of world demand for the various export commodities and on predictable world supply conditions, are fundamentally independent of the rate of internal development ; only

for the sake of simplicity, therefore, is the most optimistic assumption as to the growth of income associated throughout the study with the maximum possibility for exports, and the minimum export hypothesis with that of moderate growth.

The ultimate aim of the analysis is the formulation of reasonable projections of possible future changes in the capacity to import. Within the over-all framework of projections, this is an essential stage, since the import requirements that will derive from higher income levels and the development of the sectors of production must be compared with the available capacity to effect such imports, before the real possibilities of achieving the postulated growth can be appraised or the magnitude of the necessary import substitution effort assessed. Hence an analysis will next be made of each of the determinants of the capacity to import.

1. *Projections of the quantum and unit value of exports*

In Colombia's case, the projection of exports is somewhat simplified by the economy's lack of diversification and great dependence on a single foreign market. As was previously mentioned, coffee, petroleum and bananas have accounted for over 90 per cent of the country's exports, except in a few years during the Second World War; at the same time, foreign demand has been shaped almost exclusively by United States imports (except where bananas are concerned), although the great importance that might be acquired by other markets cannot be overlooked.

A special study³ was made, in full detail, of the characteristics of external and internal demand, the country's production potential, the distribution of world exports, etc., in the case of each of the staple commodities mentioned, as well as for minor exports as a whole. This analysis resulted in the formulation of the projections of the volume, value and composition of future exports which are briefly summed up in the following paragraphs.

As regards coffee, the conclusion reached is that, despite the predicted recovery and steady expansion of consumption in the United States and Europe respectively, world supply is likely to exceed demand. Consequently, by 1960 the value of Colombia's coffee exports, according to the most favourable hypothesis, would barely have risen above its 1954 level, which it would not regain even by 1965 on the minimum hypothesis. In both cases, however, the volume of coffee sales would increase considerably, reaching a figure between 6.2 and 7.2 million bags by 1960 and between 7.0 and 8.0 million by 1965. The explanation of this disparity between the increment in the quantum of coffee exports and the small increase — or even the decrease — in their value, lies in the relative magnitudes of the income-elasticity and price-elasticity coefficient of world market demand for this product, which are hardly compatible with the simultaneous projection of a significant rise in the

volume and value of exports. It is thus assumed that, given the sales volumes mentioned, and in order that a certain consonance might exist between world supply and demand, the price of Manizales coffee would fluctuate between 50 and 60 dollar cents per pound. However, on the basis of the current rate of new plantings and present yields, Colombia's output of coffee for export might exceed even the maximum export possibilities projected for 1960. If, in such circumstances, the country were to attempt to export a larger amount of coffee than that projected, the fall in the price would probably more than offset the effect of the increased volume on the total value of sales abroad, a point which emphasizes the great importance of a policy aimed at diversifying the composition and markets of destination of Colombia's exports.

With respect to petroleum, no limitations to a substantial expansion of exports seem likely to derive from world market demand, which, on the contrary, is expected to continue increasing at a fairly rapid rate. In contrast, it may be anticipated that the growth of Colombia's sales of petroleum abroad might be seriously affected by the influence of other factors, such as the parked expansion in domestic consumption of this fuel, which is tending to absorb an ever-larger proportion of the country's total output, and the restricted possibilities for an expansion of domestic production, exclusively based as they are on the potential yield of new oilfields or of areas that are still being prospected.⁴ Thus, only on the assumption of extremely favourable conditions can exports of crude be projected as fluctuating between 35 and 45 million barrels by 1960, and between 39 and 55 million by 1965, within the two hypotheses under consideration.⁵ It is further assumed that there will be a continuance of the last fifteen years' tendency for the price of petroleum to rise more rapidly than over-all world price levels; this would mean that the price per barrel would increase from 2.50 dollars in 1954 to 2.70 in 1960 and 2.90 in 1965.

The analysis of world banana demand and supply, as well as of the prospects for the expansion of domestic production, gives rise to projections which imply increments in the volume of exports in relation to the 1953 figure, very modest in the case of the lower hypothesis and substantial in that of the more optimistic.

⁴ See in this connexion, apart from annex I (*loc. cit.*), Part Two, chapter IV.

⁵ It must be acknowledged that the figures used here for the projections of the volume of petroleum exports do not, apparently, correspond to an objective appraisal of existing conditions in the industry, which suggest much more modest possibilities. As can be seen in detail in Part Two, chapter IV, unless further prospecting were to yield unexpectedly favourable results and productive capacity were to be rapidly developed at a considerable number of new wells, the expansion of production might fail to keep pace with the growth of domestic consumption, and in that case the volume of exports would be even smaller than at present. Nevertheless, in these aggregate projections it was felt preferable to keep to hypotheses which may be regarded as exaggeratedly optimistic — although not entirely beyond the bounds of possibility, since the country seems to possess substantial reserves — with the idea that later, when these projections are integrated with those of other basic variables, the consequences of attaining only such export levels as are indicated by present conditions to be the most feasible will become apparent.

³ See annex I, "Export prospects for principal commodities", at the end of this study.

TABLE 27. COLOMBIA : PROJECTIONS OF THE COMPOSITION OF EXPORTS AND THE TERMS OF TRADE

(Millions of pesos at 1950 prices)

	1950	1953	1954	1960		1965	
				A	B	A	B
Quantum of exports	1,101	1,529	1,350	1,918	1,598	2,315	1,853
Coffee	830	1,214	1,046	1,329	1,144	1,477	1,292
Petroleum	176	200	185	278	217	334	238
Bananas	26	34	35	95	74	110	80
Unminted gold	33	38	39	54	41	68	46
Other agricultural commodities	17	28		(105)		(205)	
Ores	4	9	45	27	122	59	197
Manufactured and miscellaneous goods	15	6		30			
Unit value of exports	100	110	134	115	100	115	100
Unit value of imports	100	115	112	115	115	115	115
Terms-of-trade index	100	96	120	100	87	100	87

SOURCE : ECLA estimates.

Exports of other commodities, of secondary importance, have shrunk in recent years to less than 3 per cent of the total value of exports, and their future trends will mainly depend upon a favourable exchange policy, possible bilateral barter and clearing agreements, and intra-regional trade prospects. There is no need in this instance to study the world market outlook in order to formulate the projections concerned, as in any event the exports under review will be marginal and will represent, even according to the most optimistic forecasts, only a small proportion of world market availabilities during the period covered by this study. In any case, a marked increase is assumed for several agricultural and mining commodities constituting minor export lines. As regards manufactured goods, it is doubtful whether domestic production can expand fast enough for internal demand to be satisfied and a sizeable quantity to be exported to other Latin American countries as well; however, inter-Latin American trade in manufactured goods might attain significant proportions by 1965, and this possibility is also taken into account in the projections.

These projections are outlined in the aggregate in table 27. The figures for each commodity or group of commodities are given in terms of 1950 prices, so that they provide an indication of fluctuations in the quantum of exports. The hypotheses adopted as to possible variations in the prices of export commodities are reflected in the index of the unit value of exports. It will be seen that this latter is a good deal lower than in 1954 on both hypotheses, and equivalent to the 1950 figure in the case of hypothesis *B*.

In brief, the detailed analysis of export prospects reveals that a change cannot reasonably be expected in past trends, which indicate a marked disparity between the growth of exports and the over-all development of the Colombian economy.⁶ Whatever the growth hypo-

⁶ It should be recalled that between 1925-29 and 1950-53 the annual *per capita* rate of growth of exports stood at barely 0.8 per cent, whereas *per capita* income increased at a yearly rate of 2.2 per cent.

thesis adopted, prospects for an expansion of the export trade will be a great deal less promising than those of an increase in gross income, the implication being that the import substitution process must be intensified, unless a much more favourable development of the other determinants of the capacity to import is achieved.

2. Exports of services

Foreign exchange receipts on the services account have been of little relative importance in Colombia's balance of payments. In most years service expenditures (excluding freight and insurance payments to foreign shipping lines) have been over twice as large as income under this head. The principal sources of service receipts are the earnings of the merchant marine, the tourist industry, the expenses of foreign diplomats and consular agents, and miscellaneous services.

By far the most important source is the first of these — earnings of the Gran Colombiana merchant fleet. These have exceeded the combined income from all other services since 1948. Nevertheless, since gross earnings of the fleet appear as service receipts, while its expenditure abroad is included under service imports, it would seem that the contribution of this source to the balance of payments is really exaggerated.⁷ It is estimated, moreover, that about 70 per cent of the fleet's gross earnings are paid out abroad in foreign currency, mainly owing to the fact that nearly half of the ships concerned are charter vessels, which absorb about 80 per cent of earnings in expenditure abroad, whereas the proportion for nationally-owned ships is approximately 60 per cent.⁸ The programme for expanding the fleet envisages the replacement of these charter vessels rather than an increase in the total number of ships, so that the effect

⁷ Colombia must also reimburse to the co-owners of the fleet (Venezuela and Ecuador up to 1953 and only Ecuador thereafter) their share of net operating profits. This reimbursement appears under profits remittances in the balance of payments.

⁸ See *Study of Inter-Latin American Trade* (E/CN.12/369/Rev.1), United Nations publication, Sales No. : 1956.II.G.3, chapter VI.

on the balance of payments will be not so much an increase in gross earnings as a reduction of payments in foreign currency. For this reason, the rise in transport receipts projected is very moderate until 1960, with a somewhat greater increase between this year and 1965, as new units begin to add to total fleet tonnage instead of replacing rented equipment.

Aside from transport receipts, the remainder of the income from services is provided by the group termed "miscellaneous services". Official balance-of-payments statistics are not explicit as to the content of the group, but figures supplied by the Exchange Control Office show that in 1953 income from this source amounted to 15 million dollars. This sum reflects a considerable increase during recent years, especially in relation to the 1952 figure of only 9 million dollars. Hence 1953 may have been an abnormally favourable year, so that in hypothesis *B* this possibility is taken into account.

TABLE 28. COLOMBIA : PROJECTIONS OF EXPORTS OF SERVICES

(Millions of dollars)

	Transport (Gross receipts)	Other services ^a	Total
1947	3.8	13.9	17.7
1948	13.3	11.4	24.7
1949	18.7	8.3	27.0
1950	22.6	10.7	33.3
1951	22.2	10.5	32.7
1952	25.2	11.7	36.9
1953 ^b	28.0	17.4	45.4
<i>Projections:</i>			
1960 <i>A</i>	30.0	25.0	55.0
<i>B</i>	30.0	20.0	50.0
1965 <i>A</i>	40.0	30.0	70.0
<i>B</i>	35.0	22.0	57.0

SOURCES: Official balance-of-payments statistics presented to the International Monetary Fund ; the projections are ECLA estimates.

^a Tourist industries, diplomatic and consular expenditure in Colombia, and various services.

^b Provisional.

Income from other service transactions — the tourist industry and expenditure connected with foreign government representation in Colombia — has apparently been declining in recent years, although balance-of-payments estimates are open to particularly wide margins of error in the case of these two categories.⁹ After rising to 6 million dollars in 1948, income from these sources fell to only 2.5 million in 1953. The decrease was due entirely to the tourist industry, however, since receipts from the other source remained relatively

⁹ Tourist trade receipts are rough estimates obtained from the exchange registration records. They are under-estimated in proportion to the amount of exchange sold outside the banking system by foreign travellers in Colombia. Credit entries in the balance of payments for foreign official representation expenditure are merely approximations, since no record is kept of such outlays.

stable. In the relevant projections it is therefore assumed that travel and foreign representation expenditure will not contribute much more than their present share to receipts in 1960 and 1965.

As can be seen in table 28, the global projections for the services account show receipts rising from 45 million dollars in 1954 to between 50 and 55 million dollars in 1960 ; the figures for 1965 are 70 and 57 million dollars in hypotheses *A* and *B* respectively. These amounts represent about the same proportion of the total exports projected in this study as they have historically in Colombia's balance of payments (between 7 and 8 per cent except during the 'thirties). According to hypothesis *B*, the proportion fluctuates around 8 per cent, while in projection *A* the share of services drops to about 7 per cent of the value of commodity exports.

3. Projections of foreign investment

Another of the determinants of the capacity to import is the movement of foreign capital, from the standpoint both of income (the gross inflow of capital) and of expenditure (amortization and remittances of profits and interest). At a later stage a fairly detailed examination will be made of the three main sectors giving rise to such movements of capital, viz., foreign investment in petroleum, other private investment and the external public debt. Meanwhile, it seems preferable to give some anticipatory idea of the general findings of the analysis, so that the future outlook for foreign investment may be outlined in terms of the over-all situation.

The recent increase in such investment in Colombia, and current prospects of a steady inflow, indicate that the foreign sector can be expected to play a positive part in financing economic development in the future. On the most pessimistic of the assumptions that fall within reasonable limits, it is unlikely that the net foreign investment figure will become negative, as it did after the world depression. Even the minimum hypothesis of growth must therefore take into account a certain net inflow of capital. In order to simplify the determination of a lower extreme, it will be assumed that between 1953 and 1960 the net inflow of foreign investment will be sufficient only to offset remittances of profits and interest. This hypothesis would necessitate foreign investment of about 30 million dollars *per annum* ; not an insignificant amount, but smaller, nevertheless, than the annual average estimated for net capital receipts during the period 1951-53. As will be seen later, petroleum investment and official loans which have already been proposed would probably be sufficient to finance this rate. After 1960, the minimum hypothesis will depend on how much the maximum rate of foreign investment up to that year may decline thereafter. This aspect of the problem will also be taken up later.

For the maximum foreign investment projection, a global rate will be fixed, and the contribution from each of the various sources of foreign funds required for the attainment of the over-all goal will be analysed. It should be pointed out in passing that the method of projecting investment must necessarily be different from that employed in projecting exports of goods and

TABLE 29. COLOMBIA : GLOBAL FOREIGN INVESTMENT PROJECTIONS

(Millions of dollars at 1950 prices)

	1953	Increase		Increase	
		1953 to 1960	1960	1960 to 1965	1965
(A) Total stock of capital	8,245	3,208	11,453	4,609	16,062
(B) Foreign investment	654	560	1,214	400	1,614
(C) Percentage relationship B/A ..	7.9	17.4	10.6	8.7	10.0

SOURCE : ECLA estimates.

services. Capital receipts tend to fluctuate very widely over a period of time, so that it would be unrealistic to assume that they are bound to reach a given level by 1960. Instead, the 1960 figure will be taken to represent average annual investment over the entire period 1954 to 1960, and the 1965 figure will stand for average annual investment between 1960 and 1965. It is thus assumed that over the intervening years fluctuations above and below the average rate will cancel out. Similarly, consonance must be maintained between the maximum and minimum foreign investment projections and the optimistic and moderate hypotheses as to the over-all rate of growth, in view of possible limitations to the economy's capacity to absorb a specific amount of foreign capital.¹⁰

In formulating the global projections, it was assumed that foreign investment would continue to account for a marginal but increasing share of total domestic capital formation, and, consequently, that this proportion would rise from 14 per cent in 1951-53 to 17 per cent in 1953-60. Since the rate of domestic capital formation envisaged under the general conditions postulated in hypothesis A would be considerably more rapid than those recently registered, the maintenance of the proportion in question would require total net foreign investment of nearly 560 million dollars between 1953 and 1960, that is, 80 million dollars *per annum*. This figure, which was exceeded only in 1927 and 1928, is double the 1951-53 rate and 20 million dollars a year greater than annual foreign investment during the whole of the quinquennium 1925-29 (in terms of dollars at 1950 prices). Furthermore, a net investment of 560 million dollars would necessitate a gross capital inflow of 735 million dollars, or 105 million yearly, and would thus raise the total value of foreign investment by 85 per cent, or to 1,214 million dollars by 1960, that is, to 10.6 per cent of the country's total stock of capital.

To maintain the same marginal share in total capital formation between 1960 and 1965 (14.0 per cent), net

¹⁰ In the present study it has not been thought necessary to attempt to measure statistically Colombia's capacity to absorb foreign capital, which would depend on a rather complicated set of assumptions and inter-relationships between factors such as average and marginal savings rates, changes in the product-capital ratio, the effect of investment in import substitution and in the expansion of exports, etc. In any event, the burden of foreign investment amortization is at present relatively light, and, as will be seen, even on the maximum growth hypothesis, it would not increase enough to create balance-of-payments difficulties in the future.

foreign investment would subsequently have to rise to about 115 million dollars *per annum*. Such a rate seems unreasonably high even for a maximum hypothesis, since it would imply a *gross* annual inflow of almost 150 million dollars. Consequently, table 29 is based on the assumption that for 1960-65 the most favourable feasible hypothesis would be a continuance of the 1954-60 rate of net foreign investment, namely, 80 million dollars *per annum*. On this postulate, the marginal contribution of the foreign sector to total capital formation would fall to 8.7 per cent, and by 1965 foreign investment would decline to 10 per cent of the country's stock of capital. Thus, even if domestic capital formation were to continue at the same rapid rate after 1960, an even greater share of it would have to be financed with domestic resources. This conclusion has important implications, since it signifies that a swift and steady rate of growth could be obtained only in proportion to the effectiveness with which domestic savings were mobilized to take over an increasing responsibility for the financing of total investment requirements.

Aggregate foreign investment projections having thus been described in general terms, more detailed consideration may now be given to the main sources of foreign capital which might contribute to their actual fulfilment.

(a) Investment in petroleum

Projections of petroleum exports and the required expansion of production to satisfy domestic demand, supplemented by widely-accepted coefficients of capital per unit of output,¹¹ provide the basis for an estimate of this sector's future investment needs.

If the production of the *Empresa Colombiana de petróleos* were maintained or increased only slightly, to meet maximum projections foreign petroleum companies would need to augment their capacity by about 25 million barrels by 1960, which would require approximately 280 million dollars, that is, 40 million yearly. Such an increase would signify a doubling of the current value of foreign investment in Colombian petroleum. This would not be unreasonable in view of what has been done in other countries recently in even shorter periods of time; moreover, the current rate of investment is probably already very near the projected figure. The amount of additional investment needed to satisfy

¹¹ It has been estimated that an investment of approximately 80 dollars is needed in order to discover, produce and transport one ton of crude oil.

TABLE 30. COLOMBIA : PETROLEUM COMPANY TRANSACTIONS

(Millions of dollars)

	1951	1952	1953
<i>Inflow :</i>			
1. Inflow of dollars	32.9	47.6	54.6
2. Imports of : (a) Equipment	11.6	17.4	18.3
(b) Refined products	8.0	16.6	22.3
3. Expenditure abroad	7.1	8.2	7.6
4. Wages	4.7	4.8	6.5
5. Miscellaneous	1.7	3.9	5.3
Total	66.2	98.6	114.6
<i>Outflow :</i>			
1. Dollar remittances	9.0	16.5	23.6
2. Petroleum exports	72.4	71.8	77.0
3. Exports of : (a) Equipment	1.4	0.3	—
(b) Refined products	0.1	0.1	0.3
4. Fuel supply			0.1
5. Miscellaneous	4.7	2.9	2.7
TOTAL	87.7	91.6	103.6
Net balance	-21.5	+7.0	+10.9

SOURCE : Statistics supplied by the Exchange Control Office (*Oficina de Control de Cambios*), Colombia.

minimum demand in 1960 would be about half as much, or 20 million dollars *per annum*. The same rates for the maximum and minimum hypotheses would also have to continue during the period 1961-65 if domestic and export requirements were to be complied with.

The measurement of the impact which the above investment rates would have on the balance of payments is complicated by the lack of current information on petroleum transactions in Colombia. Balance-of-payments figures provide only an estimate of net foreign exchange movements in the petroleum sector, including local operation expenses, taxes, profits remittances and capital movements. If the net figure is positive, it is included in the capital account as an increase in foreign investment ; and if it is negative, it appears as a remittance of profits in the balance of payments. Recent trends are summarized in table 30, which shows exports of petroleum as an outflow of foreign exchange, and imports of supplies and equipment as an inflow, in order to offset the entries in the current account and avoid double counting.

The problem is to separate capital movements from other transactions and to estimate the proportion of the petroleum companies' income accruing to the benefit of the country in the form of local operation costs and taxes and royalties paid to the Government. That part of income which is not paid out in the country can be assumed to be available for remittance abroad or for reinvestment. With regard to taxes and royalties paid to the Government, the system in Colombia is rather complicated in that only a minor share of fiscal revenue depends upon the income of foreign companies. The

major part comes from royalty payments, which are calculated as a percentage of production and vary according to the distance of the oilfields from the ports of embarkation, and the legal status of the foreign firms.¹² In 1954, the average rate for royalty payments was almost 8 per cent of production. In addition to royalties, fees are charged for the transport of oil through national pipelines and for the right to exploit petroleum (*cánones superficarios*). Taxes are charged on the capital as well as on the net income of the petroleum companies, although both exports of petroleum and imports of supplies and equipment are exempt from all taxation. Since foreign oil firms derive some income from refining and distribution activities within the country, it is by no means easy to calculate the proportion of total payments as a percentage of gross income, but partial data indicate that the figure is close to 25 per cent. If current operational expenditure within the country amounts to some 50 per cent of income, the foreign companies are left with about 25 per cent for remittance abroad in the form of dividends or for reinvestment. Petroleum profits have considerably exceeded 25 per cent of oil sales in other countries, so that the assumptions made in this study can be considered very favourable for Colombia and compatible with the maximum hypothesis.

According to the above estimates, foreign petroleum company profits at present amount to a minimum of 15 million dollars yearly. In table 32, where these projec-

¹² Lower royalty rates are applied to the production of firms exploiting private land holdings ; the majority of producers, however, work concessions granted by the Government.

tions are integrated with those of other sectors, profits are assumed to rise to an average of 20 million dollars *per annum* during 1954-60 on hypothesis *A*; this is a very modest estimate, and implies that the expansion of petroleum exports would take place mainly towards the end of the period. After 1960, earnings of foreign oil companies would grow very rapidly if production increased as projected; average 1961-65 profits have therefore been placed at an annual 45 million dollars. During this period a progressively larger proportion of production would be absorbed by domestic consumption, so that investment income remittances would also tend to absorb an increasing share of petroleum export receipts.

(b) *Other private investment*

Private foreign investment in Colombia outside the petroleum sector has not been of great quantitative importance in recent years. Between the end of the war and 1953, such investment amounted to something like 80 million dollars, or only about 35 per cent of the total increase in the value of foreign investment during the period, in spite of the fact that the public debt was declining up to 1950. Approximately 55 million dollars of the increase came from the United States, about half of this sum being invested in manufacturing and the rest principally in trade and miscellaneous activities.¹³

For the most favourable projection of foreign investment, it would really be more advantageous if the participation of private capital were kept to a minimum and public investment were to represent as large a share of the aggregate figure as possible, owing to the relatively high rate of return on private investment. As the importance of investment in manufacturing, trade and financial activities grows, and as the relative share of investment in basic activities continues to decline, the average rate of return will rise. By 1953, income remittances on United States non-petroleum investment in Colombia amounted to about 10 per cent of invested capital, although this rate was apparently superior to the average for all non-petroleum investments in the country. On hypothesis *A*, this investment is assumed to rise only from 12.7 million dollars to 15 million *per annum* between 1951-1953 and 1954-60; but dividend remittances are calculated to average 17 million annually, so that the net movement of foreign exchange accounted for by this sector would be negative, to the extent of two million dollars. Between 1960 and 1965, these remittances could be expected to rise still higher, to an annual 30 million dollars, even if the rate of investment did not increase.

(c) *The external public debt*

As has already been observed, since 1950 a marked improvement has taken place in foreign loans to official agencies in Colombia. During the years 1951 to 1953,

¹³ Since 1929, changes in the composition of United States investment in Colombia have been very marked. In that year, basic activities (agriculture, public utilities, mining and smelting) accounted for about three-fourths of private non-petroleum investment. In 1953, this proportion was reduced to approximately 40 per cent, as capital was withdrawn from these activities or increased very little.

gross official capital receipts averaged 35 million dollars *per annum*, or, if amortization payments are taken into account, a net figure of about 20 million yearly. Intensive activity enlisted the co-operation of foreign sources of public funds not previously drawn upon. It is therefore not unreasonable to assume that official investment could fill the gap between the maximum aggregate investment projection (80 million dollars yearly) and optimum private investment (55 million yearly). The resulting figure of 25 million dollars *per annum* is in fact very little above the 1951-53 figure, although owing to the present heavy amortization payments and the projected increase in the public debt, a gross annual inflow of 50 million dollars would be required to yield this rate of net investment.

Prospects for future foreign loans to the Colombian Government, official agencies and municipalities seem very favourable. At the present time the Government possesses a credit balance with the Export-Import Bank and International Bank for Reconstruction and Development of nearly 50 million dollars. The *Banque de Paris et des Pays-Bas* recently approved a further investment of 50 million dollars in the expansion of the Paz del Río steel plant. A short time ago another French bank also extended a credit of 35 million dollars for the construction of a railway and tunnel between the departments of Valle del Cauca and Cundinamarca. According to unconfirmed reports, a British banking syndicate is negotiating a loan which might amount to 100 million dollars for the construction of public works in the city of Bogotá, and miscellaneous credits from various foreign firms and banks which have already been approved or are under discussion might represent another 50 million dollars. Even if only the loans enumerated were to be obtained by 1960, they would suffice to finance 285 million of the 350 million dollars required to fulfil the projection, and it is likely that the Export-Import Bank and International Bank would continue to note that an official public debt study cited elsewhere¹⁴ recommends that Colombia contract additional external debt, and in the model given to illustrate the amortization of an increase in the debt, an annual inflow of 50 million dollars is also assumed. It can thus be affirmed that the maximum hypothesis of foreign official investment adopted in this study is quite within the range of feasibility.

In order to project the servicing of the increase in the public debt, certain simple assumptions had to be made as to average rates of amortization and interest and payment terms. At the end of 1952, 31 per cent of the public debt was medium-term (from one to ten years) and the rest long-term (up to thirty years). The relative importance of the medium-term debt is unlikely to decline in the future, owing to the very active part played by private foreign companies in financing Colombian purchases of capital goods. Nevertheless, in conformity with the most favourable hypothesis, it was assumed that the average term for these credits would rise to 7.5 years. For the long-term loans, which are assumed to account for 60 per cent of the debt, service charges

¹⁴ National Economic and Fiscal Programming Department, *Informe de la deuda publica externa (Report on the external public debt)*, Bogotá, 1954, p. 135.

TABLE 31. COLOMBIA : PROJECTIONS OF THE EXTERNAL PUBLIC DEBT

Year	The old debt				The new debt, hypothesis A				The new debt, hypothesis B			
	Balance at beginning of period	Utilization	Amortization	Interest	Balance at beginning of period	Utilization	Amortization	Interest	Balance at beginning of period	Utilization	Amortization	Interest
1954	204.7	19.0	19.5	8.6	—	31.0	—	—	—	—	—	—
1955	201.9	6.3	23.2	8.3	31.0	43.7	—	1.4	—	—	—	—
1956	182.5	3.6	21.8	7.6	74.7	46.4	2.3	3.4	—	0.7	—	—
1957	161.7	0.3	19.1	6.9	118.8	49.7	5.6	5.3	0.7	18.8	—	—
1958	140.6	—	16.4	6.1	162.9	50.0	8.9	7.3	19.5	16.4	—	0.9
1959	120.6	—	12.9	5.5	204.0	50.0	12.2	9.2	35.9	14.4	1.5	1.6
1960	104.9	—	10.5	5.1	241.8	50.0	15.3	10.9	48.8	13.2	2.7	2.2
1961	91.5	—	6.8	4.7	276.5	50.0	18.1	12.4	59.3	10.5	3.7	2.7
1962	81.7	—	5.4	4.5	308.4	50.0	20.7	13.9	69.8	9.8	4.4	3.1
1963	73.1	—	5.4	4.3	337.7	50.0	23.1	15.2	75.2	10.6	5.2	3.4
1964	64.5	—	4.5	4.1	364.6	50.0	25.3	16.4	80.6	10.1	5.6	3.6
1965	56.7	—	3.8	4.0	389.3	50.0	27.3	17.5	85.1	9.8	6.0	3.8

Year	The total debt, hypothesis A				The total debt, hypothesis B			
	Balance at beginning of period	Utilization	Amortization	Interest	Balance at beginning of period	Utilization	Amortization	Interest
1954	204.7	50.0	19.5	8.6	204.7	39.3	21.3	7.0
1955	232.9	50.0	23.2	9.7	201.9	19.0	19.5	8.6
1956	257.2	50.0	24.1	11.0	182.5	4.3	21.8	7.6
1957	280.5	50.0	24.7	12.2	162.4	19.1	19.1	6.9
1958	303.5	50.0	25.3	13.4	160.1	16.4	16.4	7.0
1959	324.6	50.0	25.1	14.7	156.5	14.4	14.4	7.1
1960	346.7	50.0	25.8	16.0	153.7	13.2	13.2	7.3
1961	368.0	50.0	24.9	17.1	150.8	10.5	50.5	7.4
1962	390.1	50.0	26.1	18.4	151.5	9.8	9.8	7.6
1963	410.8	50.0	28.5	19.5	148.3	10.6	10.6	7.7
1964	429.1	50.0	29.8	20.5	145.1	10.1	10.1	7.7
1965	446.0	50.0	31.1	21.5	141.8	9.8	9.8	7.8

SOURCE : For the old debt : National Economic and Fiscal Programming Department, *Informe sobre la Deuda Pública Externa (Report on the external public debt)*, Bogotá, 1954. Projections of the new debt are ECLA estimates.

NOTE : See text for explanation of methods of formulating these projections.

were based on an average amortization period of twenty years, which is certainly the most favourable that could be expected. The current average interest rate of 4.5 per cent *per annum* was employed for future debt service projections.¹⁵ With regard to payment terms, it was assumed, to simplify calculations, that amortization payments would commence two years after disbursements and would apply only to the amounts actually disbursed, although, in practice, a fixed annual payment of some part of the loan over a stipulated number of years is probably required in most cases. Interest charges were calculated on the basis of the amount of the outstanding public debt at the beginning of each year.

These public debt estimates are assembled in table 31. It will be seen that new debt projections are calculated separately from the old debt, since all those relating to the latter are based on official statistics.

An inflow of foreign official financing consistent with the maximum projection would thus mean that between

¹⁵ Credits of the Export-Import and International Banks at present carry an interest charge of nearly 4 per cent, but the average rate for foreign private loans is somewhat higher than 4.5 per cent.

1953 and 1960, the public debt would increase by 142 million dollars, or from 205 to 347 million. The rise in amortization expenditure would be very moderate, because of the high level of current payments, while interest would grow from 9 million dollars in 1953 to 16 million in 1960. Thus, under the terms of hypothesis A, the increment in debt servicing would be considerably less than the expansion in the total capacity for external payments. Hypothesis B assumes that just enough official funds would be received to finance amortization payments. This assumption would imply the reduction of the external public debt to about 154 million dollars in 1960. It is important to note that if the same maximum rate of official investment (hypothesis A) were to continue until 1965, by that year total annual debt servicing (amortization plus interest) would exceed receipts of official capital.

The foregoing observations are condensed in table 32, which shows the several projections of the amount of foreign investment and its amortization.

To sum up, the maximum hypothesis for foreign investment in Colombia during 1954-60 envisages net

TABLE 32. COLOMBIA : PROJECTIONS OF FOREIGN INVESTMENT AND ITS SERVICING
(Millions of dollars at 1950 prices)

	Investment	Amortiza- tion	Net investment	Dividends and interest	Net movement of exchange
<i>1951-53 (Annual average) *</i>					
Petroleum .....	..	..	..	..	-6.2 ^e
Other private investment	12.7	3.4 ^b	9.3	11.5	-2.1
Official loans	34.9	14.4	20.5	7.5	12.9
TOTAL	47.6	..	..	..	4.6
<i>1960</i>					
<i>Hypothesis A :</i>					
Petroleum	40	—	40	20	20
Other private investment	15	—	15	17	-2
Official loans	50	25	25	13	12
TOTAL	105	25	80	50	30
<i>Hypothesis B :</i>					
Petroleum	20	—	20	17	13
Other private investment	10	—	10	16	-6
Official loans	20	20	—	7	-7
TOTAL	50	20	30	30	0
<i>1965</i>					
<i>Hypothesis A :</i>					
Petroleum	40	—	40	45	-5
Other private investment	15	—	15	30	-15
Official loans	50	30	20	20	—
TOTAL	105	30	75	95	-20

SOURCES : For 1951-53 average, official balance-of-payments statistics. Projections are ECLA estimates.

* In current dollars.

^b Purchase of Venezuelan assets in the *Flota Grancolombiana* by the Government during 1953, for 10.1 million dollars.

^c Purchase by the Government in 1951 of Tropical Oil Company assets for 15 million dollars, and net foreign petroleum company transactions.

annual capital receipts of 80 million dollars, of which 25 million would represent official funds and the rest private investment. Remittances of dividends and interest would amount to 50 million dollars *per annum*, permitting an annual net inflow of foreign exchange to a value of 30 million. It is assumed that between 1960 and 1965 the same level of gross foreign investment as in the preceding period would be maintained in the case of hypothesis A, but that amortization payments would rise, so that net capital receipts would decline to 75 million dollars; official interest payments would then offset net public investment, and greater profits remittances would give rise to an unfavourable net movement of foreign exchange amounting to 20 million dollars yearly. According to the minimum investment hypothesis, during the first period the net investment of 30 million dollars annually would correspond entirely to the private sector and would just be enough to offset remittances of profits and interest. For 1961-65, the

minimum projection would depend on how much maximum investment during the previous period might decline after 1960. Many alternative assumptions could be presented in this connexion, but, for the sake of simplifying the projections, it can be assumed that investment would decline sufficiently to give rise to a net annual outflow of foreign exchange amounting (after deduction of profits and interest) to 50 million dollars, which would preserve the same margin between maximum and minimum hypotheses in 1961-65 as existed during the previous period.

The other point to be examined in this section is the future role of foreign investment in Colombia, as deduced from the projections. It has already been seen that maximum foreign investment is projected to account for 17.4 per cent of aggregate investment in the country (according to growth hypothesis A) during 1954-60, which would raise its share of the total stock of capital to a little over 10 per cent by the latter year. For the

investment target to be attained, capital formation would have to absorb over 22 per cent of gross income in Colombia, 2.0 per cent of which would thus be supplied by foreign capital. This figure is far below the relative contribution of the external sector in 1925-30, but it signifies that the target mentioned could be reached without a reduction in the projected rate of growth of *per capita* consumption. In the case of hypothesis *B*, external capital would contribute only about 8 per cent of the total investment required according to over-all growth hypothesis *A*. During the succeeding period (1961-65), even under the most favourable circumstances, a greater share of total capital formation would have to be borne by the domestic sector, since the maximum and minimum foreign investment projections would satisfy only 9 and less than 6 per cent, respectively, of capital requirements as defined by hypothesis *A*.

The future impact of foreign investment on Colombia's balance of payments would be rather moderate, according to the projections. In 1960, maximum foreign capital receipts would contribute approximately 12 per cent of the capacity for external payments, a share which, although higher, as will be recalled, than in 1951-53, is much the same as that registered for the quinquennium 1945-49. Nevertheless, it must be stressed that the investment projections are annual averages; maximum investment would therefore represent probably about one-sixth of the present level of Colombia's capacity for external payments, a proportion which is superior to any recorded since 1930, in spite of the fact that during most of the intervening years the depressed level of exports made even the most modest capital inflow appear large. According to hypothesis *A*, amortization and remittances of profits and interest would absorb about 8 per cent of the 1960 payments capacity, which does not represent any increase over the 1951-53 average.

By 1965, foreign capital amortization payments and service charges would rise, according to hypothesis *A*, to about 12 per cent of the capacity for external payments. This is not an excessively large figure, however, and its financing should create no serious balance-of-payments difficulties. Even if exports of goods and services fell as low as the minimum projection for 1965, the payments in question would not represent as large a share of the payments capacity as in 1925-29 (15 per cent). However, even on the most favourable hypothesis, gross foreign investment would fail to equal amortization and remittances of profits and interest. According to the maximum projection, foreign capital receipts would contribute only 10 per cent of the 1965 capacity for external payments, thus giving rise to a net outflow of exchange equivalent to about 2 per cent of the payments capacity. Under the most unfavourable circumstances (the minimum foreign investment projection combined with the minimum level of exports of goods and services), the net outflow of exchange might even rise as high as 6 per cent of the payments capacity. This drain on Colombia's foreign exchange resources would still not be of serious proportions, and would in any event be much less than the rate of almost 20 per cent registered during the years immediately following the world depression.

4. *Projections of the capacity to import*

Consideration of the prospects for the quantum of exports of goods and services and the unit value of exports, as well as of the possible range and scope of movements of foreign capital, must now be followed by an examination of the results to which combinations of these factors would lead in terms of the level and composition of the capacity to import (see table 33).

The first point to be discussed is the contribution to the capacity to import made by each of its three chief components, i.e., the quantum of exports, the terms of trade and foreign capital transactions. Under the conditions postulated by hypothesis *A*, the growth of the capacity to import would outstrip that of the quantum of exports up to 1960, on the assumption that the terms of trade would not be lower than in 1950 and that the final outcome of the movement of foreign capital would be a net annual contribution of 85 million pesos. In contrast, by 1965 the capacity to import would have fallen below the level of the quantum of exports, because the increase in remittances of profits on foreign investment, deriving precisely from the heavy investments of the preceding period, would determine outflows of capital in excess of the new contributions.

Hypothesis *B* postulates a conjunction of much more unfavourable circumstances. By 1960 the net contribution of the capital account would be nil, and, furthermore, the terms of trade would have deteriorated in relation to 1950. Owing to the fall in the price of coffee to 50 cents per pound, the purchasing power of exports would be 200 million pesos lower than in 1950; this sum is equal to approximately 12 per cent of the export quantum, or — to give a clearer idea of its significance — almost the same as the value of the total petroleum exports projected for 1960. In 1965, the combination of a net outflow of foreign capital amounting to 140 million pesos with an adverse terms-of-trade effect equivalent to 232 million pesos would represent almost one-sixth of the quantum of exports of goods and services. To illustrate the importance of this sum, it is enough to point out that it would be identical with the aggregate export quantum projected for petroleum, bananas and gold.

But still greater interest attaches to a comparison of the new levels of the capacity to import with the projections of the gross product. It should be recalled that a fact stressed in the foregoing chapter as one of the most important characteristics of Colombia's economic development was the radical change brought about by the crisis of the 'thirties in the relationship between capacity to import and gross product, which declined from 24.1 per cent in 1925-29 to 12.9 per cent in 1930-34, as compared with the surprising stability of this relationship from 1930 onward. A study of the relative magnitudes of the projections for the capacity to import and the gross product will now show that in only one case — that of hypothesis *A* for 1960 — does the ratio remain much the same as in 1950, while in the others it would again contract sharply. Given even the most favourable alternative, the proportion of the gross

TABLE 33. COLOMBIA : PROJECTIONS OF THE CAPACITY TO IMPORT

(Millions of pesos at 1950 prices)

	1950*	1954	1960		1965	
			Hypothesis A	Hypothesis B	Hypothesis A	Hypothesis B
Quantum of exports of goods and services .	1,191	1,406	2,047	1,711	2,479	1,987
Terms-of-trade effect	0	269	0	-202	0	-232
Inflow of foreign capital	25	120	285	135	285	135
<i>Total payments capacity</i>	1,216	1,795	2,332	1,644	2,764	1,890
Remittances of profits and interests	-106	-37	-135	-81	-258	-220
Outflow of capital	-35	-60	-65	-54	-80	-55
<i>Capacity to import</i>	1,075	1,698	2,132	1,509	2,426	1,615
<i>Per capita capacity to import (Pesos at 1950 prices)</i>	95	137	151	107	153	102
<i>Per capita gross product (Pesos at 1950 prices)</i>	558	682	852	745	1,066	890
Percentage relationship between capacity to import and gross product	17.0	20.1	17.7	14.3	14.3	11.4

SOURCE : Figures from previous tables.

* The discrepancy between the capacity to import in this column and that previously given for 1950 is due to the exclusion of short-term capital so that figures for the later years may be comparable with the projections, in which only long-term investment is taken into account. It was not possible to exclude short-term capital for the years preceding 1945.

product represented by the export quantum would continue to follow the downward trend initiated in 1950, and the difference would be covered with a net inflow of foreign capital.

In the case of hypothesis *B*, the ratio between payments capacity and gross product would fall to levels similar to those registered during the war and the world crisis, and the *per capita* capacity to import would be only slightly higher than in 1950. After 1960, the continuance of the decline in the ratio between the export quantum and the gross product would imply, according to both hypotheses, a gradual reduction of the external sector's contribution to Colombia's economic development, as net foreign investment transactions (and, on hypothesis *B*, the adverse terms-of-trade effect in addition) slowed up the rate of growth of the capacity to import. Consequently, by 1960 a decisive stage would have been reached, at which the exports multiplier would once more be modified, as occurred in 1930, and an increment of 1 per cent in the capacity to import would have to be linked to an increase of over 1 per cent in the gross product.

III. DEMAND FOR CONSUMER GOODS AND SERVICES

The preceding chapter afforded an opportunity for discussion of the characteristics of the current evolution and composition of goods and services in Colombia, and for demonstrating how closely the behaviour of the demand concerned is bound up with the most salient features of the country's economic development. It was also pointed out that an analysis of this kind not only

facilitated a clearer understanding of the trends registered in production and productive capacity, but at the same time provided valuable data on which a survey of the national economy's future development prospects could be based.

The various alternative hypotheses as to the over-all growth of *per capita* income having been formulated, the time has now come to consider how such growth may affect the level and composition of demand for consumer goods. This would, in fact, represent a first step towards assessment of the future distribution pattern of investment and productive resources that would prove compatible with the general methods envisaged. Such an analysis may also have its importance for specific aspects of the economic policy of the public sector, as, for instance, the potential significance of the establishment of minimum diet targets, and the imposing of restrictions on consumption of luxury goods and services.

The object of this section, therefore, will be to utilize the foregoing and other additional data as a basis for studying the possible bearing of the over-all growth hypotheses on demand for the various types of consumer goods and services. The rise in aggregate income is not, of course, the only determinant of this demand, which is also strongly influenced by the rate of growth of the urban population, the composition of the population by activities and income distribution itself. The following paragraphs will thus comprise an analysis of the methods of projection, mainly from the standpoint of the quantification of income-elasticity coefficients of demand for the various groups of goods and services, together with

a few general suggestions as to the possible influence of those other sectors that may affect the level and structure of consumption. The ultimate aim will be to arrive at estimates of requirements of goods and services in conformity with the two over-all hypotheses as to the rate of growth of the Colombian economy, which are taken as the basic point of reference throughout this study.

1. *Methods of projection*

Presented in its simplest terms, the problem consists in taking as a point of departure the aggregate projections discussed in the preceding section, and examining their repercussions on the volume of requirements of the different types of consumer goods and services. To serve this end, income-elasticity coefficients of demand may be determined, as a means of expressing the proportional variation to be expected in a particular branch of consumption as the result of a given change in *per capita* income.

Three principal instruments will be used for this purpose. In the first place, the 1953 survey of income and expenditure in a sample of urban families provides the basis for a break-down of consumption in that year in households at differing income levels, whence it is possible to deduce a set of demand-elasticity coefficients applicable to the various categories of expenditure on goods and services. A second way of obtaining pointers of this kind is by analysing long-term *per capita* income and consumption trends, so as to shed light on the gradual changes in the structure of consumption that have accompanied the improvement of income. Lastly, these procedures will be supplemented by comparison with statistics on the distribution of consumption in other countries where *per capita* income levels are similar or higher.

Special interest in fact attaches to the simultaneous adoption of these three methods of estimating the income-elasticity coefficients of demand for the different kinds of consumer goods and services, since the criteria involved are mutually complementary from several standpoints.

A homogeneous analysis of the elasticity of demand can be based on the data on the income and expenditure of urban families in 1953, as they are not affected by fluctuations in relative prices, supply restrictions of either internal or external origin, changes in the distribution of income and variations in the break-down of the population by urban and rural sectors. Consequently, an analysis of this sort might be regarded as the most satisfactory basis for the estimates under consideration.

It should be borne in mind, however, where an underdeveloped and rapidly growing economy is concerned, that such an analysis is essentially static, and fails to take into account a number of factors that have played an important dynamic part in development. These include the marked changes in the distribution of the population, of *per capita* income and of the components of consumption. The factors in question are reflected, on the other hand, in an historical analysis of the evolution of *per capita* income and consumption, which

therefore also constitutes significant background material, although the interpretation of the findings is a much more complex task.

Lastly, from a study of the distribution of *per capita* consumption in a group of countries where *per capita* income levels are much the same as in Colombia, or higher, a clearer idea can be obtained of the present characteristics and future prospects of Colombian demand. This may be particularly important in the case of certain specific lines of consumption, whose relative significance in total consumer expenditure may alter rapidly once a given income level is reached.

The comparisons relating to *per capita* income and the composition of consumption in several countries are based on the 1950 figures for Chile, Colombia, the Federal Republic of Germany, France, Honduras, Italy, the United Kingdom and the United States. As will be seen, the picture presented by the three elements referred to seems fairly homogeneous, in the sense that similar trends are registered, and the relative positions of the demand-elasticity coefficients are consistently maintained.

The series of small graphs contained in figure VIII illustrates the results of the three kinds of comparison mentioned.¹⁶ Some consideration may therefore be given to the most important conclusions deriving therefrom, with special reference to the three most representative categories of expenditure — namely, foodstuffs, other manufactured goods and services.

(a) Broadly speaking, the coefficient of elasticity of demand for foodstuffs is low (0.5 to 0.6), although it should be noted that in the case of processed foodstuffs, the coefficient concerned may be estimated at almost twice the corresponding figure for direct foodstuffs — 0.9 as against 0.5. Lower-quality foodstuffs, such as, for example, cereals, show a small coefficient which even becomes negative as the level of income rises, whereas the coefficient for such high-quality foods as meat, or milk and milk products, for instance, is considerably greater. Not only is the demand-elasticity coefficient for foodstuffs lower to start with, but it tends to decline even further as *per capita* income increases. In the specific case of Colombia, however, it should be recalled that *per capita* diet is so far below what are considered to be minimum recommendable standards that no decrease is likely to take place in the aggregate coefficient of demand for foodstuffs within the next ten or fifteen years. This means that if *per capita* income were to rise at an annual rate of 4 per cent, by 1970 the level of *per capita* consumption of foodstuffs would be more than half as high again.

From the analysis of the income and expenditure of urban families can be obtained not only these aggregate figures, but also the demand-elasticity coefficients for the main groups of foodstuffs. The lowest coefficients, 0.2 and 0.3 respectively, are recorded for cereals and pulses, products which account for one-third of total expenditure on foodstuffs. Fruit and vegetables, on the

¹⁶ See also Part Two, chapter III, the relevant section of which contains more detailed comparisons of a similar nature relating to manufactured goods.

FIGURE VIII. A. COLOMBIA : BASES FOR ESTIMATING COEFFICIENTS OF INCOME-ELASTICITY OF DEMAND.
FINDINGS OF THE SURVEY ON INCOME AND EXPENDITURE IN URBAN HOUSEHOLDS IN 1953

(Relationship between *per capita* expenditure on goods and services and average monthly *per capita* income)
(Pesos at 1953 prices)
(Logarithmic scale)

Y = *Per capita* expenditure.

X = Average monthly *per capita* income.

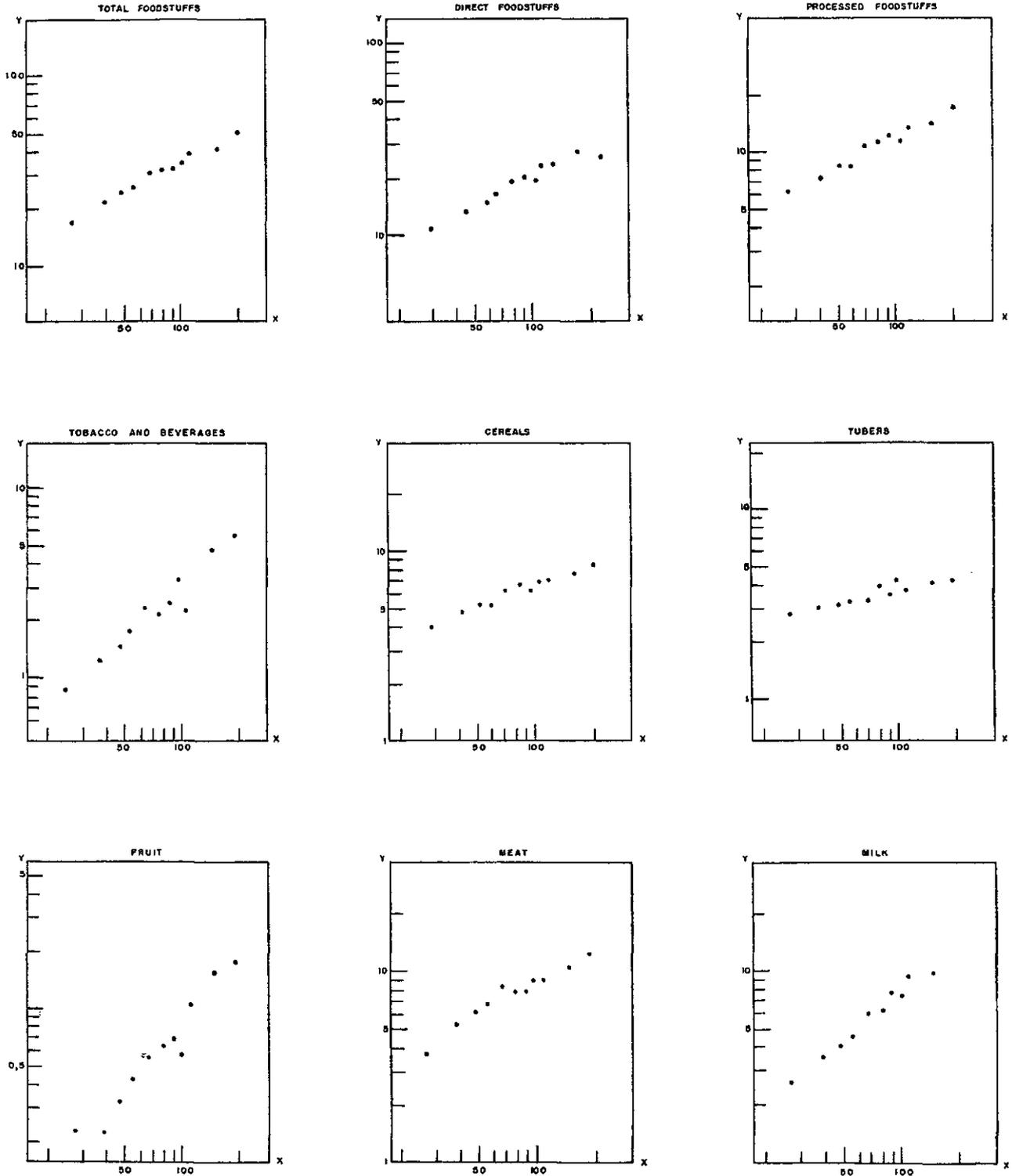


FIGURE VIII. A. (continued)

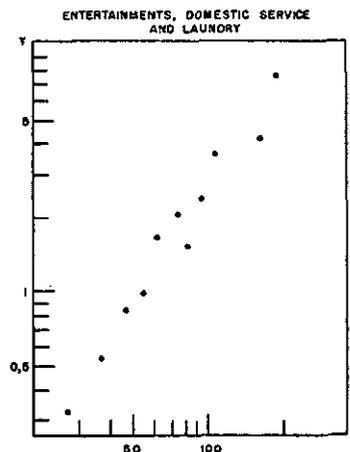
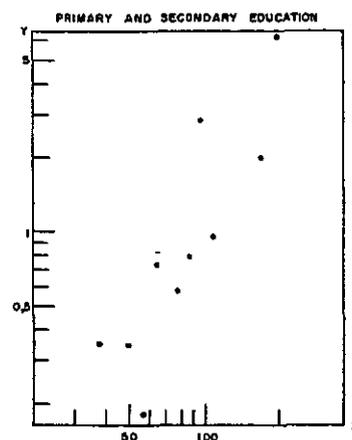
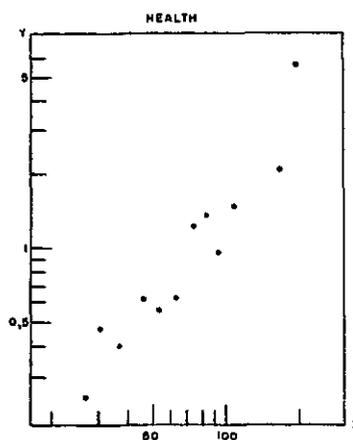
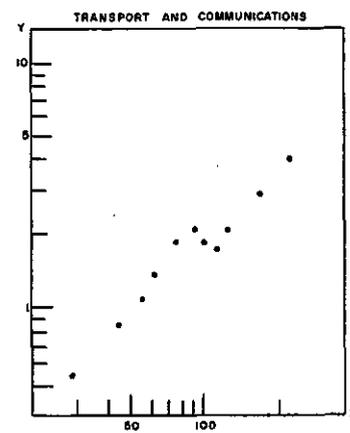
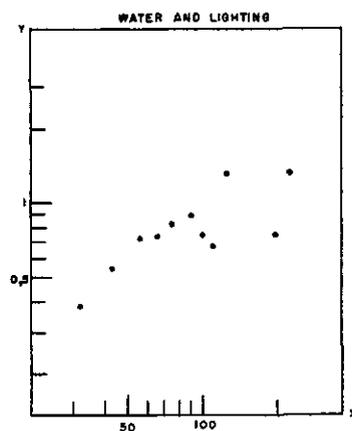
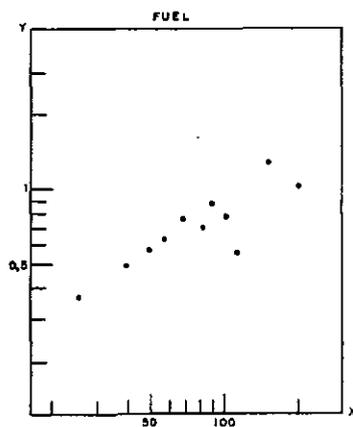
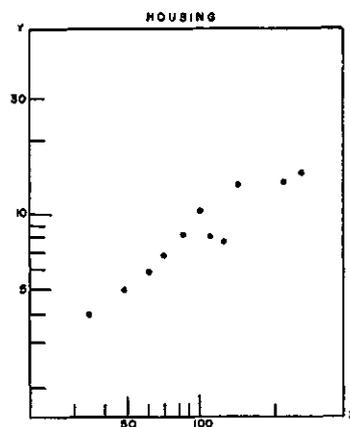
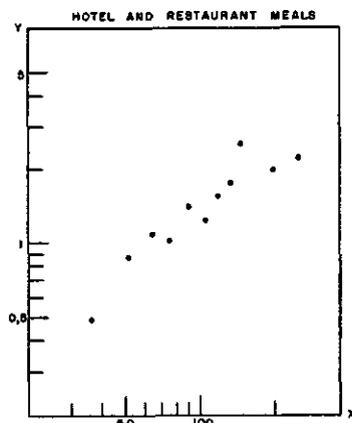
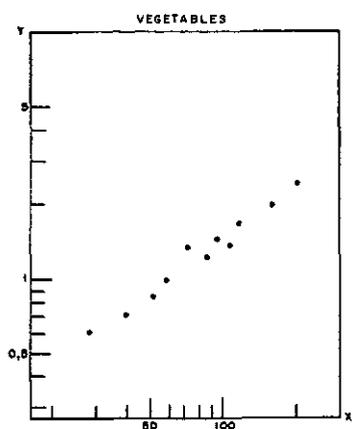


FIGURE VIII. B. COLOMBIA : BASES FOR ESTIMATING COEFFICIENTS OF INCOME-ELASTICITY OF DEMAND.
GROWTH AND COMPOSITION OF *per capita* CONSUMPTION DURING 1937-53

(Relationship between annual *per capita* expenditure on goods and services and total *per capita* consumption)
(Pesos at 1950 prices)
(Logarithmic scale)

Y = Annual *per capita* expenditure.
X = Total *per capita* consumption.

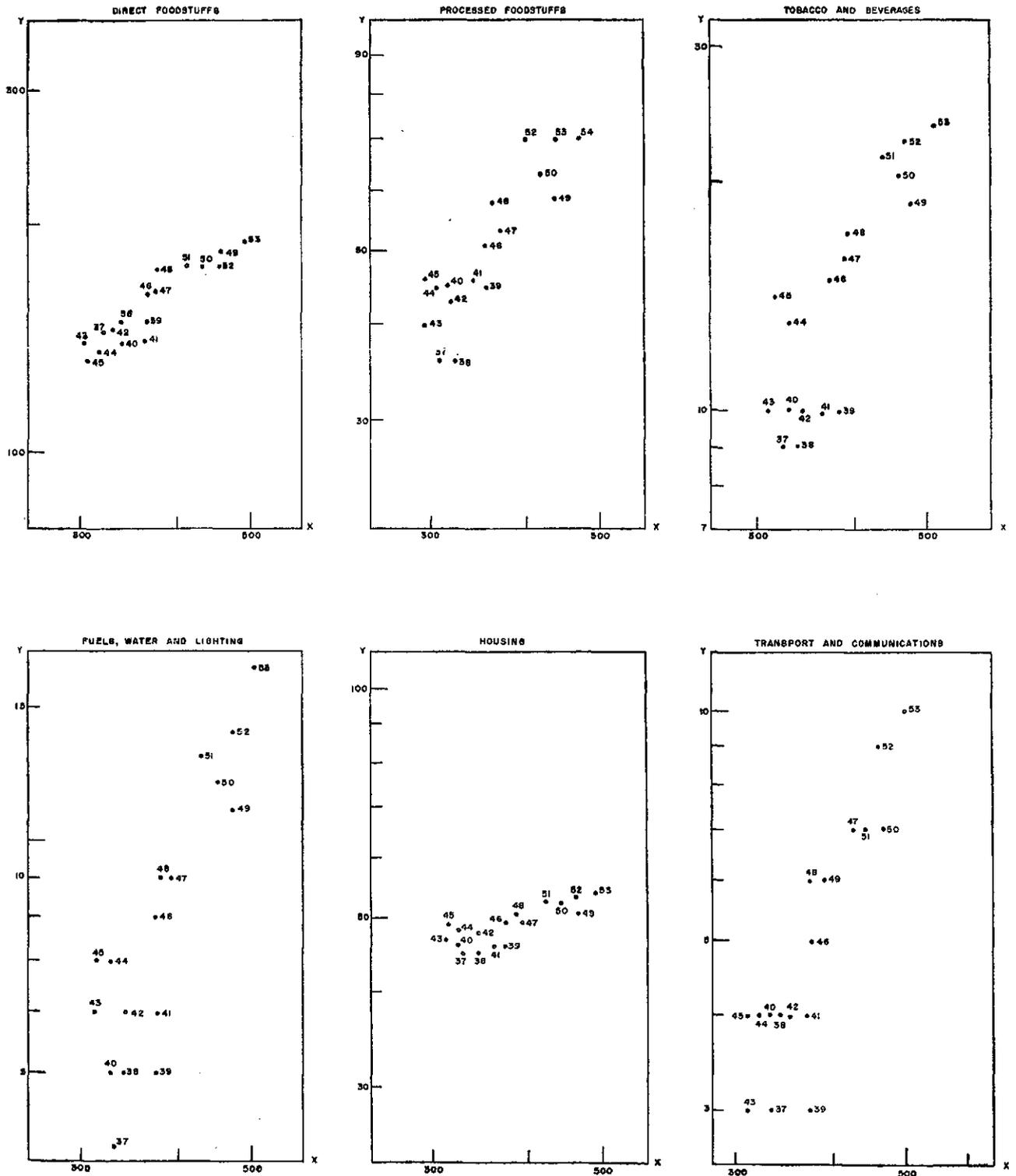


FIGURE VIII. C. COLOMBIA : BASES FOR ESTIMATING COEFFICIENTS OF INCOME-ELASTICITY OF DEMAND.
COMPOSITION OF PRIVATE CONSUMPTION IN EIGHT SELECTED COUNTRIES

(Relationship between annual *per capita* expenditure on goods and services and total private *per capita* consumption)
(Dollars at 1950 prices)
(Logarithmic scale)

Y = Annual *per capita* expenditure.
X = Total private *per capita* consumption.

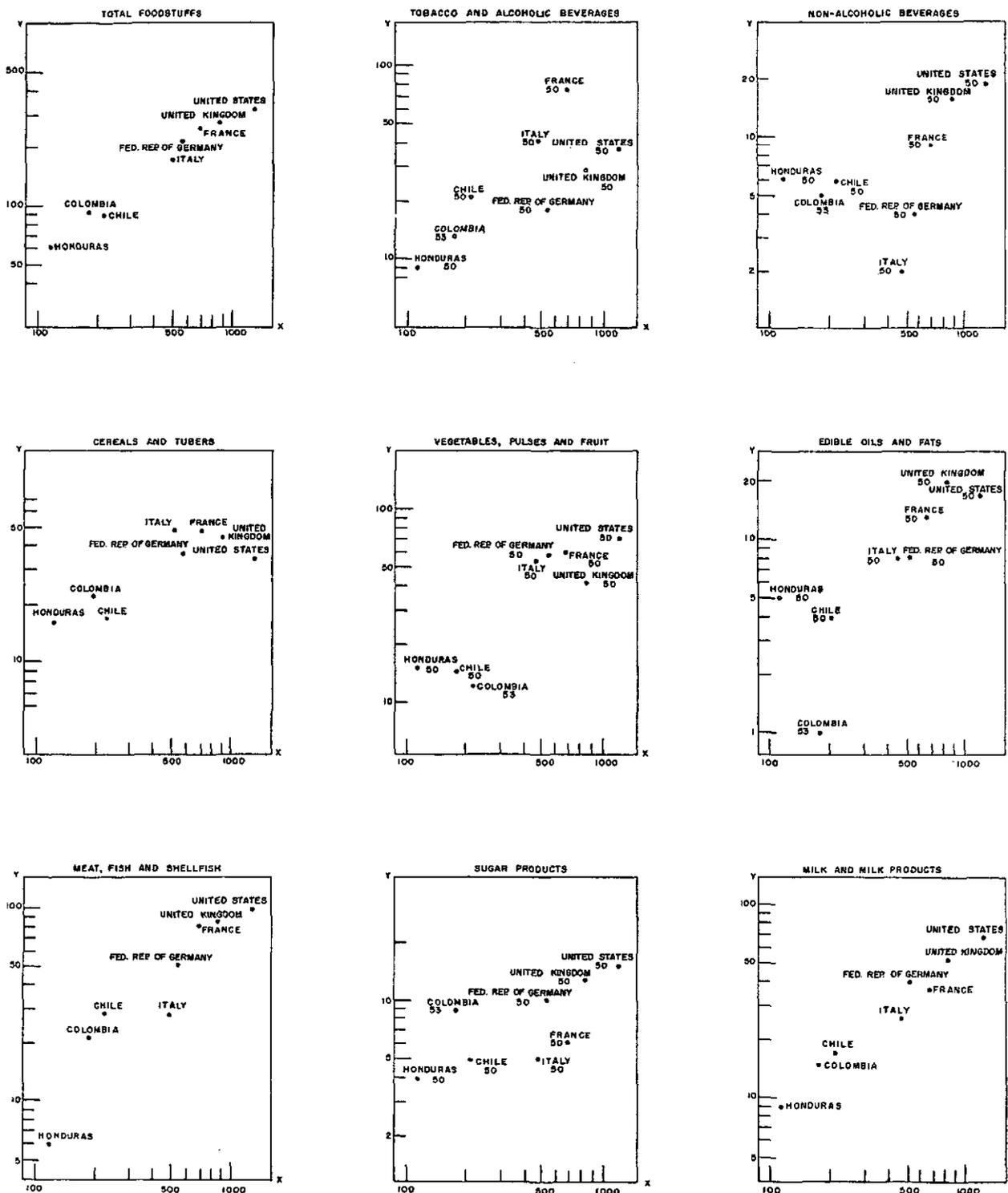
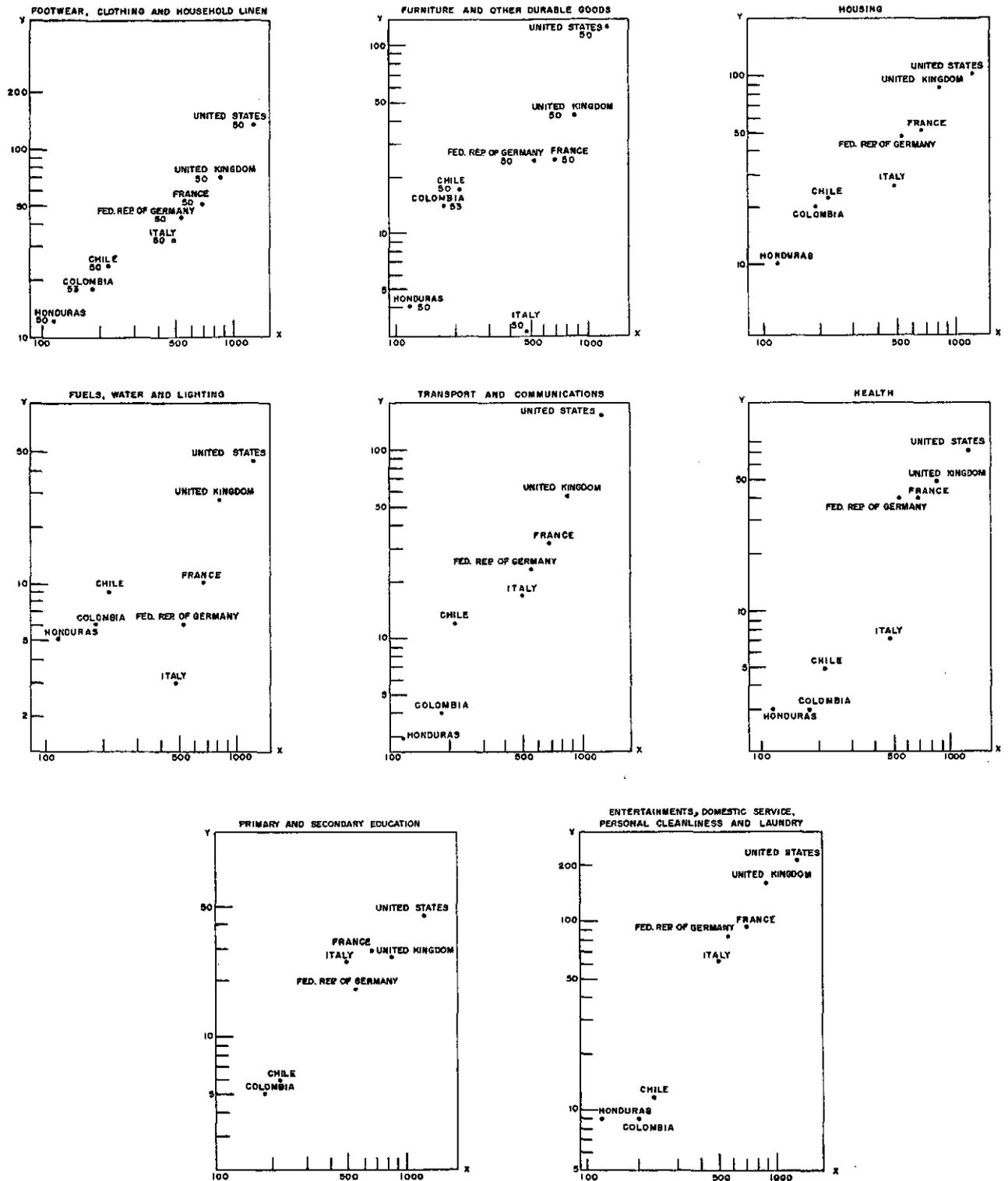


FIGURE VIII. C. (continued)



other hand, which represent 15 per cent of such outlays, show coefficients of income-elasticity of demand amounting to 1.2 and 0.7 respectively. The corresponding coefficients reach 0.7 and 0.9 for meat and for milk products, which constitute 45 per cent of total expenditure on foodstuffs.

It should be noted that, according to the findings of the survey, processed foodstuffs represented less than one-third of total expenditure on food, and the corresponding elasticity of demand was only slightly greater than that registered for non-processed foods. However, this fact may be a reflection of supply limitations, as well as of unfavourable relative prices, which tend to narrow the market. Up to now tinsplate has not been manufactured in Colombia, and this may have discouraged the development of a large canning industry, while the expansion of the food-processing industries has also been slowed up by restrictions on supplies of the necessary equipment. Nevertheless, the level reached in recent years is considerably higher than that prevailing before the war.

In contrast, the analysis of demand based on long-term trends in *per capita* income and expenditure, and more completely reflecting the dynamic role played by urbanization and industrial development, as well as the marked rise in income levels and the expansion of availabilities of processed foodstuffs, gives an income-elasticity of demand for this type of product which, with a coefficient of 1.5, is undoubtedly fairly high.

TABLE 34. COMPARISON OF PRIVATE *per capita* CONSUMPTION IN EIGHT COUNTRIES

(Dollars at 1950 prices)

Country	Private consumption			
	Total	Foodstuffs	Manufactured goods	Services *
Honduras (1950)	116	61	25	30
Colombia (1953)	181	89	45	47
Chile (1950)	217	89	62	66
Italy (1950)	388	171	77	140
Western Germany (1950)	523	218	86	219
France(1950)	663	253	153	257
United Kingdom (1950) .	829	276	145	408
United States (1950)	1,259	324	301	634

SOURCE : See *Statistical Appendix*, table 33.

* Including public expenditure on education and health services.

Finally, a comparison of the relationships between *per capita* expenditure on foodstuffs and total private consumption in the eight countries mentioned provides additional evidence that can be utilized in appraising the present and future characteristics of demand for foodstuffs in Colombia. As can be deduced from these data, the proportion of total consumption represented by expenditure on food declines as income increases. In Chile it is 41 per cent, in the Federal Republic of Germany 42 per cent, in France 48 per cent, in Honduras

53 per cent, in the United Kingdom 43 per cent and in the United States 26 per cent, as compared with 49 per cent in Colombia. The income-elasticity of demand mentioned in the case of Colombia is higher than the figure that would result from this comparison ; but if absolute levels are taken into account, it can be shown that in the four European countries and the United States *per capita* expenditure on food is two or three times heavier than in Colombia. This illustrates how greatly production of foodstuffs will have to expand as *per capita* income rises, even if the income-elasticity coefficient of demand is relatively low. The figures in table 34 sum up the main conclusions to be derived from a comparison of the four countries enumerated.

The comparative analysis of the eight countries also reveals that, if only the European countries and the United States are taken into consideration, the coefficient of elasticity of demand for cereals and pulses falls rapidly at *per capita* income levels of 250-300 dollars, is nil at the *per capita* income step corresponding to 400-700 dollars, and where income is higher still becomes negative. For high-quality foodstuffs, however, such as meat and milk products, the corresponding coefficients are larger, and decrease only very moderately as income rises.

Another conclusion reached is that even if allowance is made for the differences in *per capita* income levels, consumption of oils and fats is very low in Colombia, mainly on account of limited supplies. The coefficient of elasticity of demand for sugar and its derivatives also seems to be low.¹⁷

On the basis of the foregoing considerations, an aggregate coefficient of 0.6 for foodstuffs as a whole will be adopted here, and partial coefficients of 0.5 and 0.9 for direct and processed foods respectively. The chapter of this study dealing with the agricultural sector¹⁸ contains a highly detailed analysis of the distribution of the demand in question among numerous groups of commodities and specific products, to judge from which the growth of *per capita* demand for foodstuffs is likely to remain consistent with these coefficients at least until 1965, without minimum recommendable diet levels being exceeded, even if a fairly rapid rise in total *per capita* income is assumed.

On the other hand, the improvement of transport, storage and distribution facilities, the possibility of producing tinsplate for containers and the development of agricultural productivity may have favourable repercussions on the real costs of production of foodstuffs and may increase and diversify availabilities of high-quality foods, thus further stimulating demand for foodstuffs.

¹⁷ It should be pointed out that the analysis for these eight countries is based on expenditure statistics, so that the conclusion drawn may be affected by differences in relative prices. In the case of the four European countries and the United States, expenditure was expressed in terms of dollar prices, so that relative price differences have here been eliminated ; but differences in the effect on the quantum remain unchanged. With respect to Chile, Colombia, and Honduras, no adjustment of this kind has been made, so that the relevant figures reflect the influence of relative prices both on the quantum and on expenditure itself.

¹⁸ See Part Two, chapter II.

(b) In Part Two of the present study, chapter III, where the problems relating to the industrial sector are discussed, the characteristics and prospects of demand for manufactured goods are examined in considerable detail. It therefore seems preferable to stress only the most important conclusions here.

For manufactured goods other than foodstuffs in the aggregate, the income-elasticity coefficient of demand is estimated at 1.3 and fluctuates between 1 and 2 for the main categories of commodities included under this head. Thus, for example, the coefficients concerned amount to 1.0 in the case of tobacco and alcoholic beverages and of fuels, and 1.2 in that of clothing; for other types of non-durable and durable consumer goods they are substantially higher (1.7 and 1.8 respectively).

It is important to point out that the elasticity of demand for durable consumer goods and for "other non-durable consumer goods", calculated on the basis of past trends in *per capita* income and consumption, proves higher than the coefficients obtained from the survey of income and expenditure in urban families; this largely reflects the post-war increase over wartime and pre-war production and imports of such goods. In contrast, exactly the opposite applies to articles of clothing, presumably because the textile industry was developed to a considerable extent as long ago as during the 'thirties.

As a general rule, the coefficient calculated on the basis of the 1953 survey of urban families, which do not take into account the effect of changes in the supply situation, are lower than those deduced from the historical analysis in cases where supply conditions substantially improved during the post-war period; where there have been no marked fluctuations in these conditions, on the other hand, the coefficients based on the survey tend to be higher. The first of these statements is particularly applicable to durable consumer goods and to the group called "other non-durable consumer goods"; among the latter, clothing deserves special mention. Availabilities in this branch were more or less satisfactory during both the pre-war and post-war years, thanks to the fact that the textile industry, being longer-established, was less vulnerable to fluctuations in the capacity to import determined by external conditions. It is very significant that the relative position of the elasticity of demand for clothing should be similar in both the analyses, showing in both cases coefficients lower than those for durable consumer goods.

In assessing possible future trends in demand, due consideration must be given to the probability that the supply of durable consumer goods, as well as their relative prices, may be affected by limitations of the capacity to import or by measures of general economic policy, in view of the very high income-elasticity of demand for such products.

Colombia's experience, like that of other Latin American countries, reveals that an unforeseen change in the supply situation may considerably alter relative prices. Such a state of affairs might result either from a sudden increase or from an abrupt decrease in the

capacity to import, the effect of which on relative prices might be produced in a number of different ways: through the free interplay of market conditions, through the establishment of indirect government controls, through a modification of customs duties and rates of exchange, or through the imposition of direct restrictions. In the general interest, official measures have in many cases been aimed at reserving the scanty resources available for the most essential requirements and reducing the pressure of demand through taxes and other expedients which have usually led in the end to an increase in relative prices. Such procedures necessitate an attempt at evaluation of the shift of demand from one type of product to another which they may bring about.

The comparison of the eight countries (see again table 34) reveals that the demand for clothing and durable consumer goods has a high elasticity, and that the proportional expenditure on commodities in these categories tends to increase; thus, the relative importance of products of this type grows as *per capita* income rises. In the case of durable consumer goods, however, it must be emphasized that their share is already large in relation to the income level in Colombia, if the situation is compared with that existing in several of the European countries, where the distribution of income is more equitable and relative prices are lower.

The high elasticity of the demand for manufactured consumer goods has constituted a dynamic element of vital significance in Colombia's industrial development and urban growth, as well as in the enlargement of production capacity and the increase of *per capita* income. Until the post-war period, however, the limited bases on which industry's production capacity rests — largely because there is no domestic industry manufacturing capital goods — and the decline in the capacity to import during the 'thirties and the Second World War, seriously hampered the expansion of industrial production under the stimulus of demand.

If the upward trend in *per capita* income were to continue as intensively as in the post-war period, *per capita* consumption of manufactured goods might be more than doubled and total consumption of manufactures almost trebled in the next fifteen years, owing to the increasing proportion of consumer expenditure that would be allotted to the purchase of products of this type. Such a prospect, together with the need for production of intermediate and capital goods and new substitutes for imports, would demand a considerable expansion of industrial production capacity. In so far as failure to achieve this were to mean that availabilities of manufactured goods were insufficient to meet demand, a sustained economic policy might be called for, comprising direct or indirect measures with respect to the distribution of goods and services, the control of imports and the modification of relative prices. An expansion of industrial capacity, a more complete economic integration of the country and a consequent enlargement of the markets might in turn contribute to a higher degree of efficiency by increasing the scale of production and reducing real costs.

(c) The various series of data available all indicate that the elasticity of demand for services in the aggregate

is the highest of all, with an estimated average coefficient of 1.5. The figures are even higher for transport facilities, electricity, public health services and education, in these last cases partly because more and more services of this kind are becoming available. Proof of this is the fact that the coefficients based on the historical analysis are double those deduced from the data in the 1953 survey of urban families, in which the effects of changes in the supply situation are disregarded. Even so, the coefficients are much higher than those for foodstuffs and manufactured goods. Again, *per capita* availabilities are still so far below minimum requirements that the supply could be considerably increased without causing any reduction in the elasticity of demand. This conclusion is suggested not only by consideration of the minimum standards desirable, but also, equally clearly, by the comparative analysis of the eight countries mentioned.

Conversely, the coefficient of the elasticity of demand for housing based on the 1953 survey of family income and expenditure is double the coefficient calculated on the basis of the historical analysis, thus reflecting the low rate at which construction proceeded during the period 1937-53, even if the post-war improvement is taken into account. As was pointed out in the preceding chapter, a comparison of the findings of the housing censuses taken in 1938 and 1951 shows that total housing and urban dwellings increased between these years at respective annual rates of 1.1 per cent and 3.6 per cent, which are much lower than those of demographic growth in the country as a whole and in urban areas (2.2 and 5.0 per cent respectively). It should be noted that in 1953 outlays on housing represented 11 per cent of total consumer expenditure and almost half the amount spent on services.

The high income-elasticity of demand for services is also confirmed by comparison of the eight countries. It can be seen that expenditure of this type absorbs a growing proportion of the whole as *per capita* income rises.

The demand-elasticity coefficient estimated in accordance with the data described reach 1.3 for transport and communications services, 1.4 for water and electricity, 1.6 for public health services, recreation and personal services and 2.4 for education and vocational training. The fact that these income-elasticity coefficients are so high makes it possible to ascertain beforehand which services the Government and private enterprises would have to expand at an accelerated rate in order to meet the increase in demand resulting from urbanization and the rise in *per capita* income. A clearer conception may be formed of the social cost and the effort which such an expansion would demand, if it is remembered that the gross product per unit of capital obtained through basic social investment in activities of this type is very low.

On the other hand, if satisfactory provision for these services is not made, the deficit may constitute a serious obstacle to the process of industrial and urban development. One of the principal aims of the present study is to evaluate the need for services, the economy's capacity to establish them and the alternatives which present themselves should it prove impossible to achieve the necessary expansion of production capacity.

The figures given in table 35 below show the demand-elasticity coefficients, estimated on the basis of the data considered, which will subsequently be used as background material for the projection of the future composition of consumption.

TABLE 35. COLOMBIA: ESTIMATES OF COEFFICIENTS OF INCOME-ELASTICITY OF DEMAND FOR THE MAIN COMPONENTS OF CONSUMPTION^a

<i>Total consumption</i>		1.0
Direct foodstuffs		0.5
Manufactured goods		1.15
Services		1.5
<i>Foodstuffs</i>	Total	0.6
	Direct	0.5
	Processed	0.9
<i>Manufactured goods</i>	Total	1.15
	Foodstuffs	0.9
	Non-foodstuffs	1.26
<i>Services</i>	Total	1.5
	Private	1.6
	Public	1.2
	Housing	1.4
	Water and lighting	1.4
	Transport and communications ...	1.3
	Health	1.6
	Primary and secondary education .	2.4
	Entertainments, personal and domestic services	1.6
	Other public utilities	1.2

SOURCE: ECLA estimates.

^a The figures given in this table ought strictly to be defined as "coefficients of consumption-elasticity" of demand, since no allowance has been made for changes in the propensity to save (or payments of direct taxes) as income rises. The average coefficient for the three groups into which total consumption is divided is therefore equal to unity.

2. Prospects for the growth of urban population, the composition of the population by activities, and the distribution of income

It has already been shown that the marked changes in the composition of consumption registered in earlier periods were brought about not exclusively by the growth of total income but also by the rapid rate at which industrialization and urbanization progressed at the same time. The urban sector of the population increased from 23.2 per cent in 1925 to 42.6 per cent by 1953, so that probably by 1965 more than half the population of Colombia will be living in the larger towns.¹⁹ Naturally, this will be bound to have notable repercussions on the composition of future consumption, since the characteristics of demand are different in the urban areas and in the rural sector. An analysis, however general, should be made of possible trends in this field, even if their implications are not specifically taken into account in the estimates that follow.

¹⁹ Municipalities of 1,000 inhabitants or over.

TABLE 36. COLOMBIA : PROJECTIONS OF TOTAL POPULATION AND BREAK-DOWN BY URBAN AND RURAL SECTORS

	Current 1953	Projections			Annual rate of variation (1953-70)
		1960	1965	1970	
<i>Hypothesis A</i>					
		<i>Number of persons</i>			
Total population ..	12,111,260	14,162,000	15,867,000	17,758,000	2.3
Urban	5,177,033	7,382,449	9,512,286	12,256,580	5.2
Rural	6,934,227	6,799,551	6,354,714	5,501,420	-1.1
		<i>Percentage distribution</i>			
Total population ..	100.0	100.0	100.0	100.0	
Urban	42.7	52.1	60.0	69.0	
Rural	57.3	47.9	40.0	31.0	
<i>Hypothesis B</i>					
		<i>Number of persons</i>			
Total population ..	12,111,260	14,162,000	15,867,000	17,758,000	2.3
Urban	5,177,033	6,904,609	8,481,622	10,418,824	4.2
Rural	6,934,227	7,257,391	7,385,378	7,339,176	0.3
		<i>Percentage distribution</i>			
Total population ..	100.0	100.0	100.0	100.0	
Urban	42.7	48.8	53.5	58.7	
Rural	57.3	51.2	46.5	41.3	

SOURCE : ECLA estimates.

On the basis of the prospects of greater expansion of the urban population and the improvement in health conditions, it can be estimated that during the next few years a fall will be registered in the birth and death rates, which, on the assumption postulated here, largely for illustrative purposes, will decline from 36 and 14 per mil, respectively, in 1953 to 34 and 11 per mil in 1960. This would determine an annual rate of growth of 13 per mil for the total population. As regards its possible distribution between the urban and rural sectors, any estimates that may be formulated must necessarily be based on the over-all hypotheses as to the possible intensity of future growth.

In the case of hypothesis *A*, which postulates a more rapid rate of development, the rate of growth projected for the urban population is 5.2 per cent, similar to that recorded in the period 1945-53. The proportion of total population represented by the urban sector would thus rise from 43 per cent in 1953 to 52 per cent in 1960, 60 per cent in 1965 and 69 per cent in 1970.

According to hypothesis *B*, on the other hand, the estimated growth of urban population would be 4.2 per cent annually, a figure which resembles the long-term trends for the period 1918-53. Thus the proportion represented by the urban population would increase from 42 per cent in 1953 to 49, 53 and 59 per cent in 1960, 1965 and 1970 respectively (see table 36).

The estimates show that the absolute level of the rural population would have fallen by 1960 in the conditions postulated in hypothesis *A*, and by 1970 in those of hypothesis *B*. In both cases, on the other hand, the growth of the urban population would be marked and persistent. Even if future trends were to prove considerably less favourable than those assumed in the two hypotheses,

no change of any importance is likely to come about in the course followed by urban growth. Indeed, many factors tend to ensure the continuation of the historical growth trend of urban population. These include the differences between the rates of growth of agricultural production on the one hand, and of industrial production and services on the other; the tendency towards greater economic integration and fuller mobility of the labour force; income distinctions between the urban and rural sectors; and the possibilities of improving the productivity of agriculture.

Alongside these growth prospects for the urban and rural sectors, future trends in the distribution of income constitute another important potential determinant of the level and composition of consumer demand. Attention has already been called to the differences in income between urban and rural families and the unequal distribution of income between the wage-earning sectors and other social groups in 1953. The tendency of the real wages of non-agricultural and non-artisan workers to lag behind the increase in productivity in recent years has also been mentioned. As was stated in the preceding chapter, if the total volume of real wages received by this group continued to increase, this was solely by virtue of the marked rise in employment, since real salaries per worker were lower in 1953 than in previous years.

On the other hand, there is room for hope that real wages may recover part of the ground lost since 1950, to judge from Colombia's experience in former periods; for instance, during 1938-50 real wages lagged behind in a preliminary phase, but afterwards attained a degree of expansion similar to that of productivity. While this would seem not only desirable, but also in conformity

with the requirements of an increasing purchasing power which would find expression in a greater demand for consumer goods, it must be borne in mind that the downward course followed by the terms of trade at the end of 1954 and during 1955 has meant a loss of real income for the over-all economy, and therefore a reduction of the potential margin for improvement in the distribution of income. Nevertheless, Mexico's recent experience, and, in particular, the deflationary trends of 1952-53, suggest that in an economy which is underdeveloped but is in process of expansion, the growth of demand and production may be seriously hampered if the wage-earning sectors do not receive their full share in the improvement of productivity and the redistribution of income.²⁰

It must be pointed out that a direct relation exists between the ease with which the benefits accruing from improved productivity can be more widely shared and income better distributed, and the rates of the over-all

²⁰ See *Economic Survey of Latin America, 1951-52* (E/CN.12/299/Rev.2), United Nations publication, Sales No. : 1953.II.G.3, and also the *Survey for 1953* (E/CN.12/358), United Nations publication, Sales No. : 1954.II.G.1, and for 1954 (E/CN.12/362), United Nations publication, Sales No. : 1955.II.G.1.

growth of the *per capita* gross product, of industrial development, of urban expansion and of the productivity of labour. Both hypotheses *A* and *B* assume that the rate of development projected for production, industrialization and productivity would enable this last to be suitably distributed, and consequently would bring about a more satisfactory distribution of income, the extent compatible with the achievement of an increase in the demand for consumer goods and services.

3. Projections of the growth and structure of consumption of goods and services

Despite the potential significance of the foregoing comments, it is difficult, in a study of this kind, to take future changes in population or income distribution explicitly into account. Only in so far as such modifications are in line with past developments can they be regarded as having been implicitly taken into consideration in the computation of the income-elasticity coefficients of demand based on former trends in income and the distribution of consumption. The following projections of consumption of goods and services will therefore be derived from a more or less automatic application

TABLE 37. COLOMBIA : PROJECTIONS OF *per capita* CONSUMPTION OF GOODS AND SERVICES

(Pesos per capita at 1953 prices)

	1953	Coefficient of elasticity of demand	Hypothesis A			Hypothesis B		
			1960	1965	1970	1960	1965	1970
<i>Total consumption</i>								
Direct foodstuffs	582	1.0	765	929	1,167	668	776	946
Manufactured goods	229	1.15	310	389	490	267	316	395
Services	139	1.5	210	270	377	171	212	277
<i>Foodstuffs</i>								
Direct	214	0.5	245	270	300	230	248	274
Processed	68	0.9	85	101	124	76	86	103
Total	282	0.6	330	371	424	306	334	377
<i>Manufactured goods</i>								
Foodstuffs	68	0.9	85	101	124	76	86	103
Non-foodstuffs	161	1.26	225	288	366	191	230	292
<i>Services</i>								
Private	110	1.6	170	219	313	137	171	225
Public	29	1.2	40	51	64	34	41	52
Housing	59	1.4	85	105	141	72	86	108
Water and lighting	8	1.4	12	15	21	10	12	15
Transport and communications	11	1.3	16	20	25	13	16	21
Health	9	1.6	14	18	26	11	14	18
Primary and secondary education	15	2.4	29	43	70	21	29	44
Domestic and personal services	26	1.6	39	50	69	31	39	51
Other public utilities	11	1.2	15	19	25	13	16	20

SOURCE : See tables 12 and 36.

NOTE : The elasticity coefficients were obtained on the basis of logarithmic ratios between a given line of consumption and total consumption. Consequently, for the relevant projections the following term is used : $\frac{1^2}{1} 1 = \frac{x^2}{x} 1)^E$ in which $\frac{1^2}{1} 1$ represents the unit growth of the consumption under consideration, $\frac{x^2}{x}$ the unit growth of total consumption and E the elasticity coefficient.

TABLE 38. COLOMBIA : PROJECTIONS OF TOTAL CONSUMPTION OF GOODS AND SERVICES
(Millions of pesos at 1953 prices)

	Hypothesis A			Hypothesis B		
	1960	1965	1970	1960	1965	1970
Population (Thousands of persons) ...	14,162	15,867	17,758	14,164	15,867	17,758
Total consumption	10,832	14,745	20,231	9,462	12,321	16,806
Direct foodstuffs	3,470	4,284	5,327	3,257	3,935	4,866
Manufactured goods	4,392	6,166	8,701	3,781	5,015	7,014
Services	2,970	4,295	6,703	2,424	3,371	4,926
<i>Foodstuffs</i>						
Direct	3,470	4,284	5,327	3,257	3,935	4,866
Processed	1,206	1,603	2,202	1,076	1,372	1,829
TOTAL	4,676	5,887	7,529	4,333	5,307	6,695
<i>Manufactured goods</i>						
Foodstuffs	1,206	1,603	2,202	1,076	1,372	1,829
Non-foodstuffs	3,186	4,563	6,499	2,705	3,643	5,185
<i>Services</i>						
Private	2,404	3,486	5,567	1,942	2,721	4,003
Public	566	809	1,136	482	650	923
Housing	1,204	1,666	2,506	1,020	1,366	1,920
Water and lighting	170	238	373	142	190	266
Transport and communications	226	317	445	184	255	374
Health	198	286	463	156	223	320
Primary and secondary education ..	410	682	1,245	297	462	783
Entertainments, domestic and per- sonal services	550	794	1,227	440	621	908
Other public utilities	212	301	444	184	254	355

SOURCE : ECLA estimates.

of the elasticity coefficients discussed above to the increase in total consumption postulated in both hypotheses and to the projections of the over-all growth of the population. The relevant estimates are given in tables 37 and 38.

It seems important at this point to make brief parenthetical reference to the possible justifications for the maintenance of approximately constant income-elasticity coefficients for the various types of product throughout the whole period under review.²¹ It might well be thought that as the level of income rises, not only will the structure of consumption gradually alter, but the actual size of the coefficients in question may also tend to undergo modification. The most significant change that might be expected, to judge from the

²¹ As may be noted, reference is made to the maintenance of *approximately* and not absolutely constant coefficients. This is due to a purely mechanical difficulty which arises in the process of extending the projections to several successive periods. It has already been mentioned that the weighted average of the various partial coefficients should be equal to unity (or equal to the group coefficient in the case of more specific lines of consumption); but when more than one period is considered, the weighting factors are affected by the difference between the partial coefficients, so that small readjustments must be made in order to restore the equivalence in question.

experience of other countries, would be a progressive reduction of the coefficient for foodstuffs, which would be offset by the correlative increment in the coefficients for other consumption lines. In Colombia's case, however, this is one of the branches of consumption which lags farthest behind, so that even the substantial increase resulting, in absolute terms, from the estimates cited would probably not suffice to bridge, by 1965, the whole of the gap between average *per capita* diet and minimum recommended standards. In such conditions, it would hardly seem logical to assume that the coefficient of elasticity of demand for this type of commodity will decline. As far as other branches of consumption are concerned, the corresponding coefficients largely depend upon what proportion of the income increments is earmarked for food. Consequently, the problem would seem to reduce itself to the possible changes in the relation between the coefficients for services and for consumer goods other than foodstuffs. It should also be noted that the maintenance of the coefficients utilized here implicitly involves the assumption that the relative prices prevailing in 1953 will remain unchanged. Special importance may attach to this consideration in cases where supplies depend to some extent on imports — as in that of durable consumer goods, for instance — since,

in so far as acute balance-of-payments problems might arise, the adoption of such measures as tariff changes or the establishment of special taxation, which would have an unfavourable effect on the relative prices concerned, would in practice mean a reduction of the elasticity of demand.

Due allowance being made for the foregoing considerations, the most important conclusions to be drawn from the estimates referred to may now be analysed. The differing characteristics of demand for the various types of product would give rise in some few years to radical changes in the structure of consumption of goods and services. The relative share of expenditure on foodstuffs in total consumption would shrink considerably; and the greater the increase in total *per capita* consumption, the more intensive this contraction would be. In 1953 the proportion in question amounted to 63 per cent in the case of rural families, 43 per cent in that of urban households — and, within them, 49 per cent in workers' families and 39 per cent in those of employees — and 50 per cent for the aggregate population. By 1965, under the conditions combined in hypothesis *A*, the relative importance of expenditure on foodstuffs within total expenditure would be lower for the population as a whole than it was among urban families in 1953. According to this same hypothesis, in 1970 the proportion referred to would be no greater for the total population than it had been in 1953 for the highest income-group among those considered, namely, urban employees' families. At the same time, the level of *per capita* consumption would be one-third higher by 1965 and one-half as high again by 1970; if population growth were also taken into consideration, the conclusion would be reached that within this hypothesis total expenditure on foodstuffs would have risen 41 per cent by 1960, 75 per cent by 1965 and 122 per cent by 1970. Even if the more moderate hypothesis of growth (*B*) were adopted, there would still be considerable total increases of 28 per cent, 57 per cent and 103 per cent by 1960, 1965 and 1970 respectively.

A comparison of these findings with available data on other countries leads to the conclusion that in 1965 the share of foodstuffs in total consumer expenditure would be similar to that registered in 1950 in Chile, Italy and western Germany, and only by 1970 would it have reached a level comparable to that currently recorded in France. According to hypothesis *B*, the real proportion would be comparable in 1965 to what it is in Italy at present. Nevertheless, in absolute terms *per capita* consumption of foodstuffs in Colombia would remain considerably below the corresponding 1950 levels in France, Italy and western Germany, even in the case of projections for 1970 based on the more favourable hypotheses of growth.

This decline in the relative importance of foodstuffs within total expenditure also shows what wide prospects are opening up for the expansion of consumption of manufactured goods and services. On hypothesis *A*, the share of durable consumer goods would increase from 5 per cent in 1953 to 7 per cent in 1965; the figures for expenditure on primary and secondary education would be 3 and 5 per cent respectively in the two years

quoted, while total expenditure on services would rise from 25 to 30 per cent. In these conditions, the increases in *per capita* consumption of manufactured goods and services during 1953-65 would reach 72 and 89 per cent respectively, but would be reduced to 39 and 49 per cent under the terms of hypothesis *B*.

Both hypotheses, therefore, assume a considerable expansion of this type of consumption within a relatively short period. According to hypothesis *A*, total expenditure on manufactured goods would be more than doubled by 1965, while in hypothesis *B* it would increase by more than 80 per cent; in the case of services, the corresponding increments would be about 150 per cent and 100 per cent, and expenditure on education and public health services would be three times as great.

The significance of these changes in the composition of consumption can be more accurately appraised if it is considered that by 1965 total expenditure on consumption would rise by 110 per cent according to hypothesis *A* and 79 per cent on hypothesis *B*. Expenditure on manufactured goods other than foodstuffs would increase at rates 29 and 16 per cent higher than these, on each of the two working hypotheses; while outlays on services would outstrip the growth of aggregate consumer expenditure by one-third and one-fourth in the cases of hypotheses *A* and *B* respectively.

Such great changes as these must logically constitute dynamic factors of basic importance in the process of Colombia's economic development. Modifications in the structure of consumption imply in their turn considerable changes in the channelling of production by economic activities, as well as in production capacity and the distribution of the labour force. The consequent relative transfer of active population from agriculture to industry and services involves an improvement in productivity; while the greater relative importance of industrial production means the raising of technological standards in the economy as a whole. On the other hand, the growing importance of expenditure on services, where the gross product per unit of capital is low, entails a real increase in the social cost of production and investment. Finally, a rise in the general level of productivity achieved through the redirection of resources towards different economic sectors where technological standards are higher, helps to expand investment capacity.

Lastly, it should be noted that the effort which would be required of the various sectors of the country's economic activity if this increased demand for consumer goods and services were to be satisfied, would have to be even greater than is implied by the figures discussed. To the expansion of consumption would be added import substitution needs, since the postulated increments in aggregate consumption exceed the prospective growth of the capacity to import. This applies chiefly to manufactured articles, especially durable consumer goods; of the supply of such items, a fairly substantial proportion was still being purchased abroad in 1953. The specific branches of imports that might be replaced by domestic production, and the extent to which this would be possible, are considered in detail in the chapter on the industrial sector. All that is necessary here,

therefore, is to establish the definite assumption that the proportion of total consumption of manufactured goods accounted for by imports would decrease from 16.2 per cent in 1953 to 8.1 and 6.5 per cent in 1960, according to hypotheses *A* and *B*, respectively. Imports of non-durable consumer manufactures would by that time be negligible. Where durable consumer goods were concerned, on the other hand, even on the assumption that the domestic production effort would be highly intensive, import requirements would still represent about 300 million pesos (at 1950 prices) in the case of hypothesis *A* and not quite 200 million in that of hypothesis *B*.

Thus, the changes in the structure of production which would inevitably accompany the future growth of income can be seen to be determined not only by the differing characteristics of demand in the various lines of consumption, but also by those import substitution processes which mean, in the final analysis, that the industrialization of Colombia must be still further intensified.

IV. DOMESTIC PRODUCTION REQUIREMENTS, BY CAPITAL GOODS, RAW MATERIALS AND INTERMEDIATE PRODUCTS

In the preceding sections, export prospects have been analysed, together with the expansion that would be necessitated in the various sectors of economic activity by the increased demand for consumer goods and services resulting from the higher *per capita* income levels assumed in the over-all hypotheses formulated at the beginning of this chapter. From the standpoint of the production effort that the country would be called upon to make, growth requirements in two important branches of domestic production — capital goods, and raw materials and intermediate products — still remain to be considered.

Both aspects are discussed in detail at a later stage,²² and at this point only a general reference will be made to the methodology adopted and the main conclusions reached. In the first place, it should be recalled that the inference drawn from a previous analysis was that the predictable increase in the capacity to import would probably be inadequate to meet the import requirements consequent upon the future growth of *per capita* income, in the case of either of the two over-all hypotheses under consideration.

It would thus be justifiable to regard the strengthening of the import substitution process which has been taking place since the late 'twenties as one of the basic characteristics of Colombia's future economic development. By 1953 a fairly high degree of substitution had been attained in the case of consumer goods, although there were still significant possibilities in the field of durable consumer manufactures. The major burden of the future substitution effort would in any event have to be borne by the capital goods industry — little developed in Colombia as yet — and the activities producing raw materials and intermediate goods, imports of which constituted a considerable proportion of total requirements in 1953. It is this that imparts special interest to

a study of the prospects for domestic production of these two categories of goods.

In both instances, extreme assumptions as to probable substitutions had to be postulated, so that the results obtained might be consistent from the point of view of the volume of import requirements on the one hand and the projections of the capacity to import on the other. The indispensability of compensating for the inadequate growth of the capacity to import by a greater expansion of domestic production was thus the criterion for assessing the total extent of the substitutions that would have to be achieved during the period under review.

This warranted the formulation of projections for domestic production of capital goods based on what was apparently the maximum expansion that might reasonably be expected, given the present characteristics of the industry and the techniques and skilled labour at its disposal. According to estimates arrived at in the detailed analysis of the sectors concerned, domestic production of capital goods might increase from a value of a little over 300 million pesos in 1953 to figures fluctuating between 765 million and 865 million pesos in 1960 (hypotheses *A* and *B*) and to more than 1,000 million pesos in 1965. In weighing the practical possibilities of achieving such striking increments, it should be borne in mind that in recent years the entry into operation of the Paz del Río steel mill alone has already made a considerable contribution to development in this field, which will be supplemented by the expansion programmes already planned for the future. To all this is also being added the production of other new industries for whose installation in Colombia an incentive was provided by the very fact that they would probably be able to draw upon domestic availabilities of the most important raw materials. While the achievement of so marked an expansion of the industries in question would inevitably demand considerable effort, it does not seem to be beyond the capacity of the Colombian economy. Moreover, as will be seen later, only by means of such efforts would it be possible to compensate for the limited prospects of an increase in the capacity to import discussed elsewhere, and, therefore, to create conditions compatible with the rates of growth of income postulated in the two over-all hypotheses under consideration.

Any attempt to quantify domestic supply requirements on lines consistent with the other projections mentioned is much more complex in the case of raw materials and intermediate products. For this very reason, it seems useful here to refer briefly, in parenthesis, to certain methodological aspects of the question.

The demand for consumer goods, export commodities and even, from this point of view, capital goods — that is, for the so-called final goods — may in some contexts be regarded as an autonomous demand.

In contrast, raw material requirements derive essentially from and ultimately depend upon the production levels aimed at for other types of goods. They cannot in practice be projected on the basis of such criteria as income-elasticity of demand or product-capital ratios, which might permit of an immediate

²² See Part Two, chapter III.

estimate of the scale of future needs for commodities of this type. Since they are not directly linked to over-all growth prospects, requirements of raw materials and intermediate products can be calculated only after formulation of the projections relating to domestic production of the several types of final goods, in which these raw materials and intermediate products are incorporated as inputs.

It was precisely this objective that was borne in mind, *inter alia*, during the preparation of the inter-industrial relationships table included in that chapter of the present study which deals with the characteristics of industry in Colombia. The over-all input-output table and the tables of derived coefficients provide the means of projecting firstly the total requirements of raw materials and intermediate products which would enable domestic production to cope with the growth of demand for consumer goods, the expansion of exports and the increase in supplies of capital goods from domestic sources, and secondly the import substitutions in this field to which allusion has already been made.

All that is necessary in this connexion is to cite the main conclusions derived from the detailed analysis in the chapter mentioned. In 1953 the Colombian economy's total requirements of raw materials and intermediate products amounted to a value of just under 2,500 million pesos, of which about 390 million corresponded to imported raw materials.²³ By 1960, the raw materials and intermediate products needed to meet the demands of increased domestic consumption, production for export and the expansion of the capital goods industries would represent about 3,600 millions pesos (at 1953 prices) under the conditions established in hypothesis *A*, or a sum of close to 3,500 million pesos in the case of hypothesis *B*. If in such circumstances the share of imports in total requirements of goods of this type remained much the same as in 1953, the c.i.f. value of such imports in 1960 would range from 680 to 790 million pesos (at 1953 prices) on hypotheses *B* and *A* respectively. This in turn would mean that an exceptionally high proportion of the country's total capacity to import would be absorbed by purchases of raw materials and intermediate products on foreign markets. Such a state of affairs would be inconsistent with the over-all growth targets envisaged in both hypotheses, which would also call for imports of capital goods on a large scale and of certain consumer goods on a smaller scale.

In view of the foregoing data, it was necessary to assume, in analysing development prospects for the agricultural and industrial sectors,²⁴ a substantial expansion of domestic production to replace imported raw materials and intermediate products, or at least to absorb the increase in requirements of imports of this type. It is thus estimated that between 1953 and 1960 domestic production of such goods would have to rise in value from 2,050 million pesos to just over 3,800 million (at 1953 prices) in the case of hypothesis *A*, and to about 3,300 million in that of hypothesis *B*. Even so,

imports would still be considerable, representing c.i.f. values of approximately 330 and 270 million pesos respectively,²⁵ but they would be compatible with the projections of the capacity to import and import requirements in other categories of goods and services.

V. GLOBAL PROJECTIONS AND THE INTEGRATION OF SECTORIAL PROJECTIONS

Four main aspects of the question have been discussed so far. In the first place, over-all growth hypotheses have been established and preliminary estimates have been made of the probable values of the most important magnitudes; secondly, prospects for exports and for the capacity to import have been considered; next, the characteristics of demand for consumer goods and services have been analysed, together with the possible incidence of future variations in this demand on each of the main sectors of economic activity; and, lastly, the country's needs in respect of capital goods and of raw materials and intermediate products have been reviewed. In other words, the methodology adopted has made it possible to project domestic production requirements for the export trade and for the satisfaction of domestic demand for consumer and capital goods and intermediate products, both in the case of the economy as a whole and in that of each of its principal activities.

The time has now come to make a systematic examination of the results of the preceding calculations, as well as of the conclusions reached in the detailed studies of several of the most important sectors of economic activity, with a view to supplementing and correcting the over-all projections on which the whole of the present analysis is based. The final figures to be examined in this way are those obtained for the volume and composition of the gross product, total capital requirements, and, consequently, the amount and sectorial distribution of net and gross investment during the period under discussion. Lastly, careful consideration will also be given to the compatibility of the projections for the capacity to import and the imports needed, as well as the changes in the structure of these latter that would have to take place.

In other words, the foregoing sections have provided the bases for a consistent analysis of the main sectors. The findings of the analysis by sectors must now be assembled and the preliminary hypotheses originally formulated must be brought into line with them.

1. *Growth of the gross product and changes in its origin by sectors*

When the over-all projections were first made, two alternative hypotheses as to the rate of growth of the *per capita* gross product were taken as a point of depar-

²³ Taking into account the value of domestically-produced raw materials and intermediate products delivered at the consumer factories, and the c.i.f. value of those imported.

²⁴ See Part Two, chapters II and III.

²⁵ It should be noted that in this case total figures for raw materials and intermediate products are higher than those previously mentioned (some 4,100 and 3,600 million pesos at 1953 prices on the two hypotheses, as against slightly over 3,900 and 3,400 million). The explanation is that substitutions of domestic products for imported intermediate goods entail in their turn a further increase in raw material requirements.

TABLE 39. COLOMBIA : PROJECTIONS OF THE GROSS PRODUCT, BY ACTIVITIES, 1953-60-65

(Millions of pesos at 1950 prices)

	Hypothesis A			Hypothesis B	
	1953	1960	1965	1960	1965
Total gross product	7,751	12,300	16,745	11,059	14,513
Agricultural and livestock production	2,863	4,028	4,898	3,850	4,624
Mining	286	500	690	420	570
Manufacturing	1,330	2,648	3,928	2,298	3,276
Artisan industry	294	220	200	260	250
Construction	369	620	860	530	705
Trade, finance, etc.	1,003	1,570	2,120	1,420	1,850
Transport	574	929	1,349	791	1,153
Communications and other public utilities	94	240	440	180	320
Government	538	870	1,240	740	1,000
Personal income from rentals	400	675	930	570	765

SOURCE : ECLA estimates.

ture. One (hypothesis A) postulated relatively rapid expansion at rates of 4.2 per cent between 1953 and 1960 and 4.6 per cent between 1960 and 1965, while the other (hypothesis B) assumed more moderate growth rates of 2.2 and 3.6 per cent over the same periods. It was also pointed out that the purpose of such projections was to provide an indispensable basis for a consistent sectorial analysis, the findings of which were afterwards to be used for correcting the initial projections.

The integration of the results of the sectorial projections does in fact give gross product figures which differ only very slightly from those of the initial projections, tending on the whole to exceed them (see table 39).

The figures given in the table are not in every case derived from detailed sectorial projections, which were made only for some of the more important branches of economic activity, namely, agriculture, industry, transport and energy.²⁶ In the other cases, they correspond to over-all estimates mainly based on the indications obtained from the analysis of demand in previous sections.²⁷ In any event, an equally full analysis of all sectors might possibly have led to estimates a little higher still than the original calculations, chiefly because of the

²⁶ See Part Two, chapters II, III, IV and V.

²⁷ The gross product accruing from building activities and personal income from rentals, for instance, is computed principally on the basis of the estimated growth of demand for housing, although building needs deriving from the expansion of agriculture and manufacturing are also taken into consideration. With respect to government activities, the gross product is assumed to have increased with much the same intensity as demand for public utilities. The estimate of the gross product from communications and other public utilities takes into account the increment in net consumption of electric energy. Where mining is concerned, calculations are mainly based on the projections of production of crude petroleum and coal. Lastly, the projections for the trade and finance sector have no intrinsic significance, as for want of objective background data it was arbitrarily assumed that this sector's proportional contribution to the total gross product would be similar to that registered in 1953.

import substitution effort necessitated under the terms of the hypotheses by the inadequate growth of the capacity to import.

This point perhaps calls for more detailed explanation. It might be imagined that such substitutions would be reflected only in a relative transfer of resources from the export sectors to import replacement activities, and that they would therefore not affect the original projections of the total gross product; but it must also be remembered that they lead to an increase in derived requirements of imported inputs, which ultimately entails a proportionally greater domestic production effort. In other words, the internal activity required to determine a given increment in the capacity to import may differ from the needs that would arise if the same quantity of imports were to be replaced by domestic production, inasmuch as exports are based on the exploitation of purely national resources, while import substitution calls for a certain proportion of inputs purchased abroad, which means that still more substitution is necessary before a net foreign exchange saving equivalent to the above-mentioned amount can finally be achieved.

However, the greatest significance attaches, not to this minor discrepancy between the original projections and those resulting from the analysis by sectors, but to the study of the radical changes that would be brought about in the sectorial sources of the gross product by the increase and structural modifications in demand for consumer goods and services, by the expansion of domestic production of capital goods as well as of raw materials and intermediate products, and by the evolution of exports and the substitution of domestic production for imports. In the course of some few years Colombia's economic structure would alter considerably, whether development proceeded rapidly or at a slower pace.

Attention must first be drawn to the decline that would take place in the proportion of the gross product generated in the agricultural sector; it would fall from 36.9 per cent in 1953 to 32.7 and 24.7 per cent in 1960, and to 29.3 and 21.9 per cent in 1965, according to

hypotheses *A* and *B* respectively. This decrease would not, however, be incompatible with a marked increase in the gross product deriving from this sector in absolute terms, since the expansion registered between 1953 and 1960 would vary from 41 per cent in the case of hypothesis *A* to 34 per cent in that of hypothesis *B*, while for the period 1953-65 the corresponding increments would be approximately 71 and 62 per cent on the respective hypotheses. In both cases, such an upward trend in agricultural production would allow of a very considerable improvement in *per capita* standards of nutrition, besides supplying an increasing flow of raw materials for industry and substituting domestic equivalents for a number of imported agricultural commodities. As will be seen in the relevant chapter, between 1953 and 1965 the number of calories *per capita* would rise from 2,108 to 2,510 in accordance with hypothesis *A* and 2,353 in the case of hypothesis *B*. The level recorded in 1953, which represented only 80 per cent of that recommended by the *Instituto Nacional de Nutrición*, would reach 95 per cent on hypothesis *A* and 90 per cent on hypothesis *B*. At the same time, substantial changes would also take place in consumption of high-quality foodstuffs. *Per capita* consumption of proteins, which in 1953 stood at only 58 per cent of the level recommended, would attain to 74 and 68 per cent, according to hypotheses *A* and *B* respectively, by 1965.

In contrast with the decline in the relative importance of agriculture, that of the other sectors would increase more or less intensively, except in the case of artisan activities, where a considerable contraction, even in absolute terms, is again assumed.

The most striking expansion would be that of the gross product generated by the manufacturing sector. In 1953 this accounted for 17.2 per cent of the total gross product (excluding artisan industry), but by 1965 this proportion would rise to 23.5 per cent according to hypothesis *A*, and to 22.6 per cent on hypothesis *B*. The average annual rates of growth implied are 9.4 and 7.8 per cent respectively, and on the more favourable hypothesis the gross product accruing from this sector would be trebled, in absolute terms, during 1953-65.

The gross product of mining, too, would substantially increase, as a result both of internal and external demand

and of the more efficient exploitation of production possibilities. On either of the hypotheses under consideration, the output of coal would be from three to four times greater in 1965 than in 1953; that of petroleum might be doubled in the same interval, while that of precious metals and other ores would also improve.²⁸

The expansion of building activities would be rapid, not only because of the intensive rate of urbanization and, consequently, the greater demand for housing facilities, but also as a result of heavier investment in agriculture, industry and public utilities.

The product generated by services in the aggregate — including trade and finance, transport, communications and public utilities, government services and personal income from rentals — would also increase at a rapid rate. Even if it were assumed, for want of specific data on which to base a separate estimate, that trade and financial services (whose share in the total is high) would remain stationary, the relative importance of the gross product deriving from these sectors as a whole would rise from one-third of the total in 1953 to 37 or 35 per cent in 1965, according to hypotheses *A* and *B* respectively. The gross product originating in the governmental sector would increase, on the more favourable hypothesis, from 6.9 per cent of the total in 1953 to 7.4 per cent in 1965. The improvement in the supply of certain public utilities would be much more notable still. For example, the relative importance of the gross product from the energy sector would be doubled between 1953 and 1965, rising from 1.2 per cent in the former year to 2.6 per cent in the latter, according to hypothesis *A*, and on hypothesis *B* to 2.2 per cent in 1965.

2. Capital requirements and distribution of investment

When the over-all projections were prepared, growth targets were set up for the gross product and certain assumptions as to possible figures for the product-capital ratio were adopted; and these data in turn

²⁸ With respect to petroleum, it should be recalled that the hypothesis adopted in the over-all projections of the capacity to import, and used as a basis for this projection of the gross product, was much more favourable than seems to be warranted by the currently available data given in Part Two, chapter IV.

TABLE 40. COLOMBIA: PROJECTIONS OF THE STOCK OF CAPITAL BY ACTIVITIES, 1953-60-65

(Millions of pesos at 1950 prices)

	Hypothesis A			Hypothesis B	
	1953	1960	1965	1960	1965
Total stock of capital	22,262	34,075	45,210	30,565	39,035
Agricultural and livestock production	7,924	9,370	10,690	9,130	10,250
Mining	483	1,290	2,020	1,020	1,560
Manufacturing	3,183	6,405	9,400	5,520	7,850
Transport	2,723	3,720	4,800	3,300	4,120
Energy	424	1,530	2,630	1,160	1,900
Housing	3,521	5,950	8,200	5,035	6,725
Services	4,004	5,810	7,470	5,400	6,630

SOURCE: See annex II, "Note on methods of estimating projections of the stock of capital".

TABLE 41. COLOMBIA : PROJECTIONS OF THE PRODUCT-CAPITAL RATIO, 1953-60-65

	1953	Hypothesis A		Hypothesis B	
		1960	1965	1960	1965
Total *	0.35	0.36	0.37	0.36	0.37
Agricultural and livestock production	0.36	0.43	0.46	0.42	0.45
Mining	0.59	0.39	0.34	0.41	0.37
Manufacturing	0.42	0.41	0.42	0.42	0.42
Transport	0.21	0.25	0.30	0.24	0.28
Energy	0.22	0.16	0.17	0.16	0.17
Urban housing	0.11	0.11	0.11	0.11	0.11
Services	0.38	0.42	0.45	0.40	0.43

SOURCE : Figures deduced from tables 39 and 40.

* Including construction and artisan activities.

provided a basis for estimating the Colombian economy's capital availabilities in 1960 and 1965, in accordance with the situations postulated by the two hypotheses under consideration. These initial estimates should now be compared with the findings of the detailed analysis of each of the main sectors of economic activity contained in other chapters (see table 40).

The changes mentioned in the composition of the gross product by sectors would significantly alter the distribution of the stock of capital among the various economic activities. The proportion of the whole represented by the stock of capital in the agricultural sector, for example, would drop from more than one-third in 1953 to less than one-fourth in 1965 (hypothesis A). Conversely, the manufacturing sector's share in total capital would substantially increase ; in 1953, the capital used in industry was equivalent to about 40 per cent of that employed in agriculture and livestock production, whereas in 1965, according to hypothesis A, the stock of capital in the two sectors would be very similar, in absolute terms. Another of the most important changes would consist in the smaller proportion of capital used in the transport sector, in contrast with the long-term trend registered in previous periods ; on the other hand, the energy sector's share would be considerably larger.

It should be noted that if the figures under discussion, which are those obtained from the analysis by sectors, are in most cases higher than those provisionally adopted at the beginning of this chapter,²⁹ the reason is that the over-all projections were based on general considerations as to the possible behaviour of the product-capital ratio, which, according to estimates, would rise from 0.35 in 1953 to 0.39 in 1960 and 1965 (except in the case of hypothesis B for 1960). However, such a hypothesis as to the variations in the product-capital ratio for the economy as a whole must necessarily be subject to revision as a result of the sectorial analysis — probably, indeed, to an even greater extent than the other magnitudes, since changes in this ratio depend not

only upon the evolution of the product-capital ratio in each individual sector, but also on the way in which the stock of capital is redistributed among the various economic activities.³⁰

The inference is that the product-capital ratio is hardly likely to improve at the intensive rate envisaged in the over-all projections, as can be seen from the statistics given in table 41.

It may be observed that on both hypotheses the possible increases are on a very moderate scale, and represent the outcome of changes both in sectorial relationships and in the distribution of capital by activities.

One of the most solid improvements would be registered by the product-capital ratio for the agriculture sector,³¹ but its effects on the corresponding ratio for the over-all economy would be considerably weakened by the decline in this activity's relative share in the total stock of capital. In the case of the manufacturing sector, where the increment in the stock of capital would greatly exceed the aggregate expansion, the product-capital ratio would remain much the same as in 1953. So constant a product-capital ratio in industry would be the result of improvements in the ratio for several branches of industrial production, which would be offset by the more intensive development of manufacturing activities requiring a higher capital density than industry as a whole.³² Where transport is concerned, substantial increments in the product-capital ratio are still likely, because of the prospects of increasing utilization of the network of basic facilities with which heavy investment in former periods has by now provided the country. On the other hand, the same would probably not be true of such

²⁹ The stock-of-capital statistics envisaged in the original projections were as follows (in millions of pesos at 1950 prices) :

	Hypothesis A	Hypothesis B
1960	30,923	30,137
1965	43,369	36,192

³⁰ To take an extreme view, it is conceivable, for example, that alongside a decline in the product-capital ratio for each individual sector, an improvement might take place in the ratio for the economy as a whole, if at the same time a larger proportion of the stock of capital were to be used in activities with a more favourable product-capital ratio.

³¹ See Part Two, chapter II, for a detailed study of the factors determining this improvement.

³² See Part Two, chapter III, for detailed discussion of possible changes in the product-capital ratio for industry as a whole and for the main branches of manufacturing activity.

TABLE 42. COLOMBIA : PROJECTIONS OF GROSS INVESTMENT

(Millions of pesos at 1950 prices)

	<i>Hypothesis A</i>		<i>Hypothesis B</i>	
	1960	1965	1960	1965
Rate of growth of total gross product	6.8	6.4	5.2	5.6
Product-capital ratio	0.36	0.37	0.36	0.37
Coefficient of net investment	18.9	17.3	14.4	15.1
Total gross product	12,300	16,745	11,059	14,513
Total net investment	2,325	2,897	1,592	2,191
Stock of capital	34,075	45,210	30,565	39,035
Depreciation	1,135	1,505	1,018	1,300
Gross investment (fixed)	3,460	4,402	2,610	3,491
Coefficient of gross investment	28.1	26.3	23.6	24.0
Initial projection of gross investment coefficient	22.7	23.9	20.0	21.4

SOURCE : ECLA estimates.

sectors as those of energy and mining, where changes in the relative importance of the various activities they comprise, and technological improvements in some branches of exploitation, might lead to a decrease in the product-capital ratio.

It is not surprising that even if in some cases fairly optimistic hypotheses are adopted, the prospects of a rise in the product-capital ratio for the economy as a whole are slight. There has already been an opportunity of stressing the significant post-war improvements in this ratio, but it was also pointed out that what had made them possible was a combination of several favourable factors, the most important of which were better terms of trade and a marked increase in the capacity to import. On the other hand, consideration of more recent data would not seem to warrant the assumption, in projections for the next few years, that these factors will continue to exert an equally favourable influence. When in addition it is borne in mind that much higher figures must be envisaged for the capital per employed worker in several of the principal activities, and that sectors like energy, where the product-capital ratio is much less favourable than in the over-all economy, will grow in relative importance, it is readily understandable that the maintenance of a progressive improvement in the ratio between the gross product obtained and the input of capital is hardly to be expected. From this point of view, therefore, the specific estimates mentioned seem to be justified.

It will be remembered that when the aggregate projections were formulated, attention was called to the considerable domestic savings effort that would be required, in greater or lesser degree, if the targets set up by either of the two hypotheses were to be attained. The final assessment of this effort was based on the levels that would have to be reached by the coefficient of gross investment.³³ Since the analysis by sectors led to

the conclusion that the improvement in the product-capital ratio would be less than that provisionally estimated at the outset (except in the case of hypothesis *B* for 1960), the resultant increase in requirements should now be examined, in terms of both the absolute amount of investment needed and its ratio to the gross product.³⁴

The figures given in table 42, therefore, sum up estimated developments in the case of the gross investment coefficient, the size of which might be regarded as dependent upon the rate of growth of the gross product, the product-capital ratio and the total value of the stock of capital, together with its depreciation rate.

These statistics cannot be taken as anything more than indications of an approximate scale of magnitude. Strictly speaking, the amount of gross investment that would be necessary in 1960, for example, would be determined not by the assumed rate of growth between 1953 and 1960, but by the intensity of the development aimed at from 1960 onward. Much the same would be true of the estimated gross investment for 1965. In other words, these hypothetical calculations do not take into account the problem of the time that must be allowed for the investments to mature.³⁵

³⁴ Of course, the view might be taken that in so far as investment requirements proved to exceed those originally forecast, a possible alternative would be to reduce the growth of consumption. This, however, would entail revision of all the sectorial projections, not only in the light of such a reduction, but also taking into account the fact that the distribution of consumption by types of goods and services would no longer be the same, in view of the different size of the income-elasticity coefficients. The consideration of other correction factors here implies an assumption that the projections are definitely based on a certain rate of growth of consumption, rather than on a given increase in the gross product, the figures for which have in any case already undergone alteration in practice, as a result of the analysis by sectors.

³⁵ Depreciation estimates constitute another source of inaccuracy. The rate of depreciation largely depends on the distribution of the stock of capital among the various sectors of economic activity and the proportion corresponding in each case to machinery and equipment on the one hand and construction and improvements on the other. In this instance, an over-all depreciation rate similar to that estimated for 1953 was arbitrarily postulated.

³³ In the following paragraphs the term "coefficient of gross investment" will refer only to fixed investment, excluding inventory changes.

Even with this reservation, it can be seen that the coefficient of gross investment is in every case higher than the initial estimates. To put it another way, the targets proposed under the terms of both hypotheses would call for a greater domestic savings effort or a larger foreign capital contribution than were envisaged at the outset. In so far as the proportions attained by the discrepancies were significant and it proved impossible to adopt more favourable hypotheses as to some of the determining factors, the inevitable conclusion would be that under the conditions assumed it would be unrealistic to work on the basis of the postulated rates of growth, and the whole problem would have to be reconsidered, on the presupposition of more modest development targets.

This seems to apply to hypothesis *A*, which involves extremely high investment coefficients. In consequence of a much more moderate improvement in the product-capital ratio than the initial estimates suggested, the rate of growth postulated here would be practicable only if the Colombian economy were to receive a far more substantial contribution of foreign capital than was assumed in previous sections; and even then, consideration would have to be given to the country's capacity for servicing the interest, amortization and remittances of profits on so large an inflow.

The requisites for the expansion assumed in hypothesis *B*, on the other hand, seem more feasible. A more detailed impression of the nature of the problem can be formed by reviewing merely the situation as it would be, according to this hypothesis, in the year 1965, when there would still be an appreciable difference between the original projection of the gross investment coefficient and the figure arrived at later on the basis of the sectorial analysis (21.4 and 24.0 per cent respectively). The projections of the gross product, the terms-of-trade effect and the net inflow of foreign capital determine the total supply of goods and services that would be available for distribution between consumption and investment. The following are the relevant estimates for the example selected (in millions of pesos at 1950 prices):

Gross product	14,513
Terms-of-trade effect	-232
<hr/>	
Gross income	14,281
Net inflow of foreign capital	-140
<hr/>	
Available goods and services	14,141

As the initial projection of consumption (10,567 million pesos at 1950 prices) has been kept unchanged, the sum remaining available for investment would amount to 3,574 million pesos at 1950 prices. Total gross investment requirements of fixed capital are estimated at 3,491 million pesos, but this figure excludes possible investment in the enlargement of inventories, which was at first arbitrarily calculated, in the comparative absence of objective data, as representing 155 million pesos. Hence the foregoing projections would be completely consistent, in so far as working capital requirements were smaller than was originally estimated to be the case; otherwise, total available goods and services

would not suffice to meet the consumption and investment needs postulated here.³⁶

In practice, of course, many elements of flexibility will always exist. For example, a greater inflow of foreign capital than was forecast in the initial hypotheses might suffice to offset this potential deficit in available goods and services. It is important to note, however, that from this point of view the contribution of the external sector is so small that it can hardly be regarded as the adjustment factor in situations of this kind.

Even if, instead of the estimated outflow of foreign capital to a value of 140 million pesos (at 1950 prices), an equivalent net inflow were postulated, this would represent barely one per cent of available goods and services and less than 4 per cent of gross investment. Under such conditions, if the contribution of foreign capital were to raise the gross investment figure by only 5 per cent, the net inflow of capital from abroad might have to be trebled, a hypothesis which would not appear reasonable in the light of the analysis presented at the beginning of the chapter.

On the other hand, from a number of observations in the preceding chapter it can be seen that in Colombia some important branches of economic activity have had to maintain relatively high inventories, on account of factors which will undoubtedly become less significant in the future. The improvement of transport facilities and domestic production of a larger proportion of raw materials and intermediate products, for example, will probably eliminate some of the negative factors which have hitherto carried most weight.

In brief, an improvement in the product-capital ratio proportionally smaller than that estimated in the overall projections seems to suggest that the group of objectives postulated in hypothesis *A* would be exceedingly difficult to attain; on the other hand, it does not seem to constitute a fundamental element of incompatibility in the projections included in hypothesis *B*. It is only in this latter case, therefore, that the findings of the sectorial analysis do not lead to mutually irreconcilable conclusions which would necessitate a re-evaluation of the growth targets on which the whole set of projections is based.

One last aspect which it is of interest to consider in relation to the foregoing points is that of the net investment which would have to be effected in 1953-60 and 1960-65 under the terms of the two hypotheses, and the way in which this investment would have to be distributed among the principal sectors of economic activity. The relevant estimates can be deduced from the figures for stock-of-capital requirements in each of the periods mentioned.

In accordance with hypothesis *A*, total net investment needs would approach 12,000 million pesos at

³⁶ It might perfectly well be argued that the differences are so small as certainly to fall below the margin of error which should reasonably be allowed for in basic statistics, and that there is consequently no point in discussing them in so much detail. However, the justification lies in the methodological character of the present study, in which it is the conceptual aspects of the projections that matter, rather than the size of the figures.

TABLE 43. COLOMBIA : ESTIMATE OF NET INVESTMENT REQUIREMENTS, BY ACTIVITIES, 1953-60 AND 1960-65

(Millions of pesos at 1950 prices)

	<i>Hypothesis A</i>		<i>Hypothesis B</i>	
	1953-1960	1960-1965	1953-1960	1960-1965
<i>Total</i>	11,813	11,135	8,303	8,470
Agricultural and livestock production	1,446	1,320	1,206	1,120
Mining	807	730	537	540
Manufacturing	3,222	2,995	2,337	2,330
Transport	997	1,080	577	820
Energy	1,106	1,100	736	740
Urban housing	2,429	2,250	1,514	1,690
Services	1,806	1,660	1,396	1,230

SOURCE : Figures deduced from table 40.

1950 prices during 1953-60, and would amount to just over 11,000 million for the quinquennium 1960-65. In the case of hypothesis *B*, the corresponding figures would be approximately 8,300 and 8,500 million pesos (see table 43).

As can be seen, a high proportion of the country's resources would have to be earmarked for the expansion of industrial production capacity, in order to meet the intensive growth of domestic demand for manufactured goods and put into effect the substitution process necessitated by the inadequate increase in the capacity to import. Thus, the greater relative importance of industry, both in terms of its contribution to the gross product and from the point of view of its share in the total stock of capital, would mean that more than one-fourth of net investment in 1953-60 and 1960-65 would have to be directed towards the manufacturing sector, whichever of the two hypotheses were adopted.

Substantial net investment in urban housing would also be required, not only as a result of the country's current housing deficit and the high income-elasticity of demand for residential facilities, but also because of the continuation of the rapid rate of urbanization that characterized Colombia's development during the preceding period. It is not by mere chance that these heavy urban housing investment requirements coincide with an increase in the relative importance of investment in manufacturing activities, since it is precisely the industrialization process, combined with the much more ample provision of various kinds of services, that will determine the intensive growth of the urban population. By 1955, in all likelihood, more than half the population of Colombia will be living in the larger towns, and this also helps to explain why services will retain a comparatively large share in aggregate investment.

The kind of change that would have to take place in the distribution of the resources available for investment is particularly well illustrated by a comparison of the relevant figures for manufacturing activities, energy and transport. During the major part of the period 1925-33, investment in transport was heavier than in industry and several times as great as in the energy sector. This

situation has already undergone considerable modification during the last few years of the period, but the projections under review imply still more striking changes. The relative importance of investment in transport would fall to only about one-third of investment in the manufacturing sector. In contrast, a much higher proportion of available resources would have to be devoted to improving the energy supply, with a view not only to meeting the more exigent demands of future development, but also to gradually eliminating the deficits at present registered in specific forms of energy. This relative transfer of resources from the transport sector — now endowed with a series of basic works that can be increasingly utilized — to that of energy would constitute one of the most salient features of the future distribution of investment.

Fixed capital investment in agriculture and livestock production would account for a relatively moderate proportion of total net investment largely because sizeable increments in agriculture production might be achieved through an increase in the working capital — to be turned to account, for example, in financing greater utilization of savings — whereby the yield of a variety of crops might be considerably improved. Furthermore, in absolute terms such investment would be significant enough to permit considerable advances in the mechanization of agriculture, as well as a substantial increase in availabilities of capital per person employed in agricultural activities.

The hypotheses under consideration in the present study assume that a great effort will be made to raise the productivity of agriculture through an increment in the stock of capital per person employed in that sector. For agricultural production to attain the targets proposed for 1965 with approximately the same number of farm workers as in 1953, the stock of capital per person employed in such activities would have to increase by 76 per cent, and the gross product per worker by 75 per cent.

Although other activities would also register an overall rise in the stock of capital per active person, as well as in productivity, the disparity between productivity

in agriculture and in the rest of the economy would be considerably lessened. According to hypothesis *A*, the gross product per person employed in agriculture would have almost doubled by 1965. In 1953 it represented 65 per cent in relation to the over-all economy, whereas in 1965 the gross product per agricultural worker would be equivalent to some 73 per cent of the figure for the economy as a whole. This development would also permit a considerable transfer of additional manpower to non-agricultural activities, so that by 1965 the active population engaged in occupations other than agriculture would be larger than the labour force still employed in the agriculture sector. Obviously, the increment in the productivity of labour in agriculture, as well as the aforesaid transfer of additional active population to non-agricultural activities, would constitute a factor of vital importance in raising the level and altering the structure of *per capita* consumption. The real possibility of such an expansion of the market is a target well worth keeping in view.

Apart from these considerations as to the distribution of net investment among the principal economic activities that would be compatible with the whole set of projections formulated, the possible share in such investment of machinery and productive equipment, on the one hand, and construction and improvements on the other, might also usefully be investigated. Unfortunately, there are not enough data available for a study of this kind to give statistical results which would even be indicative of a scale of magnitude. Nevertheless, a few general pointers, at least, seem to emerge from the analysis of the various sectors. It will be recalled that in 1953 machinery and productive equipment represented about 40 per cent of total gross investment. On the assumption that, *inter alia*, the mechanization of farming would be greatly intensified, that rolling-stock would acquire considerably more relative importance within the new investment effected in the transport sector, and that industries requiring more complex equipment and a more advanced technology would be increasingly developed, the conclusion would have to be reached that machinery and equipment would claim a distinctly larger share in total investment in the future. The significance of this possible trend will be better understood if it is remembered that most of the goods called for by investment in construction and improvements are already produced in the country, whereas availabilities of machinery and productive equipment have been almost entirely dependent on imports. This means that unless a substantial expansion of the domestic capital goods industries is achieved, the prospects of satisfying investment requirements will depend to even a greater extent on the capacity to import, for which the rather unpromising outlook has been repeatedly described.

3. *Import requirements and the capacity to import*

An aspect of fundamental importance, from the point of view of the compatibility of the over-all projections with those deduced from the analysis of the main sectors of economic activity, still remains to be considered. This is the possibility of reconciling the imports

necessitated by the two growth hypotheses with the country's foreseeable capacity to import.

The aggregate projections have already made it clear that, whether the target proposed is a moderate or a more rapid rate of growth, the Colombian economy will be confronted by the problem of a much smaller increase in its capacity to import than in the gross product, with the consequent need for energetic furtherance of the import substitution process which has been registered over the last few decades.

From the data so far assembled, the magnitude of the problem can be much more accurately assessed. This is the purpose of the hypothetical calculations given in table 44, which presents estimates of the purchases that would have to be made from foreign markets in 1960 and in 1965 if the share of imports in availabilities of the various types of goods were modified in proportion to the figures registered in 1953. As can be seen, under the general conditions assumed throughout this study, import requirements would exceed the country's capacity to import in 1960 by 27 per cent on hypothesis *A* and by 44 per cent in the case of hypothesis *B*. By 1965 the discrepancies would be much more marked; import needs would be 46 and 78 per cent greater than the capacity to import under the terms of hypotheses *A* and *B*, respectively.

Mere reference to these statistics is enough to show that in such circumstances Colombia could not attain a satisfactory rate of development without an import substitution effort vigorous enough to offset the inadequate growth of the capacity to import. It is for this reason that in the sectorial analysis priority is given to the study of substitution prospects, and that, *ipso facto*, in the relevant projections a considerable expansion of domestic production to replace imports is assumed.

The Colombian economy has already achieved a high degree of import substitution with respect to non-durable consumer goods, the manufacture of which generally presents fewer technological difficulties. Consequently, future effort will have to be largely directed towards production of raw materials, intermediate products and durable consumer and capital goods; moreover, a somewhat superficial study of development prospects for the industries manufacturing goods in the last two categories leads to the conclusion that, even if fairly optimistic hypotheses are postulated in this respect, the major burden of the effort in question would ultimately be bound to fall on the sectors producing raw materials and intermediate products.

Other considerations support this conclusion. Since the mid-thirties, the rapid growth of imports of raw materials and intermediate products has almost kept pace with that of production. In this direction, therefore, import substitution has to some extent lagged behind, despite the fact that a number of types of raw materials and intermediate goods could apparently be fairly easily produced in Colombia. If advantage were taken of such possibilities, moreover, industry would be released from its hitherto considerable dependence on imports of intermediate products, while at the same time there would be a reduction of the heavy social cost

TABLE 44. COLOMBIA : HYPOTHETICAL PROJECTIONS OF IMPORT REQUIREMENTS
IF 1953 IMPORT COEFFICIENTS REMAIN UNCHANGED

(Millions of pesos at 1950 prices)

	Consumer goods	Capital goods ^b	Raw materials ^a	Total
<i>1953</i>				
Total imports of goods	262	614	452	1,328
Total available goods and services *	6,045	1,621	(2,150)	7,666
Imports coefficients	4.3	37.9	21.0	17.3
<i>1960 — Hypothesis A</i>				
Total available goods and services *	9,280	3,119	(3,396)	
Import requirements	399	1,182	713	2,294
Capacity to import goods				1,810
<i>1960 — Hypothesis B</i>				
Total available goods and services *	8,115	2,304	(2,951)	
Import requirements	349	873	620	1,842
Capacity to import goods				1,280
<i>1965 — Hypothesis A</i>				
Total available goods and services *	12,646	3,950	(4,571)	
Import requirements	544	1,497	960	3,001
Capacity to import goods				2,060
<i>1965 — Hypothesis B</i>				
Total available goods and services *	10,567	3,101	(3,880)	
Import requirements	454	1,175	815	2,444
Capacity to import goods				1,370

SOURCE : ECLA estimates.

NOTE : For practical reasons, the coefficients given in this table are formulated differently from those in chapter I, table 24.

* For the coefficient of imports of consumer goods, total consumption of goods and services was taken ; for capital goods, gross investment ; for raw materials and intermediate products, total availabilities according to the relevant estimates contained in Part Two, chapter III.

^b Including building materials.

^a Including fuels and lubricants.

implied by the maintenance of large stocks, chiefly in consequence of the aforesaid import requirements.

In anticipation of the more detailed analysis of the main sectors of economic activity, the principal findings as to import requirements and substitution processes may be examined here. To begin with, thanks to the projection of demand and growth prospects for domestic production of consumer goods, it is possible to determine import needs of this kind in the two hypothetical situations considered. In addition, the study of inter-industrial relationships ³⁷ permits the assessment of total requirements of raw materials and intermediate products, whence domestic supply possibilities and the resultant import needs can then be deduced. Since the projections of the capacity to import and the expansion of domestic production of capital goods were formulated beforehand, allowance is made, in calculating the necessary substitutions of consumer goods, raw materials and intermediate products, for the need to leave a margin of the capacity

to import wide enough to cover supplies of those capital goods which cannot be domestically manufactured (see table 45).

If the projections for domestic manufacture of capital goods are now added to the capacity to import available for goods in this category, the resulting figures will represent total estimates of the machinery, productive equipment and building materials to which the Colombian economy would have access for the attainment of the targets proposes on each of the two hypotheses. These figures are given in table 46, where they are also compared with total gross investment as estimated in previous sections.

It will be seen that these projections indicate a moderate increase in the share of capital goods in total gross (fixed) investment, as compared with the proportion they represented in 1953. This is perfectly consistent with an observation made in the preceding section to the effect that many of the available data tend to suggest that during the next few years machinery and productive equipment will attain a relative importance higher than

³⁷ See Part Two, chapter III.

TABLE 45. COLOMBIA : PROJECTIONS OF AVAILABILITIES FOR CAPITAL GOODS IMPORTS

(Millions of pesos at 1950 prices)

	1953 ^a	1960 ^b		1965 ^b	
		Hypothesis A	Hypothesis B	Hypothesis A	Hypothesis B
<i>Import requirements</i>					
Consumer goods : Non-durable	114	51	46	47	43
Durable	148	273	182	383	224
Raw materials	384	316	264	308	246
Fuels	68	—	—	—	—
TOTAL	714	640	492	738	513
<i>Capacity to import</i>	1,360	1,810	1,280	2,060	1,370
<i>Capacity available for capital goods imports</i> .	646	1,170	788	1,322	857

SOURCE : ECLA estimates.

^a See Part Two, chapter III, table 213. In order to express the relevant figures in terms of 1950 prices, they were deflated by an index of 101.8 in which changes in import prices and the parity exchange rate were taken into account. In 1953 real imports of capital goods amounted to only 614 million pesos (at 1950 prices).

^b See *Statistical Appendix*, tables 136 and 138. The figures appearing therein were deflated by the aforesaid index of 101.8. In addition, the figures for raw materials — given in terms of ex-factory price in the country of origin — were raised by 20 per cent in order to calculate their c.i.f. value.

TABLE 46. COLOMBIA : PROJECTIONS OF CAPITAL GOODS AVAILABILITIES^a

(Millions of pesos at 1950 prices)

	1953	1960		1965	
		Hypothesis A	Hypothesis B	Hypothesis A	Hypothesis B
Production ^b	273	742	656	1,140	1,010
Imports	614	1,170	788	1,322	857
TOTAL	887	1,912	1,444	2,462	1,867
Gross investment (fixed)	1,777	3,460	2,610	4,402	3,491
Percentage relationship of capital goods to gross investment ...	49.9	55.3	55.3	55.9	53.5

SOURCE : ECLA estimates.

^a Including building materials.^b See Part Two, chapter II, for the relevant statistics, converted here into terms of 1950 prices.

that of construction and improvements in the past, while at the same time industrial development will call for the equipment required by a more advanced technology.

In any event, the crux of the matter is the evidence afforded by these statistics that, in so far as the Colombian economy were to prove capable of an import substitution effort comparable in intensity to that assumed in various chapters of the present study, the slow development, and even the stagnation, of the capacity to import would not constitute an insurmountable obstacle to the achievement of a satisfactory rate of growth. The simultaneous endeavour to expand domestic production for the twofold purpose of meeting the growth of domestic

demand and replacing numerous imports of various types of commodities would mean a marked decline in the relative importance of purchases abroad within total available goods and services. In 1953 imports represented over 17 per cent of total availabilities of goods and services ; in 1965³⁸ the corresponding proportion would range from only 12 per cent on hypothesis A to 10 per cent on hypothesis B. The size of this decrease is an indication of the seriousness of the problem, while at the same time it shows how much less dependent on

³⁸ The reason why the import coefficient for 1965 is even lower in the case of hypothesis B, where a more moderate rate of growth is postulated, is that this hypothesis also assumes a much less favourable evolution of the capacity to import.

TABLE 47. COLOMBIA : PROJECTIONS OF IMPORT COEFFICIENTS ^a

	1953	1960		1965	
		Hypothesis A	Hypothesis B	Hypothesis A	Hypothesis B
Total imports as a percentage of available goods and services	17.3	14.9	12.4	12.2	10.0
Imports of consumer goods as a percentage of total consumption of goods and services .	4.3	3.5	2.8	3.4	2.5
Imports of raw materials and intermediate products as a percentage of total requirements of these commodities	21.0	8.9	8.6	6.4	6.3
Imports of capital goods as a percentage of gross investment	37.9	37.5	34.2	33.5	27.6

SOURCE : ECLA estimates.

^a The coefficients given here indicate relationships similar to those shown in table 44.

TABLE 48. COLOMBIA : PROJECTIONS OF IMPORT STRUCTURE

(Percentages of total imports of goods)

	1953	1960		1965	
		Hypothesis A	Hypothesis B	Hypothesis A	Hypothesis B
<i>Consumer goods</i>					
Total	19.7	17.9	17.8	20.9	19.5
Non-durable	8.6	2.8	3.6	2.3	3.1
Durable	11.1	15.1	14.2	18.6	16.4
<i>Raw materials and intermediate products</i> ^a	34.1	17.5	20.6	15.0	18.0
<i>Capital goods</i> ^b	46.2	64.6	61.6	64.1	62.5
TOTAL	100.0	100.0	100.0	100.0	100.0

SOURCE : ECLA estimates.

^a Including fuels and lubricants.

^b Including building materials.

the external sector the Colombian economy would become in the conditions postulated by these hypotheses.

Of course, the fall in the over-all import coefficient would not equally affect the proportion represented by imports of specific groups of goods and services, as can be deduced from the estimates given in table 47.

The coefficient of imports of consumer goods, already very small in 1953, would dwindle to a negligible figure by 1965, although this is far from implying that the amount of such imports would be insignificant in absolute terms. In any case, the most striking reductions would be registered in the import coefficient for raw materials and intermediate products. In 1953 over 20 per cent of total requirements of goods of this type had to be met with imports; the impetus which would have to be given to substitution activities, both in the agricultural and in the manufacturing sector, but especially in the later, would bring this proportion down to little more than 9 per cent in 1960 and only about 6 per cent in 1965. On the other hand, as might be expected, the same would not apply to the import coefficient for capital

goods, in which only a very moderate contraction would be registered. To state the case in different terms, in view of the very inadequate growth of the capacity to import, the effort to replace imports by domestic production would be directed towards the reduction of import coefficients for consumer goods, raw materials and intermediate products, so as to allow of an increasing flow of imports of machinery and productive equipment, essential for the development of the economy as a whole and of the substitution activities themselves.

Lastly, it is important to consider how the foregoing projections would be reflected in the structure of imports (see table 48).

According to these projections, the share of consumer goods in total commodity imports would not undergo any substantial modification, despite the above-mentioned decline in the corresponding coefficient. The explanation would lie mainly in the marked expansion of demand for durable consumer goods where the income-elasticity coefficient is high. It must also be borne in mind that their manufacture is an activity in which an adequate

expansion of domestic production is relatively unlikely over the medium or short term. Thus, the most important change in relation to the composition of imports in 1953 would take place in the proportions corresponding to raw materials and intermediate products, on the one hand, and capital goods on the other; whereas the relative importance of the former would be substantially reduced, that of the latter would expand until by 1965 they would constitute nearly two-thirds of total purchases abroad. In so far as the disparity between the growth of the capacity to import and that of the gross product were to prove still wider than is forecast in these projections, the changes in the composition and coefficients of imports would inevitably be even greater than those described. It might conceivably become necessary, for example, to resort to a variety of measures designed to discourage more or less luxury lines of consumption, in order to release resources whereby imports of intermediate products or capital goods could be increased.

In this connexion, the margin of possibilities would seem to be relatively extensive, since it has been assumed that in the case of hypothesis *A* imports of durable consumer goods would rise from 11 per cent of total purchases abroad in 1953 to nearly 19 per cent in 1965. Obviously, any change in the many elements involved in the projections described would entail their complete revision, since they constitute a homogeneous series in which all the complex process of interrelationships between the various factors has been taken into account. For this very reason, it is important to lay stress once again on the fact that these projections are not intended as forecasts of the future of the Colombian economy, but as a means of propounding a methodology which might be used precisely for studying the potential repercussions of changes in the factors in question. Such a study could thus be carried out along consistent lines, with due regard to Colombia's long-term economic development prospects.

PART TWO

ANALYSIS OF THE MAIN SECTORS OF THE COLOMBIAN ECONOMY



Chapter I

FISCAL POLICY AND THE PROMOTION OF ECONOMIC DEVELOPMENT

INTRODUCTION

In Colombia the taxation system has proved a powerful means of stimulating economic development during the last thirty years. At the close of the First World War, Colombia was a country of 6 million inhabitants, more than 70 per cent of its population being employed in agricultural activities ; productivity was low, and *per capita* income less than 100 dollars. The export trade, which accounted for 23.3 per cent of gross income in 1925, did not in itself constitute a sufficiently dynamic element to give an impetus to domestic development on the national plane ; other stimuli were required in addition. In the first place, it was external demand that provided the basic incentives to which the economy responded, and resources available for capital formation were mainly reinvested within the same exporter sector, or were channelled towards trade and urban building, and, on a smaller scale, into industry ; in the case of the few foreign enterprises then in existence, part of this surplus was remitted abroad in the form of profits and dividends. Again, the country was far from constituting an integrated market with sufficient demand to encourage substantial investment, on account of the geographical isolation of the various districts and the prevalence of subsistence farming in the sectors not concerned with exports. An initial effort was necessary to endow the economy with installations and basic services, especially in the field of transport, so as to widen markets and facilitate the mobility of resources ; and it was the Government that undertook this effort, putting into effect in 1925-30 an active policy of public works such as railways, roads, and municipal services. Such a policy stimulated private initiative in its turn, and thus inaugurated a period of economic growth and diversification.

During the depression of the 'thirties, the comparative stability of public expenditure helped to keep up the level of employment and effective demand. This circumstance, and another no less important, namely, the fact that the repercussions of the world depression were relatively not quite so severe in Colombia, helped to prevent the economic recession from proving as serious in this as in other Latin American countries. During the period in question, and for the rest of the 'thirties, investments made in earlier years began to bear fruit, and the reduction of the capacity to import, together with the effects of a protectionist tariff (established, for the first time in Colombia, in 1931), encouraged domestic

production and thus offset the fall in income brought about by the decline in export prices. The Government again complemented its expenditure policy with another aimed at remodelling its systems of financing and the structure of credit.¹ Alongside heavier public investment in agriculture and other activities, a tax reform was put into effect and official credit institutions were developed. Thanks in part to this combination of measures, the Colombian economy attained increased efficiency during the decade 1931-40, by means of a higher degree of mobility in the factors of production and in final goods, a channelling of investment towards the field of industry, and an institutional organization which, although as yet in its initial stages, attempted to adapt itself to the new requirements of development.

In subsequent years, the continuance of a policy aimed at promoting economic growth enabled the country to keep up its rate of progress, despite the existence of such serious difficulties as the Second World War and the internal political unrest of the years that followed. Government policy, taking advantage of the favourable post-war terms-of-trade situation, encouraged private initiative, and considerably increased public investment in basic services and essential industries, such as the manufacture of iron and steel and chemicals. It also made use of autonomous public institutions to develop specific sectors of the economy, of new methods of financing to increase capital formation, and of public and private international credit to expand its resources. Finally, it took important steps towards the preparation of development programmes that would guarantee the continuity of economic policy. In a more detailed analysis it will be shown that there are still spheres in which government action and economic policy have not been sufficiently energetic, or in which their value has been questionable, as seems to be the case with agricultural and industrial credit and with the system of direct taxation at present in force. It might also be noted that the share of public expenditure allotted to education and public health has not been increased or even maintained, and that only in recent years has the provision of government consumer services in general attained *per capita* figures comparable to those registered in 1929.

¹ It was by means of this policy that a decline in the public sector's *per capita* provision of goods and services was prevented, and suitable mechanisms for the more efficacious mobilization of national resources were created, with the resulting mitigation of the adverse effects of external conditions.

I. FISCAL POLICY AND PUBLIC EXPENDITURE

1. Importance and growth of the public sector

From the foregoing considerations it can be inferred that one of the most pertinent aspects of Colombia's economic development over the last three decades is the importance acquired by the governmental sector. Large-scale public expenditure and the economic and social influence indirectly exerted by fiscal operations have converted Colombia's state budget into a powerful instrument for the control and promotion of the country's economic growth.

In 1954 the consolidated expenditure of the public sector amounted to 1,753 million pesos; more than two-thirds of this sum represented outlays by the national Government, including contributions to autonomous institutions, and the remainder corresponded to the departmental and municipal authorities.

The weight carried by government activities in the Colombian economy as a whole can be better assessed if it is recalled that the public sector absorbs 15 per cent of national income through official expenditure and directly provides employment for over 120,000 persons,² that is, 3 per cent of the total active population or 6.6 per cent of the non-agricultural labour force.

The growth pattern of the public sector during the last three decades must now be analysed. Broadly speaking, the evolution of the public sector is dependent upon the development of the over-all economy, not only on account of the increased demand for public utilities which such development entails but also because financing possibilities expand as total income rises. This correlation between the progress of the public sector and that of the economy as a whole was exemplified with considerable precision in the case of Colombia during the last thirty years, since consolidated government expenditure increased at an average annual rate of 5.7 per cent, only slightly higher than the 5-per-cent growth rate registered by total gross income.

Nevertheless, for purposes of evaluating the Government's role in the supply of goods and services for community use, statistics for *per capita* expenditure shed more light than the aggregate figures. Available data show that between 1925 and 1954 official *per capita* expenditure rose at an annual rate of 3.4 per cent; hence Colombia's *per capita* availabilities of goods and services provided by the public sector are 2.6 times greater at present than in 1925.

However, neither the progress reflected in the higher potentiality of the public sector, nor the development of the economy as a whole, was achieved through a uniform process of growth. As has been pointed out in previous chapters, in the evolution of the Colombian economy between 1925 and 1953 three clearly defined stages can be distinguished, corresponding to the periods 1925-29, 1930-44 and the post-war years.

The first and last of these phases were characterized by rapid income growth, and the intermediate stage by

a slow process of economic development. The efficiency of government provision of goods and services evolved along similar lines. During the five-year period 1925-29, *per capita* public expenditure expanded at the noteworthy average annual rate of 12.1 per cent; this raised the Government's share in income and the gross product, both of which grew much more slowly. So high a supply-elasticity of governmental goods and services during 1925-29 was rendered possible by the increment in official resources achieved through a substantial increase, amounting to over 200 million dollars, in the external debt.

However, in the following period — 1930-44 — international factors militated against the efficacy of the Government's expenditure policy, which was characterized by its lack of flexibility in the provision of goods and services. To all intents and purposes, the coefficient of *per capita* public expenditure remained stationary during these years, despite the considerable structural changes which took place in the Colombian economy.

Nevertheless, the rigidity of the governmental supply situation is not surprising if it is recalled that the rate of over-all economic development was slow during the period in question. The phenomena deriving from the cyclical world depression, such as the contraction of the capacity to import, the deterioration of the terms of trade and the stagnation of the foreign capital market, as well as, subsequently, the problems created by the war, were pre-eminent among the events which directly or indirectly weakened the fiscal system's capacity to mobilize resources, owing to the high proportion of income accruing from external transactions.

Lastly, in the post-war years the positive influence wielded by external factors through better terms of trade and significant foreign credit contributions from international financing agencies, together with the favourable effect of internal factors which had altered the structure of the Colombian economy, were reflected in a rapid process of over-all economic growth, since during this phase *per capita* gross income rose at an annual rate of approximately 6 per cent. The tax reforms introduced after the crisis and the compulsory mechanisms for the placing of the public debt, in addition to the increased availabilities deriving from external credits extended to the Government, provided means of financing a post-war rate of growth for *per capita* public expenditure which exceeded that of gross income.

But it is not enough to evaluate the Government's role in the supply of goods and services in over-all terms, since the efficacy of official action is also conditioned by the allocation of public resources to the various types of expenditure. In this connexion it should be pointed out that expenditure on health, social security and education does not seem to have been assigned the highest priority in the process of expansion of government activities. The outlay on these items was practically stationary in 1930-44, since its annual rate of growth stood at 0.1 per cent, while in the post-war period it increased at an annual rate of 4.3 per cent, thus lagging behind the over-all governmental supply of goods and services, for which the corresponding *per capita* rate was 6.9 per cent (see table 49).

² Excluding labour inputs in public investment.

TABLE 49. COLOMBIA : RATES OF GROWTH OF PUBLIC EXPENDITURE AND *per capita* GROSS INCOME

(Annual average growth percentages)

	1925-54	1925-29	1930-44	1945-54
<i>Per capita</i> public expenditure	3.5	12.1	-0.8	6.9
Public expenditure on health, social security and education	—	—	0.1	4.3*
<i>Per capita</i> gross income .	5.0	—	—	6.0

SOURCE : See *Statistical Appendix*, table 49.

* 1945-52.

Finally, to complete the evaluation of the role of public expenditure policy in Colombia, it may usefully be compared with the position in other Latin American countries, despite the limited possibilities of conversion to a common standard of measurement.

In 1954 the *per capita* figure for consolidated public expenditure was over 110 pesos at 1950 prices, that is, the equivalent of some 40 dollars. Colombia is thus in an intermediate position in relation to other Latin American countries. In fact, as can be seen from table 50 only in Argentina, Chile and Venezuela does government provision of goods and services attain a higher level, whereas in the Central American countries (with the exception of Costa Rica), Peru and Ecuador such availabilities are smaller.

TABLE 50. LATIN AMERICA : *per capita* PUBLIC EXPENDITURE IN SELECTED COUNTRIES, 1953^a

(Dollars per capita, at 1950 prices)

Argentina	127
Venezuela	127
Chile	60
Costa Rica	42
Colombia	41
Brazil	39
Mexico	30
El Salvador	23
Ecuador	22
Peru	21
Guatemala	19
Nicaragua	18
Honduras	16

SOURCE : *Economic Survey of Latin America, 1955*.^a Including the whole of the public sector.

The disparities noted are essentially linked to the level of *per capita* income, but in some cases they also derive from the degree in which government policy affects the welfare of the community.

2. *Share of public expenditure in gross income and its influence on real demand*

In 1953, when foreign trade conditions were favourable, public expenditure in Colombia represented 17 per cent of gross income. However, an analysis of its development over the last three decades shows that this share did not vary widely, as it fluctuated, on an average, between 15 and 16 per cent of gross income. This implies that the elasticity of government expenditure in relation to aggregate income was slightly higher than unity. Nevertheless, it should be noted that during the phase of rapid growth through which Colombia passed in the five years preceding the depression, the proportion of resources absorbed by government expenditure increased from 13.4 per cent in 1925 to an average of 17.3 per cent in 1926-29. Mention must similarly be made of the abnormal years of the depression (1930-33), when the share of public expenditure in income rose to 21.4 per cent, not so much because the absolute level of official activities was higher, as because the Government's monetary outlays declined less intensively than prices and national monetary income.

Subsequently, in the periods of slow growth (1933-44) and of rapid expansion of income (1945-50), the proportion represented by public expenditure remained between 15 and 16 per cent of the country's total income.

Similar trends are to be noted in the Government's share of total consumption. A marked increment was registered in 1926-29 and during the depression, while later the corresponding proportion stood at about 10 per cent (see table 51).

TABLE 51. COLOMBIA : PERCENTAGE RELATIONSHIPS OF PUBLIC EXPENDITURE AND CONSUMPTION TO GROSS INCOME AND TOTAL CONSUMPTION OF GOODS AND SERVICES

Period	Public expenditure as a percentage of gross income	Public consumption as a percentage of total consumption
1925	13.4	7.8
1926-29	17.3	10.5
1930-33	21.4	16.4
1934-44	16.8	10.7
1945-53	15.4	10.6

SOURCE : See *Statistical Appendix*, table 59.

In an economy in process of development, government expenditure helps to determine the expansion of effective demand, since official outlays and exports are the two autonomous variables that promote the growth of monetary income. In Colombia, where during the last three decades private investment has accounted for over two-thirds of gross investment, the process of capital formation is essentially based on the earning of profits, and these are obtained when real demand increases.

The two periods of accelerated income growth (1925-29 and 1945-53) were also characterized by a rapid

parallel rise in monetary demand, and by external conditions providing substantial foreign exchange availabilities, which meant that part of the resources accumulated could be used for imports of capital goods. In 1925-29 monetary demand increased at an annual rate of 9 per cent and in 1945-53 by 18.5 per cent yearly, whereas during the period of slow development — 1929-44 — the annual increment amounted to only 5.4 per cent.

In 1925-29, the rise in government expenditure was the preponderant autonomous factor, although the expansion of exports also attained significant dimensions. Total autonomous demand accounted for 36 per cent of monetary income. It was during the depression, however, that the anti-cyclical role of public expenditure policy was clearly evidenced, since, despite the decline in exports, autonomous demand still represented 36 per cent of total monetary demand, as the result of a contraction in public expenditure less intensive than that registered by the demand in question. Consequently, while the share of exports dropped from 20.4 per cent in 1925-29 to 15.6 per cent during the depression, government expenditure rose from 15.7 to 20.9 per cent between these two periods (see table 52).

TABLE 52. COLOMBIA : RELATIONSHIP OF PUBLIC EXPENDITURE AND EXPORTS TO GROSS INCOME IN CURRENT PRICES

(Percentage of monetary income)

Period	Exports	Public expenditure	Total
1925-29	20.4	15.7	36.1
1930-33	15.6	20.9	36.5
1934-44	14.1	15.2	29.3
1945-53	17.5	15.1	32.6
1950-53	19.5	15.5	35.0

SOURCE : See *Statistical Appendix*, table 61.

Public expenditure was up to a point responsible for the slow growth of monetary demand during the period 1929-44, since only in 1939 did it regain its 1929 level. The process of expansion derived essentially from an increase in the value of exports, partly attributable to government policy as reflected in the devaluations of the exchange rate which succeeded the depression. The rigidity of the growth pattern followed by public expenditure during the years referred to can be explained by the collapse of the Government's financing capacity in consequence of the depression, since the tax reform of 1935 did no more than offset the decline in income from customs duties.

In 1940-44, public expenditure underwent a considerable expansion ; but this did not have very pronounced indirect effects, as, on the other hand, the autonomous demand deriving from exports contracted, on account of the difficulties created by the war.

During the post-war years, the upward trend of monetary demand was very intensive as a result of the

increase in public expenditure on the one hand and the increment in exports on the other ; the influence of this second factor was preponderant during the later years of the period under review (1950-53).

3. Changes in the distribution of public expenditure

The analysis of the distribution of public resources must be preceded by an indication of the relative importance of the various politico-territorial entities in the execution of government programmes. In Colombia the central Government accounts for 60 per cent of total public expenditure, while the departmental authorities absorb approximately 20 per cent and the municipalities the remainder.

It would seem that in the last three decades no radical changes have been registered in the institutional structure of public expenditure ; in the post-war years, however, a slight trend towards a greater concentration of expenditure in the central Government can be observed.

The extent to which public expenditure is centralized seems to be related quite as closely to the tax structure of each country as to its political organization. The reason why no fundamental changes in this direction have occurred in Colombia, despite the greater potentiality conferred on the central Government by the increase in direct taxation after 1935, is to be found in the geographical features of the economy, which call for semi-autonomous regional authorities receiving a good deal of financial assistance from the central Government.

The allocation of public funds to the various ends they serve gives some indication of the role of government expenditure in the distribution of the economy's resources. In the first place, reference must be made to the channelling of funds for consumption and investment. As can be seen from table 53, which gives average relative values for the most representative periods, it was in the years preceding the crisis that the Government's propensity to invest attained its peak level of 49.2 per cent. However, this coefficient was not the consequence of an increase in the tax burden or a restriction of current expenditure, but was achieved mainly through the expansion of the external public debt.

During the period of slow growth (1930-44), the coefficient of government investment fell to 31 per cent as a logical result of the weakening of public finances by the impact of the depression, to which was added the difficulty of reducing current expenditure in view of the increasing demands of a higher rate of urbanization.

It should be noted, however, that if the Government's propensity to invest did not undergo a more marked decline during the post-depression years, this was owing to a fiscal policy that kept current expenditure at virtually the same level throughout the phase in question.

During the war, the coefficient of government investment followed a pronounced upward trend, owing to two factors. One of these was the moderate rate at which consumer expenditure increased, and the other the increment in available resources achieved by means of compulsory subscription of the public debt and surcharges on income tax rates.

TABLE 53. COLOMBIA : BREAK-DOWN OF EXPENDITURE OF THE CENTRAL GOVERNMENT AND DEPARTMENTAL AND MUNICIPAL AUTHORITIES, 1925-52
(Percentage of total public expenditure)

Period	Total expenditure	Current expenditure						Investment in economic development
		Total	Government and miscellaneous	Public debt	National defence	Education and culture	Health and social security	
1925-29	100.0	50.8	—	5.8	—	—	—	49.2
1930-44	100.0	68.9	33.1	12.9	7.8	9.2	5.9	91.1
1945-52	100.0	69.9	31.4	12.2	8.8	8.7	8.8	30.1

SOURCE : See *Statistical Appendix*, table 40.

In 1945-52, the share of government resources allocated to consumption and investment amounted to 30.1 per cent, which was a slightly lower coefficient than had been registered in 1930-44. This rate of capital formation on the part of the public sector did not imply a marked change in favour of economic development, partly because in a period of prosperity the proportional expansion of consumer expenditure invariably tends to be greater. Lastly, it is of interest to refer to the most important changes in the functional composition of current expenditure in relation to total outlays. According to table 53, in the last two decades the proportion of expenditure devoted to education and culture slightly declined, from 9.2 to 8.7 per cent, while the share of health and social security services increased from 5.9 to 8.8 per cent ; in the aggregate there was no change in the percentage represented by these two items. But if more recent years (1949-52) are considered, a downward trend in expenditure on health and social security is to be noted.

With regard to national defence slightly heavier outlays were recorded. This increment, like that registered in the Government's propensity to invest, was achieved at the expense of expenditure on general administration, included under the heading "Government and miscellaneous", and by a reduction in the share assigned to servicing of the public debt. Obviously, these changes imply a favourable evolution in the allocation of public resources. Nevertheless, attention must be called to the need for a country like Colombia to give higher priority to the financing of education and public health services, which are directly bound up with the conservation and strengthening of the human resources at the disposal of the community.

II. THE SYSTEM OF PUBLIC INCOME

1. Sources of financing

In Colombia different financing systems exist for the central Government and for the departmental and municipal authorities.

The central Government's chief source of income lies in the taxes, which in 1952 represented 83 per cent of the regular treasury income, the remainder corresponding to revenue from sources other than taxation. Direct and indirect taxes have an almost equal share in revenue from this source. Of the former, the most important is

income-tax, which in the year mentioned brought in 36.1 per cent of regular income, the estate duty and donations tax (1.9 per cent) together with several others amounting to smaller sums (1.1 per cent in the aggregate) following far in the rear. Among indirect taxes, the group with the highest yield is that of customs duties, which produces 23.4 per cent ; next come stamp duties with 5.1 per cent, and the so-called consumption taxes, of which the chief item is the tax on petrol. Under this head may be mentioned the income accruing from foreign exchange transactions (see table 54).

TABLE 54. COLOMBIA : STRUCTURE OF CURRENT INCOME OF THE CENTRAL GOVERNMENT, 1952
(Pesos at current prices)

	Value	Percentage
1. Domestically produced goods	8.9	1.1
2. Internal services	19.7	2.4
3. Direct taxation		
On income and capital	301.0	36.1
On legacies	15.9	1.9
On other items	8.8	1.1
	TOTAL	325.7
		39.1
4. Indirect taxation		
Customs duties	195.2	23.4
Stamp duties, etc.	42.8	5.1
Consumption taxes	19.0	2.3
Export duties *	84.5	10.1
Other items	25.0	3.0
	TOTAL	363.3
		43.9
5. Total direct and indirect taxation ...	692.0	83.0
6. Miscellaneous revenue	142.0	17.0
7. Total current income	834.0	100.0

SOURCE : ECLA, on the basis of official statistics.

* The specific duty on exports and the "coffee differential" are classified as indirect taxation, although their inclusion in this category might be open to question. One hundred per cent of the coffee differential is included.

The structure of the finances of the departmental authorities is somewhat different. The main resources of the sixteen departmental budgets are constituted by

indirect taxation and monopolies. Of the indirect taxes, the most important are those applied to the consumption of beer, spirits and tobacco and the slaughter duties on cattle. The departmental monopolies mainly comprise the manufacture of distilled spirits and of pure alcohol, and the state lotteries. Departmental financing, therefore, is principally characterized by the fact that both taxation on consumption and the income accruing from the sales of departmental monopolies derive almost entirely from the consumption of alcoholic beverages and tobacco.

One of the most difficult problems which Colombia's fiscal policy has had to face is the complexity of its system of indirect taxation, owing to the lack of uniformity in the principles on which taxation is introduced by the departmental authorities. Hitherto anarchy has prevailed, not only because there has been a number of tariffs for one and the same product, but also because the basis of taxation has been assessed in accordance with differing concepts. In recent years there has been a strengthening of the trend towards organization and simplification of departmental taxes on consumption.

Departmental monopolies, although the subject of much controversy, represent a form of indirect taxation on consumption through price policy. As they are at present one of the chief pillars of departmental finance, it is difficult for any substantial innovations to be introduced into their structure.

Municipal income is based mainly on taxation and the product of the municipal services; the central Government and the departmental authorities also contribute to it. The most important taxes levied by the municipalities are the slaughter duty on smaller livestock and the taxes on real estate, public entertainments, telephonic apparatus and raffles and lotteries.

The most important feature displayed by the municipal financing system is its low potentiality. The major proportion of total municipal resources is contributed by a very small number of towns — principally Bogotá, Medellín, Cali and Barranquilla — whereas over 80 per cent of the municipal districts account for no more than one-fifth of total municipal income. This circumstance constitutes one of the most difficult problems of organization in Colombia's public sector. It seems that there is an excessive number of municipalities with poor fiscal potentiality. The consequence is that in most cases the slender revenue obtained is only sufficient to finance municipal administration, leaving no margin to promote local improvements. In recent years, therefore, endeavours have been made to ensure that the municipal works programmes of the *Instituto de Fomento Municipal*, an autonomous institution dependent on the central Government, are drawn up in accordance with a criterion of priorities which allows larger resources to be allotted to those municipalities whose financial capacity is lowest.

Within public income as a whole, the departments and municipalities have been gradually losing their relative importance. In the year 1952, 63.1 per cent of public income was received by the central Government, 20 per cent by the departments and 16.9 per cent by the municipalities.

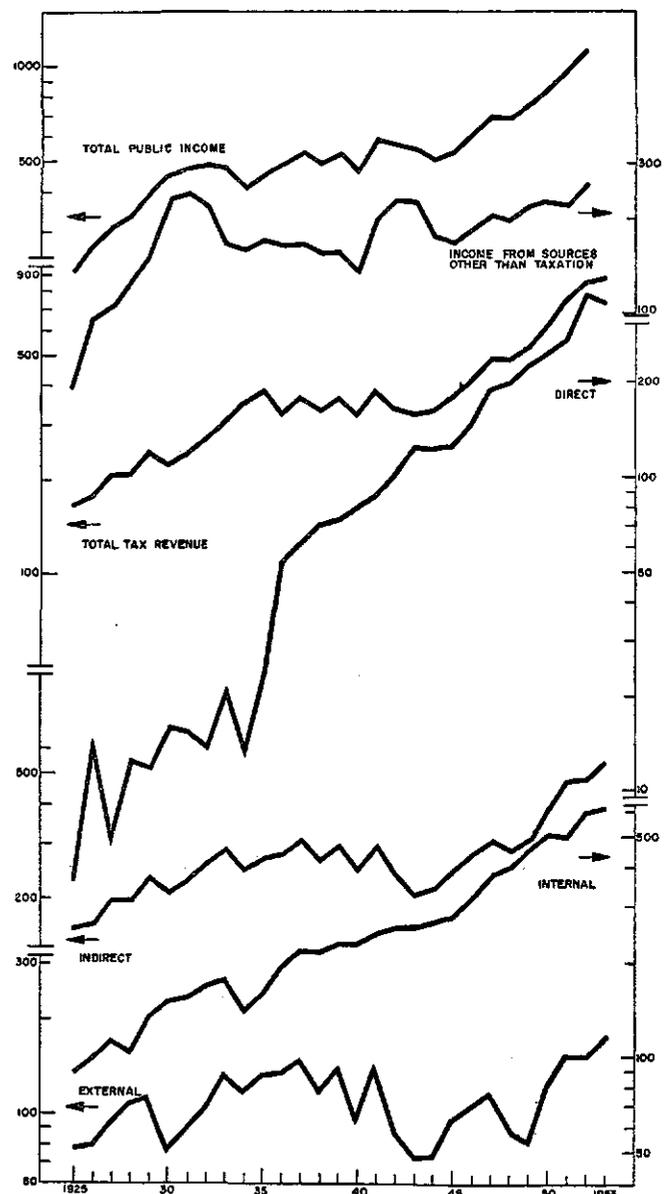
2. Incidence and composition of tax revenue

It has been shown that the income of the public sector steadily increased throughout the period under review. In figure IX it can clearly be seen that with the exception of short periods when slight downward movements took place, tax revenue persistently rose, its rate of growth increasing from 1948 onward. A less pronounced trend was registered by income from sources other than taxation; nevertheless, here too there was a notable increment between 1923-30 and 1940-43.

FIGURE IX. COLOMBIA : INCOME OF PUBLIC SECTOR, 1925-53

(Millions of pesos at 1950 prices)

(Semi-logarithmic scale)



After a sharp rise at the close of the first of these two periods, *per capita* public income remained relatively stable until 1945. The proportion varied in specific years, but as a whole, with the exception of short intervals, it remained at a *per capita* figure fluctuating between 50 and 60 pesos at constant values. After the war the situation altered, *per capita* taxation increasing year by year until by 1952 it stood at 96.1 pesos at 1950 prices. The rise in income from taxation, which increased by 80 per cent between 1945 and 1952, considerably exceeded the increment of 48 per cent recorded in revenue from other sources (see table 55).

TABLE 55. COLOMBIA: COMPOSITION OF PUBLIC INCOME
(Annual averages)

	1925-29	1930-44	1945-52	1953
<i>Per capita public income</i> (Pesos at 1950 prices)				
Total	44.0	58.3	71.7	97.8
Income from sources other than taxation	15.3	21.8	19.9	23.8
Taxation				
Total	28.8	36.5	51.8	74.0
Direct	1.2	6.5	19.7	28.2
Indirect	27.5	30.1	32.2	45.9
Internal	15.3	23.5	39.2	50.7
External	13.4	13.1	12.6	23.3
Internal taxation				
On income	0.8	5.2	16.6	23.1
On consumption	13.9	16.7	19.6	23.7
On other items	0.6	1.5	3.0	3.9
External taxation				
Customs duties	12.9	10.9	9.3	17.7
Export duties and other items	0.5	2.2	3.3	5.6
<i>Composition of consolidated taxes</i> (Percentages)				
Direct	4.2	17.5	37.8	38.1
Indirect	95.8	82.5	62.2	61.9
External sector	46.7	35.6	23.7	31.5
Internal sector	53.3	64.4	76.3	68.5

SOURCE: See *Statistical Appendix*, tables 57, 55 and 53.

Nevertheless, the heavier *per capita* taxation does not mean that the tax burden has increased in relation to income. The ratio between public and gross income has on the whole remained almost stationary during the last thirty years. Except during the depression, when tax revenue came to account for 17-18 per cent of gross income, its share was never larger than from 13 to 15 per cent. In 1952, however, a slight rise took place, bringing it up to 16.1 per cent. Thus, as national income increased, the proportion corresponding to the Government remained approximately at the same level. Since population grew relatively less than income, it is logical that *per capita* taxation should have risen.

The fiscal phenomena and the tax reform to which allusion has been made brought about substantial changes in the structure of the taxation system.

The first conclusion to be noted is that government finance is now less dependent upon the external sector. During the period 1924-29, 48.3 per cent of revenue from taxes was derived from those affecting the external sector, especially through the customs tariff. In the ten years following the depression, this proportion fell to 44.2 per cent; during the war years it pursued its downward trend, dropping as low as 26.4 per cent, and finally, in the post-war period, it sank to 24.4 per cent. It should be noted, however, that in the years 1951-53 the corresponding figure was higher than the average, owing in the first place to the peak levels reached by customs duties, and, in a lesser degree, to the rise in export duties.

The shift of the taxation system towards the internal sector reveals not only a trend towards the absorption of the increase in productivity involved in economic development, but also the more effective stabilization of public income, thanks to the reduction of its dependence on international transactions. These findings can be more clearly grasped if an examination is made of the course of development followed by *per capita* public income in the principal categories of internal taxation.

Direct taxation carries the heaviest weight in the increase of *per capita* taxes. From a *per capita* level that never rose above 3 pesos before 1935, it rose to 8.3 pesos on the eve of the war, to 14.6 pesos in 1946 and to 26.5 pesos in 1952; or, in other words, in the last eighteen years of this period the average personal contribution through direct taxation was ten times greater. This increment within the category of direct taxation was in reality due to income-tax. The study of this tax sheds light on the changes in incidence rendered possible by its augmentation. For instance, the average rate of company tax, which established a ratio between the taxes levied and the net income declared, rose from 6.9 per cent in 1934 to 19 per cent in 1940 and to 38.7 per cent in 1952.

Internal taxation on consumption, on the other hand, increased in absolute figures (in terms of pesos at constant prices) by 24.9 per cent over the period 1925-52, and *per capita* taxation by 97.6 per cent. It should be noted that these increments did not take place regularly, as the greatest increases coincided with those periods in which the growth of the Colombian economy was rapid.

In pesos at 1950 prices, the *per capita* tax rose from 14.9 pesos in 1934 to 24.3 in 1952. The proportion it represented in relation to personal consumption was almost 5 per cent, if import duties are excluded, and about 8 per cent if they are included; that is to say, the ratio remains approximately the same as in 1939. If these figures are compared with the percentage of income-tax payable by natural persons (4.4 per cent in 1939 and 15.0 per cent in 1952), it will be seen how much more progressive the taxation system has become in recent years.³

The way in which Colombia's taxation system has been adjusted to the growth of the economy also shows that it has acquired a considerable degree of elasticity.

³ It has already been pointed out that in the same space of time the pressure of direct taxation on companies increased from 19.5 to 38.7 per cent.

Certain reservations must be made, however, with respect to this statement. In the first place, the fact that the adjustments in public income were mainly achieved on a basis of surcharges on income-tax rates cannot be disregarded, since a lack of balance between direct and indirect taxation may at any given moment have repercussions on the rigidity of the system. In the second place, one influential element of inelasticity exists in the Colombian system, namely, the prevalently specific character of its indirect taxation.

III. FISCAL POLICY AND THE DIRECT MOBILIZATION OF RESOURCES

1. *General considerations*

The aim of this section is to interpret the role of fiscal policy in the direct mobilization of available resources towards capital formation.

It is a well-known fact that the prospects of economic growth depend on the amount of resources available for investment and on the incentives to utilization of these resources in the capital formation process. Again, funds for this purpose are essentially derived from the flow of territorial income not absorbed by consumption. That is, the level of income is a decisive factor in the volume of consumption, and, consequently, in the amount of domestic saving, which, in turn, is the preponderant element in capital formation.

But the resources available for investment, especially in under-developed countries, are not determined by domestic saving alone. To this is added the negative or positive influence of external factors, represented by the other two variables that affect the rate of growth — the terms of trade and the net inflow of external resources.

The latter has an immediate impact on the process of capital formation, because of its direct repercussions on the investment sector. In the case of an improvement in the terms of trade, its effect on the rate of investment is more difficult to forecast ; the over-all savings coefficient will be modified in greater or lesser degree according to the identity and consumption habits of the groups in which the increase in real income is concentrated.

It can thus be inferred that one of the essential functions of fiscal policy is to exert the right kind of pressure on the interplay of the factors determining what proportion of its resources will be allocated by the economic system to the formation of savings. That is, the efficiency of fiscal policy must be evaluated in terms of its impact on the savings-consumption node of the economy, and of its power to attract external resources and promote an improvement in the terms of trade.

Of the various means by which the State can affect the level of the community's aggregate savings, the most important are the following : (a) the use of current government income for purposes of saving and investment, that is, public savings ; (b) the mobilization of private savings through the medium of the internal public debt ; (c) the channelling of these same savings towards capital formation through securities and financial instruments issued by official credit and development

institutions ; and (d) the exertion of indirect pressure on the incentives that stimulate private saving, through public expenditure, tax policy, the exchange system and other instruments of government economic policy.

The purpose of this section is to evaluate the part played by fiscal policy in Colombia in determining the volume and structure of domestic savings, through the budget and the manipulation of the internal and external public debt. The indirect effects of fiscal policy are analysed in other chapters of the present study.

2. *Public savings*

A community's rate of saving is the outcome of decisions adopted by three different groups participating in income distribution, namely, the public sector, companies and natural persons. The degree of importance attaching to each of these groups varies according to the country's stage of development, and they also differ one from another both in the motives by which they are guided and in the factors to which they are liable to react.

In under-developed countries, public and company savings represent the main source for the financing of investment, since individual saving is on a small scale, precisely on account of the low level of *per capita* income.

Public saving is reflected in the Government's balance on current account, which results from the excess of current income over consumer expenditure and transfers.

The characteristics of consumption in the under-developed countries make it unlikely that the savings coefficient will automatically rise as income increases. As a rule, an improvement in income is not reflected in increased savings, but in an intensification of the pressure on consumption, as is the case, for example, with the growth of demand for certain imports that might be described as luxury goods.

This behaviour pattern shows how vital is the part played by the fiscal system in the process of growth, since it is primarily responsible for channelling towards saving sums which would otherwise swell the flow of consumer expenditure. Action of this kind, moreover, is of still greater importance if the rise in total income is partly brought about by such favourable factors as those deriving from the terms of trade or from a net inflow of external resources, which, on account of their relatively temporary nature, must be utilized in the best interests of economic development.

The fiscal system's potential contribution to the formation of savings depends in turn upon the flexibility of the income régime, on current expenditure policy and on the possibilities of increasing the tax burden.

Throughout the period covered by the present study, the savings of the Colombian public sector have represented a considerable proportion both of state resources and of the total savings of the economy ; except during the world depression and the war years, their volume has steadily increased. Table 56 gives an idea of the figures for public saving in the various periods, the propensity to save in relation to current income, its share in the financing of investment and the contribution of the fiscal system to the formation of total gross savings.

TABLE 56. COLOMBIA : PUBLIC SAVING AND ITS SHARE IN THE FINANCING OF INVESTMENT

(Thousands of pesos at 1950 prices: annual averages)

	Public saving	As a percentage of public income	As a percentage of public investment	As a percentage of gross saving
1925-29	100,404	33.1	52.1	15.2
1930-34	31,232	11.0	23.1	4.7
1935-39	123,609	24.6	74.8	16.2
1940-45	103,840	19.1	47.7	11.9
1946-53	209,247	23.5	72.7	15.0

SOURCE : See *Statistical Appendix*, table 60.

The inference to be drawn from this table is that in Colombia the government budget has constituted a very effective means of channelling part of gross income towards savings.

In the post-war period (1946-53), the volume of savings generated by the fiscal system was more than twice as large as in 1925-29. The public sector's propensity to save represented 24 per cent of its available current income, a higher coefficient than was prevalent in the rest of the economy. Furthermore, 15 per cent of domestic gross savings derived from the government budget, which financed over two-thirds of public investment (an average of 72.7 per cent during the period 1946-53).

In order to give a more detailed interpretation of the various factors and conditions that have influenced the fiscal system's efficacy in the formation of savings, reference will be made to each of the basic periods representative of Colombia's economic development during the last three decades.

(a) The period 1925-29

During this stage, the need to increase public expenditure and the rise in the economy's investment coefficient entailed the correlative and preliminary task of augmenting the resources earmarked for the formation of savings.

The process of mobilizing internal resources through the fiscal system by means of an increment in the surplus on current account, with a corresponding restriction of domestic consumption, was chiefly hampered by the low potentiality of the Colombian system of taxation. Indirect taxes — mainly import duties — were predominant at the time, and the yield from direct taxes was small.⁴

In seeking to increase indirect taxation in order to reduce consumption, fiscal policy encountered a serious obstacle in the low level of *per capita* income. On the other hand, there were considerable difficulties of an international character in the way of heavier direct taxation either on income or on property. Neither was fiscal policy in a position to cut down the Government's consumer expenditure as a means of augmenting the surplus on current account and thus mobilizing a larger quota of the national income for savings purposes, for

⁴ In 1924 direct taxation represented some 3.8 per cent of the total tax burden, and customs duties 54.9 per cent.

the precise reason that a deficit existed in basic social services.

The private sector could not be expected to devote of its own accord a much greater volume of its resources to the formation of savings, since such action was conditioned not only by the slow growth of gross income, but also by the way in which those groups where the highest levels of productivity were concentrated utilized the increment in their resources. The groups concerned were to be found in the export sector, and reinvested surpluses in excess of consumption in the development of their own field, or transferred part at least of their savings abroad.

As has been noted elsewhere, an inflow of over 200 million dollars in the shape of foreign loans constituted the basic autonomous factor which, from 1925 onward, led to an over-all rise in income levels, in effective demand and in the rates of savings and investment.

In view of this fact, the question of vital interest to be explored here is how far the Colombian fiscal system was capable of channelling towards saving a higher proportion of the increase in national income saving than before the process of expansion began. A few statistics may usefully be examined here. In 1925, the average coefficient of public savings in relation to national income was 3.8 per cent ; in 1926-29, which was a period of intensive growth, the corresponding proportion rose to 4.2 per cent, which implies that fiscal policy effectively absorbed a wider margin of resources for savings purposes, since the marginal coefficient of public savings exceeded the average savings rate.

Nevertheless, contradictory though it may seem, fiscal policy transferred a larger share of the increment in public revenue to consumption, through the expansion of current expenditure, which involved a decline in the public sector's propensity to save.⁵

In 1926-29, the behaviour pattern of both the receipts and the current expenditure of the Government was characterized by elasticity in relation to the growth of income,⁶ and although the rate of expansion of current expenditure was more intensive than the increase in public revenue, the volume of savings generated by the fiscal system registered a relative increase greater than that of national income. This is why the average coefficient of state savings was higher, despite the decrease in the propensity to save.

The course pursued by fiscal policy in 1925-29 suggests, however, that its contribution to the financing of domestic investment would have been more significant had official consumer expenditure been governed by a more moderate policy, such as would have maintained the public sector's propensity to save.

Again, it is obvious that during this period the formation of savings by the State was based on income ear-

⁵ In 1925, the Government saved 35 per cent of total public income ; during the period 1926-29, the corresponding coefficient was 32.7 per cent.

⁶ The share of public income in national income, which had been 10.8 per cent in 1925, rose to an average of 13 per cent during the period 1926-29 ; current expenditure increased from 7 to 8 per cent between these two periods.

marked by the community for consumption, since almost the whole structure of the taxation system rested upon indirect taxes.

(b) *Formation of public savings during the period 1930-45*

Throughout this period, fiscal policy operated under conditions entirely different from those which had determined its action in the years preceding the depression. The predominant feature was the slow growth of the Colombian economy, attributable to the action of two external factors. In the first place the disequilibrium caused by the depression reduced the capacity to import and interrupted the flow of foreign capital; and, subsequently, difficulties arose on account of wartime restrictions. During the depression, the fiscal system ceased to play an efficacious part in the financing of investment and the formation of domestic savings. Official savings underwent an abrupt decline, in both absolute and relative terms.⁷ The explanation lies in the structure of the system of public income and expenditure, which meant that government revenue, largely dependent as it was upon taxation applied to the external sector, felt the impact of the cyclical disequilibrium to a more serious extent.⁸ The fact that the average coefficient of public saving in relation to national income dropped from an average of 4.2 per cent in 1926-29 to 1.2 per cent in 1930-34, indicates that the Government not only transferred to public consumption the treasury's larger share in the increment in total gross income, but also precipitated a process of dissaving whereby the balance on current account was reduced in absolute terms. In other words, in this period the marginal coefficient of public saving was negative.

In brief, it may be asserted that during the depression the direct part played by fiscal policy in the formation of domestic savings was unsatisfactory, although from the standpoint of anti-cyclical policy the maintenance of a high relative level of current expenditure was a positive factor in mitigating the decline in real demand, as was previously pointed out in the analysis of public expenditure.

From 1935 to 1939, when the Colombian economy was in the very midst of the process of recovery, although the national income and product were expanding at a slow rate, fiscal policy made its greatest effort to channel domestic resources towards the financing of investment, attempting to replace or compensate for the external sector's negative role in economic development during this period.

The basic features of this policy must now be examined. Broadly speaking, a programme aimed at enhancing the Government's role in the formation of domestic savings can operate on two fronts, namely, public income and expenditure. As regards the former, the vital step taken

by fiscal policy during this period was the 1935 tax reform. This represented an important move towards endowing the system of public income with elasticity, since otherwise the Government's capacity for mobilizing resources would have substantially decreased on account of the high-proportion corresponding to indirect taxation based on specific customs and internal consumption tariffs. As a result of the measures in question, public income and the tax burden respectively represented 14.6 and 9.6 per cent of gross income. These coefficients were higher than those registered during the five-year period 1925-29⁹ under conditions of rapid growth, which shows that the financing policy of the public sector was efficacious in attracting towards the fiscal sector a larger share of the economy's resources. Nevertheless, the tax burden in 1935-39 was relatively little heavier than in 1930-34, a period of severe depression. Furthermore, fiscal policy in the years under consideration played a positive role in channelling resources towards capital formation by means of the restriction of public consumption, not only in relative terms with respect to national income, but also in absolute values.¹⁰

The outcome of fiscal action in the spheres of both income and expenditure was a substantial increase in public saving, which in 1935-39 averaged 123.6 million pesos yearly. This sum accounted for 74.8 per cent of the financing of public investment and 16.2 per cent of domestic gross savings.

Another aspect must be stressed, however, which throws into relief the considerable difference between the source of government savings in this period and in 1925-29. Elsewhere in this study will be found an analysis of the way in which the 1935 tax reform radically altered the incidence of taxation, introducing a more progressive system which affected the higher-income groups and the profits of enterprises. Hence it may be inferred that government savings derived not only from income intended for consumption, but also from resources which otherwise would have gone to increase private savings.

However, as will be shown in a later section, the decrease in private income did not entail a corresponding decline in the savings of the sectors concerned, simply because the transfer of resources to the public sector through taxation was financed at the expense of the raising of productivity, especially in the case of the manufacturing industries. On the contrary, it may be contended that tax and fiscal policy in this period had a favourable effect on the community's over-all savings coefficient, since the public sector's propensity to save, which reached 24.6 per cent, was higher than that registered for the economy as a whole.

To sum up, throughout the quinquennium 1935-39 Colombia's fiscal policy represented a positive endeavour to channel a larger quota of domestic resources towards the financing of investment; this fact becomes the more

⁷ Fiscal savings dropped from 100.4 million pesos in 1925-29 to 31.2 million pesos during the depression, and, in relative terms, from 4.2 to 1.2 per cent.

⁸ While the share of current expenditure in income rose from 8.8 to 15.5 per cent, public income increased on a smaller scale — from 12.5 to 16.7 per cent.

⁹ In 1925-29 public income and the tax burden respectively represented 12.5 and 8.2 per cent of gross income.

¹⁰ Current expenditure fell from 431 to 378 million pesos, and in relation to gross income declined from 15.5 to 11.0 per cent, between the five-year periods 1930-34 and 1935-39.

striking if the stagnation of the world capital market during the years is borne in mind. But for the measures referred to, the investment coefficient would undoubtedly have failed to reach a level high enough to promote a steady process of capital formation.

Consideration may now be given to the part played by fiscal policy in the formation of savings during the years, when the difficulties that had been slowing up the growth of the economy since the depression were still persisting. Colombian fiscal policy's wartime role was negative as regards the channelling of a larger proportion of the income increment towards capital formation. In fact, the average public savings coefficient was 2.6 per cent, lower, that is, than in 1935-39; this implies that during the period in question the fiscal system operated in such a way as to reduce the funds earmarked for financing, part of which were utilized to raise official consumer expenditure. The cause of the unfavourable influence of fiscal policy on available resources during this phase lay in the fact that current public expenditure was increased without a correlative intensification of tax collection, which became less efficacious as a means of mobilizing resources because customs receipts declined as imports contracted.

While average public income was 7.1 per cent higher in 1940-45 than in 1935-39, current expenditure rose by 10.8 per cent. The public sector's share in gross income fell to 13.4 per cent, whereas it had been 14.6 per cent in the quinquennium 1935-39. Hence the Government's propensity to save was reduced from 24.6 to 19.1 per cent, and the absolute volume of public savings from 123.6 to 103.8 million pesos. Furthermore, the contribution of government savings to the financing of public investment and to the formation of domestic gross savings declined to 47.7 per cent and 11.9 per cent respectively.

It should be stressed, however, that the Government's tax policy, mainly reflected in surcharges on direct taxes, represented, during the war years, a means of offsetting the decrease in customs duties and thus preventing a sharp fall in the share of tax collection in national income. Otherwise, the contraction in public savings would have been very severe, and consequently would have had even greater depressive effects on the rate of investment.

(c) *Role of the public sector in the formation of savings during the post-war period*

The post-war phase was one of intensive growth for the Colombian economy, owing to the coincidence of two fundamentally important developments. One of these was the achievement of decidedly higher productivity through the system of production itself, and the other the improvement in the terms of trade. As a result, gross income increased at an annual rate of 7.5 per cent, the highest registered throughout the period 1925-53.

It may be asked how far fiscal policy was successful in channelling an increasing proportion of the national income increment towards the financing of economic development.

The reply is favourable, since the public sector's margin of savings represented a higher proportion of gross income than in 1940-45 (3.4 per cent). This positive result was due, in the first place, to the greater potentiality of public income structure for the absorption of resources. A tax policy that laid more weight on direct taxation, and converted many of the taxes on consumption to *ad valorem* rates, combined with the tariff reform of recent years and the expansion of imports to impart greater flexibility to tax revenue, of which the share in gross income rose from 13.4 to 14.2 per cent.

The additional savings would not have been achieved, however, had not the more efficacious mobilization of resources been accompanied by a more moderate policy with respect to current expenditure, of which the share in national income remained unchanged. Thus, the public sector's propensity to save reached 23.5 per cent, a higher coefficient than during the war years.

Owing to the marked increase in total national income, the public savings coefficient of 3.4 per cent represented in absolute values a sum as large as 209.2 million pesos, or double that attained in either of the preceding periods.

Public savings thus contributed 72.7 per cent to the financing of official investment and 15 per cent to the formation of national savings. In brief, it must be emphasized that, broadly speaking, except in the abnormal periods of the depression and the war, the fiscal system played a positive part in the financing of Colombia's economic development during the last three decades.

Table 57 contains the basic statistics to which reference has been made in the analysis of the various aspects dealt with in this section.

TABLE 57. COLOMBIA : INCOME EXPENDITURE AND PUBLIC SAVING IN RELATION TO GROSS INCOME

(Percentages of gross income)

Year	Public income	Current expenditure	Average coefficient of public saving
1925-29	12.5	8.4	4.1
1930-34	16.7	15.5	1.2
1935-39	14.6	11.0	3.6
1940-45	13.4	10.4	2.6
1946-53	14.2	10.8	3.4

SOURCE : See *Statistical Appendix*, tables 59 and 60.

3. *The role of the internal public debt*

At the close of 1953, the consolidated internal debt of the central Government, the departmental and the municipal authorities amount to 583.9 million pesos. Most of the outstanding debt corresponded to the central Government's commitments (64.6 per cent of the total), and smaller proportions (22.3 and 13.6 per cent respectively) to the municipal debt and the consolidated debit balance of the departmental authorities (see table 58).

TABLE 58. COLOMBIA : INTERNAL PUBLIC DEBT, BY CATEGORIES OF DEBTOR
(Thousands of pesos)

	1937		1945		1953	
	Value	Percentage	Value	Percentage	Value	Percentage
Central Government	80,025	75.6	244,322	80.1	377,123	64.6
Departmental authorities.	14,315	13.6	40,325	13.2	76,872	13.6
Municipal authorities . . .	11,190	10.8	20,337	6.7	129,884	22.3
TOTAL	105,530	100.0	304,984	100.0	583,879	100.0

SOURCE : ECLA, on the basis of official statistics. See *Statistical Appendix*, table 62.

Attention should be drawn to the marked post-war increase in the municipal internal debt, whose share in the total internal debt rose from 6.7 per cent in 1945 to 22.3 per cent of the consolidated balance in 1953. Conversely, the relative importance of the central Government's obligations declined.

The explanation of these divergent trends lies in the differing structures of the fiscal systems of the central and municipal authorities. The latter, whose potentiality for the mobilization of resources was weak,¹¹ resorted to internal borrowing to a much greater extent than the central Government, which was in a position to finance its post-war investments with a high proportion of budget savings as well as with the external debt.¹²

TABLE 59. COLOMBIA : INCIDENCE OF THE INTERNAL PUBLIC DEBT AND ITS SERVICING

	1937	1945	1953
Public debt as a percentage of gross income	11.1	12.4	6.5
Servicing of the debt as a percentage of gross income	1.8	1.6	1.4
Servicing of the debt as a percentage of public income	12.0	12.2	9.7

SOURCE : ECLA, on the basis of official statistics.

This internal debt was not unduly large, nor did the servicing of amortization and interest represent a very heavy burden in relation to national income and tax revenue. In 1953, the consolidated internal debt balance represented 6.5 per cent of national income, or a lower proportion than in 1945, which indicates that during the post-war period internal borrowing on the part of the fiscal sector increased less rapidly than income. The servicing of the debt absorbed only 1.4 per cent of national income and just under one-tenth of tax revenue (see table 59).

¹¹ The system of municipal income, largely based on taxes on consumption for which specific rates prevail, is inelastic in relation to national income.

¹² The central Government, with a very elastic tax structure based on direct taxation, was responsible for a high quota of public savings during the post-war years.

It should be pointed out that the growth of the internal debt during the past thirty years was not a continuous and uniform process. The policy of internal borrowing was conditioned by foreign credit possibilities and by the fiscal system's efficacy with respect to the formation of savings for financing investment.

During the 'thirties, when the Government received substantial loans from abroad and public income substantially increased, the internal debt situation remained virtually unchanged.¹³ Owing to the decline in government income consequent upon the depression and the interruption of the flow of foreign credit, the internal debt rose abruptly during the slump years (1930-35), reaching an annual average of 48.5 million pesos at 1950 prices. From 1935 to 1940, however, the annual increment in the internal debt amounted to the negligible sum of 8.2 million pesos, thanks to government policy during this period, which considerably augmented the volume of savings generated by the fiscal system itself.¹⁴ During the war, Colombia's internal debt increased very sharply ; in the case of the central Government it averaged 54.3 million pesos yearly and for the public sector as a whole 63.3 million *per annum*, over the period 1941-45. The decline in the efficacy of the fiscal system as an instrument for the formation of savings, together with the growth of public investment in relation to the preceding period, obliged the Government to resort to internal borrowing, mainly through measures aimed at compulsory placing of the debt.

In the post-war period a more moderate policy was pursued with respect to the internal debt, in which the average annual increase was 11.1 million pesos for the central Government and 31 million pesos for the public sector as a whole. It has already been pointed out that most of the increase in the internal public debt was accounted for by the municipal authorities.

The fiscal system's increased potentiality for generating savings, and the substantial increment in the external debt, were factors which reduced the importance of the internal debt as a source of funds for official financing during the post-war years (see table 60).

¹³ Figures up to 1940 relate only to the central Government's debt, for want of data on that of the departmental and municipal authorities.

¹⁴ This policy was essentially based on the tax reform and restriction of current expenditure.

TABLE 60. COLOMBIA : FLUCTUATIONS
IN THE INTERNAL DEBT ^a

(Millions of pesos at 1950 prices: annual averages)

	Central Government	Public sector
1930-35	48.5	—
1936-40	8.2	—
1941-45	54.3	63.3
1946-1953	11.1	31.0

SOURCE : See *Statistical Appendix*, table 62.^a Calculated by deflating fluctuations in the balance of the internal debt in current values.

This summary of the main data on the dimensions and evolution of the internal public debt must now be followed by some reference to the present characteristics of the central Government's internal debt.

At the end of 1953, most of this debt consisted in bearer bonds or instruments to a value of 284.6 million pesos, which accounted for 80 per cent of the total ; the remainder (about 20 per cent) was constituted by drafts payable to order or IOUs, that is, by securities representing medium- and short-term operations ¹⁵ (see table 61).

TABLE 61. COLOMBIA : BREAK-DOWN OF THE INTERNAL
DEBT OF THE CENTRAL GOVERNMENT

(Millions of pesos)

Bonds	Balance on 31 December 1953	
	Value	Percentage
Salt mines	65.4	18.3
Treasury	64.0	17.9
DINU	45.6	12.8
Territorial credit	31.5	8.8
Railways	25.2	7.1
Municipal development	17.6	4.9
Miscellaneous	35.2	9.9
	284.5	79.7
IOUs	72.5	20.3
TOTAL	357.0	100.0

SOURCE : National Department of Economic and Fiscal Programming, *Informe sobre la Deuda Interna (Report on the Internal Debt)*.

Most of the internal bond debt is covered by four or five large issues. Prevailing rates of interest range

¹⁵ The central Government's total internal debt at that date actually amounted to 377 million pesos. However, this figure differs from the estimate presented by the National Economic and Fiscal Programming Department in its recent *Informe sobre la deuda interna (Report on the internal debt)*, where a lower book value of 357 million pesos is given. As the difference is insignificant for the purposes of the analysis which follows, the figure published by the department in question will be used here.

from 3 to 7 per cent, the commonest being 6 per cent. As regards amortization periods, the major proportion falls between fifteen and twenty years (see table 62).

TABLE 62. COLOMBIA : BREAK-DOWN OF THE INTERNAL
BOND DEBT BY AMORTIZATION PERIODS AND RATES OF
INTEREST

(Millions of pesos)

Amortization period	Balance outstanding	Percentage
1.1-10 years	35.8	12.6
10.1-15 "	38.8	13.7
15.1-20 "	148.9	52.3
20.1-25 "	61.0	21.4
	284.5	100.0

Rate of interest	Balance	Percentage
20 to 5 per cent	140.6	49.4
6 per cent	135.9	47.8
7 to 8 per cent	8.0	2.8
	284.5	100.0

SOURCE : National Department of Economic and Fiscal Programming, *Informe sobre la Deuda Interna (Report on the Internal Debt)*.

Lastly, the procedures for placing the internal public debt require discussion. In the analysis of public debt policy, consideration must primarily be given to the government securities market, since the volume of private savings absorbed by the placing of official bond issues is an accurate gauge of the efficacy of the policy concerned. Nevertheless, a further question is whether the placing of the debt was compulsory or was based on a programme of incentives to attract private savings. Yet another interesting angle of approach is from the standpoint of the extent to which public debt policy mobilized current savings or depended on compulsory saving through the placing of securities in the Central Bank.

Some interesting conclusions can be drawn from Colombia's experience in this field. In the first place, the essential aim of government policy has obviously been to obtain funds not by means of stimuli to voluntary saving, but on the basis of measures to enforce investment. As early as 1940, Decree 1403 obliged insurance companies to maintain at least 15 per cent of their capital and reserves in the form of bonds issued or guaranteed by the Republic of Colombia. In 1941, the Government floated the so-called *Deuda Interna Nacional Unificada* (DINU) bonds for a value of 65 million pesos, redeemable in 30 years and yielding 6 and 4 per cent interest ; in 1943, another 60 million pesos' worth of bonds were issued as *Bonos de la Defensa Económica Nacional* (DENAL) at 6 per cent interest. In order that these bonds might be placed and the objective of the issue attained, Decree 380 provided that " all enterprises habitually employing more than 20 urban workers and

with a minimum capital of 50,000 pesos shall invest not less than 5 per cent of their legal reserves in DINU bonds at 4 per cent interest, as a backing for social security benefits for their workers". By virtue of Act 45, passed in 1952, this provision was extended so as to require enterprises in the same category to invest not less than 10 per cent of their legal reserves, or, in default thereof, 2 per cent of their annual profits, in DENAL bonds. Pursuant to Decree 3096 of 1945, however, they were allowed to dispose of the latter bonds year by year, up to an amount equivalent to the payments made for social security chargeable to the reserves. Savings banks and insurance companies were also obliged by this legislation to invest not less than 20 per cent of their deposits and 10 per cent of their reserves in DENAL bonds. On the one hand, these measures enabled the Government to pay low rates of interest on the loans mentioned, and, on the other, they made it possible for most of the bonds issued to be placed with the general public and with private enterprises. By the end of 1942, 82.2 per cent of the total public debt of 169.1 million pesos was placed outside official institutions; ¹⁶ this proportion, however, dropped to 69.2 per cent in 1947, with the increment in the share of savings banks, which are classified as public enterprises. In the course of the whole period, the official portfolio of the *Banco de la República* rose from 15.1 million pesos at current prices in 1940 to 82.7 million in 1947, while its relative share increased from 12.1 to 16.8 per cent. These figures for the consolidated public debt, including the commitments of the central Government and the departmental and municipal authorities, reflect the growing importance attaching to role of public and private financial institutions in the compulsory placing of Government securities.

TABLE 63. COLOMBIA : BREAK-DOWN OF THE CENTRAL GOVERNMENT'S INTERNAL DEBT, BY BONDHOLDERS
(Millions of pesos)

Bondholders	Balance outstanding	Percentage
<i>Banco de la República</i>	130.5	45.9
Stabilization fund	25.6	9.0
Savings banks	44.6	15.7
Insurance companies	28.0	9.8
Others	55.8	19.6
TOTAL	284.5	100.0

SOURCE : National Department of Economic and Fiscal Programming.

In another study carried out by the Programming Department mentioned above, the conclusion is reached that over 50 per cent of the bonds is in the hands of the *Banco de la República* and the *Fondo de Estabilización*, 20 per cent is owned by unidentified bondholders, and the remainder is held by savings banks and insurance companies (see table 63).

¹⁶ See *Statistical Appendix*, table 41, for fuller details of the relevant annual figures.

The measures adopted to expand the government securities market through arrangements with the *Banco de la República* or the *Fondo de Estabilización*, or by means of compulsory investment on the part of other institutions and individuals, had the advantage, from the Government's standpoint, of allowing it to dictate the financial terms as regards both amortization periods and rates of interest. But, on the other hand, such methods also involve serious obstacles to the creation of a stable market for government securities, because they tend to discourage savers. As far as the obtaining of funds through the Central Bank is concerned, if this expedient is exploited unduly it may come to constitute an important focus of inflationary pressure. Of the central Government's debt, some 46 per cent is now in the hands of the Central Bank, as well as 24 per cent of the consolidated debt; this represents a substantial increase, as in 1940 the corresponding figure was only 12 per cent.

It would seem that the most serious hindrances to the creation of a voluntary government securities market in Colombia are the following :

(a) Lack of uniformity in rates of interest, which, moreover, are too low to compete with the yield of investment in other lines ;

(b) Very long amortization periods, ill-adapted to the mentality and attitude of local savers, in conjunction with the market's want of liquidity and the repercussions of currency devaluations ;

(c) Absence of a clearly-defined tax policy to provide additional inducements to savers. Three different tax treatments are applied to government bonds. Some are entirely exempt from taxation, others — the majority, in fact — are subject to the 1931 income-tax tariff, and, lastly, to some recent issues the current rate is applied ;

(d) Incompatibility of many issues with the need to mobilize the savings of the medium- and low-income groups, owing to the high nominal value of each bond ; and, finally,

(e) Failure to provide special incentives through lotteries, prizes, etc.

In the course of the next few years, the adverse effect of these factors on the creation of a voluntary government securities market may aggravate the relative situation with regard to utilization of the public debt as an instrument for mobilizing resources, if, in contrast, securities issued by autonomous official institutions or by private financial entities offer more attractive inducements to savers. The deflection of savings towards fields of greater interest, and the consequent decline in the Government's financing capacity, may strengthen the aforesaid tendency to resort more freely to the Central Bank expedient, with all its disturbing effects on monetary and economic stability.

The Colombian Government not long ago introduced substantial changes in the structure of the national internal debt.¹⁷ To simplify the existing heterogeneity in rates of interest and amortization periods, authoriza-

¹⁷ Decree 2793, promulgated in 1955.

tion was given for the conversion of 355 million pesos of the outstanding debt into a single issue for the same value, called *Bonos Nacionales Consolidados*, withdrawable in twenty years and yielding 5 per cent interest.

Institutions and other bodies holding bonds and IOUs subject to conversion are under the obligation to subscribe the consolidated national bonds up to a value equivalent to the amortization they receive on this operation, which is effected at the nominal value of the instruments.¹⁸

Such a measure clearly constitutes an important step towards simplification of the structure of the public debt, reduction of its servicing costs and the determination of a standard policy for the financial terms governing the issue, and should thus facilitate the attraction of savings to the government securities market.

4. The role of the external public debt

It has already been pointed out in other paragraphs of the present study that the amount of resources available for investment, especially in under-developed countries, does not depend on domestic savings alone; to these is added the negative or positive influence of external factors, represented by the other two variables affecting the rate of growth, namely, the terms of trade and the net inflow of external resources. The following analysis will be confined to one of the aspects relating to this latter factor — that of the part played by foreign credit in Colombia's economic development during the period under review.¹⁹

Towards the end of 1923, Colombia's external public debt amounted to approximately 25 million dollars, including both the commitments of the central Government and those of the departmental and municipal authorities. Up to that time, the external public debt had been of little relative significance for Colombia's economy. In the first few years of the twentieth century some loans had been contracted abroad for the construction of railways, but the sums obtained were very small. The balance given for 1923 also includes loans contracted in the nineteenth century.

In contrast, in 1925-29 external resources began to play an essential part in the promotion of economic development, substantially raising the over-all investment coefficient and total income. Between 1920 and 1929, the loans contracted by the public sector in the foreign market amounted to 200.9 million dollars, of which 182.5 million were obtained during the last five years of the decade. Of the obligations incurred during these ten years, almost half were contracted by the central Government, and the remainder by the departments and municipalities (see table 64).

¹⁸ Institutions subject to this regulation are savings banks, the *Banco de la República*, commercial banks, the *Fondo de Estabilización*, insurance companies, the *Federación de Cafeteros* and official institutions.

¹⁹ In Part One of the present study brief reference was made to the role of foreign capital in the country's economic development (chapter I), as well as to its possible influence on the future level of the capacity to import (chapter II).

TABLE 64. COLOMBIA : LOANS CONTRACTED ON THE NEW YORK MARKET, 1920-29, BY BORROWERS

(Millions of dollars)

Borrowers	Total 1920-29	Percentage
Central Government	96.5	40.0
Departmental authorities	73.6	36.6
Municipalities	30.8	15.4
	200.9	100.0

SOURCE : See table 65.

Official fiscal policy turned these abundant resources to account for the provision of basic social capital, especially in the transport sector, the under-developed state of which was at that time one of the decisive factors militating against Colombia's economic integration. To a lesser extent, external credit availabilities were utilized to finance port and hydroelectric projects, as well as to instal and expand certain public utilities. Only one-fourth of the total loans obtained was used to settle debts contracted during earlier periods.

The statistics given in table 65 show what use was made of the 200 million dollars borrowed during the period under analysis.

TABLE 65. COLOMBIA : LOANS CONTRACTED ON THE NEW YORK MARKET, 1920-29, BY ECONOMIC PURPOSES

(Millions of dollars)

Economic purpose	Total 1920-29	Percentage
Railways and roads	90.7	45.1
Public works	27.0	13.4
Ports and hydraulic works ...	6.0	3.0
Other public utilities	28.0	13.9
Consolidation or cancellation .	49.2	24.5
	200.9	100.0

NOTE : Tables 64 and 65 are derived from an unpublished study by the International Bank for Reconstruction and Development, mainly based on the *Handbook of American Underwriting of Foreign Securities*, United States Department of Commerce.

For want of adequate statistics on the net movement of the external public debt during this period, the contribution made by funds from this source to the financing of domestic capital formation cannot be precisely assessed. It can safely be asserted, however, that during this phase Colombia's external debt played a positive role in capital formation, but for which the country would not have had at its disposal, in the years following the depression, installed capacity in the shape of basic social capital of which the influence was decisive, both in expediting the process of recovery and in stimulating the expansion of industry.

The financial difficulties caused by the depression, added to the economic burden of the war with Peru,

forced the authorities to suspend the servicing of the external debt. In 1931, departmental and municipal authorities stopped payment; the central Government adopted a partial measure of this same nature during the following year. By 1935 practically all servicing was at a standstill. During the following five years the external public debt balance, which amounted to 165 million dollars, remained virtually unchanged, except for the amortization of 10 million dollars by the central Government. During this phase, as can be seen, the role of the external debt in capital formation was neutral, since international conditions prevented the contracting of foreign loans, but, on the other hand, neither did the servicing of interest and amortization significantly affect the financing of domestic capital formation.²⁰

As from 1940, steps were taken to resume servicing of the external debt. Consequently, the next few years witnessed a series of arrangements with bondholders. By the end of 1948, virtually the whole of the debt contracted prior to the depression, including that of the departmental and municipal authorities, had been readjusted, and normal servicing had been renewed.

The negotiations to restore the pre-depression debt to a normal footing coincided with renewed activity in the utilization of external resources for economic development purposes. From 1941 to 1950, the Export-Import Bank granted the central Government several loans amounting to over 30 million dollars, mainly for roads and railways; in addition, 2.6 million dollars were lent to the *Caja de Crédito Agrario* in 1943 for hydraulic works and a further 2.6 million to the municipality of Medellín in 1944 for electric energy projects. After 1947, and particularly from 1950 onwards, the utilization of foreign resources by the public sector attained very significant levels. The debt contracted in 1948-52 amounted to 155.3 million dollars, of which 133.3 million were obtained in 1950-52 (see table 66).

TABLE 66. COLOMBIA : MOVEMENT OF THE EXTERNAL PUBLIC DEBT, 1947-52

(Millions of dollars)

Year	Debt contracted	Amortization	Net movement
1947	+4.9	-4.4	+0.5
1948	+6.2	-6.0	+0.2
1949	+10.9	-7.3	+3.6
1950	+20.5	-9.1	+11.4
1951	+60.2	-8.2	+52.0
1952	+52.6	-11.8	+40.8
TOTAL	+155.3	-46.8	+108.5

SOURCE : National Department of Economic and Fiscal Programming, *Informe sobre la Deuda Pública Externa (Report on the external public debt)*, Bogotá, 1954.

An analysis may now be usefully made of the outstanding features of Colombia's external public debt

²⁰ Nevertheless, as will be seen later, within the aggregate role played by external resources, foreign capital had a negative influence on the rate of investment, because of remittances of profits abroad.

with respect to its volume, sources — especially in recent years — financial terms and amortization periods, and other elements, whereby not only can foreign credit policy be interpreted, but conclusions can also be drawn as to the possible requisites for an external assistance programme under an over-all plan for economic development.

At the end of 1952, Colombia's outstanding and utilizable external debt totalled 257.1 million dollars. Owing to the stagnation of the world capital market after the 1931 depression and up to 1940, most of the outstanding public debt corresponded to loans obtained during and, above all, after the war, when, as has already been noted, the net increment in foreign credit rose above 100 million dollars.

The major part of the outstanding external debt represented commitments contracted by the central Government and by autonomous official and parastatal institutions, which had developed strikingly during the previous decade as an instrument for government promotion of economic development. Of the external debt at the present time, 43.8 per cent is owed by the central Government and 26.1 per cent by autonomous public institutions. Among these latter, the *Caja de Crédito Agrario* and the Paz del Río steel making enterprise may be mentioned as the chief debtors.²¹

TABLE 67. COLOMBIA : BREAK-DOWN OF THE EXTERNAL PUBLIC DEBT ON 31 DECEMBER 1952, BY DEBTORS

(Thousands of dollars)

Debtors	Thousands of dollars	Percentage
Central Government	112,527	43.8
Official and parastatal institutions	67,130	26.1
Departmental authorities	34,216	13.3
Municipalities	29,837	11.6
Private enterprises of national importance	13,428	5.2
TOTAL	257,138	100.0

SOURCE : National Department of Economic and Fiscal Programming, *Informe sobre la Deuda Pública Externa (Report on the external public debt)*, Bogotá, 1954.

The external commitments of the departmental and municipal authorities represent one-fourth of the total outstanding debt. Mention must also be made of certain loans to private enterprises of national importance, obtained partly on the basis of government guarantees, and accounting for 5.2 per cent of the external debt.²² Almost the whole of the external debt at present outstanding is guaranteed by the central Government, only 9.6 per cent constituting an exception to this rule (see table 67).

²¹ The debt contracted by these two bodies accounts for 39.7 million dollars out of a total of 65.1 million for autonomous entities. The remainder represents credits received by the *Empresa Colombiana de Petróleo*, *ICOPESCA* and the *Corporación de Productos Agrícolas*.

²² The most important was a loan to commercial banks for the purchase of cotton.

Interest attaches to an analysis of the public debt from the point of view of the sources of foreign capital, since this gives some idea of the role of international financial policy in economic development.

As has already been noted, the 1931 depression radically altered the structure and operation of the foreign capital markets. Financial resources could no longer be obtained by the placing of national bonds on the private markets of the more highly developed countries. This is why only 30 per cent of Colombia's outstanding external debt is represented by bearer bonds totalling 67.2 million dollars and constituting the balance of the loans contracted before the depression.

Seventy per cent of the external debt corresponds to loans granted by international financial and banking institutions on a basis of central Government guarantees. The International Bank for Reconstruction and Development, the Export-Import Bank, and, recently, some European banking institutions have been the main sources from which funds have been obtained by the Government of Colombia, especially in the post-war years.

During the war, the Export-Import Bank, which is an official institution, played a positive part in the provision of external resources.²³ If, however, this Bank's total assistance to Latin America as a whole is taken into account, the proportion absorbed by Colombia is of little significance. Indeed, according to a United Nations report,²⁴ up to 1953 the aggregate credits granted by the Bank in question totalled 1,296 million dollars, of which 77.5 million, or 5.9 per cent, fell to the share of Colombia.

After the war, the financial support of the Export-Import Bank was reinforced by the external resources provided by the International Bank for Reconstruction and Development, in the form of loans for the development of transport, and, on a smaller scale, for agriculture and energy. Colombia benefited by 16.3 per cent of the International Bank's assistance to Latin America as a whole.²⁵

At the end of 1952, the two international agencies mentioned were creditors for 40 per cent of the outstanding debt; another 30 per cent derived from loans granted by banks and private enterprises, of which the most important was a 22-million-dollar credit extended by the *Banque de Paris* for the financing of the steel making industry.²⁶

Lastly, various non-banking international organizations have constituted a source of foreign capital, especially for the financing of municipal public utilities.²⁷

²³ Outstanding examples are 14.5 million dollars for irrigation works, several loans for transport, amounting to 25 million dollars, and other smaller credits for energy.

²⁴ *Foreign Capital in Latin America* (E/CN.12/360).

²⁵ *Ibidem*.

²⁶ This group also includes a loan of 14.3 million dollars granted to the central Government in 1942 by the National City Bank to redeem the floating debt.

²⁷ The most important credits were those extended by the Ericsson Company for the installation of telephone services.

Table 68 shows the outstanding external public debt broken down by sources of supply.

TABLE 68. COLOMBIA: BREAK-DOWN OF THE EXTERNAL PUBLIC DEBT ON 31 DECEMBER 1952, BY CREDITORS

Creditors	Balance outstanding (Thousands of dollars)	Utilized balance (Percentage)
Holders of bearer bonds	76,204	30
International Bank for Reconstruction and Development	53,309	21
Export-Import Bank	47,873	19
Private banks	39,627	15
Private enterprises other than banks	39,425	15
TOTAL	257,138	100

SOURCE: National Department of Economic and Fiscal Programming, *Informe sobre la Deuda Pública Externa (Report on the external public debt)*, Bogotá, 1954.

TABLE 69. COLOMBIA: BREAK-DOWN OF THE ORIGINAL AMOUNT OF THE EXTERNAL PUBLIC DEBT

(Thousands of dollars)

	Thousands of dollars	Percentage
(a) By rates of interest		
Between 2.5 and 4 per cent	215,240	67.1
4.5 and 4.75 per cent	51,328	16.0
5 and 5.75 " "	24,515	7.6
6 and 6.5 " "	25,646	8.0
7 and 8 " "	3,969	1.3
	320,698	100.0
(b) By amortization periods		
Short-term	10,848	3.3
Medium-term	91,952	27.9
Long-term	226,679	68.8
TOTAL	329,479	100.0

SOURCE: National Department of Economic and Fiscal Programming.

As regards the financial terms for the external debt, 83.1 per cent is subject to rates of interest ranging from 2.5 to 4.75 per cent; the remainder was contracted at higher rates, varying between 5 and 8 per cent.²⁸ With respect to amortization periods, more than two-thirds of the debt is on a long-term and 27.9 per cent on a medium-term basis. The relative importance of the short-term debt is slight, amounting to only 3.3 per cent²⁹ (see table 69).

²⁸ The figures relate to the gross amount of the external debt contracted and are therefore not comparable to those for the outstanding external debt referred to above.

²⁹ Debts are defined as short-term up to years, medium-term up to 3-10 years and long-term up to 10-30 years.

For the external debt as a whole, the weighted average of the rates of interest gives a mean rate of 4 per cent, and the corresponding average for the amortization periods is 18.2 years.

If the financial conditions for the balance of the loans contracted before the depression are disregarded, the international institutions, such as the Export-Import Bank and the International Bank for Reconstruction and Development, seem to be those offering the most favourable terms as regards rates of interest and amortization periods. The private banks, on the other hand, have made their loans conditional upon very narrow time limits and high rates of interest.⁸⁰

Clearly, the support given by official and governmental institutions through their policy as regards credit terms has been a beneficial factor for Colombia, inasmuch as the country has been able to take better advantage of its capacity for external borrowing.

Reference must also be made, however briefly, to certain aspects of the administration of the external debt. This problem is significant from two standpoints: that of the establishment of a co-ordinated policy as regards more favourable credit terms, and that of economic development, in relation to the distribution of the funds obtained in accordance with an order of priority under an investment programme. Of basic importance also is the efficient administrative handling of the external debt in order that decisions to contract new loans may be governed by the country's servicing capacity.

From this point of view, Colombia has had no uniform external debt policy whereby an over-all credit programme might have been drawn up on the basis of the demand for resources on the part of the central Government, the departmental and municipal authorities and the official autonomous institutions. Recently, however, measures have been adopted in this connexion with a view to filling the existing gaps.⁸¹ Two important advances have been made. In the first place, the central Government must be informed, through the Ministry of Finance and Public Credit, of the undertaking of any negotiations for internal or external borrowing. The departments, municipalities and decentralized autonomous organizations are all subject to this obligation. Secondly, the contraction of external or internal loans will be authorized only in connexion with projects or programmes previously mapped out.

A break-down must now be made of the Government's utilization of external resources, by economic sectors. Some indication has already been given of the high priority assigned in 1925-29 to loans for the financing of social capital in the transport sector and public works in general.

As from 1940, when Colombia entered upon a new phase of its external credit policy, the allocation of the

funds secured has been directly linked to new basic requirements for economic development, although high priority is still accorded to the financing of transport projects. More than one-third of the credits obtained since the war has been earmarked for the development of transport facilities, especially roads and railways; in a lesser degree, such resources have contributed to the financing of projects connected with air transport, navigation and oil pipe-lines.⁸²

Foreign credit policy in the past decade differed fundamentally from that pursued in the years preceding the depression, inasmuch as resources were channelled towards the financing of projects in sectors which were but little developed until a few years ago. Funds intended for energy programmes, for the development of the steel making industry and for irrigation and agricultural machinery projects constituted just under 40 per cent of the total credits obtained during the post-war period⁸³ (see table 70).

TABLE 70. COLOMBIA : BREAK-DOWN OF THE EXTERNAL PUBLIC DEBT CONTRACTED BETWEEN 1945 AND 1952, BY ECONOMIC PURPOSES

	<i>Thousands of dollars</i>	<i>Percentage</i>
Transport :		
Roads	20,500	
Railways	29,937	
Other items	12,704	
TOTAL	63,141	35.5
Energy	35,830	20.2
Agriculture	22,550	12.7
Iron and steel industry	22,015	12.4
Public utilities :		
Telephones	18,791	
Other items	1,453	
TOTAL	20,244	11.4
Miscellaneous	13,951	7.8
GRAND TOTAL	177,731	100.0

SOURCE : National Department of Economic and Fiscal Programming, *Informe sobre la Deuda Pública Externa (Report on the external public debt)*.

It is also of interest to stress, in analysing the purposes served by resources deriving from the external debt, the priority assigned in recent years to purchases of railway

⁸⁰ The average rate of interest charged on Export-Import Bank loans has been 3.81 per cent over an amortization period of 14.5 years. The International Bank, on the other hand, although its rates of interest are higher (4.28 per cent), has granted more liberal time limits (of 18.6 years). The terms imposed by the private banks are more burdensome (5.57 per cent interest and amortization periods of 6.1 years).

⁸¹ Decree No. 1050, promulgated in April 1955.

⁸² The most important credits for roads and railways were those for the *Plan Vial* (16.5 million dollars) and for the *Ferrocarril del Magdalena* (25 million dollars).

⁸³ The loan for the steel making industry amounted to 22 million dollars; those for various hydroelectric power stations — Anchicayá, Caldas, Lebrija and Rio Grande — to 11.1 million dollars; and those for the *Caia Agraria's* agricultural programmes to 19.5 million dollars. This list includes only the most important projects.

rolling-stock, an item whose relative importance in the composition of public investment had strikingly decreased after the 1931 depression owing to foreign exchange difficulties.

Lastly, mention must be made of the relationship between the net movements of the internal debt and the total resources available for investment.

International transactions connected with the public debt exert a direct influence on the economy's financing capacity by supplementing or reducing investment resources. If the gross capital inflow is less than the amount absorbed by amortizations, a net transfer of savings abroad takes place, to the detriment of domestic capital formation. If the reverse process occurs, the addition of a net inflow of external credit to the funds deriving from internal saving enables domestic investment to reach levels higher than the system's own financing capacity would permit.

In an analysis of the impact of international financial transactions on the rate of investment, not only the official external debt, but also the net movement of private capital should be taken into account. However, only the role of the external debt will be discussed for the time being.

Attention has already been drawn to the fact that, although no net statistics for the movement of foreign loans in 1925-29 are available, it is safe to assume that during the phase in question the part played by the external debt with respect to investment resources was positive. The effects of the flow of external credit on the capacity for investment can be evaluated in both direct and indirect terms. Its direct impact made itself felt through a gross capital inflow of more than 200 million dollars, which represented almost 30 per cent of total investment; indirectly, however, a fuller and more far-reaching influence was exerted by these credits on the mobilization of resources for capital formation. In fact, the initial impetus towards growth given by the flow of funds from abroad permitted the expansion of income, consumption and saving; that is, the coefficient of the country's own savings increased without an absolute decrease in the level of consumption.³⁴ Logically, in view of the growth of income, the fiscal system operated with great elasticity as regards the channelling of a major proportion of marginal income into public saving; 16.1 per cent of gross saving was generated through the public sector in this period.

The interruption of the flow of foreign credit caused by the depression might have had a very marked negative effect on availabilities of investment resources in the years that followed the slump. This was averted, however, thanks to the steps taken by the Government to suspend the servicing of the external debt, and in 1932-39 a net transfer abroad of only 35.6 million pesos (at 1950 prices) was registered, representing 3.9 per cent of public investment and 1 per cent of total investment during this phase. Moreover, this amount implied dissaving on the

part of the public sector and the corresponding reduction of domestic investment. If the funds in question had not been transferred abroad, the savings generated by the public sector would have increased by an equivalent amount.

After 1940, when the contracting of foreign loans was resumed and the situation of the outstanding debt was restored to a normal footing, the contribution of the external debt to the financing of domestic capital formation became positive. In 1940-45 the net movement of the external debt added to the resources available for investment a sum equivalent to 171.4 million pesos at 1950 prices, accounting for the financing of 11.2 per cent of public investment and 4.1 per cent of total investment. It should be noted that this result was partly attributable to the Government's policy for settlement of the external debt which had been contracted before the depression, and the servicing of which had been suspended.³⁵

TABLE 71. COLOMBIA : SHARE OF THE EXTERNAL PUBLIC DEBT IN THE FINANCING OF INVESTMENT

Period	Net movement * (Millions of pesos at 1950 prices)	As a percentage of public investment	As a percentage of total fixed investment
1932-39	-35.6	-2.9	-0.8
1940-45	171.4	11.2	3.8
1946-53	163.0	7.1	1.6

SOURCE : *Statistical Appendix*, tables 10 (Parts A and B), 12 and 44.

* Difference between gross inflow of capital and amortizations.

During the post-war period, although the gross inflow of external credits substantially increased, thanks to the support received not only from the Export-Import Bank but also from the International Bank and other financial institutions of a private character, the net contribution of the external debt to the financing of domestic investment was slightly less than during the war, since in 1946-53 the sum added to internal savings on account of the net movement of external commitments was equivalent to 163 million pesos at 1950 prices. In relative terms, however, this meant that the external debt was responsible for a smaller proportion of capital formation, since it financed 7.1 per cent of public investment during the period and 1.6 per cent of over-all investment in the economy. This decline in the relative importance of the public debt in the post-war financing of economic development was due to the fact that in this period higher productivity and improved terms of trade permitted the transfer of additional resources to the public sector and the non-wage-earning private sector, where they accumulated sufficiently to expand the volume of resources available for investment (see table 71).

³⁵ This debt was considerably reduced through government purchases of bonds on the open market at values up to 40 per cent below the nominal value, and by means of settlement operations agreed upon with the bondholders. From 1940 onwards, this reduction in the debt meant a substantial decrease in amortization expenditure.

³⁴ See the first volume of this series of publications, *Introduction to the Technique of Programming* (E/CN.12/363), for an analysis of the contribution of supplementary foreign capital to a country's savings coefficient.

Lastly, one aspect must be mentioned which is of great importance for the formulation of an economic development programme, namely, the evaluation of the country's capacity to contract new foreign loans. The relationship between the servicing of interest on the debt and its amortization on the one hand and, on the other, gross income, current public income and the capacity for external payments, gives the measure of the country's potentiality for increasing its external financial commitments.

On an average, the servicing of Colombia's external debt during 1947-53 absorbed 0.5 per cent of gross income, 3.7 per cent of tax revenue and 2.8 per cent of the total capacity for payments (see table 72).

TABLE 72. COLOMBIA : SERVICING OF THE EXTERNAL PUBLIC DEBT, 1945-53

Period	Total servicing (Millions of pesos at 1950 prices)	As percentage of gross income	As percentage of public income	As percentage of aggregate payments capacity
1947	21.1	0.4	2.9	2.4
1948	23.5	0.4	3.3	2.7
1949	25.6	0.4	3.4	2.6
1950	34.3	0.5	4.0	2.6
1951	33.8	0.5	3.4	2.5
1952	37.5	0.5	3.3	2.7
1953	67.0	0.9	5.6	3.9
Average 1947-53		0.5	3.7	2.8

SOURCE : National Department of Economic and Fiscal Programming, *Informe sobre la Deuda Pública Externa (Report on the external public debt)*. The dollar figures for each year were deflated by an index of the unit value of imports and multiplied by the parity exchange rate.

The incidence of the servicing of the external debt on gross income reflects the reduction in the proportion of goods and services available for investment and consumption that had to be earmarked for meeting external commitments. The average figure of 0.5 per cent for the period 1947-53 suggests that payments on the external debt did little to restrict the volume of goods and services available to the economy. Neither does 3.7 per cent of public income seem an unduly high coefficient so far as the Government's contracting capacity is concerned. The official sector's capacity for servicing the public debt is directly linked to consumer expenditure policy and to the elasticity of the public income system in relation to total national income. If the elasticity of tax revenue is negative and the growth of public borrowing keeps pace with that of income, the burden of servicing on current income will gradually increase, bringing about a corresponding decline in the Government's margin of savings.

In under-developed countries, however, the essential relationship on which to base an evaluation of the country's capacity for public borrowing is the incidence of interest and amortization on the capacity for external payments. From table 72 it can be deduced that the coefficient of 2.8 per cent is not unduly burdensome in

relation to foreign exchange availabilities, and this is the ratio which is of fundamental importance for determining external credit policy, in view of the shortage of foreign currency.

In brief, it may be said that under present circumstances Colombia has a fairly satisfactory margin for greater capital formation by the use of external resources deriving from loans. Nevertheless, for the problem to be more completely grasped, remittances of profits and interest on foreign capital must be taken into account. This topic is discussed in another chapter of the present report.

IV. TAX POLICY AND ITS EFFECTS ON ECONOMIC DEVELOPMENT

The foregoing section dealt with the direct role of fiscal policy in the channelling of available resources towards capital formation. The public sector has not confined itself, however, to such direct participation, since it has also exerted a powerful influence through various mechanisms which operate indirectly. This and the subsequent sections are devoted to the consideration of its indirect role, to which end the effects of tax policy will first be examined here.

1. Principal characteristics of the tax system

The preceding sections show the capacity of the Colombian tax system to augment the resources of the public sector commensurately with the increase in national income. It has succeeded in keeping the exchequer's share in gross income stable on the whole. The rise in public income has maintained government investment at fairly high levels. Thus it has been possible to build up basic services and installations and to finance private activities through official credit institutions. From the point of view of public expenditure, therefore, the public sector has clearly exerted a stimulating influence.

However, the Government's role in economic development must not be analysed solely from the standpoint of expenditure. The way in which the exchequer gathers its resources is of the greatest importance for the rest of the economy, since, in the final issue, state income consists of transfers from the private sector, which are thus deducted from the income of individuals and enterprises. For an economy in process of development, like Colombia's, it is therefore of interest to explore the effects of the tax system on consumption and private investment, and the extent to which these effects have reacted on the country's growth, as well as the efficacy of the instruments used in pursuing the economic aims of fiscal policy.

During the thirty years' interval between 1926 and 1955, the two principal types of income available to the central Government of Colombia derived from customs tariffs and income tax, which together contributed about 60 per cent of regular public income. They were also the chief instruments of economic development policy, owing to their repercussions on the degree

of protection afforded to domestic production or on the level of consumption, saving and investment in the private sector.

A preliminary analysis of the evolution of the economy during the period 1925-54 brings to light two principal characteristics of tax policy in relation to economic development, *viz.* :

(a) The waning efficacy, over the long term, of the customs tariff as a means of protection, and the consequent need to supplement it with other measures, such as those relating to exchange control, and to introduce reform in the tariff itself to bring it into line with the changed circumstances ;

(b) The substantial increase in the progressiveness of the tax system, which, however, has not had a dampening effect on the process of capital formation.

Each of these phenomena merits individual examination.

The 1931 customs tariff had two main aims in view. One, of a strictly fiscal nature, was to meet the growing need for resources during phases of depression ; the other, protectionist in character, was to encourage the import substitution process which was being initiated as a result of the contraction in the capacity to import. Although exchange control was established during the same period, and in practice supplemented the protectionist mechanism, its purpose was rather to combat the disequilibrium in the balance of payments, and in this respect it was regarded as a temporary expedient.

The efficacy of the tariff as a means of protection began to deteriorate after a few years. At the time of its establishment in 1931, the degree of protection achieved was 30 per cent ; by 1935 this proportion had fallen to 20 per cent, and in 1948 it was 8 per cent. The real reason for this phenomenon lies in the specific nature of the tariff itself, together with the rising trend of import prices. Secondly, in so far as those imports which were subject to the heaviest duty were increasingly replaced by domestic production, the composition of imports was gradually modified in the direction of greater predominance of intermediate and capital goods, duties on which are smaller. Hence, in 1950, an attempt was made to stem the loss of tariff efficiency with a reform establishing a combined tariff (specific and *ad valorem*). This led to an immediate rise in the level of protection, which by 1951 had reached 17 per cent. Later on this coefficient declined, owing to the influence of changes in the composition of imports and to the granting of special exemptions, mainly in the case of official imports.

A clearer understanding of the phenomenon can be obtained from the statistics given in table 73.

During the whole of the period under review, exchange control played an increasingly influential part. The weaknesses of the tariff were more than offset by the foreign exchange restrictions, which were mainly applied to final consumer goods. It is only in the light of this fact that the progress achieved during the entire period in the substitution of manufactured consumer products may be understood, especially if it is borne in mind

that the improvement in the transport system, although it stimulated development, at the same time contributed towards lowering prices and improving access to markets, to the benefit of manufactured products and thus of their competitive capacity.

TABLE 73. COLOMBIA : DEGREE OF PROTECTION PROVIDED BY CUSTOMS TARIFF

Year	Imports	Duties	Degree of protection (Percentage)
	(Millions of pesos at 1950 prices)		
1933	422.1	122.2	29.0
1936	538.5	109.5	20.3
1937	664.5	121.6	18.3
1938	620.6	98.1	15.8
1939	778.4	123.8	15.9
1940	557.1	83.2	14.9
1941	560.6	95.3	17.0
1942	329.0	53.4	16.2
1943	402.7	52.4	13.0
1944	445.4	54.6	12.3
1945	608.4	72.4	11.9
1946	774.8	79.2	10.2
1947	1,019.0	91.4	9.0
1948	868.6	71.8	8.3
1949	827.3	48.7	5.9
1952	1,165.9	175.9	15.1
1950	1,139.4	97.5	8.6
1951	1,156.4	197.2	17.1
1953	1,543.7	214.4	13.9

SOURCE : Official statistics.

It has already been said that the tax reform of 1935 was characterized by the establishment of income-tax as the basis of the taxation system. The introduction of such a system presupposes the existence in the domestic economy of economic groups capable of generating taxable surpluses on a scale justifying the new régime. Historically these groups were first formed in Latin America by the export trade. Thus it was that certain countries, the dynamics of whose growth was linked to the expansion of the external sector, preferred, in their preliminary efforts on behalf of direct taxation, to establish taxes on exports, in the form of proportional and non-progressive duties. Others from the outset sponsored the income-tax system, but so constructed the schedule that its primary tendency was to tax the export sector.

Such was not the case in Colombia. The export sector was not burdened with special duties as an alternative to income-tax, nor was any system established with the intent to make that sector suffer the major weight of the new taxation. This is partly explained by the traditional resistance to taxes on coffee, Colombia's staple export product, a resistance which results from the structure of the coffee economy, based as it is on small- and medium-scale production. In addition, coffee had just been subjected to the adverse effects of the great depression, and had regained only to a very small degree its position on the world markets. In these circumstances,

the tax reform imposed a heavier burden on the domestic sector, which was beginning to expand under the influence of the public expenditure policy, exchange control, the growth of the domestic market as the result of the population increment, and the development of transport.

It seemed at first that the structure of the new taxation system would have an adverse effect on capital formation. Taxation of natural persons increased considerably on account of the progressive nature of the scales of rates and of the equally progressive supplementary taxes on unearned income and excess profits. Furthermore, the level of exemption from income tax was set fairly high, implying that the lower-income groups would be outside the scope of the new rates. It was to be expected, therefore, that there would be a negative effect on the savings coefficient of the higher-income brackets.

The new company tax also appeared inimical to capital formation, owing to the progressive character of the scale applicable to the receipts, capital and excess profits of corporations. Partnerships, on the other hand, were not directly subject either to basic income tax or to the supplementary taxes on capital and excess profits, since the tax was applicable to each individual member only in his capacity as a natural person, and according to his share in the profits and his contribution to the social capital.

The very structure of the corporation tax failed to stimulate reinvestment of profits, since, whereas exemption from the progressive tax on dividends encouraged consumption, the progressive tax on profits discouraged reinvestment and the expansion of enterprises.

In contrast to what might have been expected, income tax does not appear to have militated against capital formation. On the contrary, since 1935 there has clearly been a growing expansion of private investment, interrupted only during the war, when serious difficulties hampered the importation of capital goods. Over the last few years, however, the curve of private investment shows two downturns, one in 1947-48 and the other in 1951. While the first may be interpreted as a natural reaction to the excessively high rate of investment growth after the war (1945-46), the second is undoubtedly a result of the general restrictive measures which were applied by the Government during this period to counteract the rise in domestic prices consequent upon the improvement in the external position of coffee, and which had a particular effect on the volume of credit.

If investments generally tended to grow, despite the characteristics of the taxation system, the explanation must be sought in other incentives which offset the apparent disadvantages of the régime in question. During the last twenty-five years the following factors may be considered to have stimulated investment :

(a) The restriction of imports as a consequence of the Second World War, which widened the markets for domestic production ;

(b) Monetary phenomena during the war and the first post-war years, which, through the rise in prices, permitted a redistribution of income to the benefit of the entrepreneurs, since the adjustment of wages to the upward trend was relatively slow ;

(c) Exchange control after the war and, from 1950 onwards, the establishment of the new customs tariff system ;

(d) Public investment in fixed social capital, mainly in the transport and energy sectors ;

(e) The stimulus provided by bodies such as the Institute of Industrial Development, which carried out studies and took on the risks of certain investments that did not at first attract private capital but later awakened its interest ;

(f) Incentives to industries ancillary to building activities, as a result of the demand generated by public investment programmes ; and

(g) The increase of national income in recent years, and its influence on the improvement in the terms of trade.

These factors account for the growth of private investment only from the point of view of the incentives whereby capital was attracted. But they do not provide an answer to the more important question of how the private sector was able to absorb the heavier taxation on income and capital without detriment to its investment capacity, which is based mainly on the reinvestment of profits.

For the economy as a whole, the tax burden underwent no increase in relation to national income after the 1953 reform, except for slight variations during the war; it fluctuated around approximately 9 to 7 per cent of national income. Nevertheless, the changes introduced into the Colombian tax system did imply a redistribution of the incidence of taxation. The remodelling of the system on much more progressive lines was reflected in the fact that the tax burden fell more heavily on the higher income groups and on enterprises. The percentage relationship of direct taxation to national income rose from 1.5 in 1936 to 4.3 in 1953.

The basic element which enabled the private sector to maintain a high rate of investment notwithstanding the increase in taxation was the rise in the productivity of the Colombian economy after the depression, especially in the manufacturing sector and the building industry. Between 1935 and 1945, the gross product per active person in Colombia increased by 17 per cent, during a period of slow growth ; in contrast, the gross product per active person in the manufacturing sector rose by 56 per cent during the same years.

After the war, two favourable factors helped to promote absorption of the growing burden of direct taxation. One of these was the continuance of the upward trend in the productivity of the Colombian economy, and the other was the improvement in the terms of trade. Thus, for the economy as a whole, the gross product per active person rose by 39.8 per cent during the post-war period, while the increase in gross income per active person, which was affected by the terms of trade, was 58 per cent.

As the growth of productivity after the depression was much more rapid in the manufacturing sector than in the economy as a whole, it is not surprising that industry should have been gradually acquiring increasing importance as regards the incidence of income tax by

TABLE 74. COLOMBIA : INCIDENCE OF COMPANY TAX

(Thousands of pesos at 1950 prices: annual averages)

	Thousands of pesos	Percentage	Thousands o pesos	Percentage	Thousands of pesos	Percentage
Agricultural and livestock pro- duction	1,412	3.7	1,404	2.6	3,067	2.7
Extractive industries	21,300	55.4	18,704	34.4	17,909	15.5
Manufacturing industry	7,909	20.6	23,388	43.1	64,574	55.8
Construction	456	1.2	452	0.8	1,420	1.2
Electricity, gas and water	1,434	3.7	1,652	3.0	2,897	2.5
Trade, banking and insurance ...	3,416	8.9	5,778	10.6	18,117	15.7
Transport and communications ..	1,354	3.5	1,755	3.2	3,897	3.4
Other activities	1,161	3.0	1,191	2.2	3,755	3.2
TOTAL	38,442	100.0	54,324	100.0	115,636	100.0

SOURCE : See *Statistical Appendix*, table 66.

economic sectors. In 1936, when implementation of the new tax policy began, manufacturing enterprises transferred to the Government, in the shape of taxes, 7.8 million pesos (at 1950 prices); from 1941 to 1945 the corresponding annual average reached 23.3 million, and in the post-war years — 1945-52 — 63.7 million (see table 74).

One outcome of the evolution described was that the share of the manufacturing sector in total taxes paid by companies substantially increased, from a proportion of only 20.6 per cent in 1936 to an annual average of 55.8 per cent during the post-war phase.

Obviously, fiscal and tax policy in Colombia after the depression was fairly successful in reconciling the heavier tax burden on the higher-income brackets with incentives to investment. On the one hand, the Government's economic policy, as implemented through public expenditure, credit mechanisms and, above all, exchange controls, can be said to have created the necessary stimuli to productivity, the effects of which were partly reflected in the more efficient utilization of equipment (especially in the manufacturing sector, whose efforts were largely directed towards import substitution). The fact that resources were more intensively exploited explains the substantial rise in the product-capital ratio for this branch of the economy during the period 1935-45.³⁶

In the second place, through the tax mechanism budget policy absorbed part of the higher efficiency attained by the economic system, channelling it towards capital formation through the surplus on current account.

A fiscal policy on this pattern is interesting inasmuch as it bears some resemblance to Japan's experience in the early stages of its development, when Government incentives to the mechanization of agriculture considerably raised productivity in this sector, and, furthermore, through direct taxation this increased efficiency

was transferred to serve the ends of economic development, especially the promotion of industry.³⁷

The analysis presented so far would be incomplete if stress were not laid on an aspect that seems to constitute one of the main reasons why private investment expanded in spite of the increase in direct taxation; namely, the distribution of the increment in the productivity of the Colombian economy among the public sector, the entrepreneurial sector and the wage-earning sector (see table 75).

TABLE 75. COLOMBIA : PRODUCTIVITY AND ANNUAL REAL WAGES^a

(Pesos at 1953 prices)

	Number of workers and operatives (Thousands)	Wage per employed person		Per capita productivity	
		Pesos	Index	Pesos	Index
1938	753	1,240	100	2,675	100
1946	983	1,332	107.4	3,117	116.5
1947	1,017	1,360	109.7	3,128	116.9
1948	1,051	1,322	106.6	3,238	121
1949	1,087	1,533	123.6	3,403	127.2
1950	1,124	1,765	142.3	3,550	132.7
1951	1,144	1,660	133.9	3,743	139.9
1952	1,197	1,657	133.6	3,718	139
1953	1,253	1,633	131.7	4,154	155.3

SOURCE : ECLA.

^a Including only industry and services.

The figures given confirm the previous suggestion that most of the benefit deriving from the increase in productivity between 1938 and 1948 fell to the share of the entrepreneurial sector and the State. In fact, while productivity per employed person rose by 21 per cent, the increment in real wages amounted to only 6.6 per

³⁶ The product-capital ratio rose from 0.33 in 1935 to 0.56 in 1945, that is, by 70 per cent.

³⁷ Bruce F. Johnston, "Agricultural productivity and economic development in Japan", *Journal of Political Economy*, Vol. LIX, No. 6 (December 1951), pages 498 *et seq.*

cent. In other words, the improvements achieved in the productivity of the Colombian economy and the slow growth of real wages were factors that played an essential role in the channelling of resources towards economic development during this period, through the successful maintenance of a high rate of private investment and the absorption of the heavier direct taxation, which, by means of the fiscal system, added to the country's capacity for financing investment.

However, a levelling-up took place in 1949 and 1950, owing to a much sharper rise in real wages. This situation, in conjunction with the restrictive monetary and exchange policy then applied, may partly account for the decline in private investment during the phase in question.

From 1951 onwards, unfavourable trends were again registered in the share of real wages in the additional productivity of the economic system as a whole, since, in absolute terms, it fell considerably below its 1950 level. If the increment in productivity is taken together with the improvement in the terms of trade, it is easy to understand how a higher income capacity became concentrated in the hands of the non-wage-earning private sector, thus providing a source of additional savings and tax capacity. However, through the tax on income and capital the fiscal sector absorbed, though to a very minor degree, part of the increment in the receipts of the higher-income brackets. The proportion of national income represented by direct taxation rose from 3.7 per cent in 1949 to 4.3 per cent in 1953.

Hence it can be inferred that in Colombia in recent years there has been an increase in the non-wage-earning private sector's capacity for saving and for financing investment through the reinvestment of profits. This process was a result not only of higher productivity and the favourable evolution of the terms of trade, but also, as has already been noted, of the redistribution of income through a decline in the absolute level of real wages.

The greater financial capacity of the private sector was reflected in the remarkable growth of private investment, which had stood at 678 million pesos in 1949 and by 1953 had reached 1,095 million, thus increasing by 61.5 per cent.

Lastly, the part played by indirect taxation in capital formation is deserving of comment. The demand for consumer goods can be subdivided into two main categories, one satisfied by domestic industry and the other met with imports. Reference will later be made to the role of import duties, especially the customs tariff, as instruments for restricting demand and providing incentives to the development of substitution industries.

Duties on domestically-produced goods have not restricted demand sufficiently to slow up or hinder the operation of investment incentives, since in their case the major burden has fallen on essential items for which demand is inelastic and which are subject to specific and fairly moderate tariffs whose incidence on monetary demand consequently tends to decline. Moreover, Colombia has no taxes directly affecting production, such as in some countries constitute, under certain circumstances, obstacles to economic development.

To sum up, it may safely be asserted that since the 1935 reform Colombian tax policy, by its emphasis on direct taxation, has helped to stimulate private investment through the expansion of consumption, which otherwise, had the Government resorted to indirect taxation on a larger scale, would necessarily have been restricted. This is a problem which calls for careful planning of fiscal policy in the under-developed countries, since too severe a pressure on consumption may mean that demand falls below the installed capacity of the consumer industries.

2. *The company-tax system*

Colombia's company-tax system is based on a tripartite arrangement of income tax, which is applied to income, capital and excess profits, the three phases constituting, for legal purposes, a single indivisible whole.

Every year, in January and February, companies have to declare their gross income during the previous taxable year, the deductions and exemptions authorized by law, their assessable cash rights or assets, and any further information required for the determination of net income and taxable capital.

Corporations, "commandite" share companies (or limited partnerships issuing shares) * and partnerships, or any taxpayer having paid taxes in the previous year to a value of 5,000 pesos or more, must make a private declaration in which they themselves work out their taxable income and the amount of the tax. On this basis, payment is effected in four quarterly instalments.

The present system differentiates between partnerships and corporations or limited partnerships issuing shares, on the following lines :

(a) *Partnerships*

(i) *The company* is liable to a proportional tax, equivalent to 3 per cent of net income, independent of the taxes on capital and excess profits.

(ii) *The partners*, as natural persons, are liable to the progressive tax on aggregate income, the progressive tax on capital and the excess profits tax. No deduction for the tax paid on behalf of the company is made in the estimate of net income for the purposes of the over-all tax.

(b) *Stock companies and limited partnerships issuing shares*

(i) *The company* is liable to the following : (a) a progressive tax on the net income of enterprises, beginning at 1 per cent (on net incomes of up to 2,000 pesos) and reaching 33.3 per cent (on incomes in excess of 5 million pesos) ; (b) a progressive tax on capital, at a rate of 1.5 per cent on capital in excess of 1 million pesos ; (c) a tax on excess profits in relation to capital, with a progressive scale after 12 per cent, ranging from 18.75 per

* *Translator's note* : Foreign to English company law, this form of organization is defined in the *Oxford English Dictionary* as : "A company to which persons advance capital without assuming the functions of partner, or incurring any responsibility".

cent at the first step to 51.24 per cent for excess profits over and above 50 per cent.

(ii) *The shareholders* are liable to the following : (a) a progressive tax on net income from any source, including the dividends received ; (b) a progressive tax on capital, including the commercial value of shares ; (c) a tax on excess profits computed on the basis of the relationship between net income and capital, in accordance with the tariff indicated above.

Thus, discrimination is exercised only against the company, since for the partners or shareholders in their capacity as natural persons the system is the same. Such discrimination takes the following form : while the corporation or the "commandite" share company has to pay a progressive rate on net income, a progressive tax on capital and yet another on excess profits, the partnership pays only a 3-per-cent tax on net income.

3. *Recent reforms in the company-tax system and their probable effect on capital formation*

An income tax reform introduced in 1953 amended some of the more important provisions of the system previously in force. It is of interest to analyse, albeit briefly, the possible effects of this reform on capital formation and, in particular, its incidence on corporations.

The first aspect to be stressed is the progress achieved with respect to the allowances made when calculating net income. Allowances for depreciation became much more flexible and adaptable to real conditions in Colombia. The introduction of the concept of accelerated depreciation resulting from the intensive use of equipment, from the probable shortening of useful life and from uselessness due to such factors and circumstances as obsolescence, is a step of great importance for the future policy of enterprises. The taxpayer can apply to the *Dirección de Rentas* requesting reasonable increases in specific depreciation aliquots for the amortization of the cost of such property as can be proved likely, for sound and obvious reasons, to be shelved in whole or in part before the expiry of its probable useful life. Again, accelerated depreciation rates can be authorized when the goods concerned are used for more than ten hours daily. The 1953 reform also represents an advance inasmuch as it recognizes amortization of regular and necessary investment for the purposes of the enterprise, a definition which covers mainly deferred payments and the amortization of investment in intangible assets. From other standpoints, the recent reform perfects and defines with greater precision the regulations relating to allowances for wastage, for bad debts or debts difficult to recover, and for remunerations. It may be asserted that on the whole the changes with respect to allowances are aimed at safeguarding the capital of enterprises.

From yet another point of view, however, the results of the new tax régime do not seem quite so clear, especially as regards corporation tax.

It has already been pointed out that under the earlier system there was a progressive scale for taxation both on the profits and on the capital of companies, but the

progressive rate was not applied to dividends paid to shareholders in their capacity as natural persons. Partnerships, on the other hand, were not taxed as such, but only a rate proportional to net income, and the progressive scale was applied to their members individually. In practice this implied discrimination against corporations, for whereas in their case the burden fell on the total amount of profits and capital, in partnerships these two elements were divided among the partners and consequently the tax affected them at a lower level of the progressive tariff. Under the 1953 reform, the taxable incomes of natural persons were increased by the incorporation of their dividends and the capital they possessed in corporations, while there was no change in the company-tax system previously in force. Consequently, commercial and industrial income received by the taxpayer is now accorded the same treatment, whether it comes from corporations or from partnerships (limited liability companies). On the other hand, while the corporation (or the "commandite" share company) has to pay a progressive tax on net income, a progressive tax on capital and an excess profits tax, the partnership pays only a 3-per-cent tax on net income.

Such discrimination may have an adverse effect from the standpoint of the financing of new industrial establishments. Where a person is desirous of making investments and has a choice of several similar alternatives, he will probably select the one which does not bear the character of a corporation, and if he does so it may happen that the financing difficulties will be greater, as regards both the possibility or recourse to the banks and the mobilization of private savings.

As far as attracting foreign capital is concerned, it may be that the existing system does not provide the best inducements, since it is the corporation that offers the safest guarantees, both as regards facilitating the association of domestic capital and with respect to the security of the investor, organizations of this type being under the official control of the appropriate department (*superintendencia*).

Another aspect to be considered is the effect of the tax system on the growth of enterprises. The essential point in this connexion is that with the establishment of a progressive tax on the absolute total of profits, the larger-scale enterprise is more heavily taxed, whatever may be its rate of profitability in relation to the capital invested.

It may well be asked how this situation might affect entrepreneurs' decisions as to the dimensions of new enterprises, and whether there is not a danger that anti-economic units may be created or that development may be slowed down in branches of production whose technical characteristics are such as to make large-scale investment essential. Certain questions also arise as to the effect of the new provisions on reinvestment of profits and on the extent to which small savers invest in the shares of large companies.

The system of progressive company tax has special consequences for industry, the reason being that for the development of this sector the type of organization generally preferred is the corporation, which is not the

case in agriculture or commerce, where individual enterprise or partnerships are the rule. Furthermore, industry is faced with greater difficulties inasmuch as the equipment for certain production lines must be purchased in large units, with the resultant need for heavy capital investment.

The foregoing observations are apparently confirmed by events in Colombia since the 1953 reform. According to published information, not only has there been less investment in the establishment of new corporations and in increasing the capital of those already in existence, but many companies of this type have been converted into limited liability companies. In the first half of 1953, before the reform, corporations with a total capital of 21 million pesos, 19 million of which represented liquidations, were removed from the register. In the second half of the same year, the capital of dissolved companies amounted to 30 million, but this time 21 million derived from their transformation into limited liability companies. In the first six months of 1954, the aggregate capital of liquidated corporations amounted to 103 million pesos, of which 95 million represented conversions to partnerships.

4. *Tax policy measures for the channelling of investment*

Apart from the general effect of tax policy on the volume and composition of domestic investment, the tax instrument can be utilized to stimulate the more selective channelling of resources towards given lines of economic activity.

Since 1940, the Colombian Government has adopted diverse measures to provide incentives to investment and promote compulsory reinvestment of private resources for specific purposes of economic development. This policy has assumed a variety of forms, among which special mention may be made of the following: (a) tax exemptions to attract resources towards specific branches of the economy; (b) general incentives to the installation of new industries; (c) exemptions to encourage investment in under-developed geographic areas; and (d) compulsory investment in public debt bonds or securities representing specific projects for basic social works.

In 1940 an attempt was made, for the first time in Colombia, to plan an integrated programme for the development of agriculture and manufacturing. This programme covered all those industries engaged in the preliminary transforming of domestic raw materials which were defined as basic, and which private enterprise and capital were not in a position to develop satisfactorily.³⁸

The tax incentive consisted in exemption from payment of the tax on capital over a term of five years, provided that the Institute of Industrial Development or the central Government has subscribed 20 per cent

³⁸ Decree 1439, promulgated in 1940, listed the following as basic industries: the iron and steel and metallurgical industries, coal mining, manufacturing of soda and similar products, the sulphuric acid, carbon bisulphide and fertilizers industries, etc.

of the capital of the enterprise. This condition was not enforced in the case of certain enterprises engaging in lines of production not hitherto undertaken in the country, of which a hard-and-fast list was drawn up.³⁹

The programme of tax incentives also included total exemption from direct and indirect taxation for enterprises set up under the aforesaid development programme in areas not incorporated into the national economy on account of their climate, insalubrity or lack of means of communication.

This exemption programme, however, had no very encouraging results, as only two industries — that of sulphuric acid and that of carbon bisulphide — took advantage of it. The scant efficacy of the measures adopted is partly explained by the limited nature of the exemption, since the incidence of the tax on capital was not heavy, as it was in the case of the income and excess profits taxes; again, these provisions were established in wartime, when import restrictions hampered the development of investments in which the coefficient of imported capital goods was high, as was true of most of the industries listed in the manufacturing programme. Similarly, the expansionist monetary conditions tended to attract available resources towards investments of a financial or merely speculative character which guaranteed a higher and more reliable rate of profit.

In 1948, tax policy made a fresh endeavour to channel resources towards capital formation by means of exemptions. Special legislation was passed to attract investment to the Paz del Río steel making industry and to enterprises producing iron from ores mined in the country.⁴⁰ The legislation in question is valid for twenty years. In the same year a more general policy was also tried out, with a view to encouraging the development of the industrial sector by exempting any newly-established industry different from those already existing in Colombia from 75 per cent of all national taxation, for a period of 10 years.⁴¹

In 1953 the programme of incentives to the development of the iron and steel making and transforming industries was supplemented by measures designed to promote the creation of enterprises using as raw material 80 per cent of domestically-produced iron, over a period of ten years. Clearly, this represented an attempt to establish an internal market for the products of the Paz del Río industry, which was just entering into operation.⁴²

Lastly, mention must be made of the tax inducement to private investment in the development of the electric energy sector. The exemption was applied to both new and established enterprises, and extended to them the

³⁹ The first industries installed for production of sulphuric acid, carbon bisulphide, pulp, etc.

⁴⁰ This exemption comprised all national, departmental and municipal taxes, including duties on imports of equipment and other elements. Dividends were exempted up to 8 per cent of the nominal value of the shares *per annum*.

⁴¹ Excluding the excess profits tax.

⁴² This exemption has been in force since 1954, and covers the taxes on income, capital and excess profits, as well as customs duties.

same tax treatment as is accorded to the official electric energy enterprises.⁴³

Broadly speaking, it may be contended that Colombia's tax policy as reflected in exemptions has been relatively successful only as far as the encouragement of development in specific lines is concerned. This applies especially to steel making, for which the legislation in force is fairly liberal and flexible in the case of industries utilizing Paz del Río products.

With respect to the efficacy of the more general measures to promote the installation of new industries in Colombia, the existing provisions seem ill-adapted to an economic development policy with this aim, for two basic reasons. In the first place the concept of the term new industry is too narrow, since it is applied only to enterprises making articles different from those produced by other domestic undertakings. Thus, although additional capital is needed in many lines of production, the mere fact that an enterprise already exists in the country prevents tax exemption from acting as an inducement. On the other hand, for certain less essential branches of production not yet undertaken in the country, tax exemption does represent a stimulus. The other reason why the sphere of action of existing legislation is limited relates to the principle that exemption must benefit only those industries utilizing domestically-produced raw materials. Obviously, the aim of this provision — to stimulate demand and thereby provide incentives for the domestic raw materials industries — is highly desirable in a development policy. Nevertheless, the requisite that nothing but domestic raw materials should be utilized seems too inflexible, as a more elastic proportion might well be stipulated, according to sectorial supply requirements. Moreover, it would also seem advisable for any programme of tax exemptions to take into account the needs deriving from the future development of import substitution industries, especially those producing raw materials.

Apart from the policy of tax exemptions, another interesting experiment in Colombia was that relating to the use of taxes mainly as instruments for the compulsory mobilization of private savings, with a view to financing official institutions or enterprises in the national interest.

During the war, a super-tax was levied for the first time to draw in private savings. On paying his tax, the taxpayer received public debt bonds, the product of which was used during the war years for financing the budget. After the war a similar method was adopted to finance the Territorial Credit Institute and the Paz del Río steel works. A 5-per-cent surcharge was levied on surplus net taxable income of 10,000 pesos and upwards; taxpayers who, when this surcharge became due, showed proof that they had bought shares in the entities mentioned were thereupon exempted from it. If such proof were not presented, the right to subscribe shares was withdrawn and the surcharge was reckoned as a tax by default. At the present time, the only provision in force is that benefiting the Paz del Río enterprise, and

as from 1956 the surcharge will be 4 per cent of the excess over 10,000 pesos.

The results yielded by this compulsory mechanism for financing through the tax instrument are shown in table 76.

TABLE 76. COLOMBIA: RESULTS OF THE COMPULSORY INVESTMENT MECHANISM DURING THE POST-WAR PERIOD

(Millions of pesos)

Year	Instituto de Crédito Territorial bonds	Paz del Río shares
1947	10.6	—
1948	13.4	—
1949	16.8	—
1950	10.0	10.0
1951	12.8	12.8
1952	13.0	13.0
1953	—	21.3

SOURCE: Fiscal and administrative statistics.

Recently, the Colombian Government issued new decrees with respect to compulsory investment through the tax system. Since 1956, corporations and "commandite" share companies have been exempt from the supplementary tax on capital, provided that they subscribe bonds for a sum equal to the amount that they would have had to pay under the tax in question.⁴⁴

5. The customs tariff as a protective device

Tariff policy as an instrument for the protection of domestic production, as has been shown, had gradually lost its efficacy during the first twenty years it was in force, owing to the specific character of the 1931 tariff. The year 1950 brought substantial reforms designed, on the one hand, to impart flexibility to the tariff system and, on the other, to increase public funds. To this end a double tariff on weight and value was established, which varied according to the different commodities.

A further aim of this policy was to make the tariff system the instrument for protecting internal economic development in such a way that the exchange controls then operative might be gradually eliminated. In this case influence was manifestly exerted by the incipient boom in Colombia's foreign trade, through the improvement in the terms of trade. It is no easy matter to assess how far the new tariff system was adapted to the development requirements of Colombian industry, but it may in any case be asserted that the average degree of protection improved, rising from its 1945 figure of 8.3 per cent to 21.9 per cent in 1951.

The Colombian customs tariff was conceived with intent to foster the import substitution process in respect to consumer goods. On the other hand, the protection

⁴³ Including the tax on capital and the national taxes not paid by government enterprises, as well as customs duties. The duration of this exemption is indefinite.

⁴⁴ With reference to bonds to be issued by the recently-created National Public Utilities Corporation (*Corporación Nacional de Servicios Públicos*).

afforded to the domestic production of intermediate and capital goods is relatively slight, as can be seen in table 77.

TABLE 77. COLOMBIA : DEGREES OF CUSTOMS PROTECTION, BY TYPES OF GOODS, 1951

	<i>Degree of protection (As a percentage of imports)</i>
Non-durable consumer goods	57.1
Durable consumer goods	34.0
Raw materials	24.0
Building materials	17.1
Capital goods	6.0

SOURCE : ECLA, on the basis of a sample of 75 per cent of imports.

It might be asked whether fiscal policy, faced with the need to adapt the tariff to an economic development programme, will not require careful revision so that the tariffs—especially those on intermediate products—may be adjusted to levels which will stimulate the development of domestic industries in this group. Much the same might be said with respect to activities producing capital goods, in particular certain branches capable of short-term development, such as specific types of metallurgical industries.⁴⁵

TABLE 78. COLOMBIA : INCIDENCE OF CUSTOMS DUTIES BY ECONOMIC SECTORS, 1952

	<i>Thousands of pesos</i>	<i>As a percentage of total</i>
Agriculture	501	0.3
Industry	89,288	51.3
Services	1,103	0.6
Transport	10,173	5.9
Consumers	61,000	35.0
Unspecified	11,975	6.9
TOTAL	174,040	100.0

SOURCE : ECLA.

Consideration of the influence of the tariff, no longer from the point of view of import substitution, but from that of its incidence by sectors of activity, leads to the conclusion that in practice most of the imported raw materials and capital goods consumed by the agricultural sector are exempt from taxation ; in contrast, more than 50 per cent of the customs duties may be reckoned as falling on the industrial sector. The incidence of the tariff on consumers, through taxes applied to final consumer goods, represents 35 per cent of total customs revenue (see table 78).

⁴⁵ See Part Two of the present study, chapter III, for a more detailed study of this problem.

V. THE EXCHANGE SYSTEM AS AN INSTRUMENT OF DEVELOPMENT POLICY

1. *Modifications in the exchange system since 1931*

Exchange controls were established in 1931 with the aim of restoring equilibrium in the balance of payments. They have, however, played a much more extensive role in Colombia's economic development, inasmuch as they became a powerful instrument of governmental economic policy to promote and stabilize industrial development after the world depression of the 'thirties.

The exchange system prevailing during the years following the depression was characterized by the introduction of a strict régime of export and import licensing. Furthermore, the Colombian peso was devaluated by 75 per cent, falling from a dollar parity rate of 1.03 in 1932 to 1.75 in 1938 ;⁴⁶ this official level remained unchanged until after the war.

In 1940, the problems which the war had brought in its train led to the adoption of various foreign trade measures. As regards imports, the single exchange rate was replaced by a system of preferential rates. The aim, on the one hand, was to encourage imports of those goods and raw materials which were essential for the normal functioning of Colombia's economy and for the maintenance of the standard of living of the population ; and, on the other hand, to restrict, by means of a higher exchange rate, imports of luxury goods or of those which could be domestically produced if existing equipment were more intensively utilized.⁴⁷

In 1944, the system of differential rates was suspended and the single dollar parity rate of 1.75 was re-established for all imports.

From the end of 1947 onwards, in consequence of the very heavy pressure on imports involved in the renewal of international trade, it was necessary to adopt a series of measures designed to control the disequilibrium in the balance of payments, which in 1947 and 1948 resulted in the reduction of monetary reserves by more than 90 million dollars. The outcome of these measures was a stricter exchange system, which remained in force until 1951. The official exchange rate of 1.75 was devalued to 1.95, while at the same time differential rates were established for both exports and imports.⁴⁸ Import quotas were also introduced, so as to make the controls

⁴⁶ In 1932, the exchange rate rose from 1.03 to 1.05 ; during 1933 it went up to 1.16, to 1.26 and to 1.50 ; in 1934 it reached 1.55 and in 1935 1.60 ; in the years 1936 and 1937 a rate of 1.742 was in force ; and finally, in 1938, the rate was stabilized at 1.75.

⁴⁷ Four categories were established : the first, that of essential goods and raw materials, 1.75 ; the second, 1.79 ; the third, 1.87 ; and the fourth, 1.95.

⁴⁸ Two rates of exchange were in force for exports. The official rate, applicable to exports in general, stood at 1.95 pesos to the dollar, while the exchange certificate rate for gold and certain agricultural commodities fluctuated between 2.50 and 3.90. For the sale of foreign exchange there was a market operating at the official rate of 1.95, but in practice differential fixed rates existed, since a variable stamp duty surcharge was applied, in accordance with the nature of the goods. Exchange certificates with fluctuating rates were used to cover payments for certain luxury goods, as well as some transfers of capital.

more selective. Goods were divided into categories according to their importance for Colombia's economy.

At the end of the first quarter of 1951, the improvement in the terms of trade, and, consequently, in the foreign trade situation, permitted the introduction of new and substantial modifications in the exchange régime. With respect to imports and exports, a more liberal policy was adopted, since quotas were abolished and a free import system was established, excluding only a list of prohibited goods. To these reforms was added that of the customs tariff, which assumed a more strongly protectionist character and was envisaged as the normal instrument for the protection of domestic industry. The official exchange rate was devaluated from 1.95 to 2.50 Colombian pesos to the dollar. Nevertheless, the system of preferential exchange rates still remained in force, although it showed features somewhat different from those it had displayed up to 1951.⁴⁹ This exchange régime, based on the boom in foreign trade, underwent considerable modification in 1955, owing to a reduction in foreign exchange income as from mid-1954, after the fall in world coffee prices. A system for the strict control of imports was set up, goods purchased abroad being divided into six categories, according to how essential they were, with surcharges on the official exchange rate ranging from 3 to 100 per cent. In the case of exports, the coffee differential was abolished, and a uniform rate of 2.50 pesos to the dollar was established for coffee exports. For certain agricultural commodities and industrial products the system of export invoices was maintained, giving rise to a higher rate of exchange.

2. Effects of exchange policy

Without any attempt at a complete analysis of the consequences of the exchange policy, an endeavour will now be made to examine its effects upon exports, on balance-of-payments equilibrium, on the expansion of domestic investment and on the structure of imports.

(a) Promotion and stability of exports

The successive devaluations of the Colombian peso from 1932 until the stabilization of the exchange rate in 1938 were partly aimed at checking the decline in exports and thus maintaining the capacity to import.

This policy of encouraging exports was focused essentially on coffee. In 1932, in addition to the devaluation of the currency from 1.05 to 1.13 pesos to the dollar, an export premium of 10 per cent of the parity value of all receipts from coffee exports was established. Early in 1933, when the premium was suspended, this incentive was replaced by a further devaluation, which brought

⁴⁹ For coffee exports a mixed rate of exchange was in force, as a major part had to be sold at the old parity rate of 1.95 and the remainder at the official rate of 2.50. The latter proportion progressively increased. In 1953 this rate of exchange was stabilized, an average coffee rate of 2.38 resulting. For other exports the official rate of 2.50 was valid, except for those covered by the system of exchange certificates or export invoices, where the level fluctuated but was in general higher. For imports, the rate of 2.50 was established as a general rule, although for some goods and services a stamp duty surcharge was levied according to the nature of the commodity.

the exchange rate to 1.23. In the years that followed, up to 1938, devaluation reached proportions as great as 75 per cent. These exchange measures coincided with a recovery in the volume of coffee exports. In 1934, 3.1 million 60-kilogramme sacks of coffee were exported; in 1936 this volume increased to 3.9 million, and in 1938 a figure as high as 4.2 million was attained. Such a recovery in coffee exports, alongside the policy of exchange devaluation, was of great importance in checking the decline in income from coffee and preventing a contraction of domestic demand (see table 79).

TABLE 79. COLOMBIA : COFFEE INCOME AND EXPORTS, 1933-38

Year	Coffee income (Millions of pesos)	Exports (Millions of 60-kilogramme bags)
1933	48.1	3.2
1934	83.7	3.1
1935	79.3	3.7
1936	90.6	3.9
1937	97.0	4.0
1938	97.1	4.2

SOURCE : *Revista de Economía Cafetera*.

It should be noted, however, that the improvement in the volume of coffee exports was also partly due to the recovery and expansion of world coffee consumption during the years following the depression. World market prices, on the other hand, did not act as an incentive.

After this stage, an exchange policy affecting the export sector was developed only in the post-war period. In the interval, the official rate was established at 1.75 pesos to the dollar, and the problems created for Colombia by the coffee quotas pact were successfully solved through the establishment of the National Coffee Fund (*Fondo Nacional del Café*), which purchased exportable surpluses.

From 1948 onwards, exchange policy began to be used as a means of encouraging certain exports other than coffee, and also to promote the formation of savings. For exports of gold and some agricultural and industrial commodities — *inter alia*, rice, maize, cotton textiles and cement — a subsidy exchange rate was fixed through mining exchange certificates and export invoices. In the case of gold, however, there was apparently no substantial change in the output.⁵⁰ With respect to agricultural and industrial items, while the desirability of such a policy is not overlooked, it must be mentioned that, as a general rule, the effects are more positive when measures relating to exports are accompanied by others aimed at guaranteeing domestic supplies and an expansion of production.

With respect to coffee, exchange policy was directed towards mobilizing part of the income increment accruing from high prices for purposes of financing the public

⁵⁰ In 1946, before the establishment of the subsidy rate, the output of gold amounted to 437,176 troy ounces, as against 436,044 in 1953.

sector or for investment in agricultural development. To this end, a rate of exchange lower than the official parity rate was established, giving rise to what has been termed the "coffee differential".⁵¹ In 1955, in view of the fall in coffee prices, the differential was suspended and the *Federación de Cafeteros* established minimum purchase prices for producers.

(b) *Exchange policy and incentives to investment*

One of the usual consequences of exchange controls, when imports are suspended or restricted, is the stimulation of investment in those sectors where import substitution is possible. Ever since the depression, Colombia has been developing a substantial nucleus of transforming industries. It has already been explained that exchange measures served as a means of encouragement in face of the decline in the protectionist capacity of the tariff. It was mainly to the development of industries replacing imports of consumer goods that exchange controls constituted an incentive, as is discussed in greater detail in other chapters of the present study.

During the war development of investment in import substitution lines was intensified. This evolution, however, was not entirely attributable to exchange controls, as import structure was largely determined by wartime restrictions on supplies.

During the first three years after the war, the level of imports, including imported consumer goods, was high. So great an inflow of imported commodities might have affected the competitive capacity of domestic industry, especially as the tariff had lost much of its efficacy as an instrument of protection. This did not occur, however, for a number of reasons. In the first place, the pressure on imports was heaviest in the case of demand for capital goods, because of the renewal and expansion requirements of enterprises which had accumulated monetary resources without being able to invest them because of the restrictions deriving from the war. Again, domestic consumption had increased, and the domestic consumer goods industries, especially textiles, were not seriously affected by the inflow of imported products. In 1948, balance-of-payments difficulties necessitated the intensification of exchange control methods. At that time import quotas were established, which once again benefited the import substitution process, especially where textiles were concerned, full advantage being taken of the expansion and renewal of equipment that had been carried out. By 1950, imports of textiles and ready-made clothing had dropped almost 50 per cent below their 1947 and 1948 levels; this reflects the magnitude of the import substitution process which had taken place in 1949 and 1950.

In recent years, as from 1951, a more liberal exchange system has meant that such controls have not played a predominant part in determining the structure of imports; but considerable influence has been exerted by the tariff system introduced in 1950.

⁵¹ Of the whole coffee differential, 30 per cent was absorbed by the budget and 70 per cent by the *Federación de Cafeteros*, which was obliged to use part of these receipts to underwrite shares in the *Caja Agraria*.

(c) *The coefficient of capital goods imports*

The role of exchange controls in the channelling of foreign exchange resources towards imports of capital goods has been very important in Colombia.

After controls were established in 1931, the coefficient of capital goods imports increased substantially. As was pointed out in earlier chapters, it rose from 25.2 per cent in 1934 to an average of 28.3 in 1935-40. Wartime restrictions caused it to fall sharply, to 17.8 per cent. In 1946 and 1947, when no additional emphasis was laid on exchange controls, capital goods imports came to represent a high proportion of total resources (34.8 per cent on an average). The explanation lies in equipment and machinery replacement needs, especially in the case of those enterprises which, thanks to import restrictions, had earned large profits during the war. The high coefficient of capital goods imports during the two years immediately after the war cannot therefore be attributed to the efficacy of exchange controls. Nevertheless, as from 1948, in which year the import quota system was established on account of the marked shortage of foreign exchange, the coefficient in question remained at a high level, which seems to imply that, despite the scarcity of foreign currency, exchange controls fostered the maintenance of a high rate of domestic investment. The average coefficient for capital goods imports thus reached 36.6 per cent during the period 1948-50.

From 1951 to 1953, under a free import system and conditions in which foreign exchange was plentiful, the capital goods imports coefficient still represented a large proportion of the aggregate, owing to the considerable expansion of investment during this period.

(d) *Exchange policy and equilibrium in the balance of payments*

In any event, the ultimate aim of exchange controls was to bring the demand for foreign exchange into line with the supply. The degree of severity of the controls, as well as the methods employed, have varied since the introduction of the system in 1931, and in 1951-54 there was even a relatively free import régime.

TABLE 80. COLOMBIA : FOREIGN EXCHANGE RESERVES, 1929-52

Year	Millions of dollars	Year	Millions of dollars
1929	47.8	1941	24.7
1930	35.8	1942	64.3
1931	17.3	1943	115.6
1932	19.6	1944	162.4
1933	18.4	1945	181.4
1934	16.1	1946	181.8
1935	21.6	1947	115.8
1936	28.2	1948	90.6
1937	21.6	1949	113.2
1938	28.0	1950	101.6
1939	26.4	1951	128.3
1940	27.2	1952	157.5

SOURCE : *Banco de la República* and *Superintendencia de Bancos*.

The efficacy of exchange policy as an instrument for stabilizing the balance of payments may be assessed through the movements of international reserves (see table 80).

To judge from the statistics given, exchange controls exerted a positive influence during the depression, by checking the decline in monetary reserves from 1931 onwards, as well as after the abrupt drop in 1947 and 1948. In subsequent years the balance between demand for foreign exchange and availabilities was successfully maintained, since in the period 1935-40 the level of monetary reserves remained constant, except for slight fluctuations. Wartime supply restrictions brought about a striking increase in the reserves, which rose from 27.2 million dollars in 1940 to 181.4 million in 1945, a movement that constituted the chief determinant of monetary expansion between these two years. A different degree of intensity was registered in exchange control policy after the war. Between the end of the war and 1948, a slackening of controls on the one hand and a very large volume of deferred demand on the other caused a sharp drop in monetary reserves, which fell from their 1945 level of 181.4 million dollars to 90.6 million in 1948. The measures decreed in 1948, by imposing strict controls, enabled a slight increment in the reserves to be accumulated in 1949, despite foreign exchange difficulties. In 1950, however, reserves decreased again, this time by 12 million dollars. As from 1951, under a very liberal import régime, monetary reserves substantially increased. This cannot be interpreted as a consequence of the new exchange system introduced in 1951, since it was essentially the outcome of the very large inflow of foreign exchange deriving from the improvement in coffee prices. There was a time-lag in the adjustment of imports to this situation, despite the Government's endeavours to encourage purchases abroad and thus prevent the resultant rise in prices.

(e) *Some remarks on the present exchange system*

At the present time Colombia is confronted with the need to adjust its imports to real availabilities of foreign exchange. Such an adjustment has become necessary in consequence of the fall in coffee prices, which gradually declined from a peak of 90 dollar cents per pound during the first half of 1954 to a level of only 60 cents in mid-1955. The strict import control measures adopted constitute a short-term emergency expedient to bring the demand for imported goods into line with foreign exchange income.

Imports have been divided into six basic groups, with a stamp duty surcharge fluctuating between 3 and 100 per cent, according to category, and prior deposits, in proportions also varying according to the imports concerned, have been made compulsory. The primary aim of the programme for the reduction of imports has been to distribute foreign exchange resources on a selective basis, priority being given to the satisfaction of domestic industry's requirements of intermediate products, to the meeting of demand for consumer goods, and to capital goods supplies.

The abolition of the coffee differential, the establishment of minimum purchase prices for coffee and the

suppression of tariff exemptions for official imports likewise constitute measures which, taken in conjunction with the severe exchange controls, are designed to restrict the demand for foreign exchange and to maintain the level of employment and income in the export sector. Moreover, the current restrictive policy is supplemented by the establishment of barter or clearing arrangements for certain categories of goods. It should be emphasized, however, that present-day policy must be interpreted as an emergency procedure. No claim is made that the measures adopted will solve the long-term problems of Colombia's economic development, such as the promotion of domestic production of intermediate and some capital goods. In all likelihood, as the objectives of a development programme gradually become more clearly defined, exchange policy will have to adapt itself to the more far-reaching aims of economic policy.

VI. ROLE OF OFFICIAL CREDIT AND DEVELOPMENT INSTITUTIONS IN ECONOMIC DEVELOPMENT

The establishment of governmental credit agencies began in Colombia in 1924 with the creation of the *Banco Agrícola Hipotecario*. But it was not until after the start of the depression that government action through the medium of autonomous credit and development institutions acquired real importance. An attempt was made in this way to create stimuli and provide financial instruments for the mobilization of the economy's internal resources, as well as to counter the weakness of the export sector and the cessation of the flow of capital from abroad. New institutions were subsequently formed which at the present time cover various sectors of economic activity. They reflect a growing awareness of the need to foster certain activities calculated to expedite economic development, and of the advisability of carrying out specific operations in these fields, to some extent independently of the organization and forms of procedure of the regular executive organs.

1. *Institutions for agricultural development*

The official autonomous bodies concerned with agricultural development are the *Caja de Crédito Agrario, Industrial y Minero*, the *Banco Agrícola Hipotecario*, the *Instituto de Colonización e Inmigración*, the *Instituto de Fomento Algodonero*, the *Corporación de Defensa de Productos Agrícolas*, the *Fondo Nacional del Café* and the *Banco Cafetero*.

Until 1940, the fundamental purpose served by the agricultural institutions was that of granting credits to farmers. During and after the war, many institutions were set up to fulfil new functions in relation with the supply of agricultural products, minimum prices, development of new crops, the provision of fertilizers and machinery, etc.

The most important of the bodies listed is the *Caja de Crédito Agrario, Industrial y Minero*, which dates from 1931, and whose operations represent 50 per cent of the credit granted by the official institutions. Its basic functions are short-, medium- and long-term credit operations ;

TABLE 81. COLOMBIA : BREAK-DOWN OF OFFICIAL CREDIT

(Millions of pesos at 1950 prices)

Year	Agriculture	Livestock production	Total	Trade	Industry	Mining	Construction	Official institutions	Miscellaneous	Grand Total
1937	49.6	25.4	75.0	—	2.5	—	18.0	—	—	95.5
1938	45.4	36.4	81.8	—	2.8	—	19.7	—	—	104.3
1939	44.9	40.9	85.8	—	2.4	—	13.9	—	—	102.1
1940	47.8	42.8	90.6	—	1.5	—	13.5	—	—	105.6
1941	52.6	55.1	107.7	—	2.9	—	14.7	—	—	125.3
1942	40.5	51.8	92.2	—	2.3	—	11.8	—	—	106.4
1943	35.1	42.2	77.3	—	1.2	—	10.6	—	—	89.1
1944	45.6	59.3	104.9	—	1.7	—	13.5	—	—	120.1
1945	47.0	48.1	95.1	—	0.9	—	20.9	—	—	116.9
1946	55.5	50.6	106.1	—	0.6	—	22.0	—	—	128.7
1947	70.9	58.4	129.3	—	0.5	—	30.3	—	—	160.1
1948	73.3	55.4	128.7	—	0.5	—	18.7	—	—	147.9
1949	76.8	51.6	128.4	—	2.6	—	12.4	—	—	143.4
1950	87.1	64.4	151.5	—	3.1	—	21.0	—	—	175.6
1951	—	—	168.0	1.1	5.7	—	20.6	—	—	195.4
1952	—	—	234.5	18.0	23.4	—	31.4	—	—	307.3

SOURCE : *Anuario General de Estadística and Informe Anual de la Superintendencia Bancaria.*

the supplying of farmers with agricultural machinery, fertilizers and implements, as well as the provision of technical assistance in their use ; and the promotion of certain agricultural development works, especially irrigation projects. The *Banco Agrícola Hipotecario*, whose primary function is to issue long-term loans, but whose operations have been practically at a standstill for several years, is administered by the *Caja Agraria*.

The aim of the *Instituto de Colonización e Inmigración*, founded in 1948, is the settling of waste land and the apportioning of farms or plots in immigration areas.

The *Instituto de Fomento Algodonero* was established in 1947, as a private corporation, by a group of individual entrepreneurs connected with the textile industry, with the aim of promoting the production of cotton. In 1948, however, by agreement with the Government, it was given a semi-official character. Its main functions are concerned with scientific research on the most suitable techniques for cotton-growing, the establishment of experimental plantations, seed selection, soil analysis and all other aspects of the development of this crop.

The *Corporación de Defensa de Productos Agrícolas* was created in 1944 to cope with wartime supply problems. Today its sole function is to guarantee farmers minimum prices for specific products — rice, maize, wheat, potatoes and beans — and to regulate the supply of these by means of sales or imports, as domestic market conditions dictate.

The *Fondo Nacional del Café* was set up in 1940 to tackle the problem of coffee production surpluses resulting from Colombia's accession to the coffee quotas agreement. Its basic purpose is the regulation of the coffee market through the purchase and storage of coffee at times when prices are low, for sale when market conditions improve. This fund is administered by the

Federación de Cafeteros, an association of coffee-planters which, by agreement with the Government, discharges various development functions in the coffee economy, its financial resources being provided by certain taxes established for its benefit.

The *Banco Cafetero* came into being in 1953, with a capital of 50 million pesos. Although the whole of this capital was subscribed by the *Federación de Cafeteros*, the Bank nowadays carries on all the activities proper to a private establishment ; the fact that it was established by legislation, and the semi-official character of the *Federación de Cafeteros*, cause it to be regarded as one of the public institutions. Its chief objectives are the encouragement of coffee-planting and the financing of works likely to benefit economic development.

Credit for agricultural and livestock production has constituted the most important of the Government's credit and development activities. As can be seen in table 81, since 1937 no less than 76 per cent of official credit has been granted to this sector. This does not imply that private credit has been lacking ; on the contrary, it has given evidence, especially since 1941, of steady and uninterrupted growth, its volume of operations in many years exceeding that of the official institutions.

Governmental credit aims particularly at financing the medium- and small-scale farmer. Its operations have been essentially of a short-term character, to cover supplies and harvesting, although in the post-war years medium- and long-term credit developed to a marked extent. The two recipients of the greatest benefits have been coffee and stock farming, although loans have been granted for many other activities. For coffee production, in particular, the organization of agricultural credit has attained a high degree of efficiency. Since credit is primarily based on the pledge system, the development of general warehouses is of great importance to the entire

scheme. Since 1929, the *Federación de Cafeteros* has been gradually setting up a network of such warehouses throughout the whole country, enabling the coffee to be deposited and the so-called "pledge bond" issued. This is a negotiable document which may be discounted at any bank and in some instances by the Federation itself. In the case of other products, the development of similar general warehouses is still in its initial stages.

Broadly speaking, the *Caja de Crédito Agrario* has made a great effort to render credit more easily and widely obtainable and to perfect banking methods and techniques. In 1954 this institution had 190 agencies scattered throughout the country. From 1940 onwards special types of credit were developed, adapted to the needs of agriculture, and substantial progress was made with respect to guarantees. The systems of over-all and open agricultural pledges, open mortgages, state-guaranteed credits and loans without prior valuation were established; in recent years there has also been a tendency to develop credit on the basis of personal guarantees. In addition, to facilitate operations, an attempt has been made to speed up the legal procedure for the constitution of the agricultural pledge. It is worthy of mention that the *Caja's* losses have never exceeded 1 per cent of its total portfolio.

Apart from the credit instrument, the Government encourages agriculture by means of other development activities. A noteworthy case in point is the *Instituto de Fomento Algodonero*, thanks to which production was raised from 5.8 million kilogrammes in 1948 to 25 million in 1954. Various methods have also been employed to promote the use of agricultural and irrigation machinery, to which end the International Bank for Reconstruction and Development granted two loans of 5 million dollars each to the *Caja de Crédito Agrario*. At the same time steps have been taken to stimulate production of wheat, barley, rubber, etc.

2. Institutions for the development of industry and energy

The official autonomous bodies designed to promote development in these sectors are the *Instituto de Fomento Industrial*, the *Banco Popular* and the *Instituto de Aprovechamiento de Aguas y Fomento Eléctrico*.

As from the outbreak of the war, the Colombian authorities devoted greater attention to encouraging and promoting the development of industry and energy. Even earlier, from 1932 onwards, an industrial credits section had existed in the *Caja de Crédito*, and in 1937 an attempt had been made to use the *Banco Central Hipotecario* for the same purpose. In 1940, the Government prepared a development programme for the manufacturing and agricultural sectors, and, to meet the needs of the former, the *Instituto de Fomento Industrial* was set up. Despite inadequate resources, this Institute has played a prominent part in the installation of various industries, outstanding among which are the *Acerías de Paz del Río*, the *Industria Colombiana de Llantas*, the *Planta Colombiana de Soda* and other metallurgical, glass and foodstuffs industries. From the time of its foundation up to 1952, the *Instituto* had participated in enterprises

with a total paid-up capital of 24.3 million pesos, of which it had itself contributed 46.6 per cent.⁵²

It would seem that the greatest lacuna in industrial policy at the present time is the want of an appropriate credit mechanism for the manufacturing sector. The economic requirements of industry are not confined to the financing of production and the storage of raw materials; even more important is medium- and long-term credit for the expansion of enterprises. The insignificance of the contribution made by official institutions to industrial credit can be judged from the figures in table 81 above. The proportion of total official loans represented by those granted to industry has never exceeded 3 per cent, except in 1952, when such credits increased, mainly as a result of the activities of the *Banco Popular*.

This Bank was created in 1950 to provide loans for small-scale industrialists and artisan industry. Almost the whole of the capital is subscribed by the central Government and the departmental authorities. Loans are granted for terms of up to five years, on the basis of mortgages, pledges and personal guarantees. Hitherto, almost 50 per cent of these loans have been used to finance minor industrialists, and the remainder for small-scale businesses or for consumption, the motive apparently being a desire to increase deposits originating in the commercial sector.

Since 1950 the Government has tried to foster industrial credit through the commercial banks. Indeed, these latter have been authorized to invest up to 7.5 per cent of their deposits in loans to industry. Apparently, however, such operations have not developed satisfactorily, and the limit stipulated has not been reached.

With regard to the energy sector, the most important step taken by the Government was the creation, in 1946, of the *Instituto Nacional de Aprovechamiento de Aguas y Fomento Eléctrico*. As early as 1939, the *Instituto de Fomento Municipal* had begun to encourage construction of electricity plants, with very good results. Between 1940 and 1953, in fact, 90 such plants were established, mainly in Antioquia, Bolívar and Cundinamarca. This programme was not, strictly speaking, intended as a far-reaching solution for the whole country's problems, but simply as a means of remedying striking deficiencies. In contrast, the *Instituto de Aprovechamiento de Aguas* has a much more ambitious aim, since its purpose is to survey zones suitable for irrigation, drainage or electrification, and to carry out on its own account, or in co-operation with other entities, such projects as may be in the national interest. The most important of such projects currently under way are the Anchicaya hydroelectric power station, in the Cauca Valley, financed by the *Instituto* itself with the aid of a 3.5-million-dollar credit from the International Bank for Reconstruction and Development, and the Caldas and Lebrija hydroelectric power stations. Furthermore, the Institute helps to finance more than twenty companies which are carrying out various electric energy and water utilization projects.

⁵² See *Statistical Appendix*, table 43, for details of the various enterprises which the *Instituto de Fomento Industrial* has helped to set up.

3. *Institutions for the development of construction, housing and municipal works*

These purposes are served by the *Banco Central Hipotecario*, the *Instituto de Crédito Territorial*, the *Instituto de Fomento Municipal* and the *Banco Hipotecario Popular*.

The *Banco Central Hipotecario* was created in 1932, under the Government's anti-cyclical programme, to provide credits for construction, up to 50 per cent of the value of the guarantee. Its operations have always carried much weight, as can be seen from the fact that since 1950 its loans have amounted to over 100 million pesos annually.

The *Instituto de Crédito Territorial* was formed to promote the building of houses for the middle and lower income groups. In urban areas, it makes itself directly responsible for constructing low-cost residential centres, or grants credits in the form of cash and materials to the co-operatives concerned; the beneficiaries are then accepted by the *Instituto* as its direct debtors. Only in exceptional cases has it authorized individual credits for urban housing; in rural areas, on the other hand, such credit is granted, but the *Instituto* itself carries out the building work in accordance with its own plans and budgetary allocations.

The aim of the *Instituto de Fomento Municipal*, founded in 1940 under the title of *Fondo de Fomento Municipal*, is the construction of schools, aqueducts, sewerage, hospitals and electricity plants in the different municipalities. Between 1940 and 1953 it built 234 aqueducts, 183 sewerage systems, 90 electricity plants, 97 hospitals and 1,338 schools. The policy of the Institute is to make larger contributions to the financing of works in those municipalities which have fewer resources at their disposal. Despite all that has been done, the deficit with regard to municipal works is very great, since it is estimated that over 80 per cent of the municipalities have neither aqueducts nor sewers. As the assistance rendered by the Institute was virtually taking the form of subsidies to the municipalities, whereby its capacity for action was reduced, the *Fondo para Empréstitos Municipales* was established in 1954, and through this the Institute grants twenty-year loans to municipalities with a budget of less than 500,000 pesos.

The *Banco Hipotecario Popular* was set up in 1954 to grant workers and employees long-term loans on real estate. Most of its capital of 2.5 million pesos was contributed by the *Banco Popular*.

Among the credit activities of the Colombian Government, building loans rank next in importance to agricultural credits. In 1952 they absorbed 10.2 per cent of official loans, but there were other periods — 1937-38 and 1945-48 — when this proportion approached 20 per cent (see again table 81).

4. *Other official financing bodies*

Attention must lastly be drawn to two other institutions supplementary to the official credit and development mechanisms, namely, the *Caja Colombiana de Ahorros* and the *Fondo de Estabilización*.

The first, founded in 1932, has played and continues to play an outstanding part in the channelling of domestic savings towards investment. Almost the whole of its resources are subject to coercive regulations with this aim. Up to 1950, the savings accumulated by the *Caja* gave substantial support to the market for the public debt (national, departmental and municipal) securities. At the present time, its backing is still of great importance, although recent measures to enforce investment are tending to direct most of the increase in savings deposits towards residential building, through the purchase of bonds issued by the *Banco Central Hipotecario* and by the *Instituto de Crédito Territorial*. Stress must also be laid on the legislation which makes it compulsory for a proportion of savings deposits to be invested in industrial bonds of the Paz del Río steel works.

The *Fondo de Estabilización* is an official body. It was set up in 1937 to serve as a means of regulating the monetary and state bond markets, and intervenes in the sale and purchase of the latter documents so as to stabilize their prices. During the war it undertook the management of impounded foreign property.

In the exercise of its regulating functions the *Fondo de Estabilización* has been hampered by financial limitations. As from 1950, however, this body embarked upon a new activity which is steadily gaining in importance; it has begun to serve as a financial institution for the supply of credit to official and parastatal organizations.

The Fund is authorized to grant loans for terms of up to five years, at annual rates of interest not higher than 6 per cent, on condition that they be employed to finance economic development projects such as oil pipelines, refineries, transport equipment, hydroelectric power stations, etc.

Although the figures for its current investment are not available,⁵³ the assertion may safely be made that its financial backing is mainly given to electrification programmes, through the *Instituto de Fomento Eléctrico*, and to the Paz del Río steel works, through the purchase of bonds. The salient aspect of the financial mechanism of the *Fondo de Estabilización* is the source from which it obtains its funds for the supply of credit. In order to curtail imports, since 1950 the Government has been requiring importers to make prior deposits in the *Fondo de Estabilización*. The resources thus accumulated have been utilized by the body in question for its financial operations.

5. *The financing of autonomous credit and development institutions*

Serious problems arise in connexion with the financing of the official development and credit institutions, on account of the remarkable intensity with which they have developed. These entities may be said to have obtained their resources principally from allocations under the national budget, issues of the *Banco de la República* and contributions made by public and private financial institutions. As regards these latter, the tech-

⁵³ These figures are confidential.

nique used has been that of compulsory placing of the securities issued.

Table 82 gives a clear idea of the sources from which such official organizations obtain their funds. The consolidated capital, amounting to 275.7 million pesos at current prices on 30 June 1953, was mainly derived from the national budget. Thus it represented a part of public savings allocated to investment through the autonomous institutions. Part of the capital had also been subscribed by the *Federación de Cafeteros*, up to that time mainly through the *Caja de Crédito Agrario*, and by other official and private entities. The contribution of the *Banco de la República* was relatively small (about 5 per cent of the capital).

TABLE 82. COLOMBIA : SOURCES OF FUNDS OF OFFICIAL INSTITUTIONS ^a

(Balances on 30 June 1953)

	Millions of pesos	Percentage of total
1. Capital		
(a) Budget	207.6	24.3
(b) <i>Banco de la República</i>	14.2	1.6
(c) <i>Federación de Cafeteros</i>	35.4	4.1
(d) Other official institutions	14.5	1.7
(e) Private individuals	4.0	0.5
	<hr/> 275.5	<hr/> 32.2
2. Securities issued		
(a) <i>Banco de la República</i>	93.2	10.9
(b) Saving banks	84.9	9.9
(c) Insurance companies	27.3	3.2
(d) Commercial banks	42.7	5.0
(e) Private individuals	109.5	12.8
	<hr/> 357.6	<hr/> 41.8
3. Loans		
(a) <i>Banco de la República</i>	16.0	1.8
(b) Commercial banks	—	—
(c) External credits	20.7	2.4
(d) Creditors	33.4	3.9
	<hr/> 70.1	<hr/> 8.1
4. Deposits	75.5	8.8
5. Reserves	44.4	5.3
6. Other resources	29.3	3.8
TOTAL	<hr/> 826.6	<hr/> 100.0

SOURCE : Data from the *Informe de la Superintendencia Bancaria*.

^a Including the *Banco Central Hipotecario*, *Banco Agrícola Hipotecario*, *Caja Agraria*, *Banco Popular*, *Instituto de Fomento Industrial*, *Instituto de Crédito Territorial*, *Instituto de Fomento Eléctrico*, *Instituto de Colonización* and *Corporación de Defensa de Productos Agrícolas*.

Nevertheless, capital resources constituted only 32.2 per cent of the available funds, the addition of the reserves bringing this figure up to 37.5 per cent. In contrast, the securities issued accounted for 41.8 per cent. These

securities were partly taken up by insurance companies, savings banks and private individuals to the considerable value of about 220 million pesos, representing 63 per cent of issues and 33.6 per cent of the total resources of the institutions. Even so, the *Banco de la República* had to cover a proportion of the subscriptions amounting to 93.2 million pesos, that is, 26 per cent. If to the issues of the *Banco de la República* are added the sums subscribed by the commercial banks, it can be seen that some 38 per cent of the resources obtained through securities were of an expansionist nature. Thus, the legislation obliging private individuals and savings institutions to subscribe such bonds in order to finance the autonomous bodies did not suffice, and recourse to inflationist instruments was in any case necessary. But the noteworthy fact remains that, in contrast to what took place in other Latin American countries, it did prove possible to channel large sums, through private savings, into public investment.

The methods of compulsory saving at present in force to provide resources for parastatal institutions are described below.

(a) *Caja Agraria bonds*

During the war, with the object of providing financial support for the *Caja Agraria*, it was made obligatory for the *Caja Colombiana de Ahorros* to invest a certain proportion of its deposits in the purchase of *Caja Agraria* bonds on a six-year basis, these being guaranteed by the pledges and mortgages which the *Caja* receives from its debtors, and, furthermore, by the backing of the State. After the war the mechanism of compulsory investment in such bonds was extended to include the stipulation that the commercial banks should invest, without restriction, 5 per cent of their deposits in bonds at 4 per cent interest, maturing in a maximum period of six months.

In recent years the boom in coffee prices led the Government to establish a tax on coffee exports in the form of an exchange differential. The product of this tax was shared between the central Government and the *Federación de Cafeteros*, which had to invest 30 per cent of the income this obtained in shares in the *Caja Agraria*.⁵⁴

(b) *Mortgage bonds*

In securities of this kind savings banks have to invest 25 per cent of their deposits, and insurance companies 15 per cent of their capital, reserves and funds in general. This ruling is applicable to increments since 1950.

(c) *Housing and savings bonds*

These securities are issued by the *Instituto de Crédito Territorial* and the *Banco Hipotecario Nacional*. Savings banks must invest 34.8 per cent of their total deposits in Institute bonds ; to expedite the growth of funds it was provided that, as from 1954, half the increase in savings deposits should be earmarked for subscribing bonds of the *Instituto de Crédito Territorial*, until this

⁵⁴ In 1955 this differential was suspended.

TABLE 83. COLOMBIA : DEBT IN TERMS OF SECURITIES ISSUED BY OFFICIAL AND PARASTATAL INSTITUTIONS, BY CREDITORS

(Thousands of pesos)

Year ^a	Public institutions			Private institutions			Public	Total
	Banco de la República	Other institutions	Total public institutions	Commercial banks	Insurance companies	Total private institutions		
1940	—	2,124	2,124	—	1,032	1,032	26,214	29,370
1942	9,761	1,573	11,334	—	1,492	1,492	28,672	41,498
1944	200	1,235	1,435	—	1,124	1,124	38,962	41,521
1946	16,600	1,353	17,953	—	2,567	2,567	51,906	72,426
1948	32,249	12,930	45,179	—	5,196	5,196	63,586	113,961
1950	64,326	19,379	83,705	30,569	11,770	42,339	62,803	188,847
1951	70,751	52,812	123,563	30,717	17,135	47,852	51,129	222,544
1952	118,581	84,088	202,669	37,861	23,468	61,329	36,011	300,009
1953	155,268	109,989	265,257	42,631	30,222	72,853	69,681	397,791

SOURCE : ECLA, on the basis of official statistics.

NOTE : In addition to those of the official and parastatal credit and development institutions, bonds issued by the Paz del Río iron and steel industry are included.

^a Figures relate to the date of closing of balances (30 June every year).

percentage was reached. Half of the deposits of the *Banco Popular* are used for the purchase of bonds issued by the *Banco Hipotecario Popular*. Moreover, it is compulsory for the commercial banks to buy Housing and Savings Bonds, although the percentage stipulated is very low.

(d) *Paz del Río bonds*

Savings banks and commercial banks have to invest 7 per cent of their deposits in these securities.

(e) *Industrial bonds*

Most of the industrial bonds issued by official entities belong to the *Banco Central Hipotecario*. Insurance companies are under the obligation to invest 10 per cent of their reserves in either industrial or agrarian bonds, as they prefer ; hitherto the investment effected by such institutions in compliance with this decree has been placed in industrial bonds only. The *Instituto de Fomento Industrial* is also authorized to issue bonds of this type, but has not done so on any very large scale.

(f) *Importers' deposits*

With the aim of mitigating pressure on the balance of payments and checking the expansion of the money supply, importers are required to make prior deposits representing a percentage of authorized imports which, under the recent exchange reform, ranges from 20 to 60 per cent, according to categories of goods. Such prior deposits constitute compulsory savings which are applied, in the manner already described, to the financing of investment connected with all national development projects.

Table 83 shows the annual volume of private savings collected through the official institutions since 1940. During the war, the annual average of net savings mobilized, if the *Banco de la República* and the commercial banks are excluded, stood at the insignificant

level of barely 4.4 million pesos. In subsequent years the corresponding average rose to 28.5 million pesos. A comparison of these figures with public savings through the budget shows that the sums saved through fiscal institutions and the public debt in general are small. However, in a financial environment that is still not fully developed, the progress achieved is by no means inconsiderable.

VII. ROLE OF FINANCIAL MIDDLEMEN
IN THE MOBILIZATION OF RESOURCES

The creation of a network of financial intermediaries, especially after the 1931 crisis, was one of the salient phenomena in Colombia's economic evolution, inasmuch as it permitted the more efficient mobilization and utilization of domestic resources.

This development is largely attributable to government policy, which has encouraged the formation of official credit and development institutions, and to the compulsory provisions for the use of resources mobilized through private middlemen. In the preceding section the function of the principal public financial institutions was described ; the time has now come to refer to the role of private financial organizations, chiefly comprising the commercial banking system, the insurance companies, the stock exchange and certain institutions set up to finance investment.

1. *The commercial banking system*

Among credit institutions in Colombia as a whole, the commercial banking system occupies an outstanding position. By the end of 1954 there were fourteen commercial banks in existence, of which ten were domestic and four foreign. On 30 June 1954, the total assets of the commercial banks amounted to 1,710 million pesos, a sum which represented 58.4 per cent of the total gross assets of public and private credit institutions.

A major part of these bank assets would seem to correspond to loan and discount operations on a one-year basis, to cash and deposits in the *Banco de la República*, and, in a minor proportion, to investment in securities, mainly those of an official character (see table 84).

TABLE 84. COLOMBIA : BREAK-DOWN OF ASSETS OF COMMERCIAL BANKS, ON 30 JUNE 1954

	Millions of pesos	Percentage
Deposits in the <i>Banco de la República</i>	225.3	14.9
Loans and discounts	998.0	67.8
Investments in securities	99.5	5.8
Other assets	365.9	21.5
	1,710.7	100.0

SOURCE : *Superintendencia Bancaria*.

Again, commercial bank credits represented over 50 per cent of the aggregate supply of consolidated loans issued by private and official institutions.

In general, Colombia's commercial banking system has operated under the strict limitations imposed by the safeguards and security measures embodied in the 1923 legislation. Since 1940, however, a gradual metamorphosis appears to have taken place, whereby the banking system is tending to acquire a more active share in the country's investment mechanism.

The influence of the commercial banks on economic development can be evaluated from two essential points of view ; first, as a source of financing for production and, secondly, as a means of providing support for the capital market.

(a) *The short-term credit mechanism*

The commercial banks constitute the main source of the working capital required for the functioning of the various economic sectors.

On 30 June 1954, the total consolidated short-term portfolio of the public and private institutions amounted to 952 million pesos. Out of this total, 87 per cent belonged to the commercial banks.

The explanation of the preponderance of the commercial banking system on the money market, despite the development of official credit, lies in the fact that the intervention of the latter has been essentially channelled towards investment operations. At the present time more than 80 per cent of total medium- and long-term credit is accounted for by the official institutions.

Owing to these characteristics, the responsibility of the banks for the direction given to working capital resources plays a decisive role in the short-term financing of economic activities, and its importance is still more striking in the case of Colombia, where enterprises require an abnormally large amount of working capital to finance their inventories, for reasons discussed elsewhere in the present study.

Table 85 shows the distribution of the outstanding credits of the commercial banks on 30 June 1954.

TABLE 85. COLOMBIA : BREAK-DOWN OF COMMERCIAL BANK CREDITS ON 31 JUNE 1954

	Millions of pesos	Percentage
<i>Agriculture</i>		
Coffee	39.3	3.9
Other crops	37.5	3.8
Livestock production	161.8	16.3
	238.6	24.0
<i>Industry</i>		
Industry	211.8	21.4
Trade	330.3	33.4
Transport	21.9	2.2
Finance and insurance	37.9	3.8
Government	51.7	5.2
Consumption	43.0	4.3
	988.0	100.0

SOURCE : *Memoria of the Banco de la República*.

As large a proportion as 78.8 per cent of the bank credits was earmarked for the financing of agriculture, industry and trade. In view of the lack of support from official credit, the commercial banking system is the main source for the financing of industrial inventories. It also seems to have made a disguised contribution, in a number of instances, to the supply of capital for investment in industry, through the practice of credit renewals. The authorization of loans for periods of up to five years places such practices, up to a point, on a legal footing.

Agriculture, too, finds its principal source of working capital in the commercial banks ; this is particularly true of cattle-breeding, which is denied access to official credit on account of the restrictions imposed by the *Caja Agraria*.

In Colombia no direct measures have been applied with a view to channelling private bank credit towards economically desirable sectors. The legislation authorizing loans to stock-breeding and industry on a five-year basis is of a purely facultative nature.

On the whole, the tendency has been to use indirect methods, mainly with a view to guiding resources towards the financing of agricultural and livestock production, by means of compulsory purchase of agrarian bonds, the product of which is loaned through the *Caja Agraria*.

The past evolution of the distribution of commercial bank credit by economic sectors reflects, especially in the post-war period, a deflection of resources towards the agricultural and industrial sector. Thus a favourable trend has been followed by the commercial banking system in the direction of supporting basic lines of economic development (see table 86).

TABLE 86. COLOMBIA : BREAK-DOWN OF THE VOLUME OF COMMERCIAL CREDITS, BY SECTORS ^a

(Percentages)

	1937-41	1947-52
Agricultural and livestock production . . .	10.3	16.5
Industry	19.7	23.2
Trade	52.0	48.2
Other sectors	18.0	12.1
	100.0	100.0

SOURCE : *Superintendencia Bancaria and Anuario General de Estadística.*

^a This table shows the break-down by sectors of the volume of credits granted, and is not comparable with table 85, for 1954, which gives the balances outstanding. A larger proportion is here assigned to trade, because its rotation coefficient is higher.

The changes tending to direct credit resources towards the agricultural sector are still more significant if the proportion of bank resources tied up in agrarian bonds is taken into account. This does not appear under the head of loans but under that of investment. A major share of the increase in credit to the agricultural sector has accrued to the benefit of stock farming. In 1937-41 the average percentage of credit to stock farmers stood at 6 per cent, but the corresponding figure for 1947-50 was 11.7 per cent.

Finally, reference must be made to an aspect strongly influencing the distribution of credit, not this time by sectors, but by capital endowments.

Since the commercial banks have to ensure that part of their portfolio is rediscountable, they charge differential rates of interest, according to whether the document concerned is susceptible to rediscount or no.

According to existing criteria, a document is rediscountable if the rate of interest charged did not exceed the rediscount rate by two points or more. As the present rediscount rate is 4 per cent, the maximum interest yielded by the rediscountable portfolio is 6 per cent. Moreover, for a document to be defined as rediscountable, it must fulfil certain solvency conditions, which in practice entail two consequences. The first is that the preferential rate of 6 per cent implies a subsidy to those enterprises or individuals with the largest amount of capital and economic backing at their disposal, since it is these that can offer rediscountable documents; and the second, that interest rates weigh heavily on the non-rediscountable portfolio, which derives from the activities of medium- and small-scale enterprises.

As the average rate of interest charged by the banks is much higher than 6 per cent, medium- and small-scale production activities clearly have to bear the burden of an abnormally high rate of interest to offset the subsidy rate.

These characteristics constitute a serious obstacle to the financing of the working capital of new enterprises that are being installed in lines of production which, although in the national interest, involve certain risks

in their early stages, and consequently cannot offer the banks satisfactory guarantees. Hence, only by paying a high rate of interest can they have access to commercial bank credit.

Similarly, medium- and small-scale industry, which receives the minimum degree of support from official credit, also encounters difficulties as a result of this bank credit structure, which militate against its development prospects.

In reality, this problem arises in most of the Latin American countries where traditional rediscount principles are still applied.

(b) *The commercial banking system as an investment market*

Up to 1940, the commercial banking system operated under the strict provisions of the 1923 legislation, which meant that operations were based on periods of over one year, and restricted investment to public or private securities.

However, during and particularly after the war, the traditional rigidity of the commercial banking system underwent a gradual metamorphosis, in the sense that it acquired greater flexibility for the following main operations: (a) support of the public debt securities market; (b) financing of capital for development institutions, especially those connected with agricultural and livestock production; and (c) investment loans for periods of up to five years for industry and stock farming.

During the war, the commercial banking system constituted an important market for public debt securities.⁵⁵ The sum of 13.6 million pesos held by the banks in internal debt bonds in 1940 had risen by 1946 to 46 million, or 12.9 per cent of the total issue. After the war, the share of the commercial banking system in the internal public debt fell to 5 per cent of the total debt, owing to the absence of coercive investment regulations and, in addition, the amortization of the documents held by the banks. On the other hand, from 1948 onwards the commercial banks began to plan an outstanding part as a source of funds for various autonomous official institutions, especially the *Caja Agraria*, through the medium of the compulsory placing of securities.

At the present time, the commercial banking system's investments in securities, whether voluntary or compulsory, are subject to regulations which permit investment in the following items:

(a) Bonds issued by the central Government, and the departmental and municipal authorities, in unlimited quantities, provided that the servicing of these commitments does not fall into arrears;

(b) Securities issued by foreign Governments, or by railway companies or industrial enterprises, to a value of up to 10 per cent of capital and reserves;

(c) Mortgage certificates issued by the *Banco Central Hipotecario*, to a value of up to 20 per cent of capital and legal reserves;

⁵⁵ The instruments placed were those relating to national defence (DENAL bonds) and consolidation of the internal debt (DINU bonds).

(d) Shares in the *Banco de la República* and in the *Banco Central Hipotecario*, to values of up to 10 and 20 per cent of capital and reserves, respectively ;

(e) Shares in the Paz del Río steel works, in unlimited quantities, and in accordance with the compulsory investment surcharges in force for taxpayers in general ;

(f) Compulsory investment in DENAL and DINU bonds, for values of 10 and 5 per cent of the banks' legal reserves, respectively. This provision was put into effect during the war (1943-45) ; and

(g) Compulsory investment in *Caja Agraria* bonds, maturing within a period of not more than six months, and for a sum equivalent to 5 per cent of sight deposits. This investment is reckoned as an additional cash reserve.

Lastly, mention must be made of compulsory investment in housing and savings bonds issued by the *Instituto de Crédito Territorial*, bonds in the Paz del Río industry, and the recent decree relating to industrial bonds.⁵⁶

Table 87 gives a break-down of the commercial banks' investment in securities on 30 June 1954.

TABLE 87. COLOMBIA : INVESTMENTS OF COMMERCIAL BANKS IN SECURITIES, ON 30 JUNE 1954

	Millions of pesos	Percentage
1. Compulsory investment		
DENAL and DINU bonds	7.1	7.1
Agrarian bonds	49.1	49.4
Paz del Río bonds	1.9	1.9
Housing and savings bonds	6.9	6.9
	65.0	65.3
2. Voluntary investment		
Public debt bonds	15.8	15.9
Mortgage certificates	7.5	7.5
Other securities	11.2	11.3
	34.5	34.7
TOTAL	99.5	100.0

SOURCE : *Memoria of the Banco de la República, 1954.*

Besides these provisions connected with the commercial banking system's support of the market for securities, especially those of an official nature, loans for periods of up to five years have been authorized since 1950. At the present time, the banks are empowered to grant investment loans up to the value of 10.5 per cent of their deposits, distributed between industrial operations and stock farming in proportions of 7.5 per cent and 3 per cent respectively. As inducements to the banks, special incentives are provided through the rediscount rate for the documents concerned.

Nevertheless, this measure has not proved efficacious, as on 30 June 1954 legal capacity for loans of this kind

⁵⁶ When this chapter was drafted details of the decree in question were not available.

stood at 182.4 million pesos, whereas the amount actually utilized was only 67.5 million.

From the foregoing considerations it can be inferred that Colombia's commercial banking system is undergoing an important transformation. Breaking down the rigid moulds in which its operations have traditionally been set, it is, in fact, steadily evolving towards greater participation in the financing of the process of economic development.

2. Role of insurance companies

Reference will now be made to the role of insurance companies in the investment mechanism of the economy.

The concentration of funds through the medium of insurance is of exceptional importance for the operation of capital markets, since in the course of time, and as the companies grow, the mobilization of the small savings of those insured ultimately creates reserves so large as to make the insurance companies one of the economic system's principal sources of available funds. Because the insurance companies attract savings that are normally channelled towards the capital market, it is very important to take them into consideration in an analysis of financial intermediaries.

Insurance business increases in terms of the economy's over-all economic growth. In 1955 there were 41 insurance companies in Colombia, representing an investment of 162.4 million pesos ; the number in 1940 had been 23, and the total sum invested, 13.9 million. These figures give some idea of the remarkable boom in insurance business that has been registered in Colombia, in consequence of the rise in the country's total income during the period in question.

The way in which this greater investment capacity has been utilized reflects the insurance companies' contribution to the process of capital formation.

These institutions have played an important part as a public securities market. Over 40 per cent of their resources has been channelled towards the central Government and official bodies, especially the *Banco Central Hipotecario*. The regulations governing the investment of the companies' funds are fairly extensive as regards public securities, and many are coercive in character. Of the total assets of the companies, 15 per cent must be invested in central Government bonds and 10 per cent in agrarian bonds issued by the *Caja de Crédito Agrario* or in the industrial bonds of the *Banco Central Hipotecario* ; the latter have generally been chosen. Furthermore, the companies are obliged to invest 15 per cent of their technical reserves in mortgage certificates or mortgage loans, as they prefer.

Apart from these compulsory provisions, the insurance companies are authorized to invest in the shares and securities of national enterprises, in urban real estate (for a value of up to 30 per cent of their total funds), in securities issued by foreign Governments (for a value of up to 15 per cent of their total funds), in loans guaranteed by their own policies, etc. The bonds of the Paz del Río steel works are admissible as an authorized investment on the part of the insurance companies, as

they are covered by the proviso relating to the shares and securities of national enterprises.

On 30 June 1953, the investments of the insurance companies were distributed as shown in table 88.

TABLE 88. COLOMBIA : BREAK-DOWN OF INVESTMENTS OF INSURANCE COMPANIES, ON 30 JUNE 1953
(Millions of pesos)

	Value	Percentage
National bonds	35.8	22.0
Departmental bonds	1.8	1.8
Municipal bonds	3.5	2.2
Industrial bonds	14.7	9.1
Mortgage certificates	17.3	10.6
TOTAL (public)	73.1	45.0
Industrial and bank shares	37.4	23.0
Loans	48.2	29.7
Miscellaneous	3.7	2.3
GRAND TOTAL	162.4	100.0

SOURCE : *Informe de la Superintendencia de Bancos*, 1954.

From this table it can be deduced that 45 per cent of the investments of the insurance companies were connected with the public securities market. This is a fairly significant quota ; and if it is taken together with their investment in the shares of industrial and banking enterprises,⁵⁷ the conclusion will be reached that insurance companies in Colombia play an outstanding part in the mobilization of domestic saving, as more than two-thirds of their investment resources are tied up in lines of high priority for the country's economic development, such as public works and industrial enterprises.

Moreover, in the past the share of public and industrial bonds in the insurance companies' total investments has always been fairly large, never falling below two-thirds (see table 89).

TABLE 89. COLOMBIA : PERCENTAGE DISTRIBUTION OF INVESTMENTS OF INSURANCE COMPANIES

	Public securities	Industrial and bank shares	Total
1941	45.6	24.6	100
1942-45	42.8	26.7	100
1946-53	44.1	26.4	100

SOURCE : *Informe de la Superintendencia de Bancos*, 1954.

The figures given warrant the assertion that the increment in the investment capacity of insurance since 1940 has provided very valuable support for public financing and the expansion of private investment in industry.

3. The stock exchange and other financing bodies

The stock exchange is an auxiliary cog in the financing machine. Its chief function is to provide a secondary market, that is, a mechanism whereby current assets can be negotiated after the primary phase of distribution.

In Colombia, and, generally speaking, in all underdeveloped countries, where there is no satisfactory organization of investment banks, the placing of securities relating to the installation of new or the expansion of existing enterprises is effected through channels other than the stock exchange, and by means of negotiations among the most important groups of investors. Again, the capital of companies already in existence is increased through subscription by the shareholders, under the guise of retention of profits.

Thus, the principal function of the stock exchange is to create a market permitting the negotiability and liquidity of the securities negotiated.

The Bogotá Stock Exchange (*Bolsa de Valores de Bogotá*), which is a corporation with a capital of 1.6 million pesos, has existed in Colombia since 1928.

From 1933 onwards, transactions on the Bogotá stock exchange market developed at a rapidly increasing rate, which was interrupted as from 1948, when a sharp decline began. The fact that the basic role in the aforesaid expansion was played by the negotiation of shares, mainly in industry, is simply a reflection of the growth of the manufacturing sector in Colombia during the last twenty years. In 1934, transactions relating to shares accounted for 20.2 per cent of the total value of stock exchange operations ; by 1952, this proportion had risen to 81.5 per cent (see table 90).

TABLE 90. COLOMBIA : TRANSACTIONS NEGOTIATED ON THE BOGOTÁ STOCK EXCHANGE
(Millions of pesos at 1950 prices)

Year	Total value of operations	Value of movement of shares	Shares as a percentage of total
1932	34.7	4.6	13.2
1933	71.8	20.5	28.6
1934	105.3	21.2	20.2
1935	133.0	28.6	21.5
1936	98.5	19.4	19.7
1937	53.9	20.3	37.6
1938	40.1	21.2	52.6
1939	61.4	38.4	62.3
1940	69.7	43.4	62.3
1941	111.2	76.5	68.8
1942	123.5	91.6	74.2
1943	210.2	143.9	68.4
1944	220.2	151.3	68.7
1945	217.2	149.9	69.0
1946	286.2	221.7	77.4
1947	196.2	138.1	70.4
1948	124.4	94.7	76.1
1949	136.5	115.1	84.3
1950	121.2	101.7	83.9
1951	103.6	84.8	81.8
1952	120.8	98.4	81.5

SOURCE : *Anuario General de Estadística*.

⁵⁷ Most of these are industrial securities.

Out of the total sum of 98.4 million pesos represented by transactions in shares in 1952, over 70 per cent corresponded to shares in industry, especially in five enterprises connected with the production of beer, tobacco and textiles, which constituted 57 per cent of the total.

There were a number of reasons for the marked falling-off in stock exchange activity after 1948. The striking wartime increase in transactions was partly due to an abnormal shift of monetary resources towards investment in securities, because of the difficulty of using them for imports. When international trade was resumed, a process of liquidation of such financial investments ensued, with the consequent depressive effect on the market. To this must be added the phase of political unrest upon which Colombia entered in 1948, and which had an immediate repercussion on the stock exchange. Lastly, attention must be drawn to the 1950 anti-inflationary measures, especially in the field of credit, which apparently acted as a temporary brake on the previous rapid rate of industrial development.

The stock exchange is becoming and increasingly important part of the country's financing mechanism, mainly as a market for imparting liquidity to securities. At present, however, the negotiability of securities, especially shares, is a factor which benefits only the financing of enterprises already in existence and offering the investor a high degree of solvency.

On the other hand, Colombia's financial organization lacks specialized intermediary bodies to constitute an investment banking system proper, designed to ensure the initial placing of securities issued by private enterprises, for the installation of new entities or for expansion purposes. The *Banco Central Hipotecario* has been authorized to operate along these lines since 1937, but has not exercised its powers.

There is only one private institution for the financing of capital formation,⁵⁸ which in recent years has developed to a remarkable extent by absorbing individual private savings through the issue of savings bonds and investment certificates at low values, with special inducements provided by means of lotteries. On 30 June 1954, the securities placed by this agency amounted to a value of 94.1 million pesos.

The *Banco Central Hipotecario* has also substantially increased its resources, especially since the war, through the issue of investment certificates.

Experience thus shows that by the use of satisfactory financial instruments it is possible to mobilize the savings of medium-income groups, which, although individually small, may amount to significant sums in the aggregate.

VIII. METHODS OF FINANCING IN PRIVATE ENTERPRISE

The foregoing sections offered an over-all analysis of the economy's savings-investment process, through the capital account, which is one of the components of the system of national accounts. In this general outline the

main financial sources of investment capacity — internal public savings, internal private savings and external resources — were defined, together with their counterpart in public and private investment.

In other words, only the initial and final stages of the savings-investment mechanism are reflected in the capital account, not the intermediate transactions that are required in order to convert the savings generated by the system into increments in the community's real assets.

To fill these gaps, the so-called "sources and uses of funds" technique is employed; by applying this to each sector of the economy, the national capital account can be arrived at. The method has the advantage of defining the inter-relationships of capital operations among the various sectors, by showing, on the income side, the various types of financing to which the sector can resort, either by drawing on internal sources deriving from domestic saving or through the medium of external sources, and of which the cost is borne by the savings of other sectors, whether in the shape of loans or as the product of assets, etc.

On the utilization side, the funds obtained are always used for the purchase of an asset,⁵⁹ whether real or financial; real, in the case of those investments which add to the assets of the community, and financial, if it takes the form of an increase in cash holdings, purchase of securities, credit to other sectors, etc.

By the application of such a methodology to Colombia's entrepreneurial sector, an approximate picture can be obtained of the financing and investment structure of the private sector, revealing the differences between domestic and foreign enterprises in this connexion, as well as between the various branches of production.

Two basic tables prepared from data supplied by the *Superintendencia de Sociedades Anónimas y Compañías de Seguros* give a break-down of the sources and uses of funds of corporations in 1941-52 (see tables 91 and 92).

One of the salient features of company financing in Colombia is the high level at which inventories must be maintained in relation to the stock of fixed capital. In 1952, the Colombian corporations had a coefficient of 33.1 per cent; that is, for every 100 pesos invested in capital stock, 33 were earmarked for the maintenance of inventories. Foreign enterprises, on the other hand, registered a lower coefficient, of 22.6 per cent.

These coefficients, in the case of both foreign and domestic enterprises, are considered high, since in the United States the corresponding figure for companies as a whole is 10 per cent.

The characteristics described strongly influence the methods of financing Colombian enterprises, the degree of efficiency with which their resources are utilized, and their competitive capacity. In the first place, working capital requirements are heavier, and in the case of the manufacturing sector this implies serious financing difficulties, because of the defective structure of industrial credit in Colombia.

⁵⁸ *Sociedad de Capitalización y Ahorros Bolívar*.

⁵⁹ Because only capital operations are included, and, consequently, current expenditure is not taken into account.

TABLE 91. COLOMBIA : SOURCES AND USES OF FUNDS OF DOMESTIC CORPORATIONS

(Percentages)

	Annual averages		
	1941-45	1946-52	1952
<i>Sources</i>			
1. <i>Internal</i>			
Undistributed profits	12.8	11.5	13.9
Depreciation	8.9	10.4	14.8
	21.7	21.9	28.7
2. <i>External</i>			
Capital in shares	44.5	33.7	27.9
Creditors	30.9	35.4	29.0
Special funds	2.1	2.9	5.7
Miscellaneous	0.8	6.1	8.7
	78.3	78.1	71.3
TOTAL	100.0	100.0	100.0
<i>Uses</i>			
1. <i>Real assets</i>			
Depreciable fixed assets ...	41.1	42.2	46.1
Inventories	14.7	13.4	15.3
Miscellaneous	—	—	—
	55.8	55.6	61.4
2. <i>Financial assets</i>			
Debtors	13.4	13.6	13.5
Cash and securities	5.2	5.2	4.7
Miscellaneous	25.6	25.6	20.4
	44.2	44.4	38.6
TOTAL	100.0	100.0	100.0

SOURCE : Prepared on the basis of the consolidated balance tables published by the *Superintendencia de las Sociedades Anónimas*.

The maintenance of a high level of stocks is a requisite imposed both by the country's geographical conformation, which hampers the mobility of resources, and by the large proportion of imported raw materials and intermediate products used by Colombian industry. These elements, upon which the efficient operation of the enterprises depends, represent a high social cost because of the margin of waste they involve, reflected in heavier production costs and a level of utilization of stocks that falls below the normal standard.

Furthermore, domestic enterprises are placed at a disadvantage as regards competition with the foreign companies, whose connexions with the Head Office abroad, in respect to both financing and supplies, enable them to operate with a lower coefficient of stocks than the Colombian enterprises require. In 1952, while foreign manufacturers had to maintain only 21 pesos in stocks for every 100 pesos invested in fixed capital, the corresponding proportion for domestic industries was 33.5 pesos. There are also certain differences worthy of mention between the sources and use of the capital of domestic and foreign corporations.

In 1952, the paid-up capital of corporations totalled 1,781.5 million pesos, of which 81.6 per cent (1,454.4 million) belonged to domestic companies. The greater part (62.1 per cent) of the capital of these latter derived from enterprises connected with the transforming industry. On the other hand, most of the foreign companies' capital (68.7 per cent) was used in the primary production sector, the transforming industry absorbing only 14.9 per cent (see table 93).

Hence it can be seen how outstanding was the part played by foreign capital in the financing of the primary production sector. Out of the capital of 437.7 million pesos invested in such activities, 51.4 per cent derived from foreign companies. On the other hand, the structure of capital in the transforming industries sector reveals the magnitude of the contribution (94.8 per cent of the total invested here) made by domestic enterprises to Colombia's industrialization process. The role of foreign capital in economic development is shown, in contrast, to have been insignificant.

Lastly, it should be stressed that in the past fifteen years corporations have constituted one of the most

TABLE 92. COLOMBIA : SOURCES AND USES OF FUNDS OF FOREIGN CORPORATIONS

(Percentages)

	Annual averages		
	1941-45	1946-52	1952
<i>Sources</i>			
1. <i>Internal</i>			
Undistributed profits	16.6	8.8	7.8
Depreciation	29.1	26.3	25.1
	45.7	35.1	32.9
2. <i>External</i>			
Capital in shares	44.4	45.6	47.9
Creditors	8.3	12.6	10.8
Special funds	0.7	3.5	5.0
Miscellaneous	0.9	3.2	3.4
	54.3	64.9	67.1
TOTAL	100.0	100.0	100.0
<i>Uses</i>			
1. <i>Real assets</i>			
Depreciable fixed assets ...	60.5	52.8	64.2
Inventories	10.5	12.4	14.5
Miscellaneous	—	—	—
	71.0	65.2	79.7
2. <i>Financial assets</i>			
Debtors	6.0	9.3	8.5
Cash and securities	2.3	4.8	5.2
Miscellaneous	20.7	20.7	7.6
	29.0	34.8	21.3
TOTAL	100.0	100.0	100.0

SOURCE : Prepared on the basis of the consolidated balance tables published by the *Superintendencia de las Sociedades Anónimas*.

TABLE 93. COLOMBIA : BREAK-DOWN OF PAID-UP CAPITAL OF CORPORATIONS, BY SECTORS OF ACTIVITY, 1952

(Millions of pesos)

	Colombian companies		Foreign companies		Total	
	Value	Percentage	Value	Percentage	Value	Percentage
Primary production	212.7	14.6	225.0	68.7	437.7	24.5
Transforming industries ..	904.3	62.1	48.9	14.9	953.2	53.3
Services	139.2	9.6	26.7	8.3	165.9	9.3
Trade	198.2	13.7	26.5	8.1	224.7	12.9
TOTAL	1,454.4	100.0	327.1	100.0	1,781.5	100.0

SOURCE : *Revista de la Superintendencia de Sociedades Anónimas.*

important of the instruments used to channel resources towards investment, especially in the manufacturing sector.

The growth of company assets has been financed mainly by the retention of profits—in the shape of undistributed profits and reserves—and by the subscribing of new capital. As will be seen from table 94, domestic companies have relied for over 20 per cent of their financing on internal sources (retention of profits), this proportion rising to about 30 per cent in 1952. However, the figures given are not really representative of the role played by the internal savings of the enterprises, as a major part of the capital increments accruing from the subscription of new shares, and shown in the table as deriving from external sources, represented purchases made by the companies' own shareholders out of the dividends distributed.

The companies have pursued the policy of distributing a high proportion of their profits as dividends. The percentage of liquid profits thus distributed by the most important industrial enterprises in recent years is shown in table 94.

TABLE 94. COLOMBIA : RELATIONSHIP BETWEEN DIVIDENDS AND LIQUID PROFITS OF A GROUP OF INDUSTRIAL CORPORATIONS

(Millions of pesos)

	Liquid profits	Dividends	
		Value	Percentage
1948	189.6	71.7	80.0
1949	108.8	85.5	78.6
1950	101.8	101.8	78.3
1951	118.9	89.6	75.4
1952	129.3	114.6	88.6

SOURCE : *Revista de la Superintendencia de Sociedades Anónimas.*

This policy with respect to dividends, combined with the tax exemption incentive in force for income of this kind, has tended to raise quotations for shares. In the case of the large enterprises already consolidated, an

additional advantage attaching to the quotation of their securities on the Bogotá stock exchange was that of liquidity.

The inducement to reinvest distributed profits through the subscription of further shares has taken the form of special incentives provided by the enterprises. A pre-eminent part has been played by the system of offering advance dividends for new shares.

According to a special study,⁶⁰ in the case of a group of fourteen companies, 54.8 per cent of their post-war capital increment was obtained through the placing of subsidiary shares with a premium. An important role was also enacted by the sale of new shares at par, especially in the case of companies whose shares were quoted on the market at rates much higher than their nominal value.

Furthermore, in some branches the reinvestment of profits has been encouraged by the fact that certain large enterprises are run on a family basis, with the consequent stimulus to a higher savings coefficient. Again, the growing preponderance of manufacturing firms has been a positive factor in the promotion of structural changes in domestic savings, thus enhancing the importance of the contribution made by saving on the part of enterprises.

It may therefore be asserted that in Colombia company financing has been largely based on the rate of internal saving of the enterprises themselves.

The credit system has not contributed very substantially to the financing of companies, although those organized as corporations have readier access to credit resources. In 1952, the use of credit represented 29 per cent of total resources. For companies engaged in primary production, however, the corresponding proportion was higher (33.5 per cent); and since these were mainly foreign firms, the comparative figures indicate the financial support received by the latter from abroad. On the other hand, the manufacturing sector, composed of Colombian enterprises, derived only 23 per cent of its finances from loans. This only serves to confirm the

⁶⁰ Alonso Manero, *El mercado colombiano de capitales (The capital market in Colombia)*, submitted to the International Bank for Reconstruction and Development, Washington, July 1952.

weakness of the internal system of mobilizing resources for the financing of the industrial sector. It should also be noted that most of the borrowing operations of the enterprises are not negotiated directly with the banks, but with short-term suppliers, which reduces still further the participation of the banking system.

Lastly, attention should be drawn to a peculiar feature of the organization and structure of corporations in Colombia. This is the limitation implied, from the point of view of the financing of large investments, by the concentration of most of the capital of the companies in medium- and small-scale units, and the consequent undermining of their individual financial capacity to undertake major projects. Enterprises on the scale of Paz del Río cannot be tackled by private savings efforts, which must be supplemented in such cases by public capital.

According to table 95, in manufacturing industry only 30 per cent of the capital invested corresponds to enterprises with a capital of over 20 million pesos. Out of all the 897 corporations existing in 1952 (including those engaged in other activities), with an aggregate capital of 1,454.2 million pesos, the enterprises whose capital exceeded 20 million pesos numbered only 7.

TABLE 95. COLOMBIA : CAPITAL OF DOMESTIC CORPORATIONS UTILIZED IN THE TRANSFORMING INDUSTRY, 1952

(Millions of pesos)

Scale of capital	Capital	Percentage
Up to 50,000	551	0.1
From 51,000 to 150,000	3,329	0.3
From 151,000 to 250,000	6,857	0.7
From 251,000 to 500,000	24,085	2.7
From 501,000 to 1,000,000	44,189	4.8
From 1,001,000 to 2,500,000	89,672	9.9
From 2,501,000 to 5,000,000	112,208	12.5
From 5,001,000 to 10,000,000	119,694	22.5
From 10,001,000 to 20,000,000	149,518	16.5
Over 20,000,000	274,225	30.0
TOTAL	904,328	100.0

SOURCE : *Revista de la Superintendencia de Sociedades Anónimas.*

IX. GLOBAL FINANCING OF CAPITAL FORMATION

In this section an attempt is made to evaluate the whole historical process of the financing of Colombia's economic development. Up to a point, the analysis that follows represents the integration of the various subjects dealt with in preceding sections.

The funds used for financing investment in any economy are obtained, in the last analysis, from two basic sources, namely, internal gross saving—that is, the proportion of total income which is not spent on current consumption—and the net contribution of external resources in the shape of capital and credit.

Table 96 sheds significant light on the source of the aggregate funds allocated to the financing of capital formation in Colombia during the last three decades

of its development. From the figures given can be obtained, in the first place, a general idea of the respective roles of internal effort and the external sector in the mobilization of financial resources for investment purposes.

Outstanding during 1925-29 was the positive contribution of foreign capital, which raised the level of investment in Colombia above the limit permitted by gross savings. During these years, the net inflow of foreign resources was sufficient to finance 12.7 per cent of aggregate investment. However, its total incidence over the period in question may appear to have been greater than this figure would suggest, if it is reflected that a considerable part of the increment in internal savings generated through the public and private sectors was possible only on account of the marked rise in national income, promoted in its turn by the primary impact of the inflow of foreign capital and credit.

Conversely, in 1930-44 the external sector can be seen to have exerted a negative influence on the availability of investment resources, a circumstance which helps to explain why the Colombian economy grew so slowly during that period. Table 96 clearly illustrates this statement, as transfers amounted annually to the equivalent of 84 million pesos (at 1950 prices), or 11.7 per cent of total investment. This negative movement of resources was financed by means of the country's domestic effort, as is reflected in total gross savings, which exceeded aggregate investment by a sum equivalent to the outflow described. In other words, during this phase of Colombia's economic development, external factors undermined investment resources, inasmuch as part of the improvement in the productivity of the over-all economy was transferred abroad.

After the war, the financing of the rate of investment was almost entirely dependent on internal resources, since the liquid inflow of external capital and credit represented only 1 per cent of total available resources. This figure may seem surprising in view of the liberal credits granted by international organizations during the post-war years. The explanation lies, however, in the fact that it is not enough to analyse the gross inflow of external resources alone, without taking into account the capital exported under the guise of amortizations, remittances of profits, etc. Such a conclusion appears the more justifiable when it is recalled that to the servicing of the new credits proper must be added that of the foreign debt contracted before the depression, payment of which was renewed during the early years of the war; moreover, the flow of private capital was weak, whereas remittances abroad on account of petroleum profits were very substantial.

In brief, it may be affirmed that in the post-war period foreign capital played a neutral part in the financing of capital formation, which relied essentially on domestic gross saving.

The other question arising from the statistics shown in table 96 is that of the distribution of the internal effort between the public and private sectors. Stress has already been laid in earlier paragraphs on the part played by general measures of fiscal and economic policy

TABLE 96. COLOMBIA : AGGREGATE FINANCING OF CAPITAL FORMATION

	1925-29 *		1930-44 *		1945-53 *	
	Value	Percentage	Value	Percentage	Value	Percentage
1. <i>Financing with internal resources</i>						
(a) Public savings	99	12.7	90	12.6	218	17.5
(b) Private savings	577	74.6	708	99.1	1,010	81.6
Total national gross savings (a + b)	676	87.3	798	111.7	1,228	99.1
2. <i>External financing</i>						
Net inflow of external capital and credit	98	12.7	-84	-11.7	11	0.9
Total resources (1 + 2)	774	100.0	714	100.0	1,239	100.0
3. <i>Gross investment</i>						
	774		714		1,239	

SOURCE : See *Statistical Appendix*, tables 13 and 60.

* Annual averages.

in the formation of domestic savings. Their influence may be exerted in two ways ; directly, through the budget, by means of a surplus on current account, or indirectly, on the margin of savings of private individuals and enterprises.

Clearly, in an economy like Colombia's, based on free enterprise, most of the funds available for investment derive from the private sector. In 1925-29 three-fourths of the economy's total investment resources came from private savings ; the Government made only a direct contribution to the mobilization and channelling of funds, through public savings, which provided 12.7 per cent of total resources.

During the interval of slow growth between 1930 and 1944, fiscal policy played a greater part in the mobilization of resources for capital formation ; in the first place, despite the bankruptcy of the public income system consequent upon the depression, efficient handling of the budget enabled the relative share of public savings in the financing of the rate of investment to be maintained. Mention has already been made in preceding sections of the basic outlines of the policy concerned, aimed on the one hand at a far-reaching tax reform, and, on the other, at the moderate expansion of current expenditure.

The increased importance of private savings in both absolute and relative terms cannot be attributed solely to the incentives created by the depression and the emergence of an industrial entrepreneur class ; this process was feasible largely because of the indirect support given by the public sector through exchange controls, official investment and the expansion of effective monetary demand by means of public expenditure and devaluations of the exchange rate.

On the other hand, measures to mobilize savings through the financial middlemen were not as efficacious at this stage as they subsequently became, since the institutions concerned were in the initial phase of their development.

As can be inferred from table 96, it was in the post-war years that the high coefficient of domestic investment

registered was attained by virtue of the external capacity of the Colombian economy.

In relation to the present time, the role of the budget gained in importance as regards its contribution to the financing of the investment rate, since public savings reached a relative annual average of 17 per cent. It should likewise be emphasized that the considerable increase in private savings during these years was largely due to the rise in national income brought about by the improvement in the terms of trade and partly concentrated in capital formation.

In Colombia, as in most of the under-developed countries, a major proportion of private saving corresponds to the undistributed shares of enterprises, which are reinvested in the expansion of the companies' own activities.

Consequently, to a large extent the saver and the investor are one and the same, so that the formation of private savings is mainly determined by the factors influencing real investment ; and this in turn depends on the existence of an increasing effective demand and on the availability of imported capital goods, essential if the expansion of activities through the reinvestment of savings is to become a reality. The volume of private savings is therefore indirectly affected by government measures in the monetary, fiscal and exchange fields.

The expansionist situation with respect to effective demand resulting from fiscal and monetary policy and the post-war growth of exports played a decisive part in accounting for the high total of private savings during the years following the war.

X. SELECTED PROJECTIONS OF THE PUBLIC SECTOR AND OF THE CAPACITY FOR FINANCING TOTAL INVESTMENT

1. *Scope of this section*

The purpose of this section is to formulate certain projections which will shed some light on the possible role of fiscal policy with respect to public income and expenditure during the next few years, in accordance

TABLE 97. COLOMBIA : PROJECTIONS OF TOTAL PUBLIC EXPENDITURE
AND ITS RELATIONSHIP WITH THE GROSS PRODUCT

	Hypothesis A			Hypothesis B	
	1953	1960	1965	1960	1965
Public expenditure (Millions of pesos at 1950 prices)	1,311	2,231	3,214	1,793	2,470
Relationship with the gross product (Percentage)	16.9	18.5	19.0	17.0	17.5

SOURCE : ECLA estimates.

with the two growth hypotheses postulated for the economy as a whole. In addition, the extent to which the total financing of national investment will be dependent upon internal or external and public or private effort is also projected.

Consequently, the projections formulated below fall into two groups, *viz.*, those relating to public income and expenditure and those dealing with the financing of the economy as a whole.

2. Projections of the public sector

(a) Projections of total public expenditure

The projection of public expenditure in Colombia is based on the idea that during the next few years the Government's fiscal policy will be bound to play an essential part in strengthening and intensifying the rate of economic growth. The Government must not only be in a position to allocate larger resources to direct capital formation through official investment programmes, but will also need to provide for a rapid and steady increase in public health, education and social security services, in which at the present time there are marked deficits.

For these reasons, the point of departure for the projection of total public expenditure is the assumption that it will expand faster than the national gross product, or, in other words, that its elasticity coefficient will be higher than unity.

In fact, as table 97 shows, government expenditure on consumption and investment will increase, in the case of hypothesis A, from 16.9 per cent of the gross product in 1953, to 18.5 in 1960 and 19 in 1965. The projection of public expenditure according to hypothesis B implies more moderate growth, as the coefficient of its relationship with the gross product will rise from 16.9 per cent in 1953 to 17 per cent in 1960 and 17.5 in 1965.

(b) Projections of current expenditure

The formulation of a public expenditure programme implies that total resources must be allocated to the two clearly-defined purposes of current expenditure and expenditure on investment.

The distribution of projected total expenditure between these two objects is based in the first place on the assump-

tion that the Government's main effort to increase its contribution to direct capital formation will take the form of moderate expansion of current expenditure, on lines such that, relatively speaking, a proportionally larger quota of resources will be transferred to the investment account. In other words, even if it is taken for granted that ordinary expenditure will rise in absolute terms, it should do so to a lesser extent than total expenditure, so as to allow of a greater increase in public investment. It will thus be assumed, with respect to hypothesis A, that while the growth rates of total *per capita* expenditure would be 5.5 per cent up to 1960 and 5.2 per cent in 1960-65, those of current expenditure would be slower, *viz.*, 3 and 4.8 per cent, respectively. Increases differing so greatly in intensity would radically alter the composition of government expenditure by consumption and investment; in fact, the proportion earmarked for current expenditure would fall from 72 per cent in 1953 to 61 per cent in 1960 and to 60 per cent in 1965 (see tables 98 and 99).

In the case of hypothesis B, the presumable change in the structure of government outlays would not have to be so great. On the one hand, current expenditure would increase slightly more slowly than total expenditure; while the rates of expansion of the latter would be 2.3 per cent up to 1960 and 4.2 per cent in 1960-65, the public sector's current expenditure would rise at rates of 2 and 3.9 per cent in the same two periods. The quota assigned to official consumer expenditure would thus decline from 72 per cent in 1953 to 70.6 in 1960 and to 69.4 in 1965 (see again tables 98 and 99).

It should be noted that the decreasing share of current in total public expenditure does not necessarily imply a lag in the absolute supply of public goods and services; indeed, at the rates of growth postulated for current expenditure, the *per capita* availability of goods and services for public consumption would increase on hypothesis A from 78 pesos in 1953 to 96 in 1960 and to 121 in 1965. On the more moderate growth hypothesis (B), the corresponding figures would range from 78 pesos in 1953 to 89 in 1960 and 108 in 1965.

The second assumption on which the allocation of public resources to the various types of expenditure is based relates to the desirability of assigning a larger share in total outlays to current expenditure on public health, education and social security services. All public expenditure related to administration, or of a general nature, would therefore be cut down.

TABLE 98. COLOMBIA : PROJECTIONS OF *per capita* EXPENDITURE

	Hypothesis A			Hypothesis B	
	1953	1960	1965	1960	1965
<i>Per capita public expenditure</i>					
Pesos at 1950 prices	108	157	202	127	156
Annual exchange rates	—	5.5	5.2	2.3	4.2
<i>Per capita current public expenditure</i>					
Pesos at 1950 prices	78	96	121	89	108
Annual exchange rates	—	3.0	4.8	2.0	3.9

SOURCE : ECLA estimates.

TABLE 99. COLOMBIA : PROJECTIONS OF TOTAL PUBLIC EXPENDITURE AND ITS DISTRIBUTION

	Hypothesis A			Hypothesis B	
	1953	1960	1965	1960	1965
1. <i>Current expenditure</i> (Millions of pesos at 1950 prices)					
Health, education and social security	194	402	643	305	469
National defence, Government, general administration	749	953	1,278	961	1,246
TOTAL 1	943	1,355	1,921	1,266	1,715
1 as a percentage of 3	72.0	61.0	60.0	70.6	69.4
2. <i>Investment expenditure</i> (Millions of pesos at 1950 prices)					
2 as a percentage of 3	28.0	39.0	40.0	29.4	30.6
Total public expenditure (1 + 2) (Millions of pesos at 1950 prices)	1,311	2,231	3,214	1,793	2,470

SOURCE : ECLA estimates.

Hypothesis A assumes that the proportion of expenditure devoted to public health, education and social security would rise from 14.8 per cent in 1953 to 18 per cent in 1960 and 20 per cent in 1965. On hypothesis B, the corresponding percentage relationships would be 17 in 1960 and 19 in 1965, which would still represent a considerable expansion in absolute terms (see table 99).

Such a concept of public expenditure policy is supported by the fact that in a country like Colombia, which is in process of rapid development and where the rate of urbanization is high, the current deficits with respect to public health and educational services, and the backwardness of the social security systems, may prove to be factors which, if they are aggravated in the future and do not receive preferential attention, may restrict development itself. It must not be forgotten that public expenditure of the kind described to some extent represents intangible investment, as, by raising the standard of living of large sectors of the community, it indirectly contributes to the improvement of productivity. Furthermore, the speedier expansion of this type of expenditure at the cost of the margin available

for general administration services does not mean that the effective rate of growth of these latter must inevitably decrease, since it may be offset, up to a point, if the productivity of state administration is improved either by the introduction of new working techniques or by the simplification and suppression of services that conflict with or duplicate one another.

(c) *Projections of public investment*

The formulation of hypotheses as to the volume and composition of government investment completes the set of projections of resources wherewith the targets for the supply of collective goods and services now and in the future can be attained. Once total public outlays and the proportion that would be absorbed by current expenditure have been projected, the volume of public investment is implicitly determined under the foregoing head. According to these figures, the coefficient of government investment would markedly increase in the case of hypothesis A, from 28 per cent in 1953 to 39 per cent in 1960 and 40 per cent in 1965. On hypothesis B,

the Government's participation in capital formation would be more moderate up to 1960, as until then the proportion of total expenditure earmarked for investment would remain the same as in 1953 (29.4 per cent). Subsequently, on the other hand, it would reach 30.6 per cent by 1965.

The projected relationship between public and total investment determines the scope of government action as far as its direct contribution to the process of capital formation is concerned. In 1953, this coefficient stood at 20.7 per cent, which may be considered low in comparison with the corresponding figure in other periods of Colombia's economic development, especially during the war and the phase preceding the depression of the 'thirties, when for several years it exceeded 30 per cent.

In the projections established by hypotheses *A* and *B*, a much larger proportion is assigned to government investment than that reached in 1953, since hypothesis *A* postulates that such investment might represent as much as 32 per cent of total investment by 1960 and 1965. On hypothesis *B*, its share is assumed to be smaller, since the projection presupposes 25 per cent for 1960 and 1965; but even so, this is higher than the figure for the base year (1953), and similar to the post-war average.

These postulates as to the role of public investment in the process of capital formation cannot be considered exaggerated, since the percentages assumed on both hypotheses have already been attained at least once in the course of Colombia's past economic development.

Nor is much justification required for the need to maintain a satisfactory volume of public investment in the next few years. Attention has already been called in the present study to the importance, for the creation of a development dynamic, of carrying out projects designed to expand or establish such basic capital as is essential if bottlenecks that might result in under-utilization of the available economic potential are to be avoided.

In the transport sector, for example, the high coefficient of public investment in relation to total investment must be maintained, in order not only to meet the more exigent demands which development will entail in years to come, but also to incorporate new areas into the country's economy and achieve a higher degree of market integration. It has already been noted that public investment in this sector of the economy is particularly important in the case of Colombia, where the country's geographical features militate against the mobility of its material and human resources and the area distribution of available goods and services.

In the field of industry, the continuance of current programmes, which are being implemented mainly through the *Instituto de Fomento Industrial*, would also call for heavy investment in the development of the pulp and paper industry, in the expansion of medium- and long-term industrial credit and in certain other projects connected with chemical industries based on petroleum and coal derivatives.

In the agricultural sector, too, public investment requirements are substantial, especially with respect

to irrigation works, drainage, agricultural machinery, imports of selected cattle, the building of silos for storage and the development of certain projected experiments with new crops.

In the sphere of investment in energy, increased governmental action through the programme of the *Instituto de Aprovechamiento de Aguas y Fomento Eléctrico* also seems needful. The reason for this expansion of demand for public capital lies in the existing deficits, which, at the end of 1954, according to the report submitted by the *Instituto* itself, amounted to 150,000 kW., as well as in the additional requirements deriving from the growth of the population and industrial development.

Lastly, the investment of large sums in the housing and municipal works sector, where marked shortages exist, is also essential. Housing programmes for the lower and medium income groups, to be put into effect through the official institutions, call for greater attention. In fact, according to official estimates, the deficit in urban housing at the end of 1953 amounted to 95,000 dwellings. It must not be forgotten that hitherto Colombia has not possessed, like other countries, mechanisms for the compulsory channelling of resources towards residential building through the creation of social security funds.

With respect to municipal works, again, the problem to be solved is far-reaching. According to the *Instituto de Fomento Municipal*, over 80 per cent of the Colombian municipalities have neither aqueducts nor sewerage systems, and the investment needed to remedy this deficit would exceed 400 million pesos at 1954 prices.

The Government has recently adopted certain measures to rationalize the administrative machinery involved in the execution of energy, housing and municipal works projects, through the creation of a Public Utilities Corporation (*Corporación de Servicios Públicos*) constituted by three of the institutions previously mentioned, namely, the *Instituto de Aprovechamiento de Aguas y Fomento Eléctrico*, the *Instituto de Crédito Territorial* and the *Instituto de Fomento Municipal*.

In view of prospective availabilities of resources for government investment, the partial or complete solution of the problems which are clamouring to be dealt with will depend upon careful programming of public investment with respect to the allocation of aggregate resources by sectors, in accordance with scientific criteria for the evaluation of projects.

3. Projections of public income

A second aspect of the projections for the public sector concerns the formulation of hypotheses as to the Government's potentiality for absorbing resources where-with to finance the postulated levels of expenditure.

The projection of government income relates essentially to current revenue, or that accruing from taxation and deriving from official capital. Consequently, all such capital resources as imply the obtaining of funds through internal or external loans are excluded. The difference between the income and the current expenditure projected gives the amount of government savings which the fiscal system is capable of mobilizing for

capital formation on the different hypotheses. In its turn, a comparison between public savings and total projected investment permits the computation of the amount of resources for which the Government will have to draw upon the domestic capital market or external funds ; that is, it gives the measure of the internal or external public borrowing that will be necessary to supplement the fiscal system's own capacity for financing on the basis of public savings.

(a) *Projections of the tax burden*

One of the essential requisites in the planning of fiscal policy as an instrument of economic development is to raise to the maximum the amount of resources which the State can use for capital formation. In the projection of the income and expenditure of the public sector in Colombia it is assumed that there are two means of attaining this end. One consists in a relative restriction of the rate of growth of public current expenditure, without prejudice to outlays on education, public health and social security ; this is reflected, as has already been seen in the discussion of the projection of expenditure, in the assignment of a larger quota of total expenditure to the investment account. The other way is to postulate a moderate increase in the tax burden in relation to national income, that is, to assume a tax elasticity coefficient higher than unity.

The assumption adopted here will be that in the case of hypothesis *A* the proportion of the gross product represented by the tax burden would rise from 11.5 per cent in 1953 to 13 per cent in 1960 and 13.9 in 1965. This would of course mean that the authorities would have to modify the tax system, either by eliminating the factors of inflexibility in certain types of taxes, improving the efficiency of tax administration and increasing the tax burden for certain sectors, or, alternatively, by raising existing tariffs or introducing new forms of taxation. The foregoing hypothesis is based

on the assumption that the change in the tax system would take the form of an increment in the percentage of the total tax burden deriving from direct taxation ; thus, the proportion of 38 per cent corresponding to direct taxes in 1953 would rise to 40 per cent in 1960 and 45 per cent in 1965 (see table 100). Such an evolution implies that the elasticity coefficient of direct taxes in relation to the gross product is higher than that postulated for the total tax burden. Tax policy could undoubtedly be implemented along these lines — which would mean that the system became still more progressive — without detriment to investment incentives, but by the sacrifice of some part of the future improvements in the productivity of the Colombian economy, as well as by drawing into the orbit of direct taxation those higher income groups which at the present time wholly or partially evade their tax obligations. In all likelihood, the tax on income and capital will long continue to represent the keystone of Colombia's tax system, since there is no denying that, despite the difficulty of applying it, it has been a valuable instrument wherewith to mobilize resources and mitigate the inequity of a régime that was based twenty years ago on a high proportion of indirect taxation, as is still the case in many Latin American countries.

The foregoing remarks are also applicable to the projection of the tax burden in accordance with hypothesis *B*, which will next be examined. In this case, the point of departure was the assumption that the elasticity coefficient of taxes was slightly higher than unity, and therefore implied a more moderate increment in the tax burden than that entailed by hypothesis *A*. In fact, the proportion of the gross product represented by taxation would rise from 11.5 per cent in 1953 to 11.8 in 1960 and to 12.3 in 1965, and the share of direct taxation in the tax burden thus projected would increase from 38 per cent in 1953 to 40 per cent in 1960 and 42 per cent in 1965 (see again table 100).

TABLE 100. COLOMBIA : PROJECTIONS OF PUBLIC CURRENT INCOME

	<i>Hypothesis A</i>			<i>Hypothesis B</i>	
	1953	1960	1965	1960	1965
1. Tax revenue (Millions of pesos at 1950 prices)					
Direct taxation	341	627	1,060	500	730
Indirect taxation	556	941	1,285	750	1,009
Total tax burden	897	1,568	2,345	1,250	1,739
2. Income from sources other than taxation (Millions of pesos at 1950 prices)	282	482	700	384	520
3. Total current public income (Millions of pesos at 1950 prices)	1,184	2,052	3,045	1,634	2,259
4. Direct taxation as a percentage of the total tax-burden	38.0	40.0	45.0	40.0	42.0
5. Tax burden as a percentage of the gross product	11.5	13.0	13.9	11.8	12.3
6. Public income as a percentage of the gross product	15.3	17.0	18.0	15.5	16.0

SOURCE : ECLA estimates.

Once the growth targets for the total tax burden and for direct taxation have been established, indirect taxes are implicitly projected by deduction. In reality, in view of the distribution of national income in Colombia, both for reasons of equity and on economic grounds it seems inadvisable to consider the obtaining of additional resources through taxes affecting consumer expenditure. Economically speaking, a cautious attitude to indirect taxation is important from the point of view of the latter's influence on effective demand, since the rate of economic progress may be slowed up if the increase in the expenditure of large sectors of the community — especially the lower income brackets — is insufficient to absorb the greater inflow of consumer goods and services resulting from development, and thus leaves room for a trend involving under-utilization of productive capacity.

(b) *Projections of income from sources other than taxation*

In Colombia, public income from sources other than taxation is largely composed of departmental and municipal revenue, deriving from monopolies in industrial and commercial enterprises connected with beer, spirits, wine and alcoholic beverages in general.

As regards the projection of resources of this kind, hypothesis *A* assumes that the proportion of the gross product which they represent would increase very slightly, from 3.6 per cent in 1953 to 4 per cent in 1960 and 4.1 in 1965. Hypothesis *B* postulates that the coefficient of elasticity would be equal to unity, or, in other words, that the 1953 relationship (3.6 per cent of the gross product) would remain unchanged in 1960 and 1965, as can be seen in table 100.

By combining the projections of income from taxes and from other sources, the Government's total potentiality for mobilizing resources through current income can be finally determined.

According to hypothesis *A*, the proportion of the gross product which would be transferred to the public sector in the form of current income would rise from 15.3 per cent in 1953 to 17 per cent in 1960 and 18 per cent in 1965; it should be noted that this increase in the share of current income basically derives from the

assumptions of greater elasticity formulated in the projection of the tax burden. In the case of hypothesis *B*, on the other hand, the increment in the percentage of the gross product represented by current income would be less marked, since the 1953 figure of 15.3 per cent would become 15.5 per cent in 1960 and 16 per cent in 1965.

(c) *Projections of the public debt*

As has already been seen, projection of total public income and expenditure permits, in the first place, the determination of the amount of public savings that can be generated on the two growth hypotheses postulated by 1960 and 1965, and, secondly, the calculation of the additional resources that would be needed to supplement government savings for financing the various public investments.

Once these projections have been established, it is clear that on both hypotheses the contribution of government savings to the financing of public investment would be higher than in 1953. In fact, according to hypothesis *A* the proportional relationship of the savings of the public sector to state investment would rise from 59 per cent in 1953 to 79.3 per cent in 1960 and to 87.3 per cent in 1965. In the case of hypothesis *B*, the contribution of fiscal savings to the financing of public investment would be smaller than in that of hypothesis *A*, but larger, nevertheless, than in 1953. Thus, from 59 per cent in 1953, it would increase to 68.1 per cent in 1960 and to 71.9 per cent in 1965 (see table 101).

The difference between the total public investment postulated and the amount of savings that can be generated by the fiscal system, gives the measure of the borrowing to which the Government must resort in order to attain the public investment targets. Such supplementary resources may be obtained through more efficient management of the internal public debt, which, as has already been shown in the present study, offers encouraging prospects for the attraction of private savings, provided that certain aspects of its administration are reformed, and, above all, that the basic principle of voluntary contribution is adopted. The private sector should be induced to use its available surpluses for purchasing public bonds by means of a wide programme

TABLE 101. COLOMBIA : PROJECTIONS OF PUBLIC SAVING, GOVERNMENT BORROWING AND FINANCING OF PUBLIC INVESTMENT

	Hypothesis A			Hypothesis B	
	1953	1960	1965	1960	1965
1. Public saving (Millions of pesos at 1950 prices)	217	695	1,129	359	543
2. Public investment (Millions of pesos at 1950 prices)	368	876	1,293	527	755
3. Resources to be obtained by means of the internal and external public debt (2-1) ...	151	181	164	168	212
4. Contribution of the Government to the financing of public investment (1 as a percentage of 2)	59.0	79.3	87.3	68.1	71.9

SOURCE : ECLA estimates.

of special incentives. The compulsory mechanisms employed hitherto seem to be approaching their limit, and if changes are not introduced in the management of the internal public debt, there is some risk of further progressive recourse to the inflationary expedient of placing government securities in the Central Bank.

The question of the external public debt and the country's capacity for borrowing is analysed in another chapter of the present study. In any case, it is difficult to project how domestic and foreign resources deriving from expansion of the internal and external debt may best be combined for purposes of financing the Government's investment programmes, since the choice is affected by a whole complex of political, economic and financial factors.

4. Projections of total financing for the economy as a whole

Tables 102 and 103 show in consolidated form the total financing of public and private investment postulated for the attainment of Colombia's economic development targets during the next few years. It can be seen that domestic resources are likely to preponderate in the financing of capital formation, and in some years should even allow of a net outflow of funds abroad.

Hypothesis *A* assumes that by 1960 97.6 per cent of resources for financing purposes would derive from domestic gross savings and 2.4 per cent from the liquid inflow of external resources. As regards the source of domestic savings, it is estimated that 78.2 per cent would be contributed by private savings and 19.4 per cent would accrue from the public sector's surplus on current account. This implies that a more important role is assigned to the budget as an instrument for the mobilization of savings than in 1953, since in that year public savings represented 13.4 per cent of the economy's total investment resources. According to hypothesis *A*, the situation in 1965 would differ from the 1953-60 phase, inasmuch as foreign capital would exert a negative influence on the availability of resources for investment, an outflow of funds amounting to 53 million pesos, or

the equivalent of 1.2 per cent of total financing capacity, being projected. This, domestic gross savings would exceed net investment resources by 1.2 per cent, a proportion which would correspond to the internal effort transferred abroad through the negative balance of external capital and credit movements. As regards the participation of the public and private sectors in the mobilization of national savings, this hypothesis assumes an even more important contribution from the governmental sector, since official savings would come to represent approximately one-fourth (24.6 per cent) of total savings (see table 102).

The projection of financing in the case of hypothesis *B* is based entirely on domestic capacity for the mobilization of resources, as in one phase (1953-60) the inflow of foreign resources is estimated as nil, and in the other (1960-65) the part played by the external sector would lead to a net transfer of the equivalent of 3.8 per cent of total investment resources. This latter would be achieved by means of a reduction in domestic investment availabilities, or, in other words, at the expense of internal gross savings. As regards the contribution of the public and private sectors to the formation of domestic savings, this hypothesis assumes that the contribution of the budget would be maintained, and that public savings would amount to 13.5 per cent of the economy's total financing capacity in 1960 and to 14.9 per cent in 1965 (see table 103).

Implicit in the estimated methods of financing capital formation in Colombia, if over-all economic growth targets are to be attained, is the need to adapt the instruments of economic policy to the ends proposed. In the internal field, budget policy should play a central part in supplementing the volume of savings for the financing of economic development; indirectly, government action through the various instruments of economic policy should be designed to secure the voluntary generation of the private savings postulated, that is, to induce enterprises and individuals to distribute their income between consumption and saving in a manner adapted to the need for financing a higher rate of investment.

TABLE 102. COLOMBIA : TOTAL PROJECTION OF RESOURCES AVAILABLE FOR INVESTMENT, 1960-65

(Hypothesis *A*)

	Millions of pesos at 1950 prices		Millions of pesos at 1950 prices		Millions of pesos at 1950 prices	
	Percentage	Percentage	Percentage	Percentage	Percentage	Percentage
1. <i>Gross savings</i>						
Public savings	217	13.4	695	19.4	1,124	24.6
Private savings	1,426	88.0	2,797	78.2	3,504	76.6
TOTAL FOR 1	1,643	101.4	3,492	97.6	4,628	101.2
2. <i>Net inflow of external resources</i> .	-22	-1.4	-85	-2.4	-53	-1.2
3. <i>Total resources available for investment</i>	1,621	100.0	3,577	100.0	4,575	100.0

SOURCE : ECLA estimates.

TABLE 103. COLOMBIA : TOTAL PROJECTION OF RESOURCES
AVAILABLE FOR INVESTMENT, 1960-65

(Hypothesis B)

	Millions of pesos at 1950 prices		Millions of pesos at 1950 prices		Millions of pesos at 1950 prices	
		Percentage		Percentage		Percentage
1. <i>Gross savings</i>						
Public savings	217	13.4	368	13.5	544	14.9
Private savings	1,426	88.0	2,363	86.5	3,242	8.9
TOTAL FOR 1	1,643	101.4	2,731	100.0	3,786	103.8
2. <i>Net inflow of external resources</i> .	-22	-1.4	—	—	-140	-3.8
3. <i>Total resources available for investment</i>	1,621	100.0	2,731	100.0	3,646	100.0

SOURCE : ECLA estimates.

Chapter II

AGRICULTURE IN COLOMBIA

INTRODUCTION

An attempt is made in this chapter to analyse the situation of Colombia's agriculture. From the outset the reader will encounter many technical and economic shortcomings which characterize agricultural production. Such a picture might either give the impression that the situation is little less than catastrophic, or awaken the suspicion that its negative features have been exaggerated in the analysis to the detriment of its positive aspects. Both these impressions would be erroneous. The unsatisfactory conditions described in the text correspond to reality, but they do not imply that Colombia's agriculture is extremely retarded or that there are few prospects for improvement. The position must be assessed within the framework of the country's geographical location and the historical circumstances in which the economy has developed.

Colombia is a typically tropical country, and tropical agriculture has been until very recently — and in some aspects still is — a complex field which science and technology have scarcely begun to explore. In addition, Colombia has a broken topography, while the staple crop — coffee — is particularly adapted to the ecological habitat and requires few technical improvements in the methods of cultivation applied. These three facts partly explain why Colombia's agriculture has not undergone a transformation similar to that of countries in other areas, or even of tropical zones with flat land and crops which have long attracted the interest of scientists and of more progressive entrepreneurs.

Historically, agriculture has for centuries been a subsistence activity or has enjoyed only a limited local market, with the exception of coffee and some other crops of minor importance. As a result — and the same is true of other countries — the techniques of the farm worker today differ but little from the practices in use when the *conquistadores* landed. The integration of the country's economy and the creation of urban markets and industries consuming agricultural raw materials were necessary to arouse interest in economic development aimed at supplying the domestic market, and to emphasize the need for increasing the productivity of the farm worker and for improving agricultural techniques.

It is worth while to consider some of these circumstances at greater length, with a view to a better understanding of the status of Colombia's agriculture.

Particularly in the medium and hot zones, the tropical climate with its high temperatures and humidity favours

the development of a profuse variety of wild plants, against which man must struggle constantly to keep the land clear for other useful species. In addition, innumerable pests exist which attack both plants and animals, and even man, and to combat which no effective means of protection, and certainly no control, existed until fairly recently.

Life was rendered still more difficult by floods during the rainy season, which not only inundated crops and drowned livestock, but also cut off the precarious means of communication, sometimes for long periods. It is not surprising that the population tended to settle in the colder zones, where such problems were less serious, and that the torrid areas were populated at a much slower rate. The cool zones, which are generally located on the slopes of the cordillera, are for that reason much healthier for human beings than the tropics; but they have their own problems, arising mainly from the rugged topography which has made communication between the different townships and between consumer and producer centres extremely difficult. The reclamation of mountainous land in the medium-climate areas was encouraged by the external demand for coffee. Although many of the problems of the extreme climatic zones affect the medium zone, the land was nevertheless brought under cultivation because it was so exceptionally well adapted to coffee-growing.

Climatic and topographical characteristics, as well as particular suitability for certain crops, definitely influenced the population pattern and thus determined the structure of agrarian ownership in each zone. The farm land in the most densely populated areas was more intensively sub-divided than in the tropical zones where the large cattle ranches were established. The pressure for land ownership, caused by the growth of the population, was accompanied by the appearance of a new problem, erosion, for which no practical and effective system of control was known.

Another major reason for the present situation of Colombia's agriculture lies in the fact that European settlers adopted and perpetuated many of the practices and farming systems of the original inhabitants.

The livestock brought from abroad by settlers became adapted to the new environment and, after a long process of natural selection, gave rise to the various indigenous breeds at present existent in Colombia, whose hardiness permits of farming by extensive methods and means that special care can be dispensed with.

The limitations and problems of the tropical environment are more than offset by a series of advantages which

can be increasingly exploited thanks to scientific and technological progress. It is now possible to protect human beings against the plagues which attack them and even to eradicate some of these pests economically. Mechanical progress has facilitated the construction and maintenance of roads, the drainage of swamps, the clearing of forests, the construction of irrigation works and other improvements. Agricultural and livestock research is producing animal breeds and plant species that mature early, are hardy and resistant to pests and disease, and provide high unit yields. Similarly, new techniques conduce to the progressive development of higher-quality commodities, improved methods of cultivation and cheaper and more effective systems of pest control in cases where resistant or immune varieties have not yet been discovered. The conservation and even the recovery of eroded land can be carried out without interrupting farming activities and, what is even more important, to the economic benefit of those who adopt such systems. The chemical weed-killers discovered in recent years have proved very efficacious, as well as being cheap and simple to apply.

In short, most of the difficulties in the tropical zone, which mainly arose from its over-exuberant fertility, have been conquered in recent years through technological and scientific progress. The application of modern techniques to crop farming and livestock production is enabling this fertility to be utilized for the benefit of man. Colombia possesses these new weapons, and has already launched a vigorous campaign in many spheres to eliminate obstacles and make the most rational use of the resources at its disposal. Examples of this include the campaigns which in a few years have eradicated malaria from vast areas; the extensive irrigation and drainage which have raised production to ten or more times its previous level on the same land; the new maize varieties, yielding four times as much as traditional strains; and the increases in cotton production obtained by expanding the area under this crop, as well as, particularly, through the higher yields deriving from the use of improved seed and the application of modern farming practices and pest controls.

In addition to these general remarks, some idea should be given of the order of presentation in this chapter.

The first part begins with a synopsis of the main agricultural problems in Colombia. Next come estimates of the supply of foodstuffs and of non-alimentary raw materials for industry. The foodstuffs balance-sheet is supplemented by calculations to determine the average diet according to statistics, which is then compared with the recommendations of the *Instituto Nacional de Nutrición*. An analysis follows of trends in agricultural production and imports, and of the nature and volume of the contribution of each of these sectors to available supplies for the home market and for export during two decades ending in 1955.

The conclusions reached point to the advisability of studying the agricultural area by analysing current land utilization and the possibilities for expansion. The situation of the staple crops and of livestock is considered jointly and individually. The study of unit yields in

relation to the evolution of production leads to an examination of the main factors conditioning agricultural development in Colombia. For this purpose, the factors concerned are divided into two groups, *viz.*, those relating to the technological level and those of a structural nature. The former include agricultural research and extension, irrigation, the use of fertilizers and plague-killers, storage, mechanization and many aspects of stockfarming. Structural factors include the systems of land tenure and labour wages, the distribution of farms by size, and the productivity of the land, this last being measured in terms of labour employed, capital invested and land utilized.

The aim of the second part of the chapter is to establish alternative projections for the future growth of agricultural production. To this end, consideration is given to the diagnosis in the first part and to the advisability, for the economy as a whole, of improving nutritional standards, replacing certain imports by domestic production and diversifying exports. A series of statistical instruments — some of them peculiar to this sector and others of a general nature — is used to integrate the projections of demand for agricultural commodities with those formulated for other sectors and for economy as a whole. The production targets once established, an analysis ensues of the contributions to the projected increments that might be made, on the one hand, by higher yields resulting from improved techniques, and, on the other, by more efficient land utilization and an expansion of the area under cultivation.

Finally, an estimate is made of future labour requirements and of the increases in productivity which might be achieved on the assumption that the desired technical progress would take place and that the investment necessary to achieve the production increments determined by the projections of demand would be forthcoming.

A. CURRENT SITUATION AND PROBLEMS OF COLOMBIAN AGRICULTURE

I. GENERAL CHARACTERISTICS

The following are some of the characteristic features of agriculture in Colombia.

(a) In general, agriculture proper, *i.e.*, the cultivation of crops, and stockfarming are completely separate activities; a combination of the two is uncommon.

(b) This situation apparently arises from the structure of agrarian property. Large and medium-sized estates are almost exclusively devoted to stock farming, subsistence crops being grown on a small scale by the permanent workers on the farm. The owner, if a stock farmer, grows no crops at all. About 50 per cent of the area under cultivation is used for the production of foodstuffs in smallholdings, with a view to satisfying, firstly, the subsistence needs of the rural family, and, secondly, the market. Such foodstuffs include plantains, yucca, maize, *panela* (unrefined brown sugar), pulse and vegetables. Another group of commodities is grown on

48 per cent of the cultivated land, also on smallholdings, but mainly for sale on the market. These are products which have an assured outlet through the exporters of the appropriate processing industries, and comprise coffee, cacao, rice, cotton, wheat, barley and tobacco. In the case of rice and cotton, an increasing proportion of the output comes from medium-sized holdings, usually leased by the planters, while the rest is produced by smallholders, share-croppers and tenant farmers. Coffee, cacao, wheat and barley are grown by the land-owners, and tobacco almost exclusively by share-croppers. Finally, cane for the sugar mills and bananas for export are cultivated over large areas by the owners of the land themselves.

(c) Crop farms are usually located on the mountain slopes and on steep and broken ground, whereas flat lands are used for stock farming. This situation arises both from historical and from sanitary causes. As the frontiers of agriculture were pushed forward, extensive tracts of flat ground were bought by wealthy purchasers for stock farming purposes. The poorer agricultural workers, who comprise the vast majority of the rural population, had to seek land elsewhere for subsistence farming, and could find nothing but the mountain slopes, in which the owners of large stock farms were not greatly interested. Moreover, weather and sanitary conditions were more favourable on the slopes, particularly in the cool and sub-tropical zones, than on the plains, where periodic floods and the existence of permanent swamps made life difficult and farming hazardous. Part of the hillside population is now made up of former gold-miners, who took to the land when the mines were depleted.

(d) Because most agricultural commodities are grown on smallholdings where a large part of the crop is consumed, special market conditions for surpluses have arisen. Each species of commodity has innumerable varieties which differ as to quality, size, shape, taste, colour, appearance and condition. Many of these commodities are essentially perishable, and even those which are not are exposed to the risk of destruction or deterioration owing to the total lack of adequate storage facilities on the farms, and deficient means of transport to the market. Producers have no sales organization, and in many parts of the country transactions are effected in open-air markets, either directly between producers and consumers, or between the former and the small retailers who supply larger urban centres. These retailers are not organized either, nor have they facilities for storing stocks and keeping them in good condition. Furthermore, the absence of uniformity among commodities of the same kind creates storage problems and hinders their standardization for purposes of large-scale trade. Prices not only undergo enormous seasonal fluctuations, but also differ from one locality to the other at the same date; contributory factors are, of course, the condition of the crops and transport facilities, while there are no organizations in a position to regulate the market by buying during the harvest and properly storing crops in order to satisfy demand during those months when they are in short supply. Fortunately, the ecological conditions of the country are such that many crops can be

grown and harvested at any time of the year, though one season may be better than another. Wastage is alarmingly high, and the appearance, state of preservation and quality of the commodities that reach the consumer are very unsatisfactory.

(e) Single-crop farming is the almost universal practice, and is particularly detrimental in the case of annuals such as rice, cotton, maize, wheat, barley, etc., which are sown continuously and unremittingly on the same soil until it is totally depleted or eroded.

(f) In irrigated land, particularly where irrigation has only recently been introduced, a process of depletion, lixiviation and chemical erosion is taking place, owing not only to repeated cultivation of a single crop but also to excessive irrigation and bad management of the water supply, while the distribution systems have not been supplemented by even the most indispensable drainage works. There have been cases where lack of drainage has caused outcroppings of salts that are harmful to the crops, thus aggravating the process of soil deterioration.

(g) Soil conservation practices are unknown to most farmers, even though, in recent years, campaigns have been launched to disseminate them among coffee-planters and producers of other crops. The scope of these programmes, however, is small as compared with the country's requirements. It is interesting to note that in coffee plantations the soil has been protected by two traditional practices which have been effective against erosion, namely, the growing of shade trees, and the use of the machete rather than the hoe for weeding.

(h) Erosion has become an acute and increasingly serious problem, which has spread almost throughout the country. Vast tracts in several departments have become unfit for agriculture, and in many cases deterioration is so complete that the land can neither be utilized as pasture, nor be reforested, since the trees would find nowhere to take root. The soil which is carried away is rapidly making the big rivers unnavigable, and all streams are losing some part of their drainage capacity. For this reason, and because the river basins are being progressively stripped of their protective mantle of forest vegetation — which acts as a brake and control on the smaller streams — the heavy rains cause floods which, year by year, are becoming increasingly severe and prolonged, with the consequent losses in crops, livestock, houses, and even human lives. Seasonal marshes are becoming permanent swamps, and new areas are turning into seasonal marshes.

(i) Water sources for the supply of cities and for irrigation tend to dry up in seasons of drought, so that irrigated areas are restricted, and the possibilities of extending irrigation to land which urgently needs it are rapidly diminishing.

(j) Roads built on mountain slopes — which comprise a major proportion of Colombia's road network — are frequently impassable in rainy seasons owing to landslides, and on more than one occasion the collapse of a hill has buried its inhabitants together with their houses, livestock and belongings. Several large towns are seriously

threatened by the wash-outs which are constantly eating away and reducing the base on which they stand.

(k) Despite this situation, the rural population still continues to cut down the forest growth on ever steeper ground in order to extend coffee plantations and subsistence crops, without restrictions of any kind to prevent it from doing so. An inventory of eroded land is needed, and, more urgently still, a general survey aimed at locating and estimating the size of the most seriously affected areas, as well as those other districts where the nature of the soil makes it particularly susceptible to erosion, and where the natural vegetation should therefore remain untouched.

(l) Unit yields are very poor and the level of farming techniques is extremely low.

(m) The use of fertilizers is not widespread, Colombia ranking very low in this respect. This is understandable in the case of mineral fertilizers, which have to be imported, since the country has not as yet discovered domestic sources of raw material, with the exception of phosphate slags from the newly installed steel making industry. Organic fertilizers are applied only by growers of potatoes and certain vegetables, for which cattle-dung is used. The waste products of slaughter-houses, including blood, are hardly turned to account at all, and the bone fertilizer industry is only incipient. There are no factories to transform city garbage into fertilizers, nor are green manures cultivated.

(n) Rotation of crops is practised very seldom, and then only with forage crops.

(o) The use of improved seed in the case of some strains of wheat, maize, beans, barley, coffee, and cacao is becoming more widespread, but still within too limited a field for its effects to be felt in the aggregate production of the corresponding crops. Only where cotton and cane for the sugar mills are concerned has the use of improved varieties resulted in appreciably increased yields and aroused general interest among planters. Some difficulty has been encountered in extending the use of improved varieties of such species as beans, maize and potatoes, as some sectors of the population have been deterred by taste and habit from reacting favourably towards them, and have preferred to continue consuming the traditional varieties despite their inferior quality and higher prices.

(p) The weather prevailing at the different climatic levels — all of which, except the high moorlands, are characterized by relatively stable temperature and humidity, without abrupt or extreme fluctuations — is the factor that most encourages the development of all kinds of plagues, which attack both plant and animal species. Annual losses on this account have been only roughly estimated, but they are nevertheless alarming, while efforts to control such plagues sometimes encounter obstacles that are very difficult to overcome.

As regards cattle-breeding, the extensive method is practised to an exaggerated degree, on large estates unprovided with adequate fencing and under absentee ownership, so that plagues and diseases cannot be controlled — if any attempt is made to do so — with the

timeliness and care recommended by veterinary science, and neglected animals later become a focus of infection within their own herd and for neighbouring ranches. Disease control among minor livestock and poultry is still more difficult, since these are dispersed over innumerable smallholdings. The same is true of crop production.

The fact that the land is broken up into small farms — about half a million comprise less than ten hectares each, and, of these, 268,000 are holdings of under two hectares — prevents full control of plant diseases, since each farm grows from three to five crops, at least, which are attacked by different specific plagues. Treatment, when technically feasible, must be given to each plague and plant species separately, the methods adopted varying according to type of pesticide and season, state of the weather, hour of the day and frequency of application. Moreover, some pests which attack cultivated crops also live on wild species, so that treatment is ineffective or a sheer impossibility. Progressive farmers frequently face failure when their orchards or fields become reinfected because their neighbours, whether through indifference or through lack of resources, have not controlled plagues on their own farms.

Plague-killers are successfully and fairly widely used in plantations of bananas for export, and in cotton, tomato, potato and tobacco cultivation. The use of weed-killers in rice, wheat and barley fields, and in the cane plantations of the sugar mills, is also becoming a general practice. It should be noted that all these crops — with the exception of potatoes, tomatoes and tobacco — are grown on large or medium-sized holdings.

(q) The conditions in which stock farming is carried on show a lack of criteria on the part of the farmers, and low standards of technology. For instance, approximately one-fourth of the existing cattle, or 3 million head, are turned out to graze "on the range" and the rest are also bred on estates too extensive for proper supervision, with the exception of some few dairy and fat stock herds, the management of which is technically satisfactory. In general, livestock yields are very poor, owing to the slow progress made in zootechnical practices, feeding systems and sanitary control.

The stock reared "on the range" consists of indigenous cattle breeds which are very adaptable and hardy, but small, slow to mature and low-yielding. They are left to their own resources, with little or no intervention from the owners, and might even be regarded as wild stock. Under these conditions, the death-rate is naturally exceedingly high, particularly for calves. Steers for consumption weigh little, while the milk yield of breeding cows is barely sufficient for the calf, and they are therefore not milked.

Extensive stock farming, both for meat and for milk, is the type most prevalent in Colombia. The cattle are mainly of native breeds, some of which are notable for their better build, complete adaptation to the habitat and marked power of resistance to disease. There is regular cross-breeding with imported animals to improve strains, but this is not satisfactorily related to the environment, feeding and care required. Large estates on fertile and level ground are frequently used for the extensive

rearing of indigenous cattle, while neighbouring farms produce bigger yields by crop cultivation.

The cattle farms that are worked intensively and use improved breeds are, as has been seen, few in number. Here the feed ration is better balanced, animal pathology is kept under supervision and management is more efficient.

Apart from the slow genetic improvement of animal stocks, the low birth rate and high death rate, additional factors limiting production are the marked deficiencies in the composition and management of pastures, the storage of fodder and the supply of feed concentrates.

Pastures are mainly of grass, with only a small proportion of leguminous plants. The fields are usually too large, and not numerous enough for proper rotation of cattle, while the grass is allowed to grow so long that it becomes ligneous and loses its nutritive value. Grass is hardly ever grown for scything, and silage and hay-making are practically unknown. Very few producers use feed concentrates, which are administered only to imported animals and to certain milch cows.

These are the preponderant factors retarding the development of stock farming, which has patently declined in recent years, not only where cattle are concerned, but also in other sectors of livestock production.

(r) On the whole, Colombia's agriculture is only in the initial stages of mechanization. Traditional practices, including the almost exclusive use of hand tools, are largely followed in the cultivation of maize, potatoes, tobacco, yucca and beans, which together cover about 1 million hectares. The small and scattered character of agricultural holdings, and the uneven ground typical of the majority, are among the basic factors which have retarded the process of mechanization in sectors where such methods might be applicable. Mechanization has made most progress in the preparation of the land with tractors for crops such as cotton, rice, cane for the sugar industry, and to a lesser extent, barley and wheat. Some irrigated plains constitute an exception in that tractors are used to prepare the soil for all kinds of crops — including maize and beans — and also to haul the harvest. In recent years, heavy tractors have begun to be used for clearing forest land, and for building approach roads and small reservoir tanks for watering cattle. Tractors are not generally used for sowing, care of crops — weeding, hilling, or manuring — or harvesting, nor are they used as motive power for the sorting and winnowing of grain.

The pest and disease control essential to the successful cultivation of certain crops — potatoes, tobacco, tomatoes, cotton and bananas for export — has been efficiently and widely mechanized. Hand and motor-driven spraying equipment is in use for the first three crops; motor pumps and fixed pumping stations with a whole network of distribution lines for liquid plague-killers are utilized for bananas; and aeroplanes are frequently employed to combat pests which attack cotton.

Harvesters have recently come into use for cereal crops, mostly among rice-growers on flat irrigated land.

Despite the difficulties arising from the large number of small farms and from broken and irregular topo-

graphy, there is still a vast field for progress in mechanization, both on the land at present under cultivation and on new areas to be farmed in future, most of which will be level ground. At the same time, increased mechanization will require the training of more operators and mechanics, the creation of new service stations and repair shops, and a machinery research programme to determine the most efficient types for each area or crop.

(s) From the institutional standpoint, a striking phenomenon is the multiplicity of public and semi-official organizations dealing with agriculture, some of them under the corresponding ministry, but the majority entirely unconnected with it or with one another. The dissipation of both economic and technical resources and the lack of unified action prevent the attainment of maximum levels of efficiency. Many undertakings are frustrated half-way through or even in embryo, and most of the programmes executed are not commensurate, either in scope or in speed, with the requirements they are intended to cover. Moreover, such programmes as are giving satisfactory results — in general, those which encourage specific crops — are more or less isolated from the other problems inherent in the complex agricultural structure of the country as a whole, and tend to perpetuate single-crop farming.

Furthermore, there are still innumerable problems which have not been studied or research into which has been abandoned, among them some of fundamental importance for the national economy. In questions of stock farming no clear guidance is available, since there has been little or no research on breeds (native and foreign), management, cattle sanitation and fertility, forage crops, preservation of fodder and pasture management, etc. Regional and departmental soil maps are needed, with the appropriate economic classification of the soils by state and conditions in relation to climate, so that their utilization capacity may be ascertained. It would thus be possible to appraise exactly what margin for expansion may exist for specific crops or types of farming, and to obtain enough background data for the clearing of natural vegetation to be prohibited in specified areas.

A service is also required to measure the flow of all streams used or potentially usable for irrigation, and to study their seasonal variations, as well as a central weather bureau to compile sporadic data, establish new observation posts and carry out research on weather and its relation to soils, plants and animals useful to man.

Little research has been carried out on oil-seeds and fruit-trees, the use of fertilizers, crop rotation, the combination of livestock and crop farming, the land tenure system, the remuneration of farm workers, the causes of low labour productivity, etc.

The success achieved in very few years in the search for improved strains of wheat, maize, potatoes, beans and cotton offers an encouraging prospect for the study of the remaining problems. A single directive — acting along clear and well-oriented lines, supported by adequate economic resources and with sufficient authority to achieve co-ordination of effort, utilize all available factors

and establish certain indispensable regulations — has made it possible to attain, in no more than four years, the main targets of the cotton development campaign. Similar programmes, duly co-ordinated one with another, might be the best instrument for promoting agricultural development.

(f) The reason why technical standards have not improved more in Colombia is mainly to be found in the shortage of technical experts in the agricultural and livestock sectors. In the very few existing agricultural and veterinary schools, enrolment is low and completely out of proportion to the country's need for a large body of agronomists and veterinarians. These professions are not very highly regarded, as is evident from the low income earned by their members, many of whom feel obliged to take up other work or to emigrate. There is consequently no incentive whereby a larger number of high-school graduates might be induced to choose these professions. The main obstacle to the expansion of agricultural development programmes lies precisely in the lack of agricultural and livestock experts at the various levels and in the various branches of specialization.

Elementary and secondary agricultural education is very limited, and agronomists and veterinarians have been allotted very little share in such training.

Systematic training courses for farmers and agricultural workers are also rare. The few experiments made by certain organizations in this field have been very successful, thus underlining the need for these training services to be extended.

The requisite connexion has not yet been established between the organizations in charge of agricultural development and the universities; the latter have lacked resources to instal laboratories and experimental farms and thus give an adequate impetus to research as a compulsory supplement to instructional programmes.

II. AVAILABILITY OF AGRICULTURAL COMMODITIES

1. Foodstuffs

The estimates of food supplies quoted in this section cover the years 1951-53, as, broadly speaking, sufficient data were available for this three-year period, and relatively normal weather conditions prevailed.¹

The average annual value of gross foodstuffs supplies² for these three years is calculated to have totalled more than 3,000 million pesos at 1953 prices.³ Of these gross

¹ Consideration of average figures for a three-year period also mitigated the effect of inventory variations, which could not be specifically taken into account for lack of adequate information. Before 1948, there was a complete absence of basic production data for a series of staple items of the Colombian diet, such as *panela*, yucca, fruit, vegetable fats, etc. For this reason, it was not possible to calculate total availabilities for any year prior to 1948.

² The term "gross supplies" is used because the figures represent the total volume of available products as they leave the farm, or — in the case of sugar and vegetable fats and oils — the factory, no deductions having been made except for exports.

³ See *Statistical Appendix*, table 70 and the relevant footnotes.

availabilities, over 96 per cent was produced domestically, while imports — which, for comparative purposes, are valued at the same prices as their local equivalents — represented only 3.8 per cent. Dependence on supplies from abroad may therefore be considered negligible on the whole.

This was not equally true, however, of specific commodities. For example, out of a total supply of 198,100 tons of wheat, 51,400, or 25.9 per cent, were imported, and imports of barley amounted to more than 38 per cent of the aggregate availabilities of 100,600 tons. As regards fats and oils, imports for this group as a whole represented 35.1 per cent of the global value of availabilities, while of its own components — oils and vegetable lard — 42.3 per cent had to be imported out of a total of 26,000 tons. It was found necessary to complete an aggregate supply of 9,700 tons of pork lard by importing 17.5 per cent, and 34.4 per cent of the 22,700 tons of cacao at the disposal of the community was purchased abroad.

The estimates of net supplies of foodstuffs given in table 104 were calculated on the basis of available supplies, mainly along the lines recommended by FAO for this type of study.

Most foodstuffs show a high percentage of total loss.⁴

To calculate net *per capita* food supplies for the period 1951-53, the net availability was divided in each case by the average annual population in the three years in question, that is, 11,849 million inhabitants. (No allowance was made for nursing babies.) A summary of the estimates of the average statistical diet for the period 1951-53, and the corresponding figures for the year 1953, is appended (see table 105).

The inference is that the Colombian diet is little better than in pre-war days, and what slight improvement there has been took place during the exact period of the war, that is, between 1939 and 1946. Since this latter year there has been practically no rise in the amount of calories consumed, except in 1953, when consumption

⁴ It will later be seen that some agricultural products are subject to a marketing system which makes it very difficult to keep them fresh, and they are therefore liable to be wasted in large quantities.

As a general rule, this situation affects all commodities for direct consumption which have been grown on smallholdings mainly for the use of the producers themselves, only the surpluses being taken to market. There are no storage facilities on these holdings, and the producer tries to sell his surplus crops as fast as possible; transport is deficient, so that the product does not always reach the market. The market-places themselves usually offer nothing more convenient than a narrow open space exposed to all the contingencies of the weather. Furthermore, most commodities of this type are infected by plagues which begin to destroy them even before they are harvested. When the commodity is stored in the farm-house it is just as liable to be destroyed by pests, since infection is omnipresent, and hardly anybody takes any precautions to disinfect storehouses and containers and subsequently to maintain them in good sanitary conditions. It is understandable, therefore, that wastage amounts to 10 per cent of the harvest or more, in the case of such commodities as maize, potatoes, yucca, plantains, *panela*, fruit and vegetables. Meat wastage amounting to 10 per cent of production is due to unsatisfactory slaughterhouses, inadequate transport, and storage at room temperature in hot, humid climates. Milk losses are caused by rapid decomposition due to insanitary milking, use of dirty containers, lack of refrigeration, slow and inadequate transport, etc.

TABLE 104. COLOMBIA : NET FOODSTUFFS AVAILABILITIES, AVERAGE 1951-53

Foodstuffs	Available supplies	Cattle feed	Seeds for sowing	Manu- facture	Losses		Gross foodstuffs	Per- centage of utili- zation	Net food- stuffs	Net food- stuffs per capita per annum (Kilo- grammes)	Net foodstuffs per capita per day (Grammes)
					Per- centage	Quan- tity					
(Thousands of tons)											
I. Carbo-hydrates											48.9
(a) Cereals											
Wheat (domestic and imported)	181.0	—	15.8	7.1	9.0	16.3	141.8	68	96.4	8.136	22.290
Wheat flour (imported)	12.5	—	—	—	5.0	0.6	11.9	100	11.9	1.004	2.751
Pearl wheat and semolina (imported)	4.6	—	—	—	5.0	0.2	4.4	100	4.4	0.388	1.064
Maize	775.3	250.0	14.4	11.5	17.0	131.8	367.6	85	312.5	26.373	72.255
Unhulled rice	269.7	—	16.5	4.6	11.0	29.7	218.9	62	135.7	11.452	31.375
Barley	100.6	1.0	4.5	75.0	—	—	20.1	80	16.1	1.359	3.723
Oats	3.9	—	—	—	5.0	0.2	3.7	60	2.2	0.186	0.510
(b) Starches											
Potatoes	587.1	—	87.2	—	18.0	105.7	394.2	90	354.8	29.943	82.036
Yuca	870.1	43.5	—	10.0	10.0	87.0	729.5	80	583.6	49.253	134.940
Plantain	960.0	95.5	—	—	7.0	66.5	788.0	65	512.2	43.227	118.430
Other tubers and root-crops	30.0	—	—	—	7.0	2.1	27.9	90	25.1	2.118	5.803
(c) Sugars											
Sugar	161.4	—	—	9.0	2.0	3.2	149.2	98	146.2	12.339	33.805
Panela	598.9	14.0	—	18.0	5.0	29.9	536.9	98	526.2	44.409	21.668
Molasses	67.3	11.0	—	12.0	5.0	3.4	40.9	98	40.1	3.384	19.271
(d) Fruit											
Bananas	238.0	7.1	—	—	11.0	26.2	204.7	70	143.3	12.094	33.134
Others	500.0	—	—	—	20.0	100.0	400.0	60	240.0	20.255	55.493
Dried fruits	0.4	—	—	—	—	—	0.4	95	0.4	0.034	0.093
Coconut	3.0	—	—	—	—	—	3.0	90	2.7	0.228	0.625
(e) Vegetables											
Garlic and onions	25.0	—	1.0	—	6.0	1.5	22.5	90	20.2	1.705	4.671
Tomatoes	40.0	—	—	—	17.0	6.8	33.2	90	29.9	2.523	6.912
Others	123.3	—	—	—	10.0	12.3	111.0	75	83.2	7.022	19.238
(f) Beverages											
Beer	384.9	—	4.4	—	0.5	1.9	378.6	99	374.8	31.631	86.660
Spirits	21.5	—	3.8	—	0.5	0.1	17.6	99	17.5	1.477	4.047
Wines	3.9	—	—	—	—	—	3.9	99	3.9	0.329	0.901
II. Proteins											
(a) Pulses											
Beans	47.4	—	—	—	11.0	5.2	42.2	97	40.9	3.452	9.457
Others	73.9	—	—	—	7.0	5.2	68.7	97	66.6	5.621	15.340
(b) Meat											
Beef	291.7	—	—	—	10.0	29.2	262.5	85	223.1	18.829	51.586
Pork	57.6	—	—	—	5.0	2.9	54.7	85	46.5	3.924	10.751
Mutton	4.6	—	—	—	5.0	0.2	4.4	85	3.7	0.312	0.855
Goat-flesh	0.1	—	—	—	5.0	0.0	0.1	85	0.1	0.008	0.022
Poultry	25.1	—	—	—	5.0	1.3	23.8	85	20.2	1.705	4.671
Offal	25.3	—	—	—	10.0	2.5	22.8	90	20.5	1.730	4.740
(c) Fish											
—	—	—	—	—	—	—	—	—	—	1.500	4.164
(d) Eggs											
—	55.2	—	1.8	—	12.5	6.9	46.5	80	37.2	3.139	8.600
Total milk	1,699.6	83.0	—	—	9.5	161.5	1,455.1	—	—	—	—
(e) Fresh milk											
—	540.0	—	—	—	—	—	540.0	90	486.0	41.016	112.373
Milk for cheese	619.1	—	—	619.1	—	—	—	—	—	—	—
Milk for butter and cream	265.4	—	—	265.4	—	—	—	—	—	—	—
Milk for processing	25.5	—	—	25.5	—	—	—	—	—	—	—
Imported milk in terms of fresh milk	5.6	—	—	5.6	—	—	—	—	—	—	—

TABLE 104 (continued)

Foodstuffs	Available supplies	Cattle feed	Seeds for sowing	Manu- facture	Losses		Gross foodstuffs	Per- centage of utili- zation	Net food- stuffs	Net food- stuffs per capita per annum (Kilo- grammes)	Net foodstuffs per capita per day (Grammes)
					Per- centage	Quan- tity					
(Thousands of tons)											
(f) Cheeses	56.3	—	—	—	8	4.5	51.8	90	46.6	3.933	10.775
(g) Processed milk (domes- tic and imported) ...	3.1	—	—	—			3.1	98	3.0	253.000	693.000
III. Fats											
(a) Oils and fats											
Edible oil											
Vegetable lard	26.0	—	—	—	5.0	1.3	24.7	95	23.5	1.983	5.433
Pork lard	9.7	—	—	—	5.0	0.5	9.2	95	8.7	0.734	2.011
Butter and cream	8.3	—	—	—	5.0	0.4	7.9	95	7.5	0.633	1.734
(b) Cacao	22.7	—	—	—	3.0	0.7	22.0	95	20.9	1.764	4.833

SOURCE : ECLA, on the basis of data from the Ministry of Agriculture, National Administrative Department of Statistics and the *Instituto Nacional de Nutrición*.

* 30 millions for incubation.

NOTE : The quantities used for feed and seed were estimated in co-operation with the technical experts from the Ministry of Agriculture. All commodities destined for non-food industries are included in the column headed "Manufacture", as well as those foodstuffs which undergo a considerable change in their food values as a result of processing. Among these are sugar, *panela* and molasses, which are used in the production of alcoholic beverages, and milk for cheese and butter. For this reason, the column entitled "Available supplies" includes both the raw material and the processed article. Net foodstuffs were calculated on the basis of figures for the latter and not on those for the constituent raw materials. In the case of oils and vegetable fats, the pertinent raw materials — which are many, and differ widely in quantity, quality, price and industrial yield — were totally disregarded. Instead, the quantity of end products available for consumption is given.

TABLE 105. COLOMBIA : ANNUAL *per capita* CONSUMPTION OF NET FOODSTUFFS AND RESULTANT DAILY CALORIES

Commodity	Per capita consumption				Calories produced			
	1935- 1939	1946	1951- 1953	1953	1935- 1939	1946	1951- 1953	1953
	(Kilogrammes)				(Number)			
Cereals	57.4	62.2	48.9	61.2	560	606	453	571
Roots and tubers	86.8	97.4	81.3	84.6	218	243	273	279
Sugar	40.0	45.1	60.1	59.8	391	442	536	541
Fruit, including plantains .	131.7	109.8	75.8	75.5	238	198	231	226
Vegetables	10.3	11.9	11.3	11.6	6	8	11	11
Pulses	7.0	77.8	9.1	8.0	66	74	77	68
Meat	26.2	25.6	26.5	23.3	140	135	213	183
Fish	0.6	0.5	1.5	1.5	2	1	4	4
Eggs	3.5	4.0	3.1	3.2	14	16	9	14
Milk (fresh, and processed in terms of fresh)	66.3	87.7	41.3	42.9	140	185	70	71
Cheeses	2.7	3.6	3.9	4.0				
Vegetable and animal fats .	3.2	2.8	3.3	3.3				
Cacao	1.0	1.4	1.8	1.8				
TOTAL					1,863	1,990	2,008	2,098
Coffee			3.0	3.1	4	4	4	4
Beer, spirits and wines ...			33.4	38.0	14	14	28	33
GRAND TOTAL					1,881	2,008	2,040	2,135

SOURCES : For 1935-39 and 1946 : FAO, *Food Balance Sheets* (Washington, April 1949). For 1951-53 : ECLA estimates. For basic data : the same source as for the table. The number of calories produced by coffee, spirits and wines was calculated by ECLA for 1935-39 and 1946. The calories produced by beer in the same years are included under cereals.

of cereals and sugar increased slightly ; while consumption of some basic commodities such as meat, milk, eggs and fruit has decreased. Statistics on consumption of cheese and of vegetable and animal fats are less reliable than most, and it is possible that an opposite course to that indicated in table 105 may have been followed.

The trends described are particularly serious because they mainly affect protective foods, consumption of which already stands at an unduly low level. Thus the amount of meat contained in the Colombian diet in 1951-53 (26.5 kilogrammes) was scarcely larger than the quantity consumed in Peru in 1947, half that used in Brazil and Chile and about one-fourth and one-fifth of the respective quantities recorded for Argentina and Uruguay.⁵ In 1947 — that is, in the very midst of reorganizing the stock farming activities that had suffered during the war — France consumed twice as much meat as Colombia, while in 1952 the United Kingdom and Canada consumed twice and three times as much, respectively.⁶

According to the official data obtained from the national agricultural sample, total net milk production *per capita* per year was 143 litres in 1954. Gross availabilities, after the deduction of wastage and milk used for animal feeding and the addition of imports, would appear to amount to 123 litres *per capita* per year and 337 grammes *per capita* per day, in fluid terms. The amount of milk used for consumption in Colombia is very low, barely amounting to 45.6 litres *per capita* annually.⁷ The remaining available milk is consumed in dried form, and as butter and cheese, which in fluid terms are equivalent to availabilities of 2.15, 52.2 and 22.4 litres respectively.

When it is borne in mind that appreciable wastage occurs in the manufacture and marketing of cheese and butter, and the rate of utilization is also taken into account, the conclusion is reached that net consumption of milk and dairy products in Colombia — in fluid terms — amounts to only 107 litres *per capita* annually,

⁵ According to FAO (*Food Balance Sheets*, April 1949), net *per capita* consumption of meat in 1947 stood at 22.6 kilogrammes in Peru and 40.1 kilogrammes in Brazil. In Chile (*Plan de Desarrollo Agrícola*, Santiago, 1954) an average of 43.7 kilogrammes was consumed in 1950-52. *Meat* (Commonwealth Economic Committee, London, 1953) gives a consumption of 114 kilogrammes for Argentina in 1952 and of 132 kilogrammes for Uruguay in 1951.

⁶ *Meat* states that *per capita* meat consumption in 1952 stood at 48.2 kilogrammes in England and 75.5 kilogrammes in Canada.

⁷ In order to calculate consumption of fresh milk in Colombia, in 1952 ECLA requested direct information from 22 of the largest towns, whose population amounts to about 3 million inhabitants. An annual *per capita* average of 73.7 litres was obtained. For the rest of the country average *per capita* consumption was estimated at 36 litres, that is, 50 per cent of the average for the most important towns obtained by means of the survey. In this estimate it was taken into account that the towns in question were the best supplied and that availabilities for the rural population were very small. Total consumption of fluid milk was thus estimated at 540 million litres as an annual average for 1951-53. With the help of experts from the Ministry of Agriculture it was calculated that 265.4 million litres were used for the manufacture of butter and cream and 619.1 million for cheese and curds. The above-mentioned survey covering the industrial sector, indicated that 25.5 million litres of fresh milk were used to manufacture powdered and other kinds of processed milk. Milk imports in different forms during 1951-53 amounted to an annual average of 5,600 tons in fluid terms.

or 298 grammes *per capita* daily.⁸ The *Instituto de Nutrición* recommends a net annual *per capita* consumption of 285 litres, and at the very least a minimum consumption of 182 litres as a first step towards this goal.

Generally speaking, Latin American countries are poor milk consumers, except for Argentina, whose net consumption of fluid milk was more than 105 litres in 1947, and Uruguay, with 160 litres. During the same year *per capita* consumption in Brazil stood at 61 litres of fluid milk ; and in Chile it was 66 litres in 1953.⁹ (These figures do not include milk used for cheese and butter.)

Annual *per capita* consumption of fish and eggs in 1951-53 (1.5 and 3 kilogrammes respectively) was also low.

The deficiency of protective foods in Colombia has had to be offset by an almost excessive consumption of those containing calories, particularly sugar-cane, of which 60.1 kilogrammes net are consumed (including sugar, *panela* and molasses) ; roots and tubers (potatoes, yucca, etc.), with a net consumption of almost 81.3 kilogrammes ; fruit (including plantains and bananas), with 75.8 kilogrammes ; and finally, cereals, with 48.9 kilogrammes. These four groups contribute 1,483 calories, or approximately 75 per cent of the 2,040 calories contained in the average Colombian diet. Low consumption of cereals is counterbalanced by high consumption of the other calorie-producing foodstuffs listed.

Net aggregate consumption of animal and vegetable fats and oils in Colombia stands at 3.3 kilogrammes *per capita* annually. It exceeds 15 kilogrammes in Argentina, 10 in Uruguay, 5 in Brazil and Chile, 31 in Canada, 18 in England and 11 in France.¹⁰

Nutritional deficiencies in general can be appreciated in their full gravity by comparing the basic dietary elements in 1951-53 with those that would be contained in the diet which, according to the *Instituto de Nutrición*, ought to have been available to the Colombian population in 1953 (see table 106).

Table 106 shows that the number of calories contained in the diet registered for 1951-53 is clearly insufficient, since it reaches only 77.3 per cent of the amount recommended by the *Instituto de Nutrición*. Calorie distribution is also deficient if compared with the recommended diet, and much more so in relation to the ideal nutritional standard¹¹ (see table 107).

Although carbohydrates are now contributing a larger share of calories than is desirable, their absolute contribution is still a good deal less than was considered recommendable for 1953. Consequently, the nutritional

⁸ The totals are distributed as follows : fluid milk, 41 litres *per capita* annually or 112.3 grammes *per capita* daily ; processed milk, 2.6 litres or 7.2 grammes ; cheese 43.2 litres or 118.4 grammes ; butter 20.2 litres or 52.2 grammes.

⁹ For Argentina, Uruguay and Brazil, see FAO *Food Balance Sheets*, 1949 ; for Chile, *Plan de desarrollo agrícola*.

¹⁰ FAO, *Food Balance Sheets*.

¹¹ The ideal recommendation assumes the same average consumption for the whole population, but, given the disparity in consumption between the different demographic groups, recommended targets are always appreciably lower than the ideal nutritional standard.

TABLE 106. COLOMBIA : CONTENT OF BASIC ELEMENTS DETERMINING QUALITY OF DIET
(Per capita and per diem)

	1935-39	1946	1951-53	Target for 1953	Percentage of target for 1953 attained in 1951-53
Calories (Number)	1,881	2,008	2,040	2,640	77.3
Proteins (Grammes)	46.7	50.9	44.5	76.5	58.2
Fats (Grammes)	36.7	39.3	41.3	72.5	57.0
Carbohydrates (Grammes)	—	—	381.4	433.5	90.3
Calcium (Grammes)	—	—	0.456	0.937	48.7
Phosphorus (Grammes)	—	—	0.958	1.586	60.4
Iron (Milligrammes)	—	—	12.26	16.57	74.0
Vitamin A (International units)	—	—	2,025	5,793	35.0
Thiamine (Milligrammes)	—	—	0.955	1.211	78.9
Riboflavine (Milligrammes)	—	—	1.040	1.916	54.3
Niacine (Milligrammes)	—	—	11.840	14.905	79.4
Ascorbic acid (Milligrammes)	—	—	104.93	128.3	81.8

SOURCES : For 1935-39 and 1946 : FAO, *Food Balance Sheets*, 1948. For 1951-53 : ECLA estimates. For 1953 targets : *Instituto de Nutrición*.

TABLE 107. COLOMBIA : DISTRIBUTION OF CALORIES

Origin	Availabilities 1951-53		Recommended target for 1953		Ideal recommended target
	Calories	Percentage	Calories	Percentage	Percentage
Proteins	173	8.5	298	11.3	12
Fats	365	17.9	634	24.0	28
Carbohydrates	1,502	73.6	1,708	64.7	60
TOTAL	2,040	100.0	2,640	100.0	100

SOURCES : For availabilities 1951-53 : ECLA estimates. For recommended and ideal targets : *Instituto de Nutrición*.

imbalance is due not so much to excessive consumption of carbohydrates as to a low fat and protein content. The average diet for 1951-53 covered only 58.0 per cent of protein and 57.6 per cent of fat requirements for what might be considered an adequate level of consumption.

The mineral salts and vitamin content of the Colombian diet is below advisable nutritional standards. In this respect the figures in table 107 are not altogether complete, since for want of data it was impossible to evaluate the rural sector's consumption of certain articles, which, although they do not greatly influence the over-all consumption level of calories, proteins and carbohydrates, do affect the mineral salt and vitamin content.¹²

These shortcomings are, however, not serious enough to invalidate the figures. The deficiency of calcium, phosphorus, vitamin A and riboflavin in the diet of the Colombian people is just as grave a drawback as the

¹² Among numerous examples are the guinea-pig, which is consumed with skin and bones in the southern areas of Colombia ; coca, which is chewed with lime by Indians in the Sierra Nevada ; tobacco chewing ; the addition of certain raw condiments to food, etc.

low protein content or possibly even more so. It should nevertheless be stressed that these are not two isolated problems, but the basic consequences of the prevalent diet, and that their common origin is to be found in unbalanced nutrition due to a market insufficiency of protective foods—milk (and its by-products), eggs, meat, fish and some fruit and vegetables—which together provide proteins, vitamins and mineral salt.

The *Instituto Nacional de Nutrición* has recently carried out dietary surveys, the findings of which confirm the above statements by showing marked avitaminosis in the individuals examined (see table 108).

TABLE 108. COLOMBIA : SAMPLE OF THE DEGREE OF AVITAMINOSIS IN SOME SECTORS OF THE POPULATION

Locality	Group	Number of persons examined	Avitami- Aribofla- nosis A vinosis (Percentage of total)		Under weight (Percentage)
			88	78	
Bogotá	Schoolchildren	685	88	78	52
Bogotá	Industrial workers, aggregate	342	71	52	43
Medellín	Industrial workers, aggregate	406	63	49	47
Cali	Industrial workers, aggregate	204	42	46	41
Valle de Tensa ...	Agricultural workers	421	78	19	35

SOURCE : *Instituto Nacional de Nutrición*, "El Problema de la disponibilidad de leche en Colombia", in *Revista Colombiana de Pediatría y Puericultura* (February 1953).

Urban schoolchildren (Bogotá) can be seen to constitute the group showing the most serious malnutrition, while farm workers seem to be the least affected, although avitaminosis A is prevalent among them.

TABLE 109. COLOMBIA : SUPPLIES OF SELECTED AGRICULTURAL RAW MATERIALS FOR INDUSTRY

Year	Cotton			Rubber			Tobacco			Domestic availabilities
	Imports	Production	Total	Imports	Production	Total	Imports	Production	Exports	
	(Thousands of tons)			(Tons)			(Tons)			
1936-39	4.2	5.2	9.4	1	...	...	63	12,700	3,099	9,664
1940-44	15.9	4.3	25.2	15	...	...	85	16,100	279	15,906
1945-49	16.9	5.6	22.5	1,297	1,000	2,297	143	18,800	2,866	16,077
1950-53	17.2	10.7	27.9	2,647	1,055	3,702	140	24,400	3,651	20,889
1950	21.5	8.5	30.0	2,879	1,020	3,899	196	20,400	3,621	16,975
1951	13.8	6.5	20.3	2,494	1,000	3,494	338	30,100	4,140	26,298
1952	18.2	10.6	28.8	2,886	1,200	4,086	2	22,000	3,192	18,810
1953	15.1	17.0	32.1	4,978	1,000	5,978	2	25,000	...	...
1954 .....	...	27.9	...	...	...	...	...	...	...	...

SOURCE : ECLA.

The high rate of infant mortality — which varied between 1945 and 1952 from 151 to 111 per mil — the low standards of labour efficiency,¹³ poor resistance to disease, a propensity to alcoholism, and even an incapacity for community life in some sectors, are all attributed by Colombian dieticians to the general prevalence of malnutrition and disguised hunger.¹⁴

Improvement of nutritional standards must therefore be achieved through a substantial increase in consumption of protein and fats as well as a moderate increment in those foodstuffs which produce only calories. Special importance should be given to animal proteins, *viz.*, milk, eggs and meat.

2. Non-alimentary raw materials

Allusion has already been made to the rapid growth of imports of non-alimentary raw materials for industry during the last few years, as well as to the fact that the development of the textile and rubber industries had not been accompanied by a similar evolution of the domestic sources of raw materials, except in the case of cotton and tobacco. Dependence on raw materials from abroad has thus increased.

¹³ See the sub-paragraph on the productivity of labour in section VI of this chapter.

¹⁴ See Dr. José Góngora y López, "El problema de la disponibilidad de leche en Colombia", *Revista Colombiana de Pediatría y Puericultura*, Vol. XII, No. 3, February 1953, pages 215-222. This report states that without an adequate diet of protective foods, particularly milk, no practical and final solution can be found for such serious problems as the following: (1) Malignant infantile malnutrition, which is probably the cause of 70-80 per cent of infant mortality in Colombia. It has been diagnosed under different names, which include nutritional oedema, proteic oedema, infantile pellagra, malnutritional syndrome, and infantile hepatic degeneration or cirrhosis (Kwashiorkor in Africa). This malignant malnutrition, which is prevalent in the tropical and sub-tropical regions of the world, mainly arises from a lack of proteins, and is cured only by consuming milk in any of its forms. The death-rate after milk has been supplied declines to 10 per cent of its previous figure. (2) The so-called "tropical anaemia" caused either by *Ancylostoma* or *Necator*, and also sometimes attributed to malaria, is curable only by supplying iron and proteins (particularly milk) and not by therapeutic or preventive treatment of the parasite alone.

The share of domestic production in these supplies may now be analysed. Table 109 gives the available statistical data on cotton, rubber and tobacco supplies.

As the tobacco industry has always been supplied with raw materials by domestic agriculture, Colombia has been a traditional exporter, its sales abroad having been reduced considerably only during the Second World War. Tobacco imports have never been substantial. Even when imports were heaviest — in 1951 — they represented less than 1.5 per cent of the domestic availabilities. In recent years such imports have declined, and now amount to no more than 2 tons annually.

In contrast, during 1945-49 rubber imports supplied 56 per cent of the raw material requirements for industry. As subsequent industrial development did not stimulate domestic production, which remained at practically the same level during the following years, the share of raw materials from abroad increased until it accounted for about 83 per cent of total demand.

Domestic production of cotton followed a different trend. The active campaign waged by the authorities, accompanied by an efficient development policy establishing price incentives, tariff protection, agricultural research, etc., permitted a substantial expansion of domestic production. Although imports continued to rise for several years, their share in aggregate supplies became smaller. By 1953, only 47 per cent of nominal availabilities consisted of imported fibre, as against 64 per cent in 1940-44. At present, Colombia grows all the short fibre it requires, and has only to import long-fibre cotton, which is as yet not produced at home.

III. ANALYSIS OF THE STRUCTURE AND TRENDS OF AGRICULTURAL PRODUCTION AND IMPORTS

1. Structure of production

Production in 1953 was taken as a basis for this analysis, since this was the only year for which more or less complete information was available. Moreover, it was a relatively normal agricultural year and was thus

sufficiently representative to give an approximate idea of the value and composition of agricultural production.

Crop and livestock production as a whole will first be considered, without examination of the components of each sector (see table 110).

TABLE 110. COLOMBIA : COMPARISON OF THE LIVESTOCK AND CROP SECTORS

Sector	Area utilized ^a		Value of production ^b		
	Thousands of hectares	Percentage of total	Millions of pesos	Percentage of total	Average (Pesos per hectare)
Coffee	831	2.8	899.7	23.8	1,082.7
Other crops	2,069	6.9	1,497.0	39.5	723.5
Total crops ...	2,900	9.7	2,396.7	63.3	826.4
Livestock	26,870	90.3	1,388.5	36.7	51.7
GRAND TOTAL	29,770	100.0	3,785.2	100.0	127.1

SOURCE : ECLA.

^a Figures refer to 1953.

^b Production in 1953, valued at prices paid to the farmer in the same year.

The value of crop production represents almost two-thirds of total agricultural output, while the remaining one-third corresponds to livestock. The difference between the two sectors is remarkable from the standpoint of production per unit of area utilized, since the value of crops per hectare is 16 times greater than the value of livestock production.¹⁵

The difference between the unit yield for crops and livestock can be to some extent attributed to the influence of coffee in the crop sector. But the basic cause is to be found in the contrast between the extensive methods of livestock farming in Colombia and the crop-growing systems, which, though not efficiently intensive in most cases, can be considered exhaustive in that the land under seed rarely remains idle, and then only during very brief periods of the year. The disparity is all the more surprising as the best soils are used for pasture, while crop farming is usually practised on sloping land,

¹⁵ Uruguay, where the soil distribution situation is very similar to that of Colombia, with 9.2 per cent of the land utilized under crops, and 90.8 per cent used for pasture, provides a standard of comparison. Of aggregate agricultural production, 38.7 per cent represents crops and 61.3 per cent livestock. The value of crops per cultivated hectare is only five times greater than that of livestock production. Argentina's position is similar to Colombia's with regard to the values of livestock and agricultural production in proportion to the total, 35.8 per cent corresponding to the former, and 64.2 per cent to the latter. Of the agricultural area in Argentina, 12.4 per cent is used for crops and 87.6 for pasture. The value per hectare of agricultural production proper is only 12 or 13 times greater than that of livestock production. In both the countries cited for purposes of comparison, the best soils are generally utilized for crops, and it is not surprising, therefore, that the average value of crop production per hectare is several times greater than that of livestock production. It should also be emphasized that in these countries, crops are predominantly cereals or oil-bearing, whereas coffee is relatively the most important in Colombia. (Basic data taken from official statistics of Argentina and Uruguay.)

depleted by uninterrupted cultivation, which causes increasing erosion and low unit yields for most commodities.

The best example to support the previous assertion may be found in the Department of Valle del Cauca, which has wide areas of level terrain, regarded as the best and most fertile land in the country.¹⁶ The total area under seed in the whole Department stood at 285,000 hectares in 1953, of which 77,000 represented level land in the river valley itself, where the area utilizable covers approximately 241,000 hectares. The balance of 164,000 hectares — equivalent to 70 per cent of the utilizable area — is, with very few exceptions, poorly utilized for extensive livestock activities.

The value of production per unit of area utilized in the level and fertile parts of the valley in 1953 was 1,110 pesos per hectare, on an average, for crops, and approximately 424 pesos per hectare for livestock. The average value of production in the whole Department in the same year was 1,211 pesos per hectare under crops and 190 pesos per hectare used for stock farming. A comparison of these figures shows that in the level areas the average value of crops per hectare was lower than the average for the whole Department, and indeed even lower than that of the sloping ground which amounted to 1,252 pesos per hectare (see table 111).

TABLE 111. COLOMBIA : VALUE OF CROP AND LIVESTOCK PRODUCTION IN THE DEPARTMENT OF VALLE DEL CAUCA IN 1953

(Pesos per hectare)

Specification	Level and fertile lands	Other lands farmed	Average for the Department
Agricultural production	643	411	467
Livestock production	424	123	190
Crop production (including coffee) .	1,110	1,252	1,211
Crop production (excluding coffee) .	1,100	1,099	1,102
Coffee	1,367	1,329	1,330

SOURCE : Basic data from the Valle del Cauca Agricultural Census, quoted by the National Economic and Fiscal Programming Department, in *Plan del Valle del Cauca — Inversiones 1954-58*.

The relatively high average value of 1,110 pesos per hectare under crops in the level part of the valley is mainly determined by cane for the sugar mills and by certain horticultural products such as tomatoes, which reached production values considerably higher than the average indicated. At the same time, it shows that the average value of the other crops farmed on level ground must be much lower than 1,110 pesos per hectare. The average of 1,252 pesos per hectare recorded for sloping land is largely a result of the higher value of coffee as compared with that of other commodities.

¹⁶ The level section of the Cauca river valley, situated within the confined of the Department to which it gives its name, covers 274,200 hectares, of which 12 per cent would not be utilizable for agriculture.

TABLE 112. COLOMBIA : STRUCTURE OF AGRICULTURAL PRODUCTION IN 1953 ^a

Commodity	Millions of pesos	Percentage of total crop value	Percentage of total crop and livestock value
<i>Crops</i>			
Wheat	110.5	4.6	2.9
Maize	176.0	7.3	4.6
Unhulled rice	106.8	4.5	2.8
Potatoes	134.2	5.6	3.5
Yucca	104.4	4.4	2.8
Other tubers	6.0	0.2	0.2
Beans and other pulses	87.0	3.6	2.3
Cacao	31.5	1.3	0.8
Oil-seeds and copra	12.5	0.5	0.3
Coconut	9.0	0.4	0.2
<i>Panela</i>	180.0	7.5	4.7
Plantains	100.0	4.3	2.6
Bananas	53.1	2.2	1.4
Other fruit	153.0	6.4	4.1
Vegetables	83.7	3.5	2.3
Coffee	899.7	37.4	23.8
Other foodstuffs	59.4 ^b	2.7	1.8
Total foodstuffs	2,312.8	96.3	61.1
Tobacco	30.0	1.2	0.8
Cotton (fibre)	45.8	1.9	1.2
Total non-foodstuffs	89.9 ^c	3.7	2.4
Total crops	2,396.7	100.0	63.5
<i>Livestock</i>			
Cattle (Number slaughtered)	609.3	44.0	16.1
Pigs (Number slaughtered)	132.8	9.6	3.5
Poultry (Number slaughtered)	84.0	6.1	2.2
Total livestock (Number slaughtered) ^d	841.1	60.8	22.2
Milk	375.6	27.1	9.9
Eggs	166.8	12.1	4.4
TOTAL	1,383.5	100.0	36.5
Wool	5.0		
Total livestock products	1,388.5		
Grand total crops and livestock	3,785.2		

SOURCES : ECLA, on the basis of data provided by the Ministry of Agriculture ; National Administrative Department of Statistics ; *Caja de Crédito Agrario* ; *Instituto de Fomento Algodonero* ; *Federación de Cafeteros y Federación de Arroceros*.

^a Estimated on the basis of prices paid to the farmer in 1953.

^b This total also includes the following : barley, 28 million pesos ; aniseed, 1.7 million ; molasses, 11 million ; and sugar-cane for sugar, 18.7 million pesos.

^c This total also includes the following : sisal, 12 million pesos and rubber, 2.1 million.

^d This total includes the following (value of animals slaughtered) : sheep, 3.8 million pesos and goats, 0.4 million.

This situation appears to be general throughout Colombia. Only occasionally are extensive tracts of level land used for annual or perennial crops, such as irrigated rice, cotton in areas where it is only recently being grown, cane for the sugar mills and bananas for export.

A study of the agricultural sector shows that foodstuffs for domestic consumption and export absorb 96.3 per cent of the total production value of the sector, while non-alimentary commodities account for only the remaining 3.7 per cent. Raw materials for industry, especially fibres and tobacco, fall into this latter group.

The value of agricultural exports, i.e., coffee, bananas, tobacco and rice, at farmers' sales prices, represents 33.8 per cent of the value of all crops and 21.7 per cent of aggregate crop farming and livestock production.

Expressed in the same terms (prices paid to the producer), that part of the 1953 coffee crop which was exported constituted 32 and 20.6 per cent of the values of crop and of crop plus livestock production, respectively.

Coffee is supreme within the agricultural sector, since its production value is equivalent to 37.4 per cent of the total value produced by the sector, while *panela* (7.5 per cent), maize (7.3) and potatoes (5.6) follow well behind. All the other commodities, considered individually, represent less than 5 per cent of the total production value of the sector ; this is a very significant indication of the large variety of commodities that Colombia is able to produce (see table 112).

Livestock production is now entirely used for domestic consumption. In previous years small numbers of cattle on the hoof were exported, reaching 23,400 head in the peak year (1944), when 12,800 head were also imported for consumption.

Cattle clearly constitute the major proportion of the livestock sector. The value of the beef produced in 1953 represented 44.0 per cent of the group and, if milk is added, the sum total of production from the bovine species amounted to 71.1 per cent of the aggregate value produced by the livestock sector in that year.

As poultry meat represented 6.1 per cent and eggs 12.1 per cent, poultry-keeping in general contributed 18.2 per cent, while pig-breeding accounted for only 9.6 per cent of the livestock sector. The share of sheep and goats — 0.3 per cent — reveals their minor importance within the sector.

If the ratio of each commodity to the total value of agricultural production is established, coffee continues to take first place, representing a proportion of 23.8 per cent, followed by cattle (16.1 per cent) and milk (9.9 per cent). However, if meat and milk were considered as co-products of the same farming unit, cattle would pass to first place, with a production value equivalent to 26.0 per cent of total crop and livestock production ; and poultry production would rank third, with 6.6 per cent, followed at some distance by the other commodities.

2. Trends and evolution of production

(a) The over-all situation

An over-all survey of the historical evolution of agricultural production in 1925-53 leads to the conclusion that development was fairly satisfactory ; in spite of this, food consumption levels remained very low, and raw materials from agricultural sources required by

domestic industry were to a great extent obtained from abroad when they might have been produced at home. The long-term trend in agricultural development was, nevertheless, modified in the last few years of the period, with the result that *per capita* availabilities of agricultural commodities fell below the average levels reached at the end of the 'forties.

A separate analysis of the crop and livestock sectors brings to light another important fact. While the former sector grew faster than the population, the latter increased at an almost parallel rate, although in most years it was below the population curve. Moreover, livestock production decreased in more recent years, thus contributing to an unfavourable short-term change in the historical growth trend for all agricultural activities (see figure X).

Between the earliest and latest periods (1925-29 and 1950-53) considered in the historical analysis of the development of agricultural production, this latter shows an increase of 87.7 per cent as compared with a 67-per-cent population increment. In other words, production expanded at an average cumulative rate of 2.60 per cent annually, or slightly faster than the population, which grew at an average annual rate of 2.12 per cent during the same interval (see table 113).

If the historical period is divided into phases, production is seen to have increased faster than population during the decade 1925-34. This period coincided with the development of the industrial sector, large-scale public investment (especially in transport), intensive urbanization programmes and substantial investment, even in the agricultural sector itself, all of which appear to have acted as incentives to agricultural progress at the time when they took place (especially in 1925-30) and for several years afterwards. During the two subsequent five-year periods (1935-1944), agricultural production increased at almost the same rate as population, while *per capita* availabilities remained stable.

FIGURE X. COLOMBIA : INDICES OF AGRICULTURE PRODUCTION
(1953 = 100)
(Semi-logarithmic scale)

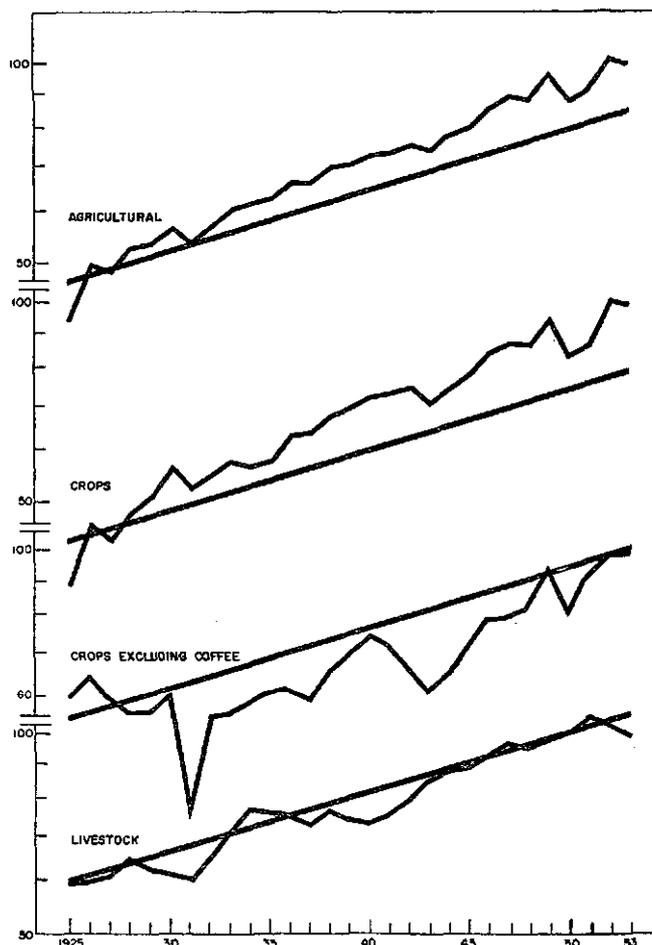


TABLE 113. COLOMBIA : INDICES OF THE DEVELOPMENT OF AGRICULTURAL PRODUCTION

(Five-year averages: 1953 = 100)

	Crops and livestock	Livestock	Crops	Crops (excluding coffee)	Agricultural production for domestic consumption			Production for export	Coffee	Population
					Total	Foodstuffs	Non-foodstuffs			
1925-29	50.4	61.4	45.8	59.9	49.0	35.6	38.5	43.5	42.3	57.8
1930-34	58.0	66.8	55.9	54.8	53.2	51.3	31.5	53.6	54.3	63.8
1935-39	67.0	75.2	74.1	63.0	63.7	65.4	44.5	64.0	65.4	70.5
1940-44	74.6	80.3	72.7	67.5	68.6	70.5	46.6	77.6	79.8	78.5
1945-49	88.2	95.9	85.6	81.1	82.0	84.2	55.5	89.9	91.6	87.6
1950-53	94.6	103.4	91.7	90.9	91.2	92.4	76.9	92.4	92.9	96.7
<i>Percentage increase</i>										
1950-53/1925-29 total	87.70	68.40	100.22	51.75	86.12	159.55	99.74	112.41	119.62	67.5
1950-53/1945-49 annual rate	1.57	1.68	1.54	2.56	3.39	2.08	7.51	0.61	0.31	2.24
1950-53/1925-29 annual rate	2.60	2.15	2.87	1.71	2.56	3.97	2.86	3.12	3.26	2.12
1950-53/1940-44 annual rate	2.53	2.69	2.47	3.18	3.04	2.88	5.41	1.85	0.41	2.49

SOURCE : ECLA, on the basis of data from the Ministry of Agriculture ; National Administrative Department of Statistics, *Corporación de Defensa de Productos Agrícolas*; *Instituto de Fomento Algodonero*; *Federación de Cafeteros*; *Federación de Arroceros*, etc.

However, among other factors, heavier investment in the agricultural and livestock sector 1945-49 brought about a strong revival in production, which raised *per capita* availabilities by 5.8 per cent in relation to the two previous five-year periods. Moreover, the influence was then felt of the policy followed by the *Caja de Crédito Agrario* at the beginning of the 'forties, which not only set up stores (*Almacenes de Provisión Agrícola*) and established a rotary fund to encourage various important crops, but also substantially expanded loans to farmers. A policy for coffee protection was initiated and pursued, the principal effect of which was to maintain the high production level and even to improve upon it, but which also appears to have stimulated the cultivation of other crops. The area sown with staple crops was enlarged by more than 250,000 hectares (22.6 per cent), to the benefit of the agricultural and livestock sectors.

TABLE 114. COLOMBIA : INVESTMENT COEFFICIENTS AND INDEX OF *per capita* AGRICULTURAL PRODUCTION

(1953 = 100)

Period	Investment coefficients		Per capita agricultural production
	Total for country	Agricultural sector	
1925-29	26.1	13.4	87.1
1930-34	14.9	13.1	90.9
1935-39	17.3	12.0	94.9
1940-44	16.2	13.5	95.0
1945-49	20.3	13.1	100.5
1950-53	19.5	11.3	97.7

SOURCE : See *Statistical Appendix*, tables 1 and 7.

Finally, a significant change in agricultural production took place during the last four years of the period (1950-53), being reflected in a *per capita* production figure 2.8 per cent below that of the previous five-year period. The sharp decline in agricultural production in 1950 owing to bad weather, and its slow recovery in subsequent years, together with lower farm investment, a drop in livestock production during the last two years, and civil disturbances, which were particularly pronounced in rural areas, were the main factors responsible for this change.

(b) *Situation by groups of commodities and by individual items*

The study of how crop and livestock farming separately affected the development of aggregate agricultural production shows that the decisive impulse in peak periods was always provided by the crop sector. An analysis of this sector's development on the basis of 5-year averages reveals a permanent upward trend. In comparison with an 87.7 per cent increment in over-all agricultural production between the earliest and latest periods (1925-29 and 1950-53), the crop sector expanded by 100.2 per cent. *Per capita* availabilities rose steadily, except in the last four years, when a 2.8-per-cent decrease in relation to the previous five-year period took place.

As regards markets of destination, Colombia's agriculture is designed to produce certain commodities intended principally for export, and others — the majority — for domestic consumption. The latter may be further divided into foodstuffs and non-alimentary commodities. As these groups, stimulated by differing incentives, have not developed uniformly in the course of the years, a brief analysis should be made of the situation by groups and the influence of each group upon the whole.

(i) *Agricultural production for export.* Coffee and bananas, produced mainly for export, constitute the group which registered the greatest increment. Between the earliest and latest periods considered, production increased by 112.4 per cent, more, that is, than in the agricultural sector as a whole. This represented an average annual rate of 3.12 per cent.

The relative importance of these crops within the agricultural sector in its entirety becomes still more evident in the light of the fact that the slower rate of development in recent years (0.61 per cent annually between 1945-49 and 1950-53) entailed a decrease in average agricultural expansion per annum, although all the other commodities — those for domestic consumption — showed rates of increase so much more rapid than in the past that the highest *per capita* availabilities since 1925 were attained.

Considered separately, the development trends and characteristics of these two commodities were widely divergent during the 29 years under review. Coffee production increased rapidly and continuously between 1925-29 and 1950-51, at an average annual rate of 3.6 per cent. Under the stimulus of external demand, this trend became more apparent between 1925 and 1930. The depression of the 'thirties checked progress, however, and production remained stationary until 1935, in which year the area planted to coffee was approximately 356,000 hectares (see table 115). The restoration of markets to normal once again provided the necessary incentives to fresh expansion, to some extent reflected in the enlargement of the areas covered by coffee plantations, which in 1946 amounted to 626,000 hectares, in 1951 to 660,000 and in 1953 to 831,000. That is, the area under coffee increased by 133 per cent in about 20 years. Broadly speaking, production followed a similar trend, although its expansion in the same period did not exceed 87 per cent. The increment in output could in no circumstances have been commensurate with the increase in the area under coffee, since over 200,000 hectares had been planted only in recent years and by 1953 were not yet in full production. The decline in the rate of expansion during the last four years, when it was 0.31 per cent lower per annum than in 1945-49, is attributable to the poor harvest in 1950 and the effects of the internal disturbances experienced by Colombia during the two following years, which reduced available manpower and so created harvesting problems.

The enlargement of the area under coffee was apparently achieved at the expense of further cutting down of forests, as well as by the incorporation of areas previously used for pasture and various food crops such as yucca, plantains, *panela*, fruit, etc.

TABLE 115. COLOMBIA : CROP PRODUCTION AND AVERAGE RATES OF INCREASE

(Five-year averages: thousands of tons)

	1925-29	1930-34	1935-39	1940-44	1945-49	1950-53	Rates of increase		
							1950-53 1930-34	1950-53 1935-39	1950-53 1945-49
<i>Export commodities</i>									
Coffee	162.6	208.5	251.2	306.2	351.9	356.7	2.79	2.44	0.30
Bananas	386.3	191.0	220.0	192.2	274.5	389.7	3.69	4.02	8.09
<i>Commodities for domestic consumption</i>									
<i>(a) Foodstuffs:</i>									
Wheat	—	73.8 ^a	108.3	109.1	112.3	135.5	3.16	1.55	4.26
Maize	—	485.1 ^a	495.6	583.4	635.5	736.6	2.18	2.77	3.33
Rice	—	97.6 ^a	117.7	146.6	220.8	266.8	5.19	5.80	4.15
Barley	—	—	—	—	28.5	59.6	—	—	17.81
Potatoes	—	—	—	401.6	486.3	528.8	—	—	1.88
Yucca	—	—	422.2	585.0	761.8	844.5	—	4.89	2.31
Beans	—	—	32.6	34.6	59.2	41.2	—	1.62	-8.39
Cacao	5.3	9.3	10.7	11.2	10.9	14.8	2.41	2.26	7.03
Sesame	—	—	—	0.6	5.0	9.2	—	—	4.51
Cotton seed	—	5.5	9.1	7.8	11.6	20.1	6.87	6.51	1.23
Copra	—	—	2.0 ^b	2.4	2.7	3.8	—	4.52	7.89
Panela	—	—	506.1	589.0	671.5	600.0	—	1.18	-2.53
Sugar-cane for sugar	563.7	517.3	559.9	839.9	1,024.5	1,581.3	5.89	7.42	10.12
Plantains	—	—	957.0	713.2	780.0	948.2	—	—	4.43
<i>(b) Non-foodstuffs:</i>									
Tobacco	10.6	8.2	12.3	16.1	18.8	22.3	5.21	4.19	3.86
Cotton (fibre)	3.2	2.9	5.3	4.3	5.6	10.7	6.92	4.96	15.47
Sisal (figue)	—	10.0	10.0	10.0	10.8	11.8	0.85	1.14	1.98

SOURCE : ECLA, on the basis of data from the Ministry of Agriculture.

^a 1932-34 average.^b 1938-39 average.

Banana production developed very differently from that of coffee, because, apart from the pressure exerted by the fluctuations of external demand during certain periods, it had to contend with extremely unfavourable weather conditions leading to the destruction of many plantations, and with the ravages of various diseases which affected yields. The sharp fluctuations registered by production from 1925 to 1953 were reflected in an annual growth rate of only 1.25 per cent between 1925-29 and 1950-53.

Production, which reached almost 290,000 tons in the quinquennium 1925-29, dropped in the following five-year period to only 192,000, owing to the hurricanes which devastated the Magdalena banana-growing zone in 1930 and 1931 and destroyed approximately half of the existing 30,000 hectares of plantations.¹⁷ In addition, there was a sudden decrease in external demand during the 'thirties which had a discouraging influence upon production.

During the following years, although new hurricanes caused further damage, production — stimulated by the

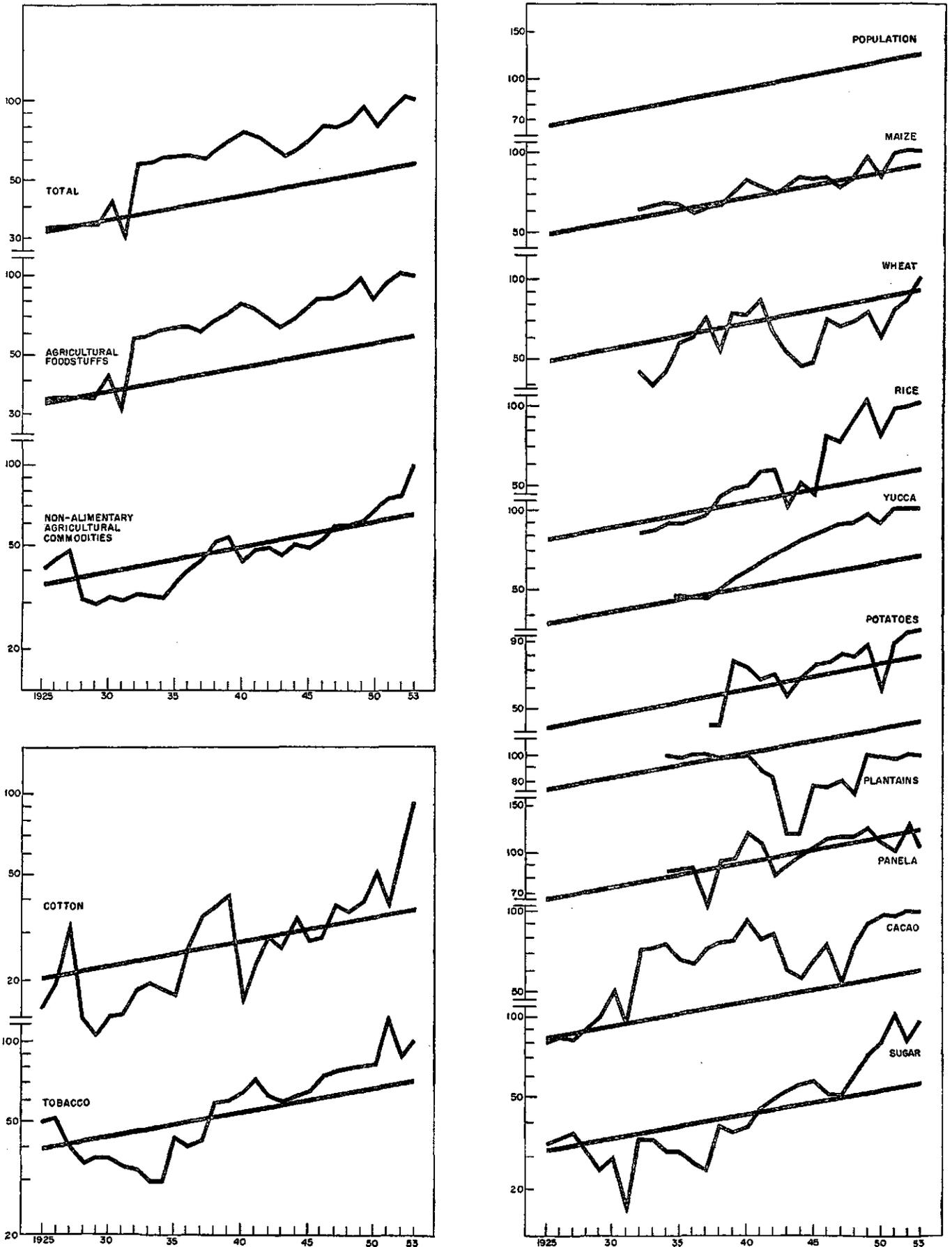
restoration of foreign markets to normal — made a partial recovery. But the Second World War again closed foreign markets, and this factor coincided with the further spread of the so-called "sigatoka" disease which had appeared in the banana region a few years earlier. The recovery of production that began in 1943 appears to have been largely due to the need to satisfy domestic demand; in addition, during the next few years, there was a substantial increase in exports which encouraged new plantations in the Magdalena banana zone.

(ii) *Agricultural production for domestic consumption.* Production for domestic consumption developed less satisfactorily than that of export commodities. In effect, between 1925-29 and 1950-53, it expanded by only 86.1 per cent, that is, at the average annual rate of 2.56 per cent. Average *per capita* availabilities during the last four years were 11.2 per cent higher than during 1925-29, as compared with an increment of 27 per cent in agricultural exports during the same periods (see figure XI).

Non-alimentary commodities. Until 1950, the production of non-edible commodities — cotton, tobacco and sisal — increased very slowly. After that year, it was given fresh impetus and rose at the average annual rate of 7.51 per cent in relation to 1945-49. This was

¹⁷ See Luis Carlos Díaz Granados, *El cultivo del banano en la zona bananera del Magdalena*, Facultad Nacional de Agronomía de Medellín, November 1952.

FIGURE XI. COLOMBIA : INDICES OF AGRICULTURAL PRODUCTION MAINLY FOR DOMESTIC CONSUMPTION
(1953 = 100) (Semi-logarithmic scale)



mainly on account of cotton, the output which had been very small — between 3,000 and 7,000 tons annually — during practically the whole of the interval between 1925 and 1949. The *Instituto de Fomento Algodonero* was established in 1950, to work closely with the planters and provide them with improved seed, technical assistance of all types, cotton-ginning services and remunerative guarantee prices for the fibre. Extensive agricultural research on cotton was also begun, and new zones for planting were surveyed; simultaneously, the Government used the customs tariff to restrict imports of fibre. These measures resulted in substantial increments in the area planted, yields and production. The 35,600 hectares under cotton in 1948, with a production of only 6,100 tons, increased in 1953 to more than 67,000 hectares producing 17,000 tons of fibre.¹⁸

This bears clear witness to the success which can be attained by a well-planned and well-financed campaign, rationally co-ordinated and efficiently implemented. It also proves that the farmer reacts favourably to all kinds of technical improvements and is willing to put them into effect, once he is sure that they will benefit him financially.

The larger areas planted with cotton were made up of land newly brought under cultivation in various areas of the country. Land was also taken over from artificial pastures and, in some zones, cotton replaced sesame, not through any real competition for the land, but because sesame was not encouraged by the price incentive and other development measures favouring cotton.

The output of tobacco also increased fairly in the course of the years under review. Nevertheless, the expansion was more marked during the last four years, when the average reached was 24,000 tons in comparison with only 10,600 during 1925-29. While it is true that the percentage of aggregate production represented by exports partly depended on external demand, its smallness appears to indicate that the incentives responsible for these increments arose mainly from the pressure of internal demand.

Foodstuffs. Of all the groups into which Colombia's agricultural production is sub-divided here, this sector was one of those that developed most, according to long- and medium-term analyses. Between the end periods already indicated, its volume of production increased by 159.6 per cent, in comparison with increments of 112.4 per cent in exports and 99.7 per cent in non-alimentary commodities for domestic consumption. On the other hand, more recently, between 1945-49 and 1950-53, for example, the expansion registered was only 9.7 per cent, as against one of 38.6 per cent in non-alimentary commodities.

In other words, *per capita* food production in 1950-53 was 55.2 per cent higher than in 1925-29 and slightly lower — by 0.5 per cent — than the figure recorded in 1945-49. If the low standards of nutrition of Colombia's population are taken into account, this development rate cannot be considered satisfactory.

From the standpoint of the area farmed, *maize* constitutes the most important of Colombia's agricultural crops for domestic consumption, although its production has developed irregularly in the course of the years. Between 1935-39 and 1950-53, *per capita* availabilities increased by 8.3 per cent. Colombia has usually been self-sufficient in maize, and only in a very few years has it had to resort to importing small quantities.

The development of *wheat* production has been quite different. A progressive expansion took place from 1932 to 1941 which raised harvests from 76,900 to 141,600 tons. Production later showed a definite downward trend, from which it began to recover only in 1946, and which was mainly attributable to the persistent unfavourable weather that helped to cause plagues and a decrease in unit yields. Recovery was relatively slow, and not until 1953 did production reach its peak level of 170,000 tons. Recent increases were the outcome of development measures, which included heavy customs tariffs on imported wheat and flour, high guarantee prices for domestic wheat, the establishment of a research programme, the selection and reproduction of improved seed varieties — some of which have already been placed at the disposal of the farmers — and, finally, credit for wheat production.

The trend described meant that *per capita* production in 1950-53 was 8.8 per cent lower than in 1935-39 and that the share of imported wheat in aggregate supplies increased steadily.

Rice production provides an example of rapid expansion, which has nevertheless slowed down in recent years. The sharpest rise took place between the five-year periods 1935-39 and 1945-49, and entailed a 50.9-per cent increment in *per capita* availabilities during this interval. With a few fluctuations, harvests continued to follow an upward trend in 1950-53, although at a slower rate than in previous periods, so that a growing domestic demand had to be met by importing small quantities as well.

The area under rice almost doubled during the last fifteen years of the period, rising from 83,900 hectares in the five-year period 1945-49 to 153,900 in 1950-53. Crop expansion took place in the new irrigated areas, which had previously been composed of natural grasslands and thickets.

Yucca and potatoes should be noted as the most important of the tubers. *Yucca* output increased relatively fast between 1935-39 and 1945-49 and *per capita* availabilities therefore rose by about 45 per cent (see again table 115 and figure XI). Production remained stationary during the following years, as if domestic demand for this item of popular diet were no longer sufficient to encourage production. The income-elasticity coefficients of demand for *yucca* in various cities and sectors of the population in 1953 confirm this statement, as they are very low, or even negative in some cases.

On the other hand, *potato* production, which increased very little up to the quinquennium 1940-45, when it reached an annual average of 486,000 tons, rose more rapidly in subsequent years until in 1953 the harvest totalled 610,000 tons. Growing urbanization supplied

¹⁸ In 1954, 82,300 hectares were sown, 27,900 tons of fibre being produced.

the main incentive during this later period. Large sectors of the population, whose incomes are improving, tend to substitute potatoes for yucca and plantains in the large towns. The income-elasticity coefficient for potatoes is 0.5. Moreover, better means of communication and transport provided increasingly greater facilities for potatoes to reach the consumer markets, and, in addition, permitted the expansion of the area sown from 79,000 hectares in 1940 to more than 115,000 in 1953, thanks to the opening-up of new land and the planting of other areas previously used for pasturage.

Plantain production in the later years of the period (1950-53) remained at practically the same levels as in the five-year period 1935-39, although lower figures were recorded during the intervening years. The obvious stagnation was probably due to market saturation, brought about mainly by changes in the dietary habits of that part of the rural population which has migrated to the cities.

Various factors helped to determine an inadequate and irregular development of *cacao* production. The greatest relative increases were noted in the ten-year period 1925-34. Substantial fluctuations characterized each season's results in subsequent years, the average output standing at 10-11,000 tons. In 1950-53, production was virtually stabilized at about 15,000 tons. On the other hand, demand is steadily growing, and now has to be satisfied with imports.

A number of factors contributed to the steady widening of the gap between *cacao* production and domestic demand. Among these must be included the ravages of disease, which in the 'twenties destroyed large plantations and eliminated many centres of production. Secondly, coffee-growing aroused keen interest in areas where manpower and soil conditions were competitive; and, above all the price of *cacao* manifestly deteriorated in relation to that of coffee, until recent years, when relative prices for these two products began to favour *cacao*. There are good prospects for an expansion of production, to promote which a seven-year campaign — the *Campaña Nacional del Cacao* — was launched in 1953.

The production of *panela* and of *sugar* followed divergent trends. While the former tended to decrease, the latter showed substantial increases. In effect, the output of *panela*, with a few major annual fluctuations, allowed of small increases in *per capita* availabilities between 1935-39 and 1945-49. After 1950, however, production declined, and the *per capita* supply in the four following years was 19.1 per cent lower than the average for the previous five-year period. Undoubtedly there is a growing tendency among consumers to substitute refined sugar for *panela*. The low income-elasticity of demand leads to the conclusion that production will not regain the rate of increase registered in previous years.

The area under sugar cane for *panela* also underwent a marked contraction, since the 160,700 hectares used for this purpose in 1943 had dropped by 1953 to only 110,000. Part of the land no longer devoted to *panela* production is probably still under cane, which is now being utilized for refined sugar. In any case, most of

the area where the change came about is today taken up by coffee and, in a very high proportion, by natural grass, because the land concerned has a difficult topography, is greatly affected by erosion and, in consequence, is only marginal for cane-growing.

In contrast, the production of sugar remained more or less stationary in the interval between the years 1925 and 1940. It began to expand faster only from 1940 onward, so that average *per capita* production in 1950-53 was 105.7 per cent higher than in 1935-39. After 1947 production increments practically freed the country from the need to import sugar,¹⁹ while exportable surpluses began to appear, reaching 50,000 tons in 1951.

The rise in sugar production was based not only on the increasing tonnages of cane available, but also on an improvement in the industrial yield, which became more marked during the later years of the period thanks to the modernization of the mills and the use of better-quality cane.

(c) *Situation of livestock production*

Livestock production developed distinctly less favourably than the crop sector. Its expansion between the earliest and latest periods considered (1925-29 and 1950-53) amounted to 68.4 per cent, which implied only a slight improvement in *per capita* availabilities. The average annual rate of increase stood at 2.15 per cent, almost the same as that of demographic growth, which was 2.12 per cent (see again table 113 and figure X).

This inadequate development tended to become still less satisfactory in the years 1952 and 1953, when livestock production decreased in absolute terms, causing a 2.5-per-cent drop in the *per capita* supply in 1950-53 as compared with availabilities in the five preceding years.

The available *per capita* production of livestock food products reveals pronounced under-consumption of meat, milk and eggs, which was inadequately offset by imports, as is explained elsewhere.²⁰ The most important aspect of livestock activities is undoubtedly cattle farming.

Cattle-slaughtering developed in the course of the years along much the same lines as population growth. Nevertheless, in the ten-year period 1935-44 it fell by 4.3 per cent in relation to 1925-29. Although in the following years it rose to the level of the population curve, in 1951 a new decline began, which was still in evidence in 1954 (see figure XII).

On the other hand, pig production increased faster than the population during the period 1925-53, with frequent annual fluctuations within a general upward trend (see table 116).

Such little sheep-farming as was carried on was also, as a rule, in the hands of smallholders. No large flocks exist, and an improvement in this activity would be difficult to achieve. The slaughtering of sheep showed considerable annual variations, within a downward trend.

¹⁹ Small quantities — 1,300 and 13,500 tons — had to be imported in 1952 and 1953 respectively.

²⁰ See point 3 of this section.

TABLE 116. COLOMBIA : LIVESTOCK PRODUCTION AND AVERAGE RATES OF INCREASE

(Five-year averages : thousands of head)

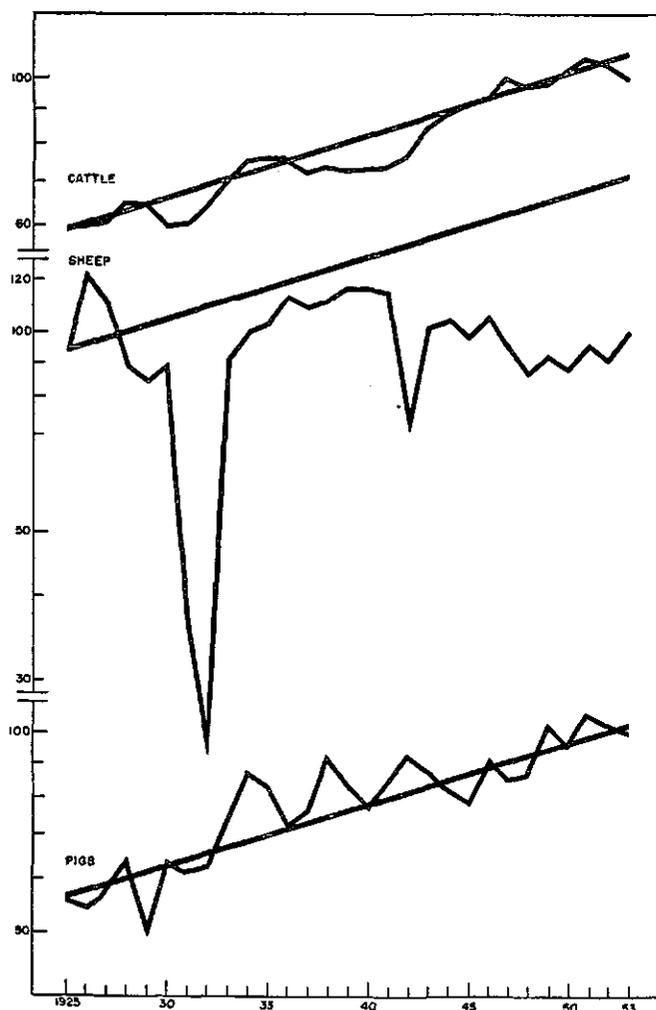
Livestock production	1925-29	1930-34	1935-39	1940-44	1945-49	1950-53	Average rates of increase		
							1950-53 1925-29	1950-53 1940-44	1950-53 1945-50
Cattle	838.9	895.8	999.4	1,073.3	1,314.9	1,404.9	2.12	2.87	1.48
Pigs	409.9	507.0	588.0	617.2	643.9	735.8	2.41	1.86	3.01
Sheep	95.0	64.6	105.0	96.9	90.4	88.7	-0.28	-0.93	-0.42

SOURCE : ECLA, on the basis of official data.

FIGURE XII. COLOMBIA : INDICES OF LIVESTOCK PRODUCTION

1953 = 100)

(Semi-logarithmic scale)



Only in 1935-39 was mutton and lamb production stabilized at peak levels (105,000 head).

No statistics are available for milk production. On the basis of total production estimates prepared by the Ministry of Agriculture for 1950 and from the figures in the 1954 agricultural sample (1,773 million litres), it

may be assumed that the available milk output decreased by 9 per cent between these two years.

3. Trends and evolution of imports of agricultural commodities

The development of agricultural imports in 1937-53 showed an uninterrupted upward trend, which reached its peak in 1950. The volume of imports in that year was 160 per cent higher than in 1937. Later, a decrease in their volume began which continued until 1953, the last year covered by this analysis (see table 117).

TABLE 117. QUANTUM AND INDEX OF AGRICULTURAL IMPORTS

(Thousands of pesos at 1953 prices)

Year	Total	Index
1937	43,951	38.4
1938	43,097	37.7
1939	74,835	65.4
1940	54,869	48.0
1941	68,288	59.7
1942	61,431	53.7
1943	60,122	52.6
1944	85,005	74.3
1945	90,871	79.5
1946	101,547	88.8
1947	108,864	95.2
1948	98,618	86.2
1949	92,248	80.7
1950	140,036	122.5
1951	134,446	117.6
1952	123,426	107.9
1953	114,348	100.0

SOURCE : ECLA, on the basis of data from yearbooks of foreign trade.

The principal components of these imports, in order of importance, were foodstuffs, non-alimentary raw materials for industries, beverages and tobacco. Significant changes in their composition took place in the course of the years. It was in raw materials for industry, which is steadily developing, that the greatest increase was registered in absolute terms (see table 118).

TABLE 118. COLOMBIA : COMPOSITION OF AGRICULTURAL IMPORTS AND PERCENTAGE SHARE OF EACH GROUP IN THE AGGREGATE

(Thousands of pesos at 1953 prices)

Period	Total agricultural imports	Foodstuffs	Raw materials	Beverages and tobacco	Percentage share in the aggregate		
					Foodstuffs	Raw materials	Beverages and tobacco
1937-39	53,960	34,141	12,287	7,533	63.3	22.8	13.9
1940-44	65,943	24,622	34,764	6,556	37.4	52.7	10.0
1945-49	98,430	40,898	43,634	13,898	41.6	44.3	14.1
1950-53	128,064	66,418	49,802	11,844	51.9	38.9	9.2

SOURCE : ECLA.

TABLE 119. COLOMBIA : TOTAL GROSS SUPPLIES, ON THE BASIS OF IMPORTS AND DOMESTIC PRODUCTION, OF SOME OF THE PRINCIPAL FOODSTUFFS IN SHORT SUPPLY

(Annual averages: thousands of tons)

Period	Rice			Sugar			Cacao			Barley			Wheat		
	Im-ports	Pro-duction	Total	Im-ports	Pro-duction	Total	Im-ports	Pro-duction	Total	Im-ports ^a	Pro-duction	Total	Im-ports ^a	Pro-duction	Total
1936-39	22.5	117.7	140.2 ^a	12.0	38.8	50.8 ^a	3.3	10.7	14.0	5.8	...	...	21.4	108.3	129.7
1940-44	3.0	146.6	149.6	6.0	61.9	61.9	3.0	11.2	14.2	3.7	...	...	20.6	109.1	129.7
1945-49	2.6	220.8	223.4	6.3	96.6	102.9	5.4	10.9	16.3	11.1	28.5	39.6	45.9	112.3	158.2
1950-53	3.4	266.8	269.2	3.8	133.9	137.7	7.9	14.8	21.7	25.7	59.6	85.2	55.1	135.5	190.6

SOURCE : ECLA, on the basis of official foreign trade and production statistics.

^a Not including export movements.^b Barley and malt, in terms of barley.^c Wheat and wheat flour, expressed in terms of grain.

Wheat, cacao, rice, sugar, copra and barley are the principal foodstuffs imported by Colombia. Imports of wheat, cacao and barley are progressively increasing, although it is possible that domestic agriculture will be able totally or partially to replace them. On the other hand, imports of rice and sugar have tended to decrease or even disappear, as a result of greater domestic production, which at present meets most of the demand.

In the case of wheat, the slow development of production — which has accelerated only in the last few years — meant that 28.9 per cent of apparent consumption in 1950-53 was satisfied with imports of wheat flour or wheat, expressed in terms of grain, whereas in 1936-39 imports had contributed only 16.5 per cent. The volume of imports was thus more than two and a half times larger (see table 119).

The situation was much the same for cacao, even though resources and conditions in Colombia are such that it could produce enough to become an exporter. The apparent consumption of cacao, which rose slowly until the mid-forties, later increased more rapidly, rendering imports necessary, since production remained stationary or increased very little. In the four most recent years (1950-53), rather more than one-third of consumption was covered by imports, which in 1953

represented a value over 15 per cent higher than that of wheat and wheat flour imports.

Barley for brewing is another product of which consumption increased too rapidly during the last 9 years of the period to be satisfied with domestic production, although the latter expanded substantially. Imports of malt and barley rose from 11,100 to 25,700 tons²¹ between 1945-49 and 1950-53.

The development of rice in Colombia, production of which doubled between 1940 and 1953, permitted at one and the same time an increase in *per capita* consumption, a reduction of rice imports and the provision of small exportable surpluses in some years. The 22,500 tons²² imported in 1936-39, which represented 16 per cent of apparent consumption, were cut down to only 3,400 tons in 1950-54 — no more, that is, than 1.3 per cent of consumption. Had it not been for the exceptional drop in production in 1950, caused by bad weather, and the consequent need for unusually heavy imports of rice (11,400 tons) in 1951, the annual average would have been considerably lower.

The organization and expansion of the sugar industry had effects similar to those described for rice. From

²¹ Expressed in terms of barley.²² In terms of unhulled rice.

1957 onward, imports virtually disappeared, and a flow of exports began which attained almost 50,000 tons in 1951. Imports were again effected only in 1952 and 1953, and in the period 1950-54 averaged 3,800 tons annually as compared with 12,000 tons in 1936-39.

Apart from these commodities, Colombia imported varying quantities of tinned or powdered milk and cream, butter, animal fats and vegetable oils, potatoes, beans, hops, copra, fruit, etc., to meet the surplus demand not covered with domestic production.

Except for part of the consumer requirements of wheat, barley and some kinds of temperate-climate fruit, Colombia is potentially capable of producing all the foodstuffs which are at present imported.

Imports of beverages and tobacco are of little importance. Having reached a peak in 1945-49, when they represented 14.1 per cent of the aggregate volume of agricultural imports, in recent years they have tended to decrease, principally owing to the contraction in imports of tobacco and cigarettes. Colombia is a net exporter of tobacco, and its small regular purchases abroad are used by the industry for blends. The average annual imports of 143 tons recorded for the five-year period 1945-49 rose to a maximum of 338 tons in 1951 and dropped in subsequent years to only 2 tons annually. Imports of cigarettes declined as a result of the development of Colombia's own tobacco industry (see table 120).

TABLE 120. COLOMBIA : IMPORTS AND TOBACCO AND CIGARETTES ^a

Period	Tobacco (Tons)	Cigarettes (Millions of packets)
1936-39	63	8.6
1940-44	85	8.8
1945-49	140	22.3
1950-54	143	12.3

SOURCE : ECLA, on the basis of official foreign trade data.

^a Annual averages for the periods indicated.

The largest increments were registered in imports of non-alimentary agricultural raw materials for industry, which consisted principally of cotton, wool and natural rubber.

The establishment of the textile and rubber industries, and the fact that their later development was not accompanied by a more or less parallel expansion of the sources of raw materials, rendered Colombia almost entirely dependent upon supplies from abroad, which reached their peak levels in 1950. The volume of raw material imports was almost six times greater in 1950 than in 1937.²³ The success of the cotton development campaign initiated in 1950 helped to reduce imports in subsequent years. In the specific case of cotton, the

²³ In 1937 imports of raw materials from livestock sources reached a value of 9.2 million pesos at 1953 prices. They increased steadily in subsequent years and by 1950 attained a maximum of 62.8 million pesos.

maximum of 21,500 tons purchased abroad in 1950 was cut down to 15,100 by 1953.

Production of rubber and wool remained almost stationary. Industry had to resort to an increasingly great extent to supplies from abroad. Thus, imports of rubber in 1953 amounted to about 5,000 tons, as compared with an annual average of only 14.5 tons in the five-year period 1940-44 (see table 121).

TABLE 121. COLOMBIA : IMPORTS OF RAW MATERIALS FOR INDUSTRY

(Annual averages: tons)

Period	Cotton ^a	Rubber	Wool ^b	Tobacco
1936-39 ..	4,180	1	22	63
1940-44 ..	15,920	15	136	85
1945-49 ..	16,889	1,297	100	143
1950-53 ..	17,169	2,647	96	140

SOURCE : ECLA, on the basis of data from yearbooks of foreign trade.

^a Registered in the statistics as raw cotton, ginned or unginned.

^b Registered in the statistics as carded or combed wool or hair, and greasy or washed raw wool.

IV. AGRICULTURAL AREA

1. Land utilization

Of the 113.8 million hectares which constitute Colombia's total area, only 29.8 million are under crops or used for pasture. This implies that barely 26.2 per cent of the land can be considered as incorporated in agricultural activities. Of this area, 2.9 million hectares are under annual or perennial crops and 26.8 million are under natural or artificial pasture. The areas used for crops and pasture represent 2.6 and 23.6 per cent, respectively, of the Colombian territory. (See table 122.)

Most of the land used for pasture and particularly for crops is located in administrative and political divisions called Departments which constitute the most closely integrated part of the country. The rest is found in the *Intendencias* and *Comisarias* which, in the aggregate, comprise 55 per cent of the territory. Only global data were available for these parts of the country, which are in general but little known.

If the Chocó Department, which is part of a forest region as yet unintegrated, is excluded, data for the 15 remaining Departments show that they cover 46.4 million hectares, that is, the equivalent of 40.8 per cent of the country's total territory, of which 21.5 million hectares, or 46.5 per cent of their own aggregate area, are used for agricultural purposes. Of the Chocó Department only 2.3 per cent is farmed—108,000 out of a total of more than 4.6 million hectares.

The *Intendencias* and *Comisarias* comprise 62.7 million hectares, of which 12.9 per cent, or about 8 million hectares, are utilized. Almost the whole of this area is

TABLE 122. COLOMBIA : LAND UTILIZATION

(Thousands of hectares)

	Territorial area	Area farmed			Areas farmed as percentage of territorial area	Crops as percentage of territorial area	Crops as percentage of area farmed
		Total	Crops	Livestock			
Antioquia	6,581	2,670	370	2,300	40.6	5.6	13.9
Atlántico	347	307	37	270	88.5	10.7	12.1
Bolívar	3,527	1,269	159	1,110	36.0	4.5	12.5
Boyacá	6,458	3,170	270	2,900	49.0	4.2	8.5
Caldas	1,337	900	290	610	67.3	21.7	32.2
Cauca	3,020	1,092	92	1,000	36.2	3.0	8.4
Córdoba	2,429	920	90	830	37.9	3.7	9.8
Cundinamarca	2,359	1,555	355	1,200	65.9	15.0	22.8
Huila	2,070	1,180	80	1,100	57.0	3.9	6.8
Magdalena	5,392	2,447	97	2,350	45.4	1.8	4.0
Nariño	3,256	1,278	198	1,080	39.3	6.1	15.5
Norte de Santander	2,069	1,071	91	980	51.8	4.4	8.5
Santander	3,207	1,161	161	1,000	36.2	5.0	13.9
Tolima	2,299	1,487	237	1,250	64.7	10.3	15.9
Valle del Cauca	2,094	1,045	285	760	49.9	13.6	27.3
Total	46,445	21,552	2,812	18,740	46.5	6.1	13.0
Chocó	4,657	108	38	70	2.3	0.8	35.2
Total for Departments ...	51,102	21,660	2,850	18,810	42.4	5.6	13.2
Intendencias	18,826	2,800	40	2,760	14.9	0.2	1.4
Comisarias	43,907	5,310	10	5,300	12.1	0.0	0.2
Total Intendencias and Comisarias	62,733	8,110	50	8,060	12.9	0.1	0.6
GRAND TOTAL	113,835	29,770	2,900	26,870	26.2	2.6	9.7

SOURCES : Territorial area : National Administrative Department of Statistics, *Boletín No. 110*, July 1954. Land under crops : Ministry of Agriculture. Land used for livestock : ECLA and Ministry of Agriculture estimate.

used as pasture, leaving only a very small balance — about 50,000 hectares — for crop farming.

The highest proportion of land utilized in relation to the territorial area of each Department (88.5 per cent) is found in that of Atlántico. Next in order come the Departments of Caldas (67.3 per cent), Cundinamarca (65.9 per cent) and Tolima (64.7 per cent).

Still with the exclusion of Chocó, the Departments utilizing the smallest share of their territorial area are Bolívar (36 per cent), Cauca and Santander (36.2 per cent), Córdoba (37.9 per cent), Nariño (39.3 per cent) and Antioquia (40.6 per cent). Land use in the remaining Departments varies between 45 and 57 per cent.

A striking feature revealed by table 122 is the disproportion between the areas used for crops and for pasture. In effect, of the country's whole agricultural area, 90.3 per cent is devoted to livestock production, and only 9.7 per cent is used for crops.

These figures might suggest that Colombia's agriculture is primarily concerned with livestock production and only secondarily with crops, if the value of production of the two sectors did not prove the exact reverse, as will be shown elsewhere.²⁴

(a) Distribution of the cultivated area

Table 123 shows a break-down by crops of the 2.9 million hectares cultivated in 1953.

Although both coffee and maize are grown on small holdings, they rank first as regards the area they occupy, with 831,000 and 700,000 hectares, respectively. Far behind, though still taking up a considerable area, come wheat (175,000 hectares); rice (171,000); sugar cane (152,000); plantains (120,000); and potatoes (115,000). All other crops cover less than 100,000 hectares.

About 27 per cent of the area used for livestock production, or a little more than 10 million hectares, is under artificial pasture.

In 1953 *per capita* availability of cultivated land stood at 0.24 hectares, and at only 0.17 hectares when coffee was excluded from the aggregate. *Per capita* availability of land used for livestock production was 2.22 hectares.

The daily contribution to diet made by crop land was 10,050 calories and 150 grammes of vegetable protein per hectare, while the daily contribution per hectare of pasture lands amounted to 157 calories and 8.5 grammes of animal protein.²⁵

²⁵ Excluding coffee plantations, since their production is almost entirely exported.

²⁴ See Section III of this chapter.

TABLE 123. COLOMBIA : DISTRIBUTION OF CULTIVATED AREA, BY CROPS, 1953

	<i>Thousands of hectares</i>	
<i>Annual crops</i>		
Wheat	175	
Maize	700	
Barley	53	
Rice	171	
Potatoes	115	
Yucca	76	
Other tubers	7	
Sesame	17	
Beans	85	
Other pulses	75	
Garlic and onions	20	
Tomatoes	8	
Other vegetables	17	
Aniseed	2	
Tobacco	22	
Cotton	67	
TOTAL	1,610	
<i>Perennial crops</i>		
Cane for sugar	29	
Cane for <i>panela</i>	110	
Cane for syrup	13	
Plantains	120	
Bananas	45	
Other fruit	77	
Copra	5	
Coconut	4	
Sisal (figue)	20	
Rubber	4	
Coffee	831	
Cacao	32	
TOTAL	1,290	
<i>Summary:</i>	<i>Thousands of hectares</i>	<i>Percentages</i>
Annual crops	1,610	55.5
Perennial crops	1,290	44.5
TOTAL	2,900	100.0

SOURCE : Ministry of Agriculture.

(b) *Irrigated and drained areas*

Colombia has at least 200,000 hectares of irrigated and 30,000 of drained land, used mainly for such crops as rice, sugar cane, beans, tobacco, cacao, vegetables, cotton, maize and fruit. As a rule, a single crop is cultivated repeatedly until the soil deteriorates to such an extent that a change has to be made, generally to natural grass. Very rarely are artificial pastures rotated with other crops on irrigated land.

Were all the irrigated land cultivated, only 8 per cent of the area under crops would be subject to irrigation.

The oldest irrigation works — those in the tobacco zones of Santander, the sugar plantations of the Valle del Cauca and the Magdalena banana area — were built by private enterprise. Recent larger-scale irrigation works,

such as those in Tolima, and all drainage works were carried out by the Government. Table 124 shows the distribution of irrigated and drained land, by Departments.

TABLE 124. COLOMBIA : IRRIGATED AND DRAINED AREA
(Thousands of hectares)

<i>Department</i>	<i>Area irrigated</i>	<i>Area drained</i>
Huila	10.0	—
Tolima	90.0	—
Valle del Cauca	50.0	—
Cundinamarca	15.0	16.6
Boyacá	3.2	9.2
Norte de Santander	5.0	—
Santander	12.0	—
Magdalena	15.0	—
Cauca	1.2	—
Atlántico	1.0	—
Others, including Llanos Orientales	15.6	4.2
Total area	220.0	30.0

SOURCES : *Huila*: Ministry of Agriculture, *Jefatura Departamental de Agricultura y Ganadería*. *Tolima*: ECLA survey. *Valle*: calculated on the basis of cultivated area assumed to be irrigated, as follows (in thousands of hectares): sugar-cane for sugar, 32.1; beans, 5; rice, 5; cacao, 4.5; miscellaneous, 3.4; total, 50,000 hectares. *Santander*: calculated on the basis of cultivated area assumed to be irrigated, as follows: tobacco, 10,000; rice and other crops, 2,000 hectares. *Norte de Santander*: estimate on the basis of data collected on the spot. *Cundinamarca and Boyacá*: estimate on the basis of data provided by the *Instituto de Aprovechamiento de Aguas*. *Magdalena*: estimate on the basis of information collected on the spot. *Cauca*: estimate based on data supplied by the *Instituto de Aprovechamiento de Aguas*. *Atlántico and Llanos Orientales*: estimate on the basis of data collected on the spot.

2. *Possibilities of expansion*(a) *Over-all situation*

An over-all view of present conditions shows that barely one-fourth of the territory is being used for agricultural purposes. The remaining three-quarters, equivalent to 84 million hectares, includes both areas unfit for agriculture and land which might be exploited.

The utilizable area offers significant possibilities of expansion. Most new land must be reclaimed by cutting down forests, while considerable increments can also be achieved by irrigation, flood control, drainage and the dredging of rivers or streams. The purpose of these last reclamation systems is not so much to bring new areas under cultivation, as to improve fields at present under-utilized, making them suitable for intensive farming on the basis of high yield crops and artificial pastures. In many cases a combination of these methods will have to be used.

For want of basic surveys, only a rough estimate can be made of the new areas that could be used for farming if the land were cleared of forests (see table 125). Such estimates were made only for the Departments, since information and impressions, though of a very general

TABLE 125. COLOMBIA : TERRITORIAL AREA AND LAND SUSCEPTIBLE OF UTILIZATION, BY DEPARTMENTS

(Thousands of hectares)

	Territorial area			Utilizable area		Non-utilized area as a percentage of territorial area	Area which could be incorporated as a percentage of forested area	Area which could be incorporated as a percentage of utilizable area	Total area as a percentage of territorial area
	Total	Not utilized for agriculture		Susceptible of reclamation	Total ^a				
		Total	Forested						
Antioquia	6,581	3,911	3,031	1,200	3,870	59.4	39.6	31.0	58.8
Atlántico	347	40	30	—	307	11.5	—	—	88.5
Bolívar	3,527	2,258	818	400	1,669	64.0	48.9	24.0	47.3
Boyacá	6,458	3,288	2,038	1,220	3,490	50.9	59.9	27.8	68.0
Caldas	1,337	437	157	30	930	32.7	19.1	3.2	69.2
Cauca	3,020	1,928	868	520	1,612	63.8	59.9	32.3	53.4
Córdoba	2,429	1,509	1,338	860	1,780	62.1	64.3	48.3	73.2
Cundinamarca	2,359	804	284	140	1,695	34.1	35.3	8.3	71.9
Huila	2,070	890	527	200	1,380	43.0	38.0	14.5	66.7
Magdalena	5,392	2,945	1,595	1,000	3,447	54.6	62.7	29.0	63.0
Nariño	3,256	1,978	1,153	700	1,978	60.7	58.3	35.4	60.7
Norte de Santander	2,069	998	586	290	1,361	48.2	49.5	21.3	65.8
Santander	3,207	2,046	1,316	600	1,761	63.8	45.6	34.1	54.9
Tolima	2,299	812	467	230	1,717	35.3	49.3	13.4	74.7
Valle del Cauca	2,094	1,049	630	330	1,375	50.1	52.4	24.0	65.7
Total	46,445	24,983	14,838	7,720	29,272	53.5	52.0	26.4	63.0
Chocó	4,657	4,549	4,549	—	—	97.7	—	—	—
Total for Departments	51,102	29,449	19,387	—	—	57.6	—	—	—
Intendencias	18,826	16,026	—	—	—	85.1	—	—	—
Comisarías	43,907	38,597	—	—	—	87.9	—	—	—
Total for Intendencias and Comisarías	62,733	54,623	—	—	—	87.1	—	—	—
Grand total for Colombia	113,835	84,065	—	—	—	73.8	—	—	—

SOURCE : ECLA, on the basis of official statistics.

^a The figures in this column include the areas which could be incorporated (previous column) and those already incorporated, as shown in table 122.

nature, are available for most of them.²⁶ The almost complete absence of data precluded an evaluation of the possibilities of the Department of Chocó and the *Intendencias* and *Comisarías*.

An analysis of the area comprising the Departments, excluding Chocó, shows that of a total of 46.4 million hectares, 25 million (or 53.9 per cent) are not used for agricultural purposes. In order to estimate the potential agricultural area, such land as is unsuitable or impossible to farm, amounting to very little more than 10 million hectares, was deducted.²⁷ The balance of 14.8 million hectares, most of it forested, forms the basis for the enlargement of the agricultural area. But this could not rationally be used in its entirety for agriculture. Any

²⁶ There are only isolated soil surveys or general information for some areas or localities.

²⁷ These areas are constituted by (a) land heavily eroded, bare rock, excessively steep land, desert areas impossible to reclaim, snow-peaks, barren moorland, etc. ; (b) the beds of rivers, streams, lakes, undrainable marshes and quagmires, mangrove swamp, etc. ; (c) land occupied by townships, buildings, mines, roads, etc. When these three groups are excluded, the remaining unutilized area is considered potentially suitable for some kind of crop or livestock farming, which does not imply that all such land could necessarily be used for agricultural activities.

programme for reclaiming new land should make provision for the preservation of natural forests wherever their elimination would endanger the conservation of the soil or of water resources, whatever the use made of the latter at present. Furthermore, forest reserves must be maintained for lumber, fuelwood and other commodities such as oil nuts, vegetable ivory, rubber barks, *guadua* (native bamboo), etc.

The scanty available data show that of the 14.8 million forested hectares, only 7.7 million, or 52 per cent, could be cleared and reclaimed for agriculture.²⁸ The remaining 48 per cent will have to be left with its original woodland covering.

Hence it would appear that the 21.6 million hectares already used for agricultural purposes in the Departments could be extended by 35.7 per cent (7.7 million hectares), giving an effectively utilizable area of 29.3 mil-

²⁸ There are no systematic and complete studies on soils and possibilities of agricultural expansion by reclamation in the various areas and Departments. The figure of 7.7 million hectares given in the text was derived from the compilation of opinions and estimates collected by ECLA from various sources. Most of these estimates were revised and approved by the technical experts of the Colombian Ministry of Agriculture.

TABLE 126. COLOMBIA : AREAS SUSCEPTIBLE OF IRRIGATION OR DRAINAGE

(Hectares)

Department	Irrigation	Irrigation and drainage	Total area susceptible of irrigation	Flood control and drainage in irrigated areas	Drainage apart from irrigation
Antioquia	—	—	—	—	—
Atlántico	29,122	—	29,122	—	50,000
Bolívar	72,000	—	72,000	—	—
Boyacó	—	50,000	50,000	—	—
Caldas	5,600	—	5,600	—	—
Cauca	8,134	—	8,134	—	—
Córdoba	—	328,000	328,000	30,000	—
Cundinamarca	—	45,000	45,000	55,000	—
Huila	39,962	—	39,962	—	—
Magdalena	37,000	—	37,000	—	10,000
Nariño	—	—	—	—	38,000
Norte de Santander	60,600	—	60,600	—	—
Santander	732	—	732	—	—
Tolima	95,500	—	95,500	—	—
Valle del Cauca	—	200,000	200,000	30,000	—
Total for Departments	348,650	623,000	971,650	115,000	98,000
Chocó	—	—	—	—	—

SOURCE : See annex III, "Note on possibilities of extending the irrigated area".

lion hectares. This estimate does not seem excessive, since it represents 63 per cent of the territorial area of the Departments under consideration, and therefore leaves 37 per cent, or 17.1 million hectares, for all those areas which, because of their nature or use, cannot or should not be turned to account for agricultural purposes.

This analysis of the position with respect to the Departments excludes the Chocó, the high rainfall and temperatures of which create a difficult environment for crop and livestock farming. Thus 97.7 per cent of its area, amounting to 4.7 million hectares, still remains unutilized, although it borders on both the Pacific and the Atlantic Oceans, while navigable rivers such as the Atrato, Boudó, and San Juan cross it in several directions. This does not imply that no land can be found in the Chocó Department to extend its present small agricultural area of 108,000 hectares. Probably 30 to 40 per cent of the total area, if not more, could be farmed in the future, when mechanical or chemical means of clearing the land at little cost become available, as well as sufficient heavy machinery to drain the soil, dredge rivers and streams and build ports and roads. In any event, some forested areas could be cleared for bananas, rice and certain subsistence crops.

There seem to be vast possibilities of enlarging the farm area in the *Intendencias* and *Comisarias*. These, in the aggregate, extend over 62.7 million hectares, or 87 per cent of their total area. Although no studies are available on this subject, the data to hand show that the margin for expansion of the agricultural area might amount to several million hectares, particularly if clearing were preceded by road-building and supplemented by drainage, dredging of rivers and streams and, in some cases, irrigation works. According to one estimate, the eastern slopes of the whole length of the *Cordillera*

Oriental comprise not less than 10 million forested hectares with good soil, suitable for farming. Part of this area lies in the *Intendencias* and *Comisarias* and part in the Departments.

Rather than the reclamation of new areas, the rehabilitation of land through irrigation, drainage and/or flood control might well be attempted, with a view to the intensive and permanent cultivation of areas already in use, located in zones which are developing rapidly, where large population centres exist and basic investment in means of communication and transport, market facilities, security measures, etc., has already been effected, but where utilization is deficient owing to long periods of drought, which may or may not be followed by floods that make farming virtually impossible. Such land is generally used temporarily for extensive-type livestock production with very poor yields.

The construction of irrigation works and/or flood control facilities so radically transforms the land that its effects are reflected in a production per unit of area several times larger than that obtained on the average from a similar unit of area reclaimed merely by clearing.

The advantages of both systems and the priorities to be assigned to them in a programme aiming at the extension and more efficient utilization of cultivated areas will be discussed and assessed at a later stage.

Table 126 summarizes all the information available on areas which can be irrigated and drained.

Although these data do not refer in all cases to specific projects of which a detailed study has been made, and in a few cases result only from observations collected in the course of preliminary surveys, the possibilities of extending the irrigated area would seem to approximate very closely to one million hectares. The area that could

be irrigated is equivalent to 33.5 per cent of the total area farmed in 1953. If all the works listed in table 126 were constructed, the present irrigated area of 220,000 hectares would increase five-fold and would ultimately represent 40.5 per cent of the cultivated acreage in 1953. New surveys may point to possibilities of equal or even greater significance. The *Llanos Orientales* seem to offer ample prospects, since they comprise flat lands, with numerous rivers but a climate that makes seasonal irrigation necessary for many crops. Moreover the yields of others would improve, and crops could be rotated with artificial pastures having a high carrying capacity for dairy or fat stock farming.

Similar comments might be made as to projects for the drainage of damp soils or those subject to floods, which afford abundant possibilities for the incorporation of new land. Emphasis should also be laid on the urgent need for immediate preventive measures against any further extension of the large area already covered by marshes or swamps and against the danger of floods in vast tracts of useful cultivated and grazing land, as a direct consequence of progressive erosion on almost all steep and bare ground in the river basins of the country. These measures are constituted by such soil conservation programmes as, in addition to preventing the wearing-away and removal of the soils subject to erosion, avert other equally harmful and in some cases irreparable consequences, among which are the barrenness of eroded fields, the destruction of urban sites and roads, reduction of navigability (on the River Magdalena for instance) and loss of human life, animals and crops.

(b) *Possibilities for certain crops and livestock*

The possibilities of extending the agricultural area have so far been outlined in general terms. It has been shown that the mere clearing of forest land and using it for agriculture affords ample margin for the development of any programme, no matter how ambitious. Irrigation and drainage possibilities have also been reviewed and seen to be far-reaching. It now remains to consider the expansion prospects for each commodity. Such expansion will not always necessarily require the incorporation of new land, since a more expeditious alternative would be to grow certain crops on land at present under pasture; livestock activities could replace the areas they had lost by more efficient utilization of what remained or by the reclamation of new land wherever necessary. Moreover, the livestock sector, while obliged to surrender some ground to crops, will receive in return other land which is unsuitable for crops but on which artificial pastures could be planted.

(i) *Coffee*. The area under coffee amounts to 831,000 hectares. There seem to be good prospects for expansion, especially on the eastern slopes of the *Cordillera Oriental*. In the opinion of experts, not less than 200,000 hectares could be planted with coffee in this area by using forest land and without the displacement of any established crop. The Sierra de Santa Marta and the mountain range separating the Department of Magdalena from Venezuela have been attracting coffee planters, although no information is available either on areas recently planted or on the extent of the possibilities for new

coffee zones. In the traditional areas suitable land can still be found, but their utilization for coffee would mean a contraction of the area under food crops.

(ii) *Maize*. About 700,000 hectares are cultivated, but only 570,000 hectares are actually utilized, since in some areas a crop is sown on the same land more than once a year. Although maize should not be planted on excessively steep ground and should give place to artificial pastures or forests, it is one of the crops for which the prospects of expanding the area under seed are most promising; three times the existing area could be incorporated, or even more if necessary. Maize can be grown on grass land in rotation with fodder crops and even in association with them, so that its increased cultivation would cause no crop displacement; on irrigated land it could be rotated with rice, cotton, beans, grass, etc. By using fertilizers and applying soil conservation measures, it should be possible to extend the practice of growing more than one crop in the year on the same field, particularly when maize could be rotated with some leguminous plant. In the last resort, new land could be made available for maize by clearing, irrigation or drainage.

(iii) *Rice*. The area under rice in 1953 amounted to 171,000 hectares, of which about one-half was sown under conditions of controlled artificial irrigation and the other on non-irrigated land with flooding not subject to control. The actual area used for this crop was estimated at 143,000 hectares, since some of the sowings on irrigated land are repeated more than once a year on the same soil. Good prospects exist for increasing the area under rice, but they are conditional upon the expansion of the irrigated area. This does not imply that the new areas could not be sown with rice unless irrigation works were constructed, but in such cases, the crop would be subject to a series of contingencies resulting in losses and persistently low yields. Of the land to be irrigated in future, in localities with suitable weather and soils for rice, about one-fifth could be used once annually for rice, in rotation with other crops. An increase in the frequency of sowing, through intensive and rational soil utilization, would still further improve the prospects for this crop. A reduction of the present cultivated area to 150,000 hectares — in order to eliminate marginal sowings — indicates that the maximum area for annual sowings of rice might amount to 250,000 hectares without displacement of other crops. The 100,000-hectare increment implies the construction of irrigation works for 400,000 or 500,000 hectares.

(iv) *Cotton*. The cultivated area in 1953 stood at 67,000 hectares.²⁹ There are vast areas in the country with natural conditions suitable for cotton, as shown by some more or less detailed surveys. The best opportunities seem to be offered by the Departments of Magdalena de Tolima, as well as by the *Intendencia* of Guajira, in all of which enough suitable zones are available in the aggregate to permit the doubling or trebling of the area sown in 1953. Good possibilities are also to be found in the Departments of Córdoba and Atlántico, but in these cases the construction of water regulation

²⁹ In 1954, 82,300 hectares were sown with cotton.

and control works would be indispensable, since the land appropriate for cotton-planting is usually flooded during the rainy season.⁸⁰ In all these instances there would be no displacement of other crops, but only perhaps of grass. This possible loss of pasturage could be replaced by the reclamation of forested land for stock farming.

(v) *Oil-seeds*. Apart from cotton, the seed of which is used as raw material for edible oils, oil-seed crops in Colombia include 17,000 hectares under sesame and 5,000 hectares under coconut palms. If the possibilities for the supply of vegetable oils were reduced to annual crops alone, available land could always be found for extending the area under seed. Prospects for sesame are more or less similar to those for cotton, and these two could perhaps be rotated with other useful crops. Experiments have recently been made with sunflower and soya beans, while peanuts are grown on a very small scale for direct consumption.

There are innumerable wild palms in Colombia which yield oleaginous nuts, some of them being successfully used by the edible oil industry. No work on the selection of native palms has yet been carried out, but research, selection and reproduction of the best species can undoubtedly make a substantial contribution to solving the problem of oleaginous raw material supplies. Reproduction of the selected species could be continued in their own habitat, on ground whose topography would probably preclude its utilization for other purposes. The African oil palm has been introduced on a limited scale, which suffices, however, to indicate which varieties of this species are best worth reproducing. Large tracts exist where this palm could be planted, to judge from the experience of countries with similar natural conditions. One of the many advantages of the African palm is that it can be grown in association with other plants, including artificial pasturage. The coconut palm should not perhaps be included in an oleaginous development programme until the causes of the rapid loss of existing plantations have been investigated and can be easily controlled.

(vi) *Cacao*. The area under cacao comprises 32,000 hectares, mainly in the Cauca, Valle, Huila and Antioquia Departments, which together contribute about 90 per cent of the country's cacao output. Current programmes for cacao development in these Departments make provision for new plantations covering approximately 15,000 hectares. As potentially suitable areas, although no studies have yet been made, can be cited Carare and the Carere and Opón Basins in the Department of Santander; Territorio Vásquez in Boyacá; Valle del Sarare in Santander del Norte; Dibulla in Goajira; the banana area in the Magdalena Department; Valle del Sinú in Córdoba; San Vicente del Caguán and other localities in the Comisaría del Caquetá; several sites in the *Intendencias* of the Meta and Arauca and the *Comisarias* of Vichada and Vaupés. All these contain small planta-

tions indicative of a possibility of expansion, particularly in Amanavén (Vaupés), where the foreign Amazon variety of cacao is grown. Coffee areas between 1,000 and 1,200 metres above sea level may also be considered as potential cacao areas, particularly in Quindío and similar localities, where existing cacao plantations show that under certain conditions this crop may yield a satisfactory economic return.⁸¹

(vii) *Sugar-cane*. The area planted with sugar-cane in 1953 totalled some 152,000 hectares, of which 123,000 were used for production of *panela* and syrup or treacle (molasses), while 39,000 were devoted to sugar production. There are substantial possibilities of expanding the area under cane for *panela* production as a small agricultural industry, depending mainly upon the reclamation of forested land, since the plantations already existing in other zones would have to be enlarged at the expense of existing crops or artificial pastures.

Sugar-cane for the sugar mills offers good prospects for development on the flat lands of the Valle del Cauca and Tolima Departments, provided that irrigation works are built. Similar though less favourable conditions are found in the Departments of Bolívar and Córdoba and in the Llanos Orientales, in the first of which sugar cane is already grown. In any case, only in Valle del Cauca is irrigated land available on a scale large enough for the area under cane for sugar production to be doubled, for which purpose some of the land at present used for stock farming, mainly of the extensive type, would have to be taken over.

(viii) *Bananas*. Part of the production from the 45,000 hectares currently under this crop is used for domestic consumption, and part is exported. Bananas for domestic consumption are grown on small plantations spread all over the country, while those for export are obtained from rationally organized plantations, all located in the irrigated land of the banana area around Santa Marta in the Department of Magdalena. There appear to be favourable prospects for increasing plantations of bananas for domestic consumption in the new areas being opened up for agriculture. Conversely, the prospects for new plantations for export are limited in the Santa Marta area by the relatively narrow margin for extending the irrigation works. Excellent potential zones are Atrato, on the Caribbean coast, Baudó in the Chocó Department and Tumaco on the Pacific coast of the Department of Nariño, where bananas are already being grown. In these cases, plantations would be extended to land at present under forest, after a survey of environmental conditions, incidence of diseases affecting bananas and methods of economic control.

(ix) *Wheat, barley, potatoes*. These three crops are grown on high lands in the so-called "cool zone". In the aggregate they cover about 343,000 hectares, wheat accounting for 175,000, barley for 53,000 and potatoes for 115,000 hectares. The land used for potatoes is also suitable for the other two crops, so that they can be grown

⁸⁰ In the Atlántico Department, the building of the road from Puerto Giraldo to the Canal del Dique on an embankment would avert danger from the River Magdalena's overflowing its banks, while in the Department of Córdoba, the damming of the Sinú river would prevent the flooding of vast areas at present under cultivation or about to be cultivated.

⁸¹ *Caja de Crédito Agrario, Fondo Rotatorio de Fomento Económico and Campaña Nacional del Cacao, Informe sobre el cultivo del cacao*, prepared by the chief of the Campaign, Mr. Celso García B., at ECLA's request.

in rotation ; only part of the area covered by wheat and barley is appropriate for potatoes, however. There are no soil studies to indicate which part of the area utilized is suitable for all three crops or only for wheat and/or barley. Nor has any research been conducted on the possibilities of reclaiming new areas for these crops, or for others, such as different kinds of vegetables and fruit, which might be grown in this zone. It should be recalled that the cool zone comprises 10.4 million hectares, or 9.2 per cent of Colombia's territory. Of these, 7.4 million hectares are within the boundaries of the Departments where the three crops in question are grown, the area utilized representing barely 3.4 per cent or the latter figure and 2.4 per cent of the country's total cold zone. Most of this zone has difficult topographical features, but there are also large tracts of flat or only slightly broken ground, which are mainly used for pasture, apart from those taken up with wheat, barley, potatoes, vegetables and miscellaneous crops. It is precisely in these grazing grounds, which can be worked without difficulty, and the area of which is at least one million hectares within the Departments,³² that additional land for wheat, barley, potatoes, certain vegetables and fruit should be sought. Since about 500,000 hectares are at present under cultivation in the cold zone, the total availability of arable land would seem to be some 1.5 million hectares.

Apart from improved means of communication and transport facilities, drainage, flood control and, in some cases, irrigation would be required. Among the Departments where such possibilities exist are Cundinamarca, Boyacá, Nariño, Tolima, Antioquia and Valle del Cauca. In Nariño, for example, the Túquerres plateau and the Sibundoy valley are suitable. The first comprises about 100,000 hectares, of which 40,000 are under pasture (mainly natural grass) and 30,000 under potatoes, wheat, maize, etc., while 30,000 are too marshy for use. In the Sibundoy valley, out of a total of 25,000 hectares, of which 12,000 are flat land, 8,000 hectares are permanently flooded and the remaining 4,000 are almost exclusively pastureland.³³

The Savannah of Bogotá, with 145,000 hectares in Cundinamarca, and 50,000 in the valleys of Sogamoso, Villa de Leiva and Chiquinquirá in Boyacá, could be more extensively used for cold climate crops once the projects for flood control and irrigation in the former, and drainage and irrigation in the latter, are carried out.

On the assumption that there were 1.5 million hectares of arable land in the cool zone and that a rotation cycle of six years, three for crops and three for artificial pasture, were adopted, the maximum area which could be used

³² Raúl Varela M., agronomist of the Ministry of Agriculture, in his report on the wheat situation in Colombia during 1954, estimates that the flat areas suitable for cultivation which are under pasture in the cool zone within the Departments amount to more than one million hectares. This land is generally found in medium-sized and large holdings.

³³ See A. I. Staffe, *La situación lechera en Nariño*, an unpublished report prepared under the direction of the Ministry of Agriculture at the request of ECLA (Bogotá, February 1955); *Plan de desarrollo agrícola y ganadero para el departamento de Nariño*, prepared by the *Sociedad de Agricultores de Nariño* (Pasto, May 1954), unpublished.

for annual and perennial crops would amount to 700,000 hectares, or 200,000 hectares more than are at present cultivated.

These very provisional conclusions point to the need for more thorough and systematic research into all the arable land possibilities that might be offered by the cool zone of Colombia.

It is, moreover, this cool zone which, owing to its ecological conditions, offers the best prospects for the development of intensive dairy farming. Sound exploitation, aiming at a proper balance between crops and livestock on each farm as complementary rather than mutually exclusive activities, would permit the expansion not only of the area under crops but also of livestock production, through an improvement in the quality and quantity of forage.

(x) *Rubber*. The rubber-tree grows wild in the Amazon area of Colombia and in Bajo Atrato on the Caribbean. In the first of these areas there are some 4,000 hectares of artificial plantations and in the second an experimental station of 380 hectares. It is generally agreed that favourable conditions for rubber exist, and that it could be cultivated on vast tracts at present covered with virgin forest.³⁴

(xi) *Fique or cabuya* (sisal hemp). An estimated 20,000 hectares are used for the cultivation of this hard-fibre crop. Sisal is mostly grown along the boundaries of smallholdings, and only exceptionally are formal plantations of any size found. In general, depleted and eroded soils are used, since this plant makes an efficacious contribution to their conservation and recovery. There are many large areas with soil unfit for other crops, including artificial pastures, which could only be used rationally for *fique* or *cabuya*.

(xii) *Fruit-trees*. No accurate data are available for the area at present planted with fruit-trees, but it must be extensive. There are substantial prospects for new plantations, particularly as some species can grow on sloping and even very steep ground. Once plague and marketing problems were solved, there would be no serious obstacles to a considerable expansion of the plantations of citrus fruits, avocado pears, *chirimoya* and other tropical fruit. Although perhaps on a more modest scale, and only for the domestic market, the growing of temperate-climate fruit such as pears, apples, peaches, grapes, etc., could also be more widely developed.

(xiii) *Livestock production*. The outlook is very promising for the clearing and establishment of areas for new stock farms, thanks to government programmes for road construction and land settlement. The Departments, *Intendencias* and *Comisarias* contain about 10 million hectares of unutilized land that could easily be reclaimed for livestock production. A survey of the main forested areas susceptible of conversion to pastureland indicates the area that could be utilized in the near future. Excellent possibilities are to be found in the Magdalena Department ; on the right bank of the River Magdalena, from Chiriguaná to Gamarra and east-

³⁴ A government decree reserves 90,000 hectares in the Bajo Atrato area for future rubber plantations.

ward to the cordillera, there are some 150,000 hectares³⁵ suitable for pasture, discounting forest reserves equivalent to half this area. On both banks of the César river, in the San Juan del César, Codazzi and Becerril districts, some 300,000 hectares could be utilized; in the Riohacha-Dibulla zone about 60,000 hectares could be turned into pasture, much of this land having possibilities for irrigation. About 20,000 hectares are available south of Gamarra. The areas listed total 530,000 hectares, or barely half of the new land which could be used in the Department of Magdalena.

In the *Intendencia* of Caquetá, particularly in the districts of Florencia and San Vicente, the largest potential livestock area is found, estimated at not less than 2 million hectares, after forest reserves are deducted.

About 200,000 hectares in the Bolívar Department could be converted into permanent pasture for cattle, the largest availabilities lying to the east, near the River Magdalena and in the districts of San Marcos, Tolúviejo and Sincelejo.

The Department of Córdoba likewise possesses very fertile land, at present covered with forests, but easy to clear and use for livestock. A total of not less than 400,000 hectares is available, mainly in the Sinú area.

In Santander, Boyacá and Cundinamarca, at least 1 million hectares, at present unexploited, could be brought into use for livestock activities. In other parts of the country the new areas available for pasturage are not so extensive, but still significant in the aggregate.

Development programmes for the dairy industry might include the following areas:

Savannah of Bogotá. Although this is the main dairy centre, maximum encouragement should be given to production to meet the growing demand for milk and dairy products in the *Distrito Especial de Bogotá*. Perhaps about 100,000 hectares, or 70 per cent of the area's aggregate 145,000 hectares, are at present used for dairy farming. The main dairy centres are found in Bogotá, Boyacá, Cajicá, Cogua, Chocontá, Chía, Engativá, Facatativá, Fontibón, Funza, Madrid, Mosquera, Nemocon, Soacha, Suba, Usaquén and Zipaquirá. A provisional estimate suggests that about 50,000 cows are milked, which, on the assumption of an average yield of 5 litres, would give a total daily output of 250,000 litres. A survey of dairy farms management — which in many cases was on extensive lines — led to the conclusion that production could be increased by 50 per cent, that is, to 7.5 litres per cow, even if total pasturage were to decrease on a basis of larger yields, greater carrying capacity per hectare and higher livestock density. The available means of communication, the flatness of the land, the existing dairy herds — rightly considered the best in the land — the technical level of milk production and the existence of a very large potential market, all justify and indeed require the early implementation of a dairy development programme in the Savannah of Bogotá.

Valley of Ubaté. This area includes in particular the cool, flat districts of Carupa, Cucunubá, Fúquene, Guachetá, Lenguazaque, Simijaca, Susa and Ubaté. The

nature of the land and the quality of the pasture make this the region with the best prospects for increasing dairy production. About 60,000 litres daily are being produced at present, of which 65 per cent is delivered to Bogotá and the remainder used for making cheese and butter. This represents the yield of from 8,000 to 9,000 cows, which give on an average a little over 7 litres each; as the average for a large region, this is the highest in the country. There are herds with average yields of 11 and even as much as 15 litres, but these are, of course, composed of selected cattle receiving supplementary rations of concentrates. These facts show that the Valle de Ubaté has substantial dairy potentialities. According to estimates, the volume of production could be raised by some 60 per cent,³⁶ without any expansion of the pasturage area, merely by the provision of supplementary rations (grains, concentrates, fodder and hay) and the generic improvement of dairy stock, particularly through a co-operative service for artificial insemination.

Valle del Cauca. Although warm, the flat part of this district offers various advantages for intensified milk production, and may become the main supply centre for the Department. Of the 400,000 hectares comprising the plains of the Valle del Cauca, some 300,000 might be estimated to be under pasture,³⁷ on which a similar number of cattle graze. Of these, 60,000 would seem to be steers from other Departments which are being fattened. The breeding, rearing (*levante*³⁸) and fattening of cattle belonging to the Valle area probably account for 240,000 head (30 per cent of which are cows), including those used for beef. Owing to the exceptionally favourable conditions with respect to fertility of the soil, means of communication and density of the population, the rational and economic utilization of the land should be based on the growing of high-yield crops (sugar cane, rice, tomatoes and beans) and on intensive dairy farming. At present the northern area and the banks of the Cauca river are used mainly for fattening cattle, but it seems likely that once the benefits of the development programme for the Valle, including drainage and irrigation works, begin to make themselves felt, meat production will be replaced by crop-growing and intensive dairy farming. Fat stock rearing would be economic only at high levels of technique and with special breeds. At present the cattle composing most of the herds are indigenous, or with a very low proportion of cross-breeding, and it is for this reason that average production ranges only from 2.25 to 2.5 litres per cow. This is one of the lowest yields of the country, and yet the area is considered exceptionally propitious for the development of crop and livestock farming. Expansion of dairy farming might be aimed at supplying milk processing plants and at meeting the increased *per capita* consumption of fresh milk. Some cattle farmers in Valle del Cauca are demonstrating in practice the advantages of

³⁶ Report by José J. Cañón and A. I. Staffe to the National Programming Committee, September 1954.

³⁷ The agricultural sample for Valle del Cauca gives a total of 380,000 hectares under pasture in all the hot zones of the Department.

³⁸ The word "*levante*" is used in Colombia to designate the interval between the animal's first year of life and the year it becomes fit for slaughter.

³⁵ Report by C. G. Randell on meat production in Colombia.

this part of the country for the development of large-scale dairy farming.

Districts in Antioquia. Milk production in Antioquia is also of special present and future importance. Supplies are worse than inadequate, their quality is unsatisfactory and prices are relatively high. The main centre of production is the Aburrá Valley, which is also the scene of considerable industrial development. There are large dairy farms in the districts of Bello, Barbosa, Caldas, Copacabana, Envigado, Girardota, Itagüí, La Estrella and Medellín. It is to be hoped that dairy farming will be intensified in these areas, since demand will remain at high levels as the population increases. Development of milk production in the La Ceja Valley and in the districts of Yarumal, Ovejas and other cold zones would also be worth while. There are many farms in these municipalities and many of them possess selected cattle bred from imported stock. Production costs are high, but they are offset by the good prices paid to farmers.

Valleys of Chiquinquirá, Samacá and Sogamosa. These are located in the Boyacá Department, and have pasture resources and considerable stocks of dairy cattle, very suitable for a far-reaching milk production campaign. The first of these valley is formed by plateaux and slightly sloping land in the municipalities of Chiquinquirá, Saboyá and Caldas, with an estimated 34,000 hectares of grass land. In the Chiquinquirá district and adjacent parts of the neighbouring municipalities alone, stocks are estimated at 15,000 head of cattle, of which 5,000 are milch cows, with an output of slightly over 22,000 litres of milk daily. Here current production could probably be increased by 60-70 per cent, by means of well-planned campaigns for the improvement of dairy herds, with two milkings daily instead of one, diversification of forage crops, rational pasture management, reduction of the death-rate and an extension of the area utilized for milk production purposes. This last could be achieved through the partial superseding of cattle-rearing for beef. The area is far from large fresh milk consumer centres, but it seems very appropriate for the installation of a dried milk factory which would have to be established with assistance from UNICEF.

The Samacá and Sogamoso valleys also provide favourable conditions for an increase in milk production, both to cover Bogotá's requirements of fresh milk and derived products and to satisfy the large future demand on the part of the Paz del Río steel works. The progress and expansion of the dairy industry must here be sought through technical progress and modern production techniques.

Túquerres and Sibundoy Valleys. Prospects for these two areas are very promising, and favourable to the development of dairy herds on a considerable scale. There are 44,000 hectares of pasture, which are at present under-utilized, the cattle population numbering only 13,000 head, including stocks in the municipalities of Cumbal and Ipiales.³⁹ Production conditions are unsatisfactory, yields per unit of area and per animal are low, and pasture management and feeding systems are exceedingly backward. Nevertheless, the results being

obtained by a very small number of farmers, the nature of the potential resources and the cool climate more than justify the encouragement of production. The prevalent uneconomic size of farm, the geographical location and other factors make the manufacture of cheese and butter the main branch of production, primitive methods being used. It is calculated that, through a local dairy farming development programme, current production, estimated at about 24,000 litres for the two areas, could be trebled. This would mean that cheese and butter manufacture could be industrialized and powdered milk factories established.

Specific dairy development programmes could also be undertaken in the area of Roncesvalles (Tolima) and on the plateaux of Caldas, Cauca and other districts, but more detailed research would first be required.

3. Unit yields

A comparative study of unit yields for selected crops in Colombia and in other countries in North or South America reveals that commodities such as coffee and cacao are produced in much greater quantity per hectare in Colombia than in Brazil, Ecuador or Venezuela. Cotton yields are tending to improve rapidly, and by 1954 United States standards had already been attained. Tobacco production per hectare is satisfactory, although it is below that of the United States and 60 per cent beneath corresponding figures for Chile. Rice yields are very low in comparison with those of Argentina, Chile and the United States. The average yields for such commodities as wheat, potatoes, beans, maize and sesame are at times not even half of those obtained in the other countries used as a basis of comparison (see table 127).

High average yields for coffee and cacao seem to indicate exceptionally favourable conditions for both crops in Colombia, as also for cotton. Yields for this last crop, however, have not always been good; the recent improvement has been due to the introduction of modern techniques. Similar possibilities exist for most crops, as can be seen from the results of operations tried out by experimental stations and, latterly, by a number of progressive farmers. The adoption of better techniques, even in some isolated aspects such as the use of improved seeds, enables the unit yield of maize, beans and potatoes to be doubled, while that of wheat can be raised by 50 per cent. More careful preparation of the soil, use of fertilizers, plague control and other technical improvements, are other ways of raising unit yields open to the producer.

Little can be said of the evolution of average yields, since statistics cover only a very recent period. However, the very nature of typically traditional and empirical farming suggests that the average yield of many crops must have deteriorated considerably. Although such a deterioration has not been unduly apparent in the country as a whole, it has been outstanding in specific areas, where sowings have had to be abandoned and the depleted soils used for pasture. The constant reclamation of new soil to replace that rendered unfit for use by erosion prevents a clear over-all grasp of the problem of the fall in yields in Colombia as a whole.

³⁹ A. I. Staffe, *La situación lechera en Nariño*, op. cit.

TABLE 127. COLOMBIA : AVERAGE YIELDS OF SELECTED CROPS IN COMPARISON WITH OTHER AMERICAN COUNTRIES, 1953
(Hundreds of kilogrammes per hectare)

	Colombia				Argentina	Brazil	Chile	Ecuador	Venezuela	United States*
	1940-42	Annual averages		Year 1953						
		1945-47	1951-53							
Sesame	—	5.2	6.0	5.9	—	—	—	—	8.4	—
Rice (paddy) ...	—	18.3	16.0	17.9	31.8	14.8	28.8	12.1	12.3	27.4
Cotton fibre ...	—	1.5	1.6	2.0	2.3	1.4	—	—	3.1	3.1
Coffee	5.7	5.6	5.1	4.6	—	3.8	—	2.9	—	—
Bananas	—	—	88.1	100.0	—	—	—	117.4	—	—
Plantains	—	—	79.1	79.2	—	—	—	—	—	—
Cacao	—	3.5	4.6	4.7	—	4.0	—	1.6	2.3	—
Sugar-cane	—	—	645.8	594.3	—	—	—	—	—	—
Barley	—	12.0	12.2	12.3	14.0	10.2	14.8	8.6	—	—
Beans	4.9	4.9	5.6	5.9	11.0	6.9	10.7	—	8.7	14.4
Maize	10.1	9.8	11.0	11.0	15.1	11.9	13.9	7.8	12.7	25.4
Potatoes	54.9	46.5	55.6	53.0	71.9	48.0	86.4	33.6	23.0	168.0
Tobacco	12.1	10.9	12.1	11.4	10.2	7.8	19.1	—	10.3	14.3
Wheat	8.7	6.2	8.3	9.7	13.7	8.5	12.7	8.3	—	12.3

SOURCE : For Colombia : Ministry of Agriculture. For the other Latin American countries : relevant national statistics. For the United States : FAO.

* 1952 statistics.

V. THE TECHNOLOGICAL LEVEL

1. Agricultural research and extension

(a) Research⁴⁰

The supply problems created by the First World War awakened interest in the modernization of agriculture in Colombia. The first step was to formulate programmes for the organization of state agricultural services, such as would serve as the basic tool with which to promote and improve food production, in terms of both quantity and quality. Numerous efforts have been made since then to establish experimental farms and laboratories for purposes of research on the multiple problems of the land, of plants and of animals. These undertakings have not fully achieved the expected results, owing to frequent changes in work programmes, shortage of technical personnel—who were never assured of their posts—and dearth of resources. The few and limited resources available were further dissipated in the vast number of work projects, for some of which no technical or economic support was forthcoming. At times there were more than 40 experimental farms in existence, each established to solve local problems and with a programme

⁴⁰ Annex IV of this study contains an outline of salient developments in the field of agricultural research. Both for the annex and for the present analysis the following sources were consulted : *Historia de la Investigación Agrícola en Colombia*, by Jorge Ramón (1954) (unpublished) ; *Memorias of the Estación Agrícola Experimental de Palmira, 1951-52-53* ; *Bulletin of the Estación Experimental Agroforestral del Pacífico-Callima*, Nos. 1 and 2 (1948) ; "Annual reports" for 1950-51, 1951-52, and 1952-53 of the *Oficina de Investigaciones Especiales* (published in *Revista Nacional de Agricultura*, Nos. 585 and 587) ; *Progress report for 1953 of the Centro Nacional de Investigaciones Agrícolas de Tibaitatá*, unpublished ; and reports of the *Federación de Cafeteros*, of the *Instituto de Fomento Algodonero* and of the *Caja de Crédito Agrario*.

unrelated, as a rule, to the work planned or under way in the other farms. There was often duplication of activities, and a very serious lack of co-ordination between those investigating similar problems, or between these research workers and the personnel responsible for disseminating their findings among the farmers. Despite all these obstacles, some experimental stations achieved successes which were of great economic benefit to the country, particularly as regards such crops as sugar, rice, cotton and tobacco, and the acclimatization of a series of exotic forage crops superior in quality to many native varieties.

Through the agreement between the Government and the *Federación Nacional de Cafeteros*, whereby the latter engaged to take charge of everything related to the improvement of coffee growing and processing, research into this branch of agricultural activity was established on sound and permanent bases. Something similar took place later in the case of cotton, a satisfactory impetus being given to research programmes for this crop in 1948, when they were entrusted to the *Instituto de Fomento Algodonero*. In recent years, with the co-operation of the Rockefeller Foundation, a Special Research Bureau (*Oficina de Investigaciones Especiales*) was established within the Ministry of Agriculture. This is a semi-autonomous organization responsible for maize and wheat programmes. It has achieved important advances in less time than was expected. The co-operative programme has lately been extended to potatoes, beans, barley, phytopathology, entomology, soils and fertilizers. The early success obtained by the Special Research Bureau is fundamentally due to two basic factors, namely (a) the progress already made by the Ministry of Agriculture in the same directions and (b) the agency's organizational structure, which is characterized by a relatively adequate and stable system of financing and by the continuity

of its programmes and permanence of the technical staff in charge of their implementation.

The work of Colombian experimental stations on innumerable projects covering multiple aspects of agricultural research has been planned on satisfactory lines, and extremely valuable results have already been obtained. Many of the conclusions arrived at, however, have not been disseminated outside the experimental station concerned, in some cases because lack of resources have prevented their confirmation by large-scale tests, and in others, when this has been possible — or unnecessary — because extension services have been inadequate. At the same time, these services have apparently not co-ordinated their activities with development programmes relating to fundamental aspects such as credit, seed supplies, mechanization, prices, transport and storage.

Frequent changes of plan have their most serious repercussions on research programmes for livestock and pastures. The explanation probably lies in the long time required to reach any useful conclusion in this field, no matter how modest the scope of the experiment concerned. The experience of other countries demonstrates that the outcome of research must be awaited with patience, mainly because expenditure is incurred which cannot be financed by the results of the investigation itself, as would be the case in a commercial undertaking. The country has already benefited to an incalculable extent, however, from the spread of the findings of experimental work on cotton, coffee, sugar-cane and rice, and more recently, on maize, wheat, barley and potatoes. Furthermore, it must be remembered that research is not static, but represents a constant striving towards optimum solutions, consistent with the changing patterns and conditions of the environment and with the requirements imposed by the country's development.

Obviously, no agricultural development programme can yield results that make the effort expended worth while, unless a thorough knowledge is obtained of possible ways of solving the problems involved. Research in the country itself is the only means of acquiring such knowledge; and it is the lack of technical personnel (agronomists, veterinarians, chemists, biologists, etc.) that is one of the main obstacles to the launching of a broadly-conceived agricultural research and extension programme in Colombia.

Among the most important results recently obtained through agricultural research, special mention should be made of Menkemen wheat, which gives higher yields and is more resistant to drought and rust than traditional varieties (see table 128).

In commercial farming, the Menkemen average yield was 30 per cent higher than that harvested from the regional variety known as Bola Picota, obtained some years previously from research work undertaken at the *Estación Experimental de la Picota*. Furthermore, Menkemen ripens relatively early, its growth period being one month shorter than that of Bola Picota, so that two crops a year can be obtained from the same land. In 1953 about 11,500 hectares were sown with Menkemen, out of the country's total of 170,000 hectares under wheat. Since yields average 6 metric quintals per hectare,

TABLE 128. COLOMBIA : YIELDS OF MENKEMEN 50 WHEAT, IN COMPARISON WITH TWO DOMESTIC VARIETIES

(Kilogrammes per hectare)

Variety	Tibaitatá	Bonza ^a	Isla ^b
Bola Picota	1,977	313	531
Blé Tendre	2,033	720	765
Menkemen	3,555	1,960	1,651
Difference between Menkemen and Bola Picota yields	80 %	526 %	211 %
Difference between Menkemen and Blé Tendre yields	75 %	172 %	116 %

SOURCE : Ministry of Agriculture, Special Research Bureau (*Oficina de Investigaciones Especiales*).

^a Severe rust.

^b Low yields due to drought.

the 30-per-cent increase obtained from the improved seed is equivalent to 1.8 metric quintals per hectare, and a production increment of 2,700 tons on the 11,500 hectares sown with Menkemen in 1953. The farm value of this additional output amounted to 1.3 million pesos, much more than the sum spent by the country on research to obtain the improved variety. Since in a few more years it will be possible for approximately 50 per cent of the area under wheat to be sown with improved seed, better yields will result in a minimum increment of 15,300 tons annually, with a value of 9.9 million pesos at 1953 prices.

Research must unremittingly seek increasingly satisfactory ways of solving the various problems connected with the improvement of the technological level of farming. The production of a variety of wheat such as Menkemen was therefore not the final and only target for experiments in this sphere. Work consequently proceeded, and a new variety, called Bonza, was obtained, which seems to be superior as regards yields, rapidity of growth, resistance to disease, and industrial quality to Menkemen which it will supersede in the near future. It is propable that varieties better even than Bonza will be available shortly, to judge by the new selections which are still at the experimental stage.

If work on wheat has been satisfactory, the success obtained with maize may be considered phenomenal, particularly in regard to varieties for medium and warm climates, which have yielded as much as 100 per cent more than the traditional varieties grown under the same conditions (see table 129).

Seven experimental hybrids have been obtained at the *Estación Experimental de Medellín*. The yields vary from 61 to 64.5 metric quintals per hectare/crop for the first sowing of the year and from 33.1 to 44.6 metric quintals for the second sowing. Yields of these hybrids are 20-30 per cent higher than those obtained from the improved varieties Rocol H-201, Col. 2 and Eto, which were produced in the first stage of the programme, and from 60 to 88 per cent higher than those obtained from traditional varieties, all these types having been grown under similar conditions.

TABLE 129. COLOMBIA : COMPARATIVE YIELDS OF IMPROVED AND TRADITIONAL MAIZE VARIETIES

(Hundreds of kilogrammes per hectare)

First sowing of the year			Second sowing of the year		
Variety	Yield	Percentage increase over test sample	Variety	Yield	Percentage increase over test sample
<i>Montería</i>					
Rocol V-1	39.0	110	Rocol V-1	36.9	106
Eto	36.3	96	Ven-1	35.7	99
Rocol V-101	27.3	47	Eto	32.3	80
Rocol H-201	23.4	26	Cuba-2	25.1	40
Amarillo Montería (Test sample)	18.5	0	Amarillo Montería and Blanco Montería (Test sample)	17.9	0
<i>Medellín</i>					
Rocol H-201	51.3	50	Rocol H-201	29.3	42
Col 2	50.7	48	Eto	26.5	29
Eto	45.8	34	Col 2	23.0	12
Amagaceño (Test sample)	34.3	0	Amagaceño (Test sample)	20.6	0
<i>Medellín *</i>					
Eto 13-A-1-2 x Cos 303	51.2	62			
Eto 13-A-1-1 x Cos 303	49.1	58			
Eto 176-1-1 x Cos 303	49.1	58			
Eto 185-E + x Cos 303	47.4	53			
Col 2-14 + 1-1 x Fto 59	46.8	51			
Rocol H-201	46.1	49			
Eto 210-1 + x Cos 303	46.0	48			
Palmira V-2	44.9	44			
A. Theo 13-8 x Ven 1	44.0	42			
Rocol V-101	43.7	41			
A. Theo 13-B x A. Theo 29-C	43.4	40			
Blanco común (Test sample)	31.1	0			

SOURCE : Ministry of Agriculture, Special Research Bureau.

* Data relate to the whole year's experiments.

The economic importance of the successes achieved in maize improvement programmes can best be appraised if it is borne in mind that the average yield for the country as a whole stands at 11 metric quintals per hectare, with a total area of 700,000 hectares under maize in 1953.

Maize improvement programmes were extended in 1953 and 1954 to include new projects for the production of cool-climate varieties. It seems reasonably likely that in the next two or three years 200,000 out of the 700,000 hectares under maize will be sown with improved seed. On the very conservative assumption of an average increment of only 30 per cent in yields in comparison with those of traditional varieties, the crop would increase by 3.3 quintals per hectare (a total of 66,000 tons annually, worth 14.5 million pesos at 1953 prices). The whole of the research on maize has probably cost the country a sum equivalent to 2 per cent of the value of the additional output which will be obtained annually by applying the results of this research. In any case, annual expenditure on such work has not exceeded 1 per mil of the annual value of maize production. In other words, outlays on

research amounting to only 1 per mil of the value of maize production will increase the harvest by 20-30 per cent or even more, if an efficient mechanism is found to disseminate the results of such research among farmers. These figures once again show that among the best investments a country can make to improve its agriculture is that effected in the field of research.

Successes very similar to those described for wheat and maize have already been obtained in the improvement of potatoes, beans and barley.

The results of research on the use of fertilizers will be reviewed elsewhere in this report.⁴¹

Work on the improvement of cotton varieties, begun some years ago by the Ministry of Agriculture and continued since 1948 by the *Instituto de Fomento Algodonero*, has permitted a substantial expansion in recent years of the area under cotton and, at the same time, of average yields (see table 130).

⁴¹ See point 2 of this section.

TABLE 130. COLOMBIA : AREA UNDER COTTON, AND YIELDS

Year	Area sown (Hectares)	Yields in terms of fibre (Kilogrammes per hectare)
1951	39,700	163
1952	55,163	192
1953	67,080	254
1954	82,300	338

SOURCE : *Instituto de Fomento Algodonero*.

Research on cotton has proceeded along several lines simultaneously, covering discovery and acclimatization of improved indigenous and exotic varieties ; the most suitable times for sowing ; spacing-out ; the most appropriate zones and soils ; plague control ; soil preparation systems, etc.

An attempt is made to evaluate direct estimated benefits at farm level accruing from the improvement in cotton yields between 1951 and 1954 (see table 131).

TABLE 131. COLOMBIA : ESTIMATE OF BENEFITS OBTAINED BY INCREASED COTTON YIELDS

Specification	Fibre	Seed	Total
Increase in yields per hectare between 1951 and 1954 (Kilogrammes)	175.0	239.0	—
Value of crop increment per hectare in 1954 in comparison with 1951 (Pesos at 1950 prices)	471.5	43.8	515.3
Total value of crop per hectare in 1954 (Pesos at 1953 prices)	910.6	84.5	995.1
Percentage increase over 1951	107.3	107.6	107.4
Expenditure of the <i>Instituto de Fomento Algodonero</i> in its cotton research and extension campaign, per hectare, in 1954 * (Pesos at 1953 prices)	—	—	14.9
Percentage of the <i>Instituto's</i> expenditure over total value of crop	—	—	1.50
Percentage of the <i>Instituto's</i> expenditure over increment in value of the crop	—	—	2.89
Profitability of investment, ^b from the national standpoint	—	—	3,458.0

SOURCE : ECLA, on the basis of data supplied by the *Instituto de Fomento Algodonero*.

* Includes 50 per cent of administration and overhead expenses, and all cotton research and extension expenditure.

^b Obtained by comparing expenditure referred to in footnote a with the increase in the value of the crop resulting from the expenditure in question.

The experimental stations at Palmira and Medellín saved the sugar and *panela* industry from ruin by the timely introduction and acclimatization of sugar-cane varieties immune to mosaic, when this disease had begun to ravage Colombian plantations.

The most important of the numerous varieties introduced by the stations were P.O.J. 2714, P.O.J. 2878,

and P.O.J. 2725, which today occupy 90 per cent or more of an approximate 182,000 hectares under cane. Work is proceeding in Palmira on the acclimatization of exotic varieties of sugar-cane and on the creation of new varieties through crossing, selection and research into their agricultural and industrial qualities.

The experimental stations have also introduced and acclimatized improved varieties of rice, some of which — Fortuna, for example — have become widespread. It should further be recalled that, in the mid-'thirties or thereabouts, two serious diseases affecting rice appeared in Colombia, and caused rice yields to drop by as much as 70 per cent. When the existence of these diseases was discovered, the experimental station found ways of controlling them through the use of resistant varieties and the disinfection of seed. Research programmes for rice are proceeding within the limits imposed by the lack of personnel and financial resources.

It would take too long to enumerate every one of the work programmes under way in the experimental stations, many of which are of great economic value. Stress should be laid, however, on the fact that the only programmes for which sufficient technical personnel and economic resources are available are those carried out by the Special Research Bureau, the *Instituto de Fomento Algodonero* and the *Federación de Cafeteros*. The rest, which are in the majority, are far from possessing even the minimum requisites, and they make little progress or barely subsist, when their work is not suspended or abandoned. Moreover, there are numerous lines of crop, livestock and veterinary research which have not been initiated in the country. Again, many of the results already obtained by research were confined to the experimental stations, owing to the lack of co-ordination between national research and extension services, and between these and the agricultural services of the departmental authorities. For instance, the *Estación Experimental de Palmira* has obtained four or five sugar-cane varieties whose characteristics of early ripening, hardiness, and high yields could revolutionize the production of *panela* and molasses, if they were utilized by the planters. The same experimental station has also produced very good varieties of forage cane, which are fast-growing, hardy and high-yielding. Their cultivation on stock farms would partially solve the problem of the deficient quality of available forage, and, above all, that of the acute seasonal shortages. But these achievements are almost unknown outside the experimental stations. Much the same might be said of the research work on oil-seeds and fibre crops undertaken by the *Estación Experimental de Magdalena* (Aracataca) ; of that on fruit trees at Palmira, Medellín and Armero ; or of the interesting work on cross-breeding and selection of cattle which, despite all kinds of difficulties, is being carried out at the *Estación Experimental de Armero*. This research aims at determining, through a process of tri-hybridization of native, zebu and either Jersey or brown Swiss cattle, the characteristics of a new dairy breed adapted to warm climates. By 1954, fourth-generation tri-hybrids were producing about 9 litres daily when the mixture included brown Swiss stock and 7 to 8 litres with Jersey stock. In both cases the cows were grazing and receiving

supplementary rations of concentrates, calves were reared at the udder with a full milk diet, and there was one daily milking.

The annex to the present study of which mention has already been made also contains a review of the activities of several institutions in the field of livestock development. As will be seen, a variety of programmes for the encouragement and development of livestock production in Colombia have been prepared by both national and foreign organizations and technical experts. In 1952 the Ministry of Agriculture drew up a livestock development programme based on credit,⁴² and subsequently a United States expert⁴³ was engaged to study conditions and possibilities for the breeding of beef cattle and to formulate recommendations. Despite these laudable efforts, and the Government's unflinching interest in livestock production, this activity is not developing commensurately with the natural resources available and with domestic consumer requirements.

It is worth while stressing that in Colombia there are a considerable number of stock farmers who are intent upon solving the problem of the breeds of cattle best fitted for their own particular area. Each has carried out independent experiments in cross-breeding, the minority on scientific and technical lines, and the rest simply according to their own judgment. Such experiments are of great value for the improvement of breeds, and might well be the object of special attention on the part of official organizations. An inventory and description of the experimental work carried out by the private sector, designed to enable advantage to be taken of the experience acquired, including both successes and failures, would supplement current activities and provide a basis for their fuller utilization.

(b) Extension

The Agricultural Extension Division (*División de Extensión Agrícola*) is under the Ministry of Agriculture. This service maintains offices in all the departmental capitals, staffed by two or three technical experts, agronomists or veterinarians, who have to spend more time on administrative and information tasks for the central office than on extension. In spite of the lack of resources and personnel and of the absence of liaison with research services, the success obtained by some minor extension projects demonstrates the benefits which could be secured if this work were undertaken on a national scale. An extension programme has recently been initiated in the Department of Boyacá, with the technical and economic co-operation of the United States Government, but mainly with Colombian staff. A similar programme is being organized for the areas reclaimed through irrigation in the Department of Tolima.

The *Federación de Cafeteros* and the *Instituto de Fomento Algodonero* are also doing extension work, each in its specific sphere of action. In the case of the *Federación de Cafeteros* its extension work consists of soil conservation, improved methods of coffee-growing and training the farm worker so that he may achieve

better standards of living. The *Federación* supports primary agricultural schools in several coffee areas and in its experimental station at Chinchiná it gives brief training courses for young coffee workers.

Most of the departmental authorities have agricultural offices, some of which have formulated extension programmes. A serious obstacle to all this work is the lack of funds and of specialized personnel. It should be noted that only exceptionally — as in Tolima — is there any reasonably close co-ordination between the various organizations dealing with agricultural extension with a view to carrying out joint programmes and so making integrated use of the scanty resources available.

Moreover, extension programmes suffer from the want of basic research and surveys, the findings of which would enable the work to be planned in conformity with a realistic conception of the problems to be solved.

2. The use of fertilizers

(a) Present situation

One of the causes of the small unit yield of Colombia's agriculture is the low technological level characteristic of farming. This circumstance has resulted in a deterioration of the soil, such that at times the process of erosion even causes the top soil to disappear and leave only bare basic rock in its place, thus preventing further cultivation. There are, nevertheless, many soils where no physical erosion appears to exist, largely because the actual type of soil and the environment are not propitious to intensive physical deterioration. On the other hand, chemical erosion is widespread, and begins from the moment when the soil is brought under cultivation, since mineral and organic elements are extracted from the soil by the plants themselves, without being replaced. Such elements are also eliminated, on an even greater scale, through the movement and washing of the soil by rainfall and irrigation, when, as is usually the case in Colombia, soil conservation methods are not used.

TABLE 132. COLOMBIA : IMPORTS OF FERTILIZERS EXPRESSED IN UNITS OF THE PURE ELEMENT TO BE ASSIMILATED

(1953 = 100)

Year	Nitrogen		Phosphorus		Potassium	
	Tons	Index	Tons	Index	Tons	Index
1935-39 * ...	798	17	362	5	90	2
1940-44 * ...	824	18	480	6	131	13
1945-49 * ...	2,699	60	3,167	41	1,477	35
1950-53 * ...	4,041	90	6,806	88	4,393	105
1950	4,634	104	4,288	55	1,768	42
1951	4,242	95	9,322	120	7,025	168
1952	2,819	63	5,849	75	4,607	110
1953	4,466	100	7,765	100	4,173	105

SOURCES : ECLA, on the basis of data from yearbooks of foreign trade and the *Caja de Crédito Agrario*.

* Annual averages.

⁴² Prepared by the former Minister, Mr. Camilo J. Cabal Cabal.

⁴³ Mr. Cortés G. Randell.

Since time immemorial, although to a limited degree, cattle manure has been utilized for growing potatoes and sometimes for other vegetables. Green fertilizers are not applied, not is the method of sowing a leguminous cover-crop while the soil is lying fallow. Crop rotation is infrequent, and a characteristic of Colombia's agriculture is the repeated cultivation of one crop. From this point of view, the crops do not benefit from livestock activities, because there is none of the integration between crop and livestock farming which entails such great

mutual advantages for both sectors of agricultural production.

The use of commercial fertilizers is very limited and is only now beginning to develop (see table 132).

Although fertilizer imports have increased substantially during the last few years, their volume is small in comparison with requirements. Domestic production has been insignificant to date. Table 133 gives details of the total volume of fertilizers available in 1953.

TABLE 133. COLOMBIA : TOTAL AVAILABILITY OF COMMERCIAL FERTILIZERS, 1953

	Nitrogen		Phosphorus		Potassium	
	Tons	Per-centage	Tons	Per-centage	Tons	Per-centage
<i>Imported fertilizers</i>						
Sodium nitrate	622	16	100	—	—	—
Ammonium sulphate	2,750	21	577	—	—	—
Unclassified nitrogenous chemical fertilizers	5,495	40	2,198	—	—	—
Natural phosphates	1,363	—	—	30	409	—
Calcium and potassium super-phosphates	64	—	—	20	13	5
Soluble phosphates	9,547	—	—	44	4,201	—
Crude potassium salts	486	—	—	—	—	40
Potassium chloride	2,587	—	—	—	—	60
Potassium sulphate	1,623	—	—	—	—	48
Mixtures of chemical fertilizers	999	5	50	24	240	20
Other mineral fertilizers	14,382	—	—	20	2,876	10
Miscellaneous fertilizers	130	10	13	20	26	5
Totals	40,048		2,938		7,765	
<i>Other fertilizers</i>						
Carbonate and calcium oxide .	17,224					

SOURCE : ECLA, on the basis of data from yearbooks of foreign trade, the Industrial Census and the *Caja de Crédito Agrario*.

If the aggregate amount of fertilizers available in 1953 is divided by the area cultivated that year (2.9 million hectares), the result will give the average availabilities per hectare shown in table 134.

TABLE 134. COLOMBIA : AVERAGE CONSUMPTION OF FERTILIZERS PER CULTIVATED HECTARE

	Volume available (Tons)	Kilogrammes per cultivated hectare
Total fertilizers	40,048	14.0
Nitrogen	2,938	1.0
Phosphorus	7,765	2.7
Potassium	4,173	1.4
Total lime	17,224	5.9
Lime assimilable	9,984	3.4

SOURCE : ECLA, as for previous tables.

For example, in 1950, Chile used somewhat more than 200 kilogrammes of total commercial fertilizers per cultivated hectare, that is, 14 times more than the average of 14 kilogrammes registered for Colombia in 1953.⁴⁴ Cultivated soils, however rich, are not inexhaustible, and it is good husbandry to replace what is extracted by plants without neglecting the necessary measures to prevent a waste of fertilizing elements through inefficient utilization of the soil. Table 135 gives an impression of the volume of nutritive matter extracted by various crops.

According to this table, the maize crop alone would annually extract no less than 21,600 tons of nitrogen, 8,000 tons of phosphorus, 15,900 tons of potassium and 1,200 tons of lime, that is, except in the case of this last, much more than Colombia's total availability of these same nutritive elements in 1953.

⁴⁴ In Chile the use of organic fertilizers, prepared on the farms themselves, is also becoming widespread.

TABLE 135. COLOMBIA : WEIGHT OF THE NUTRITIVE ELEMENTS
CONTAINED IN CURRENT CROPS WITH GOOD YIELDS, PER TON OF HARVEST

Crop	Yield (Tons per hectare)	Nutritive content in plants (Kilogrammes of pure element extracted per ton harvested)				
		Nitrogen	Phosphorus	Potassium	Calcium	Magnesium
Maize	3.8	28.0	4.5	25.0	10.0	—
Wheat	2.0	28.0	10.3	20.5	1.5	1.5
Rice (paddy)	2.2	14.1	11.0	17.0	5.0	2.0
Soya bean	1.7	82.3	26.5	39.4	2.9	2.9
Tomatoes	22.3	5.0	1.7	8.7	0.8	0.9
Potatoes	20.2	6.9	1.9	9.4	0.2	0.3
Oranges	44.8	2.2	0.8	3.3	0.2	0.1
Cotton	1.7	42.9	16.5	32.9	4.7	3.5

SOURCE : Ministry of Agriculture, Extension Division, Soil Protection and Conservation Section, with reference to the FAO publication entitled *The efficient use of fertilizers*.

TABLE 136. COLOMBIA : ECONOMIC RESULTS OF USING FERTILIZERS
FOR SELECTED CROPS

Crop	Place	Fertilizers used	Increase over test sample (100- kilogramme quintals per hectare)	Cost of ferti- lization (Pesos)	Profit derived from ferti- lization (Pesos)	Profit- ability of invest- ment in fertilizers (Percentage)
Potatoes	Tibaitatá-Sabana- Bogotá	N-P-K ^a	82.5	220	1,747	794
Potatoes	La Isla-Nemocón	N-P-K ^a	72.5	220	1,507	685
Potatoes	Bonza-Boyacá	N-P-K ^b	35.0	213	612	287
Wheat	Tibaitatá-Sabana- Bogotá	N-P-K ^c	10.0	190	517	272
Wheat	Bonza-Boyacá	N-P-Ca ^d	15.0	210	847	403
Barley	Techo-Sabana- Bogotá	N-P-Ca ^e	8.8	240	360	150

SOURCE : ECLA, on the basis of data provided by the Ministry of Agriculture, Office for Special Research.

^a The formula utilized contained the following amounts of pure fertilizers : nitrogen (N), 20 kilogrammes ; phosphorus (P), 160 kilogrammes ; potassium (K), 80 kilogrammes.

^b The formula utilized contained the following amounts of pure fertilizers : nitrogen, 40 kilogrammes ; phosphorus, 160 kilogrammes ; potassium, 40 kilogrammes.

^c The formula utilized contained the following amounts of pure fertilizers : nitrogen, 20 kilogrammes ; phosphorus, 160 kilogrammes ; potassium, 40 kilogrammes.

^d The formula contained : nitrogen, 20 kilogrammes ; phosphorus, 160 kilogrammes ; and 4 tons of lime.

^e The formula contained : nitrogen, 40 kilogrammes ; phosphorus, 160 kilogrammes ; and 4 tons of lime.

Phosphorus and nitrogen appear to be the minerals most lacking in Colombian soils. This would seem to be proved by the controlled fertilization tests that are being carried out. The satisfactory use of fertilizers could substantially raise harvests and be of great financial benefit to farmers. (See the examples shown in table 136.)

Tests have recently been started at a sugar mill in the Valle del Cauca Department on the application of fertilizers in cane cultivation. The use of nitrogen, in a proportion of 66 kilogrammes per hectare, has given the results shown in table 137.

The use of nitrogen alone caused an improvement varying between 26.3 and 34.5 per cent in the cane yield

per hectare and between 21.1 and 32.5 per cent in that of sugar. In two of the experimental plots there was a slight drop in the quantity of sugar per ton of cane, whereas in the third the situation was reversed. It is probable that this decline can be explained by the fact that the soils of plots (A) and (B) were short or devoid of some basic element such as phosphorus or potassium, or both, or of some other minor element. These elements must have been better balanced in plot (C), which showed an increase in the amount of sugar per ton of cane. Experiments are being continued, and different doses of nitrogen and various formulate containing phosphorus and potassium are being tested. The application of 31 kilogrammes of nitrogen, 16 kilogrammes of

phosphorus and 25 kilogrammes of potassium per hectare promised better results than those shown in table 137 above.

TABLE 137. COLOMBIA : EFFECTS OF NITROGEN FERTILIZER ON SUGAR-CANE CULTIVATION

Specification	Plot A	Plot B	Plot C
<i>Cane production per hectare :</i>			
With fertilizer (Thousands of kilogrammes)	124.8	140.4	134.2
Increase over the test sample (Thousands of kilogrammes)	32.8	48.4	35.9
Percentage	26.3	34.5	26.8
<i>Sugar production per hectare :</i>			
With fertilizer (Quintals)	132.9	156.5	151.6
Increase over the test sample (Quintals)	28.1	46.7	49.3
Percentage	21.1	29.8	32.5
<i>Sugar per ton of cane :</i>			
With fertilizer (Quintals)	1.07	1.12	1.13
Test sample (Quintals)	1.13	1.19	1.04
<i>Profitability of investment in fertilizers :</i>			
Estimated fertilization cost per hectare (Pesos)	77.0	77.0	77.0
Value of the cane production increment per hectare (Pesos)	361.0	532.0	395.0
Profitability (Percentage)	469.0	691.0	513.0

SOURCE : ECLA, on the basis of data provided by the Oriente Sugar Mill, Palmira, Valle del Cauca.

Although research on fertilizers is in its initial stages in Colombia, these examples show that considerable increases in agricultural production can be obtained without an extension of the cultivated area. It is obvious that any programme to spread the use of fertilizers must be established on fundamentally technical bases supported by the findings of research. Mere commercial propaganda has in some countries led to failures and discouragement among farmers which it would be as well to avoid, since the greatest possible prestige should attach to measures calculated to raise the technological level of farming. Owing to the very nature of the risks inherent in his work, the farmer is wary, especially of those technical improvements which involve high expenditure ; and his distrust is converted into resistance when investment does not yield the promised results.

(b) Fertilizer requirements⁴⁵

So far no national study has been made of the characteristics of Colombian soils as regards their organic and mineral deficiencies. The data compiled are only partial, and an immense amount of general work remains to be done. Nevertheless, there is a consensus of opinion among technical experts that most of the soil under crops and a good part of that used for livestock produc-

tion is very seriously lacking in nutrient elements. Calculations made by the Ministry of Agriculture in 1949 demonstrated that for crop farming to reach a fairly satisfactory level no less than 25,000 tons of nitrogen,⁴⁶ 54,000 tons of potassium and 73,000 tons of phosphorus would have to be used annually, apart from the applications of lime which it would also be essential to add in order to correct acidity and thus facilitate the assimilation of minerals beneficial to plant life. If these figures, which are far from exaggerated, are compared with 1953 fertilizer availabilities, a deficiency in consumption will be noted which is equivalent to 88 per cent for nitrogen, 89 per cent for phosphorus and 92 per cent for potassium.

Among the causes of low consumption of fertilizers may be mentioned most farmers' lack of knowledge of the benefits entailed by their use and, in the majority of cases, limited financial resources. Moreover, research and studies on the nutrient elements required by the different types of soils, according to their characteristics and the kinds of crops grown, has not been carried out to any adequate extent. Specific knowledge of such requirements would seem to be indispensable as a guide to policy for fertilizer production or imports and consumption. Finally, a check would in addition be imposed upon demand by the high price of fertilizers, which are mainly imported. The heavy cost of freight from the market of origin to the farm is a powerful factor in raising prices. The whole of the country's fertilizer policy, in so far as it relates to the study and utilization of national resources, and to imports of raw materials, or of high-grade fertilizers ready for use, therefore calls for revision in order to avoid needless freight charges wherever possible.

(c) Possibilities for domestic production of fertilizers

Among the possibilities of producing nitrogenous fertilizers is that of obtaining urea from natural petroleum gas at the Barrancabermeja refinery. According to this project, the plant would be capable of producing 26,250 tons of urea annually (grade 46 per cent), which would provide a supply of 12,075 tons of pure nitrogen. A company was founded in 1950, under the sponsorship of the *Instituto de Fomento Industrial*, to develop this industry. Participants in the company are the central Government, the *Caja de Crédito Agrario*, the *Federación Nacional de Cafeteros* and the *Instituto de Fomento Industrial* itself. Its industrial activities are still in abeyance, apparently owing to shortage of capital for the installation of the plant. Studies show that it could produce nitrogen at a unit cost of between 30 and 40 per cent less than the c.i.f. price of imported fertilizer, and could cover approximately 40 per cent of the minimum nitrogen requirements of Colombian agriculture. The process of making coke and the oxygen-generating industry, both closely connected with the iron and steel works already installed at Paz del Río, are also potential sources of nitrogen. A more detailed study will probably reveal hydrogen requirements even higher than those previously estimated.

⁴⁵ Ministry of Agriculture, memorandum on manure and fertilizers.

⁴⁶ More recent calculations show that the nitrogen requirements amount to 30,000 tons annually.

Coffee pulp, animal manure, town garbage and sewage can be included among the sources of organic nitrogen. It is estimated that coffee processing could annually provide 1.7 million tons of pulp containing 2 or 3 per cent of nitrogen; the utilization of all this material would mean that not less than 15,000-20,000 additional tons of nitrogen would be incorporated into the soil under cultivation. Thanks to the extension work of the *Federación de Cafeteros*, more and more coffee-growers are using their coffee pulp as fertilizer, a practice which has the further advantage of introducing a large quantity of organic matter into the soil. Manure converted into humus is also an important potential source of nitrogen for cultivated land. In Colombia it is used only for potatoes and some vegetables on mixed farms. An extension campaign, and the encouragement of dairy and poultry farming, with the stipulation that the granting of credit would be dependent upon the building of simple and economical manure deposits — a measure already adopted in other countries — might be an efficient way of extending the use of manure in crop farming. It is not known whether advantage is being taken of city waste to transform it into humus for subsequent use as fertilizer. Leguminous plants also provide nitrogen, and some of these species can be cultivated in rotation with other crops, turned into green manure by mixing them with the soil, used as a catch-crop while the land is lying fallow or in permanent plantations, or, again, grown for forage. On the Colombian coffee and cacao plantations the use of leguminous trees for shade is fairly widespread, and plants of the same species are now beginning to be used as a catch-crop on land utilized for coffee. This practice should be encouraged, leguminous plants being given preference over others that contribute no nitrogen to the soil.

With regard to phosphorus, the heavy iron-smelting industry at Paz del Río has begun to provide, as a by-product, about 27,000 tons of 20-per-cent grade Thomas slag annually, which ensures a supply of 5,400 tons of pure fertilizer. Furthermore, Thomas slag contains 50 per cent of calcium oxide and other minor elements in considerable quantities. Another important source of phosphate fertilizers is constituted by the bones of animals slaughtered for meat. The production of bone fertilizer, which could be expanded if given adequate incentives, has already been started in the country. A qualified specialist considers that every year the country wastes 60,000 tons of bones which contain 25 per cent phosphoric acid, equivalent to 15,000 tons of pure fertilizer.⁴⁷ A well-organized industry would probably be able to collect a fourth of the bones available in the country, and turn them into 3,700 tons of purely nutrient matter. At present no other potential sources of material for phosphate fertilizers are known of in Colombia.

Hitherto the search for sources of potassium in the country has been fruitless. Studies on material from the sodium salt mines indicate such a low potassium content that this element is not worth exploiting commercially. Studies on ocean brine have also yielded unsatisfactory results.

⁴⁷ José Uribe A., *Una Industria de Fertilizantes a base de huesos* (Library of the Faculty of Agriculture, Medellín).

It appears that the problem which can be solved most satisfactorily with domestic raw materials is that of calcium. The *Servicio Geológico Nacional* has discovered limestone deposits in every Department, many of them easily accessible to the land in need of this element.⁴⁸ At the present time the only exploitation of importance for agricultural purposes forms part of the iron-smelting industry of Belencito (Paz del Río steel mills). The plant can produce 43,000 tons of lime annually, for agricultural purposes, which is distributed between the Departments of Boyacá and Cundinamarca. There are also other small plants which supply particular localities, but present agricultural lime production is still far from satisfying the needs of the country.

With the object of reducing the financial burden of the inevitably growing imports of fertilizers, especially phosphates, technical experts working under the Technical Assistance programme of the United States Government have put forward a project for the establishment of large super-phosphate factories in Colombia. For this, high-grade phosphorite from Florida and sulphur from Louisiana (United States) would be used. The plants would be installed in those areas which are not supplied with Thomas slag produced at Paz del Río.

3. Irrigation and its advantages

As has already been seen, the area at present irrigated in Colombia would seem to be only some 220,000 hectares, which is a small percentage if it is taken into account that 2.9 and 26.9 million hectares are at the moment being used for crop farming and livestock production respectively.

The variability and irregular distribution of the rainfall constitute a serious obstacle to agriculture in many of the most important zones of Colombia, and also make farming an unstable, uneconomic proposition, subject to tremendous variations in yields.

There are numerous areas in the country where it would be possible to build engineering works for irrigation, or combined irrigation and drainage. When the possibilities for expanding the crop and livestock farming area were analysed, the localities where, according to available information, such plants could be set up were defined. Thus, reasonably complete land surveys would be made for irrigation in the different Departments, which would benefit 348,650 hectares, as well as another 623,000 hectares in which irrigation and drainage would be possible.

Owing to the small area of the country at present irrigated, many farmers have as yet no very clear notion of the special methods called for in working irrigated land.

Both physical and chemical erosion of the soil can be found in some of the land already irrigated, owing to ignorance of the technical methods needed for farming with irrigation. The excessive use of water is common,

⁴⁸ Ministry of Development, National Geological Service, *Yacimientos Importantes de Caliza para Cal Agrícola en Colombia*. Report No. 769, by Enrique Hubach, Director of Geology (July 1951).

as are also the absence of irrigation and drainage canals following the contour lines, lack of rotation between crops and pasture, etc. The success of any agricultural extension campaign in areas already or about to be irrigated would be greatly enhanced if the farmers were first trained in soil management.

It is difficult to assess the advantages which would derive from irrigation in the various areas where it has been shown to be feasible and desirable. Each district offers special advantages arising from its ecological conditions; from the degree to which irrigation will make up for the want or unfavourable distribution of rainfall; or from its potential crops, markets, etc.

Nevertheless, certain general considerations are more or less universally applicable. Naturally, this is true of areas already in production, which have such basic services as public security, commerce, communications and transport and in which the productivity of the population leaves room for improvement. Irrigation costs in finished works in operation, as well as the economic surveys which are the basis of other projects, show that the additional cost per unit of soil can be easily borne by the farmers, thanks to the subsequent substantial increments in the yields and general profitability of the enterprise.

Some interesting details on this subject are mentioned below which, though confirming earlier assertions, must not be too readily accepted as generally applicable, since each project leads to particular conclusions which must be studied.

The irrigation works at Saldaña can be mentioned as one of those already in operation.⁴⁹ Before these works, benefiting 10,500 hectares, were installed in this area — which is characterized by very irregular rainy seasons — the land was being farmed extensively, chiefly for livestock production, with an estimated total return of only 40 to 60 pesos per hectare. Among the crops which were being grown on a small scale was rice, which was cultivated at considerable expense and with very poor yields. The value of the soil fluctuated between 30 and 60 pesos per hectare. Later, with the establishment of irrigation, farmers in the area specialized in rice-growing, and in 1954 8,000 hectares were sown to this crop. The security deriving from irrigation, and the widespread introduction of early and improved varieties, combined with the region's special suitability for this crop, permitted two yearly harvests to be obtained from the same soil. Average yields per hectare, without the use of fertilizers, are about 37 metric quintals of rice, and on some farms up to 50 are obtained per hectare, representing a gross income for the farmer of between 1,900 and 2,100 pesos per hectare, respectively. These figures can be compared with an average of 16.8 metric quintals for the country. It should be mentioned that tests on the use of fertilizers in this region have shown an increase of up to 40 per cent in the yields indicated. The farmer's present annual net profit is estimated at 900 pesos per hectare.

⁴⁹ Most of the data mentioned were compiled by ECLA. See also report on the Saldaña river irrigation works, and production in that area, by the Office of Economic Studies of the *Caja de Crédito Agrario, Industrial y Minero*.

The cost of the irrigation works amounted to 1,086 pesos per hectare, and that of servicing of the debt, with administration and maintenance expenses, to 70 pesos per hectare annually.

The commercial value of the irrigated land, according to its quality and location, fluctuates between 1,200 and 2,000 pesos, and the annual rent, standard in this region, is 300 pesos per hectare.

Thus the total cost of the works per hectare represents about 50 per cent of the value of the gross production obtained annually from the same land unit, and is practically equal to net income in one farming year. Rice yields, on the other hand, are more than three times the average for the country.

Also deserving of brief mention are the findings of a study carried out in 1951⁵⁰ on the Ponedera-Candelaria project in the Atlántico Department, for the irrigation of 12,122 hectares by the pumping system. In this study cotton, pasture for livestock, maize, rice and sesame are considered to be the most important products grown in this area. When production per hectare is analysed, under existing conditions and those which would result from irrigation, it is estimated that, in the case of livestock farming, with pasture cultivated all the year round and of better and more varied quality, the present rate of one head of cattle per hectare could be increased to five. The current average cotton yield of 200 kilogrammes per hectare could be raised to 1,250 if, besides irrigation, programmes for the introduction of improved techniques were carried out. In the case of sesame, the average would rise from 500 to 700 kilogrammes per hectare to two annual harvests of 1,000 kilogrammes each, and the maize yield, on a basis of two crops yearly, could be easily doubled.

The annual cost per hectare of the works, when this study was made, totalled 350 pesos, and the annual expenses corresponding to administration, amortization in 30 years and depreciation of the pumping equipment in 20 years would total only 71 pesos per hectare. On the other hand, the probable gross yield per irrigated hectare, at 1951 prices, fluctuated between 600 and 1,200 pesos.

4. Conservation of commodities

Colombian agricultural production, owing to deficiencies in the transport, storing and marketing systems, is liable to suffer considerable losses between harvesting, and purchase by the consumer or shipment for export. The lack of good storing centres makes standardization of grain difficult and causes serious marketing setbacks.

An estimate based on data obtained in the country by an ECLA research group is summarized in table 138.

Certain studies⁵¹ indicate losses much greater than those estimated. Thus, for example, in the Cauca valley in 1948 losses of certain agricultural products in storage,

⁵⁰ Olarte, Ospina, Arias & Payán, Engineers, *Irrigación Ponedera-Candelaria, Informe General* (Bogotá 1951).

⁵¹ Horacio Ochoa, *Anotaciones sobre depósitos de grano* (Library of the Faculty of Agronomics at Medellín).

caused by plagues and poor storing conditions, are said to have reached 37 per cent for corn, 26.5 per cent for beans, 41 per cent for chickpeas, 18 per cent for rice and 8 per cent for wheat flour. In the year 1953 losses were estimated at 296.6 million pesos of products valued at prices received by the farmer in the same year. Since the production value was 3.8 million pesos, this signifies that 7.8 per cent of total agricultural production was being lost.

TABLE 138. COLOMBIA : ESTIMATE OF LOSSES
IN AGRICULTURAL COMMODITIES

(Percentages of total production)

Products	Percentage of losses, 1951-53	Losses: 1953 (Thousands of tons)	Value (Millions of pesos at 1953 prices)	
Wheat	9.0	15.3	9.9	
Maize	17.0	136.0	29.9	
Unhulled rice	11.0	31.7	11.7	
Barley	4.0	2.6	1.1	
Potatoes	18.0	109.8	24.2	
Yucca	10.0	87.0	10.4	
Plantain	7.0	66.5	7.0	
Other tubers	7.0	2.1	0.4	
Sugar	2.0	3.8	0.4	
Panela	5.0	30.0	9.0	
Syrup and treacle (molasses)	5.0	3.3	0.6	
Bananas	11.0	49.5	5.8	
Other fruit	20.0	102.0	30.6	
Garlic and onions	6.0	1.5	2.1	
Tomatoes	17.0	6.8	1.9	
Other vegetables	10.0	13.0	3.8	
Beans	11.0	5.5	4.9	
Other pulses	7.0	4.2	2.9	
Coffee	1.0	3.8	9.0	
Products derived from	Cattle	10.0	40.3	60.9
	Pigs	5.0	2.9	6.6
	Sheep	5.0	0.2	0.5
	Goats	5.0	0.1	0.2
	Poultry	5.0	0.1	4.2
Eggs	12.5	6.7	20.8	
Milk	9.5	160.9	35.7	
Oils and fats	5.0	1.5	1.2	
Cacao	3.0	0.4	0.9	
TOTAL			296.6	

SOURCE : ECLA.

Broadly speaking, it is evident that there is a need on the farms themselves for means of storage fulfilling average requirements, to protect the harvests from losses caused by humidity, rodents, or insects while the farmer is seeking markets or transport facilities. The difficulties and deficiencies of communications in many regions help to increase these losses, as on the one hand they oblige the producer to store his harvests for long periods in unsatisfactory conditions, and, on the other, they cause considerable damage in transit. This last factor is especially serious in the case of perishable products and livestock, when cattle have to be driven on the hoof.

Storage deficiencies do not affect all products equally. Broadly speaking, in the case of those which are to be processed before they are consumed, the problem is less serious, as the industries, in addition to being firm buyers, so that the need for the farmer to store the crops himself is averted, possess better storage facilities. Such is the case with barley, cacao, cotton-seed, sesame, copra, sugar and also, to some extent, rice.

On the other hand, the difficulty becomes more acute in the case of wheat, corn, potatoes and beans, production of which normally represents over 1.8 million tons. The characteristics of Colombian agriculture, which make two annual harvests possible for many crops, partly alleviate the shortage of storage facilities by reason of the smaller bulk of products which need to be preserved.

Losses are also great in the livestock sector. In this case, the driving of cattle on the hoof for long distances, or their transport by water with the use of inefficient craft, brings about great decreases in the weight of the animals and therefore additional fattening is often necessary. Finally, the scarcity of well-equipped slaughterhouses, and especially of refrigeration facilities, should also be noted.

No information is available on the present storage capacity of the country, whether on farms or in markets, which would enable the shortcomings to be assessed. The only capacity known is that of the installations recently built by the *Corporación de Defensa de Productos Agrícolas*, which is trying to find a solution to these problems. To date nine grain warehouses⁵² exist, with a total capacity of only 68,000 tons. The programmes of the Corporation envisage the future construction of new units with greater capacities, which will probably be situated in Pasto, El Banco, Cartagena, Málaga and Pamplona. To supplement these basic plants others of a more elementary type will be set up for the preliminary treatment of the grain and storage for short periods.

Certain studies on the subject also point out the pressing need to establish similar installations in places such as Barranca, Villavicencio, Tolima, Sogamoso, Valledupar, Nariño and others of lesser importance.

5. Mechanization of farming

The hoe and the machete have been the traditional implements of the Colombian farm labourer, and they are still being used on a large scale, notwithstanding the country's great effort in the last few years to mechanize farm work. This task is difficult, if not impossible, in crops such as coffee, and others of a permanent nature, which cover large areas. On the other hand, annual crops, the renewal of artificial pastures and the conservation of forage are activities which permit a high grade of mechanization. The greatest progress so far made in Colombia has been with tractors, which are mainly used in preparing the soils for crops, and have recently, on an appreciable scale, contributed towards the reclaiming of new land for mixed farming. Next in

⁵² These are located in Fontibón, Fundación, Magangué, Montería, La Dorada, Tunja, Espinal, Cartago and Buga.

TABLE 139. COLOMBIA : ESTIMATE OF AGRICULTURAL MACHINERY AND TRACTOR STOCKS AND AVERAGE DENSITY, 1953

	Number of units ^a (1)	Cultivated area which could be mechanized (Thousands of hectares) (2)	Density (Hectares per unit of machinery) (3)	Estimate of work capacity (Hectares per unit of machinery) (4)	Mechanized area (Thousands of hectares) (5)	Percentage of (5) over (2) (6)
Tractors (For crops only)	8,881	1,790 ^b	202	80	710	40
Tractors (For crops and livestock) ..	8,881	2,790 ^c	314	80	710	25
Ploughs (Mechanical and animal traction)	13,500	1,790 ^b	133	70	945	53
Ploughs (Animal traction)	13,500	2,790 ^c	207	70	945	34
Harrows (Animal traction)	10,700	1,600 ^b	150	90	963	60
Harrows (Animal traction)	10,700	2,600 ^c	243	90	963	37
Cultivators (Animal traction)	4,300	1,500	350	20	86	6
Seeders and planters	2,600	1,450	560	80	208	14
Stationary and movable grain threshers ^d	850	380	447	150	128	34
Maize-shelling machines	2,600	700	269	30	78	11
Mowing-machines	400	10,000	25,000	40	16	—
Hay rakes	70	10,000	143,000	80	6	—

SOURCE : ECLA, based on data from the Ministry of Agriculture ; yearbooks of foreign trade ; *Foreign Commerce and Navigation of the United States*.

^a Farm machinery stocks were estimated in each case by adjusting the figures for the number of units imported by Colombia from the United States, on the basis of the ratio between the total import tonnage of each type of machinery and the tonnage from the United States. The study of each group of machinery took into account imports for the number of years estimated as the average working life of such machinery in Colombia.

^b Including only annual crops and sugar-cane.

^c Including annual crops, sugar-cane and one million hectares of artificial pastures, estimated as the annual renovation quota for the maintenance of the existing 10 million hectares of artificial pastures. The figures for tractors given in the first and second lines of column (1) should not be added together, since they are the same in the two different cases under consideration.

^d Movable threshers include all automatic and combine harvesters.

order of importance comes the use of combine harvesters for wheat, barley and rice and of sprayers for the control of plagues. In general, intermediate farm operations and the harvesting of a considerable number of commodities are very little mechanized, and machinery is only beginning to be used in all the work connected with livestock. Depulping machinery is widely employed for coffee processing ; on the other hand, washing, drying, cleaning and sorting is still mainly done by hand. The use of shelling machines and grain sorters for maize is not at all common.

Many agricultural products are carried by mule, donkey, or on horseback, or even by porters, while air transport is coming into use for cattle (on the hoof or slaughtered), milk and other high-priority commodities. Animal traction plays no important part in Colombian agriculture, but the use of motor lorries is becoming more general every day, and they now compete keenly with railway and river transport, not only for perishable commodities but also for cattle on the hoof and various other products.

The farm mechanization process was slow until the year 1944. The end of the Second World War, when the industrialized countries once again turned their swords into ploughshares, meant that supplies of machinery re-entered the market, and this was reflected

in Colombia by an acceleration of the agricultural mechanization process from 1945 onwards. In 1949, the International Bank, as an incentive, granted the country a loan of five million dollars for agricultural machinery. The *Caja de Crédito Agrario* was made responsible for administering this loan. At the end of 1954 the International Bank, together with two other private United States banking institutions, lent to Colombia, also through the *Caja de Crédito Agrario*, another five million dollars for agricultural machinery and tractors. Even all these efforts were not sufficient to cover more than part of the requirements for the mechanization of Colombian agriculture. Table 139 gives an idea of the situation in this respect in 1953.

The figures show that the greatest effort was directed towards the mechanization of the preparation of the soil, and secondly towards the harvesting of cereals. If it is borne in mind that mechanization can be applied only to annual crops and sugar-cane, it can be observed that tractors are used on 47 per cent of the area occupied by these crops, while ploughs of all types appear to be employed on 53 per cent of the soil where they can be utilized, and harrows on 60 per cent. All this means that 47 per cent of the land where ploughs could be used is tilled by hand, or that the seed is simply sown without moving the soil beforehand. If the normal renewal of

TABLE 140. COLOMBIA : TOTAL IMPORTS OF AGRICULTURAL MACHINERY, TOOLS AND TRACTORS

(Thousands of tons) *

	Machinery and spare parts							Minor tools		Tractors			Total	
	Ploughs	Seeders	Thresh-ers	Fer-tilizers	Others	Total	Index	Weight	Index	Number of units	Weight	Index	Total weight	Index
1938-40	255	35	17	10	929	1,246	48	829	63		1,710	23	3,785	33
1941-43	181	29	10	—	455	675	26	307	23		678	9	1,660	15
1944-46	317	30	40	1	915	1,303	50	835	63	563	2,435	33	4,573	40
1947-49	698	107	85	16	3,195	4,101	158	1,533	116	1,089	3,564	48	9,198	81
1950	824	320	97	25	5,113	6,379	246	1,255	95	1,590	4,050	54	11,684	102
1951	1,206	193	53	76	3,030	4,558	176	1,590	120	1,615	5,530	74	11,678	102
1952	471	180	82	38	2,351	3,122	121	1,488	112	979	4,474	60	9,084	80
1953	403	153	188	15	1,830	2,589	100	1,326	100	1,369	7,489	100	11,404	100

SOURCE : ECLA, on the basis of yearbooks of foreign trade.

NOTE : See Statistical Appendix, tables 71 and 72, for further details of annual imports of tractors and agricultural machinery from the United States.

* Statistics of Colombia's imports of agricultural machinery are given in tonnage and value. The number of units is shown only in the case of tractors.

artificial pastures, where it is also possible to utilize mechanical equipment, is reckoned in addition to the area used for annual crops and sugar cane, tractors would appear to cover the requirements of only 25 per cent of the area where they could be utilized, ploughs of all types about 34 per cent and harrows 37 per cent.

The fact that the harvesting work in about 34 per cent of the area grown with cereals, except maize, is mechanized or semi-mechanized also shows that Colombian farmers are making substantial efforts. Nevertheless, in this respect much could still be done to mechanize cereal harvests (wheat, barley, rice), on small- and medium-scale farms by using very light machinery for the sorting and cleaning of the grain, even though reaping might have to be done by hand. This is also the case with maize, of which only 11 per cent is machine-shelled.

Mechanization has not yet been much applied to the intermediate operations such as sowing, hoeing, hilling, weed control, fertilizing, etc. The number of seeders and planters in existence shows that sowing is mechanized on no more than 14 per cent of the area where this would be possible. The degree of mechanization is still lower as regards cultivators, stocks of which would clearly be insufficient to cover even 6 per cent of the crop area where they could be utilized.

The fact that there is a stock of only 400 mowing-machines and 70 hay-rakes shows that the harvesting and conservation of forage are not common practices, obviously necessary though they are to overcome the seasonal feed shortages which affect a large part of the Colombian livestock population. Their diffusion offers a very wide field for the use of machinery, in view of the gravity and scope of the existing problem.

Mechanized control of the plagues which affect vegetable produce has been extended considerably in the last few years, but much remains to be done. With regard to transport of agricultural commodities, motor vehicles are slowly replacing mules and horses, and in

some cases human portorage. In the intermediate stage of animal traction very good possibilities appear to exist for the use of small- or medium-sized carts, especially in the level zones which already have roads and tracks.

An idea of the development of imports of agricultural machinery can be formed from table 140. A study of the column corresponding to machinery and spare parts shows that imports dropped during the Second World War, but recovered soon after it ended, and continued to increase until the maximum was reached in the year 1950; in the following years there was a definitely downward trend. Imports of minor equipment, such as axes, hatchets, machetes, sickles, spades, picks, hoes, etc., also dropped in the war years, but later recovered and remained high during the whole of the interval between 1947 and 1953, though the level in the latter year was slightly lower than in the two previous ones. Measured by their weight in tons, imports of these articles represented between 20 and 40 per cent of all machinery and tools imported (or between 12 and 20 per cent if tractors are included). The conclusion to be drawn is that in Colombia the use of hand tools in farming is still widespread.⁵³

Of all imports of agricultural machinery, tractors were those most seriously affected by the Second World War. Nevertheless, as from 1944 imports began to increase, and were maintained at a relatively high and constantly rising level between 1945 and 1953. This can be clearly seen if the development of imports is measured by the weight in tons of the tractors imported. The number

⁵³ Research carried out by ECLA in Ecuador in 1951 established that the average net weight of manual agricultural implements imported was 657 grammes per unit. If this same average weight is applied to the net tonnage of all manual tools imported into Colombia, the following annual availabilities would be obtained :

Year	Millions of units
1950	1.9
1951	2.4
1952	2.3
1953	2.0

TABLE 141. COLOMBIA : CULTIVATED AREA, TRACTOR DENSITY AND AREA SUITABLE FOR MECHANIZATION, BY DEPARTMENT

Department	Cultivated area (Thousands of hectares) (1)	Number of tractors (2)	Density (Hectares per tractor) (3)	Mechanized area (Thousands of hectares) (4)	Area suitable for mechanization (Thousands of hectares) (5)	Percentage of mechanized area over area suitable for mechanization (6)
Atlántico	37	191	194	15	140	10.7
Antioquia	370	132	2,803	10	903	1.1
Bolívar y Córdoba	249	789	316	63	2,157	2.9
Boyacá	270	283	954	23	291	7.9
Caldas	290	131	2,214	10	118	8.5
Cauca	92	773	119	62	101	61.4
Chocó	38	—	—	—	605	0.0
Cundinamarca	355	1,445	246	116	299	38.8
Huila	80	511	157	41	173	23.7
Magdalena	97	615	158	49	1,672	2.9
Nariño	198	165	1,200	13	1,756	0.7
Norte de Santander	91	154	591	12	426	2.8
Santander	161	113	1,425	9	708	1.3
Tolima	237	1,372	173	110	380	28.9
Valle del Cauca	285	2,139	133	171	273	62.6
Goajira	—	—	—	—	180	—
Meta	—	107	—	9	—	—
Caquetá	—	20	—	2	—	—
TOTAL	2,900	8,940 *	—	715	10,182	7.0

SOURCES : (1) Ministry of Agriculture. (2) Estimate on the basis of figures presented by Raúl Varela Martínez in *La Mecanización de la Agricultura en Colombia* (1951). The figures for 1953 were adjusted on the basis of tractor sales made during the last four years by the *Caja de Crédito Agrario* in the various Departments. (3) ECLA estimates. (4) ECLA estimates, based on the assumption that each available tractor can work 80 hectares annually. (5) The area suitable for mechanization, by Departments, was calculated on the basis of a survey made by the *Caja de Crédito Agrario* in all Departments in October 1954. The figures include all land, whether cultivated or not, which is suitable for agricultural purposes and whose topography would permit the use of tractors. (6) ECLA estimates. * Total number of tractors use in agriculture.

of tractors imported in the years 1950 and 1951 constituted a record for the country ; it dropped appreciably in the years 1952 and 1953. This is explained by the considerable increment in imports of heavy tractors, in preference to those of medium and small size, during the last two years under consideration.

The United States supplies between 80 and 90 per cent of the agricultural tractors imported into Colombia, and between 70 and 80 per cent of the rest of the agricultural machinery, taken as a whole. Harvesters and threshers constitute an exception, the United States quota fluctuating between 40 and 60 per cent ; so possibly do other groups of machinery, such as those used for dairy farming.

Mechanization in Colombia consists principally of the use of tractors for the work of soil preparation, as indicated by the fact that the number of imported ploughs and reapers is far greater than that of other implements which can also be drawn by tractors.⁵⁴ The increasing import quota of heavy tractors in preference to the others shows that they are no longer used solely for soil preparation, but also for the clearing of new land and for other farm improvements requiring very

high power. If the degree of mechanization in a given area or Department is measured by the ratio between the number of tractors and the area under cultivation, the Departments where it is highest would seem to be Cauca, Valle del Cauca, Huila, Magdalena and Tolima, which have one tractor for every 101 to 147 cultivated hectares, while those least mechanized are Antioquia, Caldas, Santander and Mariño, with one tractor for every 1,020 to 2,371 hectares. The density in the other Departments fluctuates between 164 and 811 cultivated hectares per available tractor (see table 141).

According to a survey made by the *Caja de Crédito Agrícola* in 1954, the cultivable area in the Departments which is topographically suited for the use of tractors would seem to total 10.2 million hectares. The 715,000 hectares where tractors are apparently actually used at present thus represent 7.0 per cent of the total area in which they could be employed. Therefore, the use of tractors can still be very greatly expanded.

The predominance of small farms can be cited as one of the reasons for the low degree of mechanization in Colombia.⁵⁵ There are relatively few large- and medium-

⁵⁴ See Statistical Appendix, table 72.

⁵⁵ See the sub-paragraph relating to "The structure of farming units", in section VI of this chapter.

scale farms, which indubitably offer the greatest scope for tractors and other types of agricultural machinery. Heavy tractors are principally used in the reclamation of new land for farming and in the construction of other improvements, particularly on stock farms. The great number of smallholdings in the hands of people with limited resources and without co-operative organizations to help provide them with mechanical implements largely accounts for the continued heavy imports of manual tools.

The rural labour force in Colombia is, broadly speaking, under-employed; supply far exceeds existing demand, and wages thus remain low. This fact, together with the share-cropping system, characterized by the share-cropper's personally doing almost all the work on his small holding, also explains why owners, even of medium-sized and large properties, have no incentive to mechanize their farms. They find it simpler and probably cheaper, for many operations, to utilize human energy rather than mechanized or animal power. The use of tractors and other types of machinery requires a relatively large initial investment, as well as working capital to draw on; but only very modest funds are needed when the work is carried out exclusively by human labour, whether wage-earning or remunerated by means of working systems such as share-cropping, leasing, etc. The most highly mechanized zones in Colombia, all types of machinery being taken into consideration, are precisely those where agricultural labour is relatively scarce, for which reason mechanical implements must necessarily be utilized to expand the cultivated area. This is the case, for example, with the Departments of Tolima, Magdalena, Valle del Cauca, Córdoba, etc.

Prices of agricultural machinery appear high in relation to those which farmers obtain for their products, and this situation also acts as a deterrent to mechanization. The shortage of efficient operators and of competent mechanics is a further drawback. Some of the farm workers themselves generally make shift to operate the machinery, while mechanics are sought in motor-repair shops in the towns. The official courses held so far by the Ministry of Agriculture and the Army to train tractor drivers have produced excellent results, but are far from satisfying the country's real requirements in this respect. The low yields from inefficiently operated machinery have caused many a disappointment, and the high price of spare parts and the scarcity of mechanics in the rural zones are added disadvantages.

Very often the purchase of a machine is a real adventure for the farmer, as it may be an entirely new experience in the area and quite often in the whole country. When a specific machine is chosen, its adaptability and efficiency in the operations and location where it is intended for use are frequently not taken into account. There is a manifest lack of agronomists specializing in such implements, and also of an experimental service to advise on the types of machinery and tractors most appropriate for certain areas, crops, types of soil, etc. and to show how they may be operated with the maximum economic efficiency, so as to produce the most perfect results and highest yields.

The fact that parastatal institutions such as the *Caja de Crédito Agrícola* have not had sufficient capital of

their own to invest in imports of agricultural machinery is another of the factors which have retarded the mechanization process. The remarkable progress achieved from 1949 onwards, thanks to the loan of five million dollars granted by the International Bank to the *Caja de Crédito Agrícola* for this purpose, has already been mentioned.

The lack of roads has very often precluded the use of heavy machinery and of tractors, because of difficulties in the transport not only of the machinery itself, but also of the fuel, lubricants and spare parts needed for its operation and maintenance. The improvement and expansion of the road system in the last few years has substantially helped to raise demand for mechanical implements.

Finally, it should be mentioned that there has been no research on the results so far obtained by the mechanization process, either in the shape of an extension of the area under seed or in the form of production increments achieved through the perfecting and the more timely performance of operations. There has been neither time nor opportunity for basic studies to ascertain how far the mechanization of farming activities has competed, advantageously or not from the economic viewpoint, with available manpower. In countries such as Colombia, situations have probably more than once arisen in which the use of tractors has proved to be more expensive than the employment of human labour alone. The reason may have lain not only in the high prices of spare parts and the difficulty of obtaining them, but also in the limitations imposed by the climate and the sometimes restricted size of the farms, which determine the number of days in the year when the machine can be utilized, and, as a result, the cost per hour of actual working time. Neither has it been possible to conduct research on the shifts of active population which may ultimately result from the progressive mechanization of farming, or on the greater or lesser possibilities of employment open to the manpower superseded by machinery. Apparently the use of tractors to reclaim new land for cultivation immediately improves the employment level. The situation is different when labour traditionally carried out by hand is mechanized. Save when the use of machinery is accompanied by an increase in the cultivated area or by a change-over to crops for which more labour has to be employed, such as cotton, for example, it would be difficult to contend that displacements of this kind have not occurred.

Hence great importance attaches to research of this type, which would seem an essential step towards a more detailed phase of the work of programming economic development.

6. Livestock situation

It has already been stated that livestock production, expressed in terms of the slaughter of cattle, pigs, sheep and goats, increased between 1925 and 1950 slightly faster than the population, while, from 1951 onwards, the reverse was true. Moreover, in 1953 the absolute figures for cattle slaughtered were lower by 41,000 head than in 1950, and fewer pigs were killed than in 1951.

A drop in the slaughter of sheep can also be seen in the last quinquennium in comparison with previous five-year periods. Although no definite data are available on slaughtering in 1954, an estimate based on statistics for the first ten months indicate that the downward trend continued. The milk production figures estimated by the Ministry for 1950 to 1953, and those resulting from the agricultural sample taken in 1954, would seem to suggest the conclusion that milk production also decreased in the last few years.

It is also known that the country's availabilities of livestock products are insufficient to satisfy domestic demand, and are still far below the minimum consumption levels recommendable for a satisfactory diet.

When, in previous chapters, the available soil resources and their degrees of utilization were studied, it was established that extensive tracts, including some of the best land in Colombia, are used for livestock, and that the margin for the expansion of the livestock area is almost as large again. The stagnation of livestock production is thus not due to shortage of land, but to another series of factors which will be analysed in the following paragraphs.

(a) Stocks

The country has no census figures for the number of animals, livestock production and areas devoted to this activity. In 1951 an agricultural census was carried out, but various shortcomings made it a failure. This led to the taking of a national agricultural sample in 1954, which gave the figures shown in table 142.

TABLE 142. COLOMBIA : STOCKS OF LIVESTOCK AND POULTRY ACCORDING TO 1954 AGRICULTURAL SAMPLE ^a

	Units
Cattle	12,300,000
Pigs	1,819,000
Sheep	1,341,000
Goats	496,000
Horses	1,204,000
Mules	420,000
Asses	304,000
Poultry ^b	22,000,000

SOURCE : ECLA, on the basis of official statistics.

^a The figures were completed by the addition of an estimate of probable animal stocks in the *Intendencias* and *Comisarias*, not included in the Department sample.

^b Including estimated stocks in urban areas.

According to the estimates made by the Ministry of Agriculture, cattle increased up to 1950, the stock amounting to 13.3 million head in that year, and then began to decrease, until they numbered 12 million in 1954. So appreciable a decline in the livestock population could be explained by the various unfavourable conditions prevailing during the period of social unrest which existed for several years in the country until the middle of 1953. In many sections, numerous livestock farmers abandoned

their ranches, farms, and country properties, to which they were able to return only years later. Cattle-stealing increased considerably, and, worse still, the livestock death-rate rose for want of inoculations and other attention. Clandestine slaughter and exports appear to have been much more common during the period in question, with the result that stocks of heifers and cows presumably became smaller each year. In addition to these unfavourable factors, there was a high declared slaughter rate of female animals, as a result of a marked shift from breeding to fattening. The appearance, for the first time, of foot-and-mouth disease in 1950 was another blow which undoubtedly helped to intensify the gravity of the livestock crisis.

Even though these explanations show that the stock of cattle decreased in the last few years, it should nevertheless be borne in mind that census figures are not available for an exact appraisal of the situation, and that a reduction in the number of animals slaughtered does not always originate in a corresponding reduction of the stock.

Existing information is insufficient to indicate the trend of stocks of other species (sheep, pigs, goats and horses).

(b) Breeds and their improvement

Notwithstanding the progress achieved in the genetic quality of the cattle population, much still remains to be done in this respect. The large majority of the livestock is represented by native breeds, and selection is only just beginning. In the *llanos* to the east, for example, there are about a million head of locally bred cattle descended from the Iberian strains introduced by the Spaniards. They are small, with a heavy bone structure, large horns and hides of widely-varying colour; their low meat and milk yields are low. The milch cows produce only just sufficient milk to nurse their calves. This type of cattle is also to be found in other hot-climate areas, but the breed is slightly improved.

The *Romo Sinuano*, *Blanco Orejinegro*, horned *Costeño* and *Chino Santandereano* strains stand out among the native cattle bred from Spanish stock. Each of these has a more or less uniform genotype, and although their yields are, in general, inferior to those of foreign breeds, they are specially adapted to the environment and offer greater resistance to disease. The *Romo Sinuano* cattle have characteristics particularly lending themselves to meat production, as can be seen by the favourable results of the selection now in progress at the Experimental Livestock Station at Montería. Unfortunately, the number of specimens of this breed is diminishing, as is the case with other native strains. The *Blanco Orejinegro* cattle have proved to be irreplaceable so far in the sub-tropical parts of the country, because of their peculiar resistance to skin parasites and their complete adaptability to broken country. The other two breeds mentioned have given evidence of possessing genes very favourable to a good output of milk and a considerable meat yield in the tropics.

In hot climates, alongside the creole breeds of Spanish origin, crosses of these with zebu cattle are increasing rapidly. The valuable contribution of Indian strains to

the improvement of beef cattle in tropical zones is an incontrovertible fact; their resistance to diseases has proved to be unequalled, and to this advantage can be added the high degree of heterosis or hybrid energy resulting from their crossing with other breeds. The earlier maturity attained by the first generations of crossed breeds obviously constitutes a very important economic incentive for meat producers, and the practice of crossing creole with zebu cattle is becoming increasingly widespread. Experts, however, fear that an uncontrolled expansion of zebu blood might lead to the complete extinction of the native breeds. The desirability of restricting such continuous and absorbent crossing with zebu species has often been stressed, and, irrespectively of the feasibility of such restriction, the preservation and selection of native cattle must be promoted, both for the sake of obtaining pure-bred and high-yield stock and in order to have material available for future crossings with other breeds. According to the same experts, the zootechnical improvement of livestock for meat production should take into account the quality of the product. To this effect it would be necessary to utilize other breeds, producing high quality meat, in inter-current or polyhybridization crossings with the creole varieties.

Although the bulk of the Colombian cattle population consists of creole animals and of admittedly rather heterogeneous breeds produced by crossing with foreign stock, the latter have effectively contributed to livestock progress, despite import and acclimatization difficulties. Dairy cattle is particularly improved by the introduction of specialized double-purpose foreign breeds producing both meat and milk. Of the 12 million head of cattle which exist in the country, slightly under 800,000, that is, 6.7 per cent of the total, might be taken to represent crossed breeds with a marked infusion of European blood. Stocks of thoroughbreds are still low, only 6,551 of both sexes having been registered up to May 1954;⁵⁶ these belonged to the Holstein, Brown Swiss, Ayrshire, Norman and Red Poll breeds, some having been imported and some born in Colombia.

Undoubtedly, the country will have to continue importing pedigree specimens for many years to obtain a high degree of improvement in the breeds. Present imports far from cover requirements, especially in respect of stud bulls. But in the present state of the Colombian livestock, mass importing of cattle would be attended by serious difficulties as regards the proper feeding and care of the animals; in addition, the danger of a high death-rate would exist, owing to the problems inherent in the acclimatization of large number of specimens. Experts consider that the full benefit of mass imports could not be expected unless a zootechnical classification of the various zones were carried out, which would require preliminary studies and research of a kind not yet undertaken in Colombia. The lack of precise guidance as to which breeds are best suited to the different areas, according to their ecological conditions, has led to serious failures with certain foreign breeds. The import policy

that should be adopted, especially as regards breeds and types, and also the number of specimens to be introduced, has been frequently discussed. If immediate large-scale imports are to be dismissed as impossible, the only resource left is the introduction of improved livestock in numbers compatible with the progress gradually achieved in facilities for feeding and care.

Artificial insemination has so far not developed to a satisfactory extent in Colombia, although this system of genetic improvement will be called upon to play an immensely important part. The cost of the service per animal impregnated has hitherto been high, owing to the low percentage of positive results obtained. Such poor success obviously limits the farmers' enthusiasm for the system. Contributory factors are the lack of timely supplies of equipment and material to rural technicians, frequent interruptions in the service, and the drawbacks attendant upon the distribution and application of semen in scattered stock farms, sometimes under poor management and lacking in means of communication; moreover, insemination is practised on many farms without previous study of the pathology of the genital organs and any ill-effects they may be liable to suffer. The slow development of artificial insemination can be judged from the fact that in 1954 only 9,163 inseminations were carried out in the whole country, at the high cost of 96.0 pesos per animal.

Until 1953, the Ministry of Agriculture has been reinforcing its programmes for genetic improvement by supplying free stud facilities, from which numerous smallholders in different parts of the country were able to benefit. Though these stations were not always properly organized, the good results obtained were reflected in the visible zootechnical progress of local livestock.

(c) *Livestock zones*

Livestock activities are centred in three very different climatic zones: hot, sub-tropical and cool.

All the Departments and the majority of the *Intendencias* and *Comisarias* have hot livestock-production zones. Generally these are low or level pasture land of very variable fertility. Livestock activities are distributed throughout the country, but as the hot zone is the most extensive (77 per cent of the total area), the largest numbers of livestock are naturally to be found there. The ranches and stock farms in hot areas are devoted to meat production; systematic milking is not common, or constitutes a secondary line, in which case the milk is mostly used for the making of cheeses. As a rule the ranches are large, with big grazing-grounds, and the livestock is kept permanently at pasture; the extensive system is practised, often in primitive or uncultivated conditions, as occurs in the eastern *llanos*, where the cattle are left "on the range", as there are not even any fences. Livestock management in the hot zone is generally primitive, with a minimum of technique, and there are no agricultural crops whatever. Types of livestock and pasture in the hot zone differ considerably, varying from poor soil, without humus, covered with natural grasses of little value, where the low-yield creole breeds are left to graze "on the range" in certain parts

⁵⁶ Figure based on information obtained from the stockfarmers' associations concerned.

of the eastern *llanos*, to the fertile lands on the margins of the Rivers Magdalena, Cauca, Sinú, San Jorge and César, which flow through vast sectors of the Departments of Bolívar, Magdalena, Córdoba, Antioquia, Santander, Valle, Tolima, Cundinamarca, Caldas and Cauca. Here the prairies are covered with a variety of artificial pastures and the quality of the stock is better. In the hot zones beef cattle predominate, dairy herds being found only in the neighbourhood of more populated areas.

The stock farming area of the sub-tropical zone is located between 1,000 and 2,000 metres above sea level, on the slopes and low plateaux of the three ridges of the Andes, with average temperatures ranging from 18 to 23 degrees Centigrade. Livestock production is carried on in this medium climate in Antioquia, Caldas, Cundinamarca, Santander, Boyacá, Cauca and Tolima in particular. The land is broken and steep, and the soil, which is not very fertile, is eroded in some areas; the pastures are mainly formed by "*Gordura*" grasses (*Melinis minutiflora*), and the breed most commonly reared is the *Blanco Orejinegro* and its varieties. The cattle ranches are relatively small, but since it is in these sub-tropical zones that coffee is grown, there is in fact no coffee plantation which does not own some cows, whose scanty production is used for domestic consumption. The principal difficulty encountered by stock farming in this climate is the *nuche* (larva of the *Dermatobia cyaniventis* fly), which does great harm to cattle, notwithstanding the natural resistance of the *Blanco Orejinegro* breeds. Livestock production in the sub-tropical zone is not specialized, and both meat and milk yields are low. Since the coffee area is the one with the densest population, its stock farming will naturally have to specialize in milk production.

Livestock production is carried on in the cool zone on the savannahs and highlands of the cordillera, with altitudes above 2,000 metres and a temperature lower than 18 degrees Centigrade. Cool-climate stock farming takes place in the Departments of Nariño, Boyacá, Cundinamarca, Antioquia, Santander, Cauca, Huila, Tolima and Valle. The mildness of the climate favours the exploitation of European dairy and double-purpose breeds. The size of the cattle farms is mid-way between that of the large estates in the hot zones and the small stock farms of the subtropical zone. In general, the fields are more adequately fenced in, and pasture and farm management is more efficient. There are now several dairy farms in the cool zone whose yields and production techniques are equal to those of the best farms of a similar type in countries where livestock production is more highly developed.

Pigs, sheep, goats, horses and poultry are also reared in these three stock farming zones.

(d) Grass, pastures and feeds

The low yields of Colombia's livestock activities are mainly due to serious feed deficiencies, both in natural and artificial pastures and in supplementary concentrates. The salient feature is that livestock is reared almost exclusively on the basis of extensive and permanent

grazing, very few farmers using fodder and feed concentrates.

Grasses and pasture management vary in each of the three livestock zones. In the highlands where the climate is favourable for dairy production, the cultivation of leguminous forage plants is easy and common. Nevertheless, there is still an excessive proportion of grasses in the fields where milch cows graze. Above 2,000 metres, the main leguminous plant is clover, some varieties being found wild. In the sub-tropical and low-lying areas, most of the fields are sown with artificial and natural grasses, unassociated with cultivated leguminous forage plants. Some native leguminous plants grow wild, and these are of great nutritive value, but, unfortunately, they are destroyed by many farmers who are unaware of their importance and even consider them weeds.

In default of precise data, the total extent of pastures and grasslands was estimated at 27 million hectares, of which 10 million would seem to be under artificial pasture and 5 and 12 million hectares respectively covered by permanent and seasonal natural grass. The high proportion of seasonal pastures unutilizable during part of the year because of drought or floods makes the pasture area too large in relation to the number of animals. This means that the carrying capacity per hectare is low, a defect which can also be attributed to inefficient pasture management.

For clarity's sake it is advisable to determine the density of present animal stocks, for which purpose they are reduced to homogeneous units of cattle. The pasture is measured in terms of artificial grasslands. The density of animal stocks if therefore expressed in terms of head of cattle per hectare of artificial pasture (see table 143).

TABLE 143. COLOMBIA: ANIMAL STOCKS IN TERMS OF CATTLE, 1953

	Stocks (Thousands)	Coefficient*	In terms of cattle (Thousands)
Cattle	12,300	1.000	12,300
Sheep	1,237	0.250	309
Goats	496	0.125	63
Pigs	1,752 ^b	0.200	196
Horses	1,933	0.750	1,450
TOTAL			14,318

SOURCE: ECLA, on the basis of official statistics.

* These figures are the reciprocals of equivalence in terms of cattle determined by the carrying capacity of the pasture for each species.

^b 40 per cent at pasture.

In order to reduce the grassland used for livestock production to a common denominator (hectare of artificial pasture), it was estimated that 3 hectares of natural permanent grass have the same carrying capacity as one hectare of artificial pasture, and that for seasonal grasses the corresponding equivalence stands at 10 to 1 (see table 144).

TABLE 144. COLOMBIA : PASTURE AREA
IN TERMS OF ARTIFICIAL PASTURE, 1953

	Pasture		Forage coefficient *	Hectares of artificial pasture
	Thousands of hectares	Percentage of total		
Artificial pasture	10,070	37.5	1.000	10,070
Natural permanent pasture	5,000	18.6	0.333	1,665
Natural seasonal pasture .	11,800	43.9	0.100	1,180
TOTAL	26,870	100.0		12,915

SOURCE : ECLA, on the basis of official statistics.

* The reciprocal of equivalence in artificial pasture.

The preceding data show that the country's average livestock density apparently stands at 1.1 head per hectare ; this is quite a low figure, but it is attributable to the existence of a large proportion of pastures with poor carrying capacity, as, for instance, in the eastern *llanos* and some parts of Bolívar, Magdalena and other Departments. The livestock density, measured in terms of head of cattle and in relation to the total pasture area of 27 million hectares, amounts to only 0.53 head per hectare.

Even in the most prosperous livestock areas, pastures are very often deficiently managed, the grass being allowed to grow until it becomes lignified and unfit for consumption. Moreover, the system of alternating pastures is little used, and when applied, as for certain dairy herds, rotation or change of livestock is not always carried out with the due regularity because the fields are not properly divided up. Inadequate weed control is another factor which is reducing the carrying capacity of pastures.

There is abundant fresh grass during the rainy season, and a scarcity during drought periods. This points to the advisability of storing fodder in order to counteract the effect of seasonal fluctuations in production. Ensilage and haymaking are little known, although conditions in the three climatic zones favour the economic cultivation of various forage plants for these processes, as has been shown by various experiments.

Although it is needless to stress the importance of forage reserves in all branches of livestock production, the attendant advantages are most marked in the case of the dairy industry. It may be estimated that milk production in Colombia drops some 30 per cent or sometimes more during the "summer" seasons, which last about six months (alternate three-month periods), and result in the disruption of regular supplies to markets and sharp price fluctuations. In order to obviate these difficulties every effort might be made to foster the conservation of fodder by means of ensilage and haymaking. Prospects are encouraging, since during the rainy season the livestock does not utilize all the abundant grass available, and there is considerable wastage. In order to extend the practices of ensilage and haymaking, a far-reaching research and information campaign would be extremely useful. Attention to this aspect of forage

conservation will largely determine the maintenance of the milk yield at constant levels, as well as the securing of a better-quality product and an aggregate increase in milk production.

Most of the feed given to cattle consists of bulk foods (fresh forage, particularly) and only a few owners of selected herds provide some of their animals with supplementary rations of concentrates. This system might well be modified in the direction of giving a supply of concentrates proportional to milk yields. In Colombia, as elsewhere in Latin America, there is a great shortage of feed concentrates, because production is inadequate and human consumption of cereals leaves little available for cattle. Moreover, the by-products of milling and brewing, and slaughterhouse waste, which is rich in proteins and albuminoids, are not adequately utilized. The deficiency of concentrates with a high content of proteins and other nutrients is usually aggravated by the scarcity of mineral preparations for the cattle to ingest at will, while various soil analyses in several parts of the country have shown a lack of essential salts.

Another related problem is that of drinking water. This constitutes a serious obstacle in many areas, where insufficient supplies are available, and the cattle have to travel long distances to find it, or it may be contaminated.

(e) *Other factors limiting livestock development*

Special mention should be made of the low birth-rate, high death-rate and inefficient management.

For example, on the average, under 70 per cent of heifers and cows fit for reproduction actually calve. The main causes of this low percentage are the insufficient number of stud bulls and their habitual running with the cows, which often leads to the exhaustion or reduction of their inseminating capacity. Moreover, fertility is frequently impaired both in males and females by diseases of the genital organs, attributable to the tropical environment, which is particularly unfavourable for imported cattle, and to inadequate and unbalanced diet.

The various diseases which intensify the mortality of animal species, linked in turn to the variety of climates in which livestock is reared, constitute a serious obstacle to the development of stockbreeding. The situation is aggravated by deficiencies in the prevention and treatment of common ailments.

This is not the place for a complete list of all the pathogenic agents which cause the most serious losses, but, undoubtedly, the main bar to an increase of animal stocks is the high death-rate among young animals, which reaches 50 per cent in many herds of dairy cattle and other livestock. Infectious diseases are the commonest cause of death for calves under three months ; from then on until they are a year and a half old, the incidence of gastro-intestinal parasites and verminous bronchitis is equally severe. The average death rate of 15 per cent for calves less than one year old, which account for 18 per cent of total cattle stocks, is undoubtedly a factor which greatly limits the growth of the livestock population. Foot-and-mouth disease, pyroplasmoses and paretic rabies particularly cause heavy losses among

adult animals and those being fattened for slaughter. Hog cholera is the main cause of death for pigs and Newcastle disease for poultry. The Ministry of Agriculture estimates that annual deaths of cattle amount to more than 600,000 head, of which 360,000 are calves under one year old, 141,000 cattle in process of rearing for slaughter, and 99,000 adult cattle. If the cost per head is reckoned at 100 pesos per calf, 200 pesos per animal being reared, and 400 pesos per adult cow or bull, annual mortality losses would seem to amount to 36, 28.2 and 39.6 million pesos respectively. The total figure — 103.8 million pesos — is decidedly high.

In spite of official sanitary control campaigns, diseases are still one of the main causes of low productivity, not only because of the high death rate, but also owing to the economic losses resulting from lowered yields. Attacks of vesicular stomatitis, abortions due to Bang's disease, mastitis, *nuche* or ticks do not cause many deaths, but they lead to considerable losses through a reduction of the meat and milk output.

In most cases sanitary control stands at a very low technological level. Such practices are often confined to the application of two or three inoculations during the life of the animal, purging of lean cattle and dipping when the cattle are already over-infested with ticks. Few farmers regularly inoculate their stock against endemic diseases, systematically dip their cattle in pesticides or periodically administer vermifuges.

Deficient management is another factor standing in the way of livestock development. This is due largely to absentee ownership and to the fact that administration is left in the hands of bailiffs or managers who are not always properly trained in knowledge of livestock techniques. Consequently, if livestock production is deficient, primitive and anti-technical, this is sometimes for want of satisfactory administrative practices. Extension campaigns will be slow to give results unless an effort is made to train sufficient managers capable of absorbing and practising new techniques and modern systems of control and management.

Thus, for example, bullocks are castrated at the age of one year or more, and not in the first few months, so that an appreciable proportion of the calves is derived from unselected stock, and even from degenerate animals.

Corrals are used for milking on most dairy farms; in about one-quarter, this operation takes place under thatched shelters, and only on a very small percentage of the farms are sanitary cowsheds found.⁵⁷

Inspection of dairy production is only in its initial stages, and is still inadequate, covering only a very limited sector. Hence the improvement of dairy farming is hindered, since without this service it is impossible to determine yields per animal or the fat content of the milk, which are basic factors for any programme of technical selection and management. The inspection and

⁵⁷ General data indicate that of the milk produced (822,000 litres daily), 10 per cent is supplied by milking in cowsheds; on the assumption of a capacity equivalent to an average of 70 cows each with an average yield of 6 litres per cow, the number of cowsheds would amount to about 2,000 for the whole country, including those of very primitive construction.

recording of production should be supplemented by services for conducting specific sanitary campaigns (particularly against infectious abortion, mastitis and tuberculosis) and for promoting the adoption of better feeding practices.

The formulation and implementation of dairy development programmes for given areas is of the utmost importance if full advantage is to be taken of the favourable conditions for milk production prevailing in various parts of the country.

(f) Yields

The foregoing cursory review of the factors which hamper livestock development may conveniently be followed by an analysis of yields in relation to the overall volume of production.

The weight of beef bullocks for slaughter averages 420 kilogrammes on the hoof for the larger breeds and only 350 kilogrammes for unselected creole breeds. Moreover, apart from this light weight, they are slow to mature, most male animals being ready for slaughter only at 4.5 or 6 years of age. The yield of carcass meat fluctuates around 52 per cent of live weight, and the average per head does not exceed 200 kilogrammes. The rate of slaughter in relation to stocks is notoriously low for all edible species. Eleven per cent for cattle and 40 per cent for pigs are rates that clearly indicate low productivity.⁵⁸ Milk yields barely exceed 2 litres daily per cow on an average, owing to the very large number of poor milch cows and to the fact that herds with high yields are few. Wool yields stand at barely 1 kilogramme per animal, and the clip is of an inferior quality. The useful meat on poultry weighs only 1.5 kilogrammes, while egg production per bird does not rise above 120 units annually.

To low yields per animal and per unit of area must be added wastage between producer and consumer. Transport of cattle on the hoof on journeys lasting several days causes serious loss of useful weight. Not less than 300,000 head of cattle are transported annually over long distances to the consumer centres; they lose 10 to 15 per cent of their weight in transit, so that they have to be fattened again for several months. Milk frequently turns sour owing to transport over long distances in unsuitable vehicles without refrigeration. Considerable losses also occur during the transport of eggs and poultry. Unsatisfactory processing of wool, empirical methods of skinning, lack of technical facilities in the manufacture of cheese and cream and the incipient stage reached by industries concerned with the processing of animal products constitute current deficiencies which it would also be advisable to remedy in future livestock development programmes.

The contraction in consumption of domestically-produced animal foodstuffs in recent years made it necessary to suspend exports of cattle on the hoof, which had been regular and fairly significant from 1942

⁵⁸ In Chile the relationship between the number of animals slaughtered and the livestock population is 15.3 per cent; it is 13.5 per cent in El Salvador and 18 per cent in Uruguay.

to 1952. In 1942, 17,100 bullocks were exported. This figure rose in subsequent years, and began to decline in 1948. For many years the country has been importing small quantities of cattle, not for consumption but for improvement of domestic stocks. In order to supplement production shortages, imports of tinned meat, condensed and powdered milk and fresh eggs have increased in recent years, but on a scale far from sufficient to compensate for domestic production deficits. This import policy is being modified at present, in order to prevent discouragement among domestic producers.

With respect to production of animal raw materials such as hides and wool, the trend towards heavier imports indicates that a considerable share of supplies for tanning and textile industries, as in the case of wool, has to be obtained from abroad.

VI. STRUCTURAL FACTORS

1. *System of land tenure and remuneration of labour*

These two subjects will be discussed in conjunction, since it is difficult as a rule to keep them clearly apart.

(a) *Medium-sized and large farms*

Most medium-sized and large farms are run by the owners of the land, or by managers, although for some crops the tenant-farmer system is also important. All such entrepreneurs employ wage-earning labour. To this category belong stock farms; those growing cane for the sugar industry or for large-scale production of *panela*; plantations producing bananas for export; an increasing proportion of cotton and rice plantations; and some of the farms on which wheat, barley, potatoes, and coffee are grown.

Tenant farmers generally hold a fairly important acreage (fifty hectares or more) forming part of a larger farm used for extensive cattle rearing. The agreed rent is paid in money, usually at an annual rate per hectare. The term varies between one and three years. On the rented land a single crop is usually grown over and over again in the same soil until the end of the contract, which is renewed up to the point at which the soil has become so impoverished that it is no longer worth while to continue. The tenants are usually business men, rather than farmers, who exploit a certain crop—rice or cotton, for instance—and for whom it is more profitable to rent land than to buy.

This type of farmer seldom makes improvements of any importance, and works the soil as a non-renewable natural resource; even if at times he helps to solve problems arising from production shortages, it is doubtful whether his contribution in this respect is not offset by the indirect losses deriving from the deterioration of the soil. While his farming is basically technical, since he uses machinery, sows improved seeds, and keeps down pests and disease, it must be remembered that he does not practise crop-rotation or fertilizing, concentrates on a single crop and in a few years leaves the soil depleted.

Under the administrative system in use in some cases,

especially on stock farms, the owner has nothing to do with the farm management, which is turned over to an administrator, who often lacks technical skill and is uninterested in improving the land under his care. Absenteeism is prevalent among Colombian landowners, and this certainly explains to some extent the relatively backward state of farming, and the marked inefficiency of stock farming.

Another administrative system is that in which the owner turns the farm over to a manager-entrepreneur (a sort of partner), who handles the enterprise under his exclusive responsibility, and personally foots the regular overhead expenses. The owner receives his agreed proportion of the profits and the rest goes to the manager.

(b) *Small farms*

Small family holdings and those of uneconomic size (*minifundios*) are sometimes worked on the farmer's own soil and sometimes on land obtained under such traditional systems in common use as leases⁵⁹ or share-cropping. In small enterprises of this kind, whether or no the farmer is the owner, he and his family work the soil without hope of remuneration other than that available from the disposal of surplus produce after their own consumption requirements and the owner's share or rent have been deducted.

(c) *Share-cropping system*

Broadly speaking, this means an agreement whereby the land-owner turns the land over to a share-cropper whose obligation it is to grow the crops agreed upon, and give the owner a certain quota of the harvest. The institution as such is subject to wide variations from one part of the country to another, and according to the crops grown. If the owner provides implements or other facilities, in addition to the land, his share in the produce is larger.

In the last analysis this share-cropping system, which is a form of land tenure, comes to represent another way of remunerating labour, into which the monetary element scarcely enters, except at the time when the owner disposes of his share of the harvest.

Almost all the tobacco, a great deal of the rice, and a smaller fraction of the output of cotton and non-perishable subsistence crops such as maize, millet, wheat, etc., are produced under this system of labour. It is also practised in the case of other crops, including cane for *panela*, and, broadly speaking, throughout the whole country, although it is more nearly universal in some Departments than in others.⁶⁰

Among the recognized advantages of this system is the fact it does make land accessible to innumerable farmers who have none of their own. It is also pointed out that the system intrinsically involves incentives for the share-cropper, who is likely to work harder and better when he is directly interested in the harvest. And,

⁵⁹ In this case small lots are leased out for one or two crops.

⁶⁰ There is no statistical information as to the number of *aparceros* (share-croppers) in the country, but they are known to be numerous.

since the whole family shares in an enterprise of this kind, the resultant economy of labour ensures the share-cropper a better income. Lastly, the ties which are formed between owner and share-cropper are apparently conducive to better social and economic relationships between the two parties.

The actual state of affairs seems to be very different. For illustrative purposes, table 145 gives some estimates relating to tobacco-planting in the Department of Santander, and the income per hectare under cultivation and per harvest accruing to the land-owner and the share-cropper.

TABLE 145. COLOMBIA : EXPENDITURE, INCOME AND PROFITS OF TOBACCO-PLANTING UNDER THE SHARE-CROPPING SYSTEM IN THE DEPARTMENT OF SANTANDER ^a

	Value of tobacco obtained		Expenditure		Balance	
	Pesos per hectare	Percentage of total	Pesos per hectare	Percentage of total	Pesos per hectare	Percentage of total
<i>Soto area :</i>						
System (a)						
Owner	312.00	33.3	46.66	8.3	265.34	71.0
Share-cropper	624.00	66.7	515.54	91.7	108.46	29.0
Total	936.00	100.0	562.20	100.0	373.80	100.0
System (b)						
Owner	624.00	66.7	335.35	55.7	288.65	77.2
Share-cropper	312.00	33.3	266.85	44.3	85.15	22.8
Total	936.00	100.0	602.20	100.0	373.80	100.0
System (c)						
Owner	468.00	50.0	139.00	24.7	329.00	88.0
Share-cropper	468.00	50.0	423.00	75.3	45.00	12.0
Total	936.00	100.0	562.00	100.0	374.00	100.0
<i>Enciso :</i>						
Owner	275.00	50.0	91.60	23.4	183.40	115.3
Share-cropper	275.00	50.0	299.40	76.6	-24.40	-15.3
Total	550.00	100.0	319.00	100.0	159.00	100.0
<i>Capitanejo :</i>						
Owner	300.00	50.0	91.60	23.4	208.40	99.7
Share-cropper	300.00	50.0	299.40	76.6	0.60	0.3
Total	600.00	100.0	391.00	100.0	209.00	100.0
<i>Fence Basin :</i>						
Owner	213.00	33.3	20.00	4.0	193.00	156.9
Share-cropper	413.00	66.7	483.00	96.0	-70.00	-56.9
Total	626.00	100.0	503.00	100.0	123.00	100.0
<i>Central Basin of the Suárez :</i>						
Owner	156.00	20.0	—	—	156.00	81.3
Share-cropper	624.00	80.0	588.00	100.0	36.00	17.7
Total	780.00	100.0	588.00	—	192.00	100.0

SOURCE : *Contraloría General de la República, Geografía Económica de Colombia-Santander* (Bucaramanga, 1947).

^a The table summarizes the data for one crop and includes only special direct expenditure on cultivation. It does not therefore include taxes or other general expenses, nor capital outlays. The systems of share-cropping in each area are as follows :

Soto area : (a) The owner, apart from handing over the land ready for planting, supplies the tobacco sheds and covers expenditures arising from sorting, rolling, packing and transporting his share ; he keeps one-third of the harvest and two-thirds goes to the share-cropper. (b) The owner provides the land already prepared and fertilized, tobacco sheds and sacking, and pays for the sorting, rolling and packing of his share. He also feeds the share-cropper on working-days. One-third of the crop belongs to the share-cropper, and two-thirds to the owner. (c) The owner provides the fertilized land and tobacco sheds, and the harvest is equally divided between him and the share-cropper.

Enciso and Capitanejo areas : The owner contributes the land and pays for sorting, rolling and transport of his share, the harvest being divided equally between him and the share-cropper.

Central Basin of the Suárez : The owner provides only the land. All other expenses are defrayed by the share-cropper. Four-fifths of the harvest belong to the share-cropper and one-fifth to the owner.

Fence Basin : The owner provides only the land, and occasionally also the tobacco sheds. The harvest is divided on the basis of one-third for the owner and two-thirds for the share-cropper.

Even though the absolute figures in table 145 might be considered out-of-date, referring as they do to 1947, the fact is that from then until now, general farming conditions have not altered much and share-cropping agreements are on the same lines as in that year. These are long-standing customs which are more likely to disappear than to be modified in favour of the weaker party to the agreement.⁶¹ According to the table referred to, there are zones in which the only one to benefit from the system is the owner of the land, for if the value of the share-cropper's labour is taken into account, as has been done, it can be seen that he really gets less than he would have obtained under the scale of wages prevalent in the area. In other cases the remuneration he receives for his labour is slightly higher than the current rate, except in one case — type (a) in the Soto zone — but under this type of contract the owner pays only 3.3 per cent of the direct expenses of cultivation.

In some cases the lower remuneration which the share-cropper receives for his work is partly offset by the larger income he may ultimately obtain, by sowing in addition "subsistence" crops which provide a minimum supply of food for himself and his family. This, however, is not the general practice.

The description given of the situation of tobacco-planters in Santander is also applicable to those in Bolívar, as well as to the cotton-planters in the Atlántico Department, the rice-growers of Bajo Sinú in Córdoba, and, in general, to many landless agricultural workers.

As a general rule, the sort of people who take part

⁶¹ Many difficulties have arisen over the legal aspect of share-cropping. Act No. 100 (1944) represented an attempt to settle some of them, such as, for example, those connected with the form and deed of the contract, its duration in relation to the crops specified in it, grounds for its termination before the agreed term, the question of improvements, right of retention and so forth. Furthermore, it declared the system to be to the public benefit. All this was with the object of affording encouragement and greater security to signatories of such contracts.

in this system of production are farmers without land, or possessing too little to support themselves and their families and absorb their labour; and in either case, with little opportunity for other remunerative employment. In other words, there is no alternative to share-cropping but emigration; this is more difficult for a people steeped in age-old traditions and accustomed throughout generations to this system, without even moderate hopes of security in different work or other areas. The density of the population in some parts and the shortage of arable land lead to competition among share-croppers which inevitably redounds to their disadvantage. The land given out for share-cropping is of minimum extent, sometimes less than half a hectare per family. The abundance of share-croppers accounts for the perpetuation of the system.

Such an arrangement is conducive to owner-absenteeism and provides no incentive to improve production. Many properties given over to share-cropping are left in charge of bailiffs with no technical knowledge, so that the share-croppers themselves have no one to supervise and guide their work, and thus encourage them to adopt improved methods which might result in larger yields.

As this system is practised in Colombia, it does not achieve the economic objectives which characterize it in other countries; on the contrary, it is a factor tending towards the impoverishment of the land, and a grave obstacle to the introduction of better farming techniques. Neither does it serve social ends, since there can be little hope of progress in this direction for individuals whose work as a rule does not supply their minimum subsistence requirements.

However, the system of share-cropping, properly applied and technically directed, is capable of producing very different results from those described above. Experiments carried out in 1928 with 29 share-croppers at the Agricultural Station at San Gil, belonging to the Ministry of Agriculture, yielded the results compiled in table 146.

TABLE 146. COLOMBIA : INCOME, EXPENSES, AND PROFITS PER HECTARE IN A TOBACCO PLANTATION WORKED UNDER THE SHARE-CROPPING SYSTEM AT THE SAN GIL AGRICULTURAL STATION ^a

	Income from sale of product		Expenditure		Profits	
	Pesos	Percentage	Pesos	Percentage	Pesos	Percentage
Agricultural Station	732.9	29.7	114.3	10.0	618.6	46.7
Share-cropper	1,732.1	70.3	1,027.3	90.0	704.9	53.3
TOTAL	2,465.0	100.0	1,141.6	100.0	1,323.5	100.0

SOURCE : Alfredo Pino Espinel, Chief of the Santander-Bucaramanga Technico-administrative Zone, *Conclusiones del primer ensayo de explotación agrícola por el sistema de aparecería de los cultivos del tabaco, maíz y millo en la Estación Agrícola de San Gil* (July 1947).

^a The table relates to the results of one harvest. The features of the contract were as follows : The Agricultural Station put up the land, built and allowed the use of the tobacco sheds, directed and guided planting, harvesting and processing, furnished the seed and lent the tools required for care of the crop, and paid one-third of the processing expenses : it also obtained credits from the State for the share-croppers, sold the crop, and authorized the share-croppers to utilize 10 per cent of the land for "subsistence" crops for their exclusive use. The tobacco harvest was divided on a basis of two-thirds for the share-cropper and one-third for the Agricultural Station. Under the contracts for maize and millet, the Station paid for the threshing, cleaning and storing of the harvest.

A comparison of results obtained from the share-cropping system as tried out in the Agricultural Station with those secured under the traditional method shows that a slight contractual improvement in favour of the share-cropper, granting him credit and technical assistance on suitable terms, leads to an increase in productivity which is beneficial to both parties, but particularly to the share-cropper.

Maize and millet⁶² were cultivated in the course of the same experiment but with results which were, economically, greatly inferior to those obtained for tobacco, and which, compared with those of tobacco-planting at the same Station, illustrate the outcome of the traditional share-cropping methods applied to low-yield crops.

(d) *Settlers*

Settlement represents a particular form of land tenure which, if persevered in, leads to ownership. Demographic pressure in areas where cultivable land is scarce, and there is little prospect of employment in non-agricultural activities, leads a number of agricultural workers to seek a livelihood in uncleared public land. These farms are generally of small acreage, and the dwelling-houses hardly sufficient to afford protection from the weather. The settlers employ only rudimentary equipment and their principal activity consists in clearing and subsistence farming. Available manpower is confined to the settler himself and his family, and, broadly speaking, they lack economic resources to undertake larger-scale enterprises. Progress is slow; means of communication are lacking; and surplus produce rots on the farm for want of means to take it to market. These settlements are always far from centres of consumption, and are without the most elementary security, social and technical assistance services.

Livestock production, too, progresses very slowly. Although it is the easiest means by which the settler can make some sort of income to cover those minimum necessities of clothing, medicines, salt, and foodstuffs which the farm does not supply, the forced sale of animals frequently reduces the possibility of a more rapid increase in the small existing stock.

The settler's horizon begins to broaden with the construction of roads; but much individual effort has been wasted, since innumerable settlers, a prey to failure and disappointment, have abandoned their land and returned to their former homes or to urban centres in search of better opportunities. Although to begin with these settlers contribute relatively little to the national economy, they undeniably constitute a first-class potential element. They have demonstrated this by the decisive part they have played in the reclamation of important agricultural and stock-breeding zones. Constructive results might soon be obtained from the individual initiative of the settlers, if they were given the minimum requisites of security, social and health services, technical guidance, credit, farm supplies, transport and an outlet for their produce.

A special situation is that of the stock-farming plainmen (*llaneros*) of the eastern *llanos*. Most of them live in hamlets and villages, and their chief activity consists in rearing beef cattle on virgin land belonging to the State. The cattle share the common pasturage no matter to whom they belong, owing to the community spirit of the *llaneros*, none of whom has land with fixed boundaries for his exclusive benefit. It seems that environmental conditions of exposure to continuous floods and prolonged droughts have necessitated this method of operation, which allows the cattle to be moved from one place to another in search of pasture or drinking-water, or to avoid loss of animals on account of floods. The grave defect of this system of land tenure is that it offers no incentive to the stock-breeders to better their farms. The very nature of the system means that any improvement carried out is to the common advantage. Similarly, the quality of the cattle is slow to improve, for few care to invest in pedigree bulls. As for pasture, only what nature provides is utilized, and such natural forage is poor and of seasonal growth. Yet excellent conditions exist for the formation of permanent artificial pastures, and for the construction of simple and economic irrigation systems. Nor would there be technical obstacles to the construction of drinking-ponds on the basis of wells and windmills. It looks as if large-scale progress in cattle-rearing in the eastern *llanos* depends chiefly on the solution that is found to the problem of land tenure.

(e) *Tenant farmers*

The tenant farmer (styled "*viviente*", "*agregado*" or "*arrendatario*" in Spanish) is a farm worker who establishes himself in a certain farm where he receives lodging for himself and family, and a piece of cultivable land for his exclusive use and benefit. On the large stock farms he may be given the right to run his own animals along with those of the farm. For these benefits he pays with his work, usually on a wage basis, and carries out any farm operation assigned to him. The name "*arrendatario*" or tenant has its origin in the fact that in some parts, the role of "*viviente*" or "*agregado*" is disguised as that of a tenant who pays for his lodging and his piece of land with his personal labour. The "*viviente*" may also take land on an adjoining farm under the share-cropping arrangement.

Prior to 1936, this institution was extremely common, and was practically universal in all medium-sized and large farms. Owing to the passing of the Land Act of that year, and particularly to its misinterpretation, a number of "*vivientes*" claimed title to the dwelling-house and land they occupied on the hacienda; most of the owners, fearing similar claims, thereupon dispensed with the tenants.⁶³ This of course created some problems and aggravated others already existing. Eviction of the "*viviente*" led to a shortage of labour accustomed to carrying out particular operations and enlarged the ranks of displaced agricultural workers; many became share-croppers and increased the competition, while others settled on virgin land or went to the urban centres.

⁶² A crop belonging to the sorghum family.

⁶³ *Contraloría General de la República, op. cit.*

(f) *Work under the "good neighbour" system*

This is a system of labour remuneration (known as "*brazo vuelto*") in use in certain localities where single-crop smallholdings, used for coffee, tobacco, cotton, etc., are predominant. When certain operations on the farm require the intensive use of labour for a short time, the farmer requests the assistance of his relations and neighbours. Remuneration is confined exclusively to board, but the recipient of this assistance is under the obligation to return it in kind, on the same terms.

(g) *Hired labour*

Day-wage labour predominates in all enterprises directly managed by the owners, and especially so where the country population is not very dense and share-cropping is uncommon. Usually the remuneration for labour is an agreed daily wage, but for some years lately the job-work system has been spreading. The daily wage is lower if the owner provides the worker with board, and lower still if the farm's own implements are used.

2. *The structure of farming units*

Available numerical data on the structure of farming units is extremely scarce, while a complete lack of information makes it impossible to analyse the structure of farm ownership.

According to official sources,⁶⁴ and on the basis of the preliminary findings of the National Census of 1951, it would seem that there were in Colombia 1,590,933 rural properties, of which 1,370,382 were situated in the 16 Departments, and the rest in the remaining territory of the Republic. This figure covers farms in the strict sense of the term, and also villages which on account of their small number of inhabitants cannot be classified as urban centres.

The calculation based on the afore-mentioned census appears to indicate the existence within the 16 Departments of 820,842 farms duly classified by size.⁶⁵ This figure is not official and is subject to correction; it suffices, however, to give an idea of the approximate situation as to the structure of farming units by size.⁶⁶

Analysis of these estimates confirms the existence of *minifundios* (farming units of uneconomic size) and *latifundios* (large farms run on the extensive system). Both are grave problems that must be considered among the most formidable obstacles to the agricultural development of the country. On account of their large number and very small area, the *minifundios* keep a substantial proportion of the labour force idle and make the mechanization of cultivation difficult, besides depleting the soil and rendering it sterile through over-cultivation resulting from demographic pressure. The *latifundios*

⁶⁴ National Administrative Department of Statistics.

⁶⁵ The term used here refers to units of production, and not properties.

⁶⁶ The actual number of farms is probably higher; the *Federación de Cafeteros* estimates the number of coffee plantations at 600,000 and almost certainly the 16 Departments contain more than 200,000 other farms.

cover immense areas devoted to extensive stock farming; the employment level is extremely low, techniques are backward and productivity is exceptionally poor, whether measured from the standpoint of unit of area or from that of labour employed. Their legal situation as private property makes them inaccessible to landless agricultural workers, except for small tracts distributed under the share-cropping system, which in turn are affected by the problems inherent in farming on too small a scale.

There do exist a certain number of farms of satisfactory size, where crop and stock farming are sometimes combined, and where technical standards are comparatively acceptable.

The 112,000 small properties of less than one hectare in extent represent 13.7 per cent of all the enterprises included in the sample, and amount to scarcely 0.25 per cent of an aggregate area of 56,000 hectares; while, at the other extreme, 32 farms of more than 10,000 hectares each own in all 480,000 hectares. Even if it is acknowledged that average conditions with respect to proximity to population centres, health services, means of communication, transport, etc. are appreciably better in the zones where the small properties are located, the fact still remains that there is an exaggerated sub-division of land on the one hand, and on the other a concentration of vast areas among a few owners, in parts of the country that have been at least semi-incorporated into the economy.

The distribution of farming units by size can be appreciated still more clearly in the resumé given in table 147.

TABLE 147. COLOMBIA : RÉSUMÉ OF THE STRUCTURE OF FARMING UNITS, BY SIZE

Size of farming units	Number of farms		Area occupied by farms	
	Number	Percentage of total	Thousands of hectares	Percentage of total
Under 5 hectares ...	459,380	55.97	950.9	4.18
Over 5 and under 20 hectares	230,550	28.09	2,434.4	10.73
Over 20 and under 100 hectares	101,384	12.35	4,746.1	20.92
Over 100 and under 500	25,072	3.05	7,521.6	33.15
500 hectares and over	4,456	0.54	7,035.5	31.02
TOTAL	820,842	100.00	22,688.5	100.00

SOURCE: See *Statistical Appendix*, table 73.

It can be seen that farming units of under five hectares — numerically equivalent to 56 per cent of the aggregate included in the sample — own only very slightly over 4 per cent of all the land involved; while enterprises of 500 hectares and over, representing numerically 0.54 of the total, occupy 31 per cent of the land. Among the farms of less than 5 hectares are reckoned those owned by the holders, and others of which the tenure is precarious and temporary, as for instance those worked under the share-cropping system. Enterprises of over

500 hectares are farms owned by the entrepreneurs, and some have more acreage than that indicated, the difference representing small or medium-sized holdings worked by share-croppers or tenant farmers, independently of the main undertaking.

Although surveys have never been carried out to determine the optimum size for different types of farming units in each zone and at each climatic level, it may be stated *a priori* that, very broadly speaking, those of under 2 hectares and over 500 are not economically desirable. Only exceptional conditions would justify enterprises not falling within these limits.

In the case of farms of under two hectares — and there are apparently 268,000 of these, according to the sample — the labour capacity of the agricultural worker and his family is very far from being absorbed, except where cultivation is extremely intensive, which seldom happens in Colombia. The average annual input of human labour per cultivated hectare is 73 days' work, with a minimum of 25 days in banana-growing and a maximum of 360 days in market gardens. Coffee absorbs 72.6 days' work; maize, 58; potatoes, 95; yucca, 93; and sugar cane for *panela* or molasses, 119.8. If an average family of five members is assumed to have a work capacity of 400 days in the year, it can be seen that no type of agricultural enterprise — unless perhaps market gardens combined with fruit-growing — is capable of furnishing the agricultural worker and his family with full employment. Furthermore, the value of any production he may obtain is totally insufficient to raise his standard of living above mere subsistence levels. The average value of agricultural production in the country is 817 pesos per hectare; thus the value of the production from two hectares per member of the family cultivating them would be 324 pesos. And this is in the most favourable average case, for if the agricultural worker has only one hectare at his disposal, the gross value of production per member of his household falls to 162 pesos.

An analysis of table 147 shows that 28 per cent of these farming units fall under the family type of holdings or those whose area ranges from 5 to 20 hectares. All these farms in the aggregate cover 10.7 per cent of developed land. Most of the family holdings are under crops, but some, although on a small scale, rear livestock.

The properties of 20 to 100 hectares may be considered as the medium-sized type when they are mixed crop and stock farms, since if they bred livestock only they would still be family holdings. In the aggregate they represent 12.4 per cent of the total number of farms covered by the sample, and comprise 20.9 per cent of the land.

Large-scale farming units are those whose size varies from 100 to 500 hectares, and which represent numerically 3 per cent of all farms. Their aggregate area covers 33.2 per cent of utilized land. When these farms are being actively worked, whether under crops or livestock, or a rational combination of the two, they make an important contribution to agricultural production. But when this is not done, in spite of their capacity to produce, they acquire the character of *latifundios* in the social and economic sense of the concept.

With a very few exceptions, all farms of over 500 hectares can be described as *latifundios*; these farms, numerically, form 0.54 per cent of the aggregate, and cover 31 per cent of all the incorporated or semi-incorporated land in the Departments. Units of this size, added to properties of from 100 to 500 hectares, comprise in the aggregate 14.6 million hectares, most of which are used for extensive stock farming. The value of the annual gross product per hectare thus utilized is only 49 pesos on the average throughout the entire country. The average carrying capacity of pastureland is 1.1 head per hectare, taking homogeneous units as the basis of comparison, as regards both animal stocks of all species, and natural and artificial, perennial and seasonal pastures.

Livestock density is only 0.52 head per hectare if total homogeneous units of livestock are related to the aggregate area used for stock farming. This is a very low rate of density, when it is remembered that 37 per cent of all pastureland is artificial, and confirms the extent to which stock farming in Colombia follows the extensive pattern.

On the other hand, the input of labour per hectare used for livestock is barely 7 working days per annum, so that a 400-hectare farm where no crops were grown would absorb 2,700 working-days per annum, which would mean permanent employment for only ten or twelve workers, in addition to the administrative work done by the owner or his manager. In other words, one worker would be expected to take care of the stock and pastureland occupying 35-40 hectares. This wretchedly low employment level is not counterbalanced by the use of machinery, and is an index of the extensive nature of stock-farming in Colombia. The low level of livestock density, and in consequence, of production, gives rise to a small production coefficient and an almost negligible labour-productivity of only 7 pesos per day's work, while in the crop sector the corresponding figure rises to 11.20 a day; and this despite the fact that the latter sector usually utilizes eroded and depleted soils, and has an exceptionally high rate of labour input, while stock farming, on the other hand, employs very little manpower and the land it utilizes includes the best in the country.

3. Productivity in agriculture

(a) General information

To complete the analysis of the different structural aspects of crop and stock farming in Colombia contained in the preceding pages, the productivity of the factors of production must be determined. The level of productivity, whether of labour, capital, or land, in the final issue, constitutes an index of the efficiency with which available resources are utilized, and reflects the degree of technical progress attained.

In this sense the state of Colombian agriculture must be rated as unsatisfactory, particularly as regards the deficiencies of the livestock sector. Thus labour productivity, measured either by the value added or by the gross product per active worker,⁶⁷ is far below the

⁶⁷ The meaning of the term "gross product" as used in the text is the value added or generated by farm production, and not that of farm production itself.

TABLE 148. COLOMBIA : DETERMINATION OF VALUE ADDED (GROSS PRODUCT) IN THE AGRICULTURAL SECTOR, 1953

<i>Millions of pesos at 1953 prices</i>	
Value of production at farm level	3,785.2
To be deducted : materials and services (A + B)	447.3
(A) <i>Materials</i>	282.2
1. From the same sector	181.8
Seed	72.4
Feeds	109.4
2. From other sectors	100.4
Seed	0.8
Fertilizers	18.5
Pesticides	10.1
Feeds	24.1
Salts, vaccines and medicaments for livestock	13.0
Fuels and lubricants	18.0
Packing materials and cordage	15.9
(B) <i>Service costs paid to other sectors</i>	165.1
Maintenance	76.0
Irrigation and drainage	13.6
Interest and commissions on credit	75.5
Value added (gross product)	3,337.9

SOURCE : ECLA.

average for the country, a fact which becomes more significant when it is taken into account that more than half the population is engaged in the activity in question. This in turn results in low income and consumption levels, and prevents the sector from exerting a dynamic influence on the development of non-agricultural activities.

Agricultural assets constitute approximately one-third of the country's investment, but they consist mainly of land and livestock, while the equipment, buildings, and installations whereby the productivity of soil and labour could be raised are relatively scarce. This, combined with the low technical standards, results in a very unsatisfactory ratio between the gross product and the unit of capital or land, particularly in the livestock sector.

(b) *Value added by agricultural production for the year 1953*

Agricultural activity in 1953 contributed 35 per cent of the value added registered for the whole of the Colombian economy, a figure which represented the culmination of a decline in relative importance that had been taking place over the previous thirty years. The conclusions to be drawn from the determination of the value added, as well as from other analytical data mentioned in the present chapter, reflect the levels of technique currently

prevailing in Colombian agriculture. It is a well-known fact that in all farming where technical standards are being or have been improved, the importance of the value added or gross product — remuneration of labour, owners' profits, indirect taxation, and depreciation of equipment — tends to diminish in relation to the overall value of production. This is due to a progressive increase in input, as a result of the growing use of materials and equipment destined to augment the productivity of both land and labour.

Surveys and calculations made have made it possible to establish the fact that in 1953 the value of agricultural production, estimated on the basis of prices paid to the producers, slightly exceeded 3,700 million pesos. The value of inputs was 447.3 million pesos, or 12 per cent of the value of production, the balance of 88 per cent representing the value added (see table 148).

These figures alone — approximate as they are — give some idea of the lack of technical progress in agriculture, for they indicate that the productive process is carried on without the benefit of the goods and services which modern techniques have placed at the disposal of the farmer. In other words, traditional methods of work still seem to predominate in Colombian agriculture.

A more detailed analysis of the different materials and services utilized, as, for example, the composition of the value added, helps to confirm this opinion. In fact, of the 447.3 million pesos' worth of general goods and services purchased, only 265.5 million were provided by non-agricultural sectors, while agriculture itself supplied materials to a value of rather more than 180 million pesos. Attention is drawn by the low expenditure on fertilizers, insecticides, feed concentrates, fuels and lubricants, as also by the insignificant amount spent on maintenance of capital. This demonstrates that modern methods of soil utilization and crop protection are seldom applied, and that there is a dearth of investment in mechanical equipment, storage facilities, housing, irrigation works, and other improvements.

TABLE 149. COLOMBIA : COMPOSITION OF THE VALUE ADDED IN THE AGRICULTURAL SECTOR, BY COST OF FACTORS, 1953

<i>Millions of pesos at 1953 prices</i>	
A. Income of factors of production in the sector	3,156.9
1. Remuneration of labour	2,033.5
2. Entrepreneurs' profits *	1,123.4
B. Depreciation for replacement	169.8
C. Indirect taxation	11.2
Value added	3,337.9

SOURCE : ECLA.

* The entrepreneurs' profits were calculated as follows :

Total gross production	3,785.2
Minus value of inputs, including remuneration of labour	2,661.8
Entrepreneurs' profits	1,123.4

The consequences of this state of affairs finally become evident if an analysis is made of the composition of the value added or gross product generated by agriculture with these characteristics (see table 149).

In fact, unsatisfactory technical levels and lack of equipment necessitate enormous inputs of labour, whose remuneration in 1953 represented 62 per cent of the value added, and nearly 54 per cent of the total value of production. On the other hand, the low yield of the rural worker, attributable among other factors to lack of mechanical equipment, makes farm labour the worst paid employment in Colombia and that from which the lowest *per capita* gross product accrues (see table 150).

Entrepreneurs' profits amounted to 29.7 per cent of the value of production, and depreciation to 4.5 per cent.

TABLE 150. COLOMBIA : DAY-WAGES PAID AND VALUE ADDED PER ACTIVE WORKER IN SECTORS INDICATED, 1953

	Agriculture	Industry	Total for country
Total payroll (Millions)	2,033.5	422.0	4,617.0
Value added (Gross product Millions)	3,337.9	1,551.3	9,037.7
Employed persons (Thousands)	2,214.6	263.0	4,118.0
Wages per active worker (Pesos)	918.2	1,604.6	1,121.2
Value added per active worker	1,507.2	5,898.4	2,194.7

SOURCE : ECLA.

TABLE 151. COLOMBIA : VALUE OF PRODUCTION AND INPUTS, VALUE ADDED AND ITS COMPOSITION IN AGRICULTURE IN THE UNITED STATES AND COLOMBIA FOR THE YEARS 1947 AND 1953, RESPECTIVELY

	Colombia			United States		
	Millions of pesos at 1953 prices	Percentage of production	Percentage of value added	Thousands of millions of dollars at 1947 prices	Percentage of production	Percentage of value added
Value of production	3,785.2	100.0		39.9	100.0	
Input of materials and services ..	447.3	12.0		21.4	53.6	
Value added (gross product) ...	3,337.9	88.0		18.5	46.4	
Composition of value added :						
Entrepreneurs' profits	1,123.4	29.7	33.7	13.8	34.6	74.6
Remuneration of labour	2,033.5	53.7	60.9	2.8	7.0	15.1
Depreciation	169.8	4.5	5.1	1.5	3.8	8.1
Taxation	11.2	0.3	0.3	0.4	1.0	2.2
TOTAL	3,337.9		100.0	18.5		100.0

SOURCE : ECLA.

A more complete picture is obtained by comparing the figures for Colombia with those for other countries where agriculture is more highly developed and more advanced techniques are applied. The United States was selected for this purpose, and the data presented in table 151 correspond to 1947.

The preceding figures clearly show the variations as between two agricultural sectors at different stages of development. In the United States, inputs corresponded to 53.6 per cent of the over-all value of production, as against the 12 per cent already given for Colombia. The greater output obtained in the former country — as a result of more widespread technical progress and increased mechanization — determined a substantial improvement in the efficiency and productivity of labour. The figures in the table relating to remuneration of labour and entrepreneurs' profits are not directly comparable between the two countries, since in the case of Colombia the labour referred to includes work done by small entrepreneurs personally, while in that of the United States, the item refers only to manpower other than the family itself. However, the fact that the value added represented a much lower percentage of the value of production

means that the input of labour was less and the level of productivity would therefore seem to be more satisfactory.

Another important aspect is the part played by various sectors in the formation of the gross product. Table 152 shows that it was the crop sector, which had at its disposal only 9.7 per cent (2.9 million hectares) of the utilized area, that supplied 64.5 per cent of the gross product. The relative importance of the coffee sector is shown by its participation in the latter, contributing as it did rather more than one-fourth of the total share of agriculture.

In contrast, stock farming, which utilized 90.3 per cent of the area (29.8 million hectares), accounted for only 35.5 per cent of the value added. If the ratio between crop and stock farming were to be expressed in terms of area, this would mean that one hectare under cultivation yielded a gross product equivalent to that of 17 hectares used for livestock. Such marked differences between the crop and livestock sectors reflect the extensive systems and the low technical levels prevalent in livestock activities in Colombia.

TABLE 152. COLOMBIA : VALUE OF PRODUCTION, VALUE OF INPUT, AND GROSS PRODUCT IN THE MAIN SECTORS

	Coffee	Other crops	Total for crop sector	Livestock	Total for agriculture
Area utilized (Thousands of hectares)	831.0	2,069	2,900	26,870	29,770
Value of production (Millions of pesos)	899.7	1,497.0	2,396.7	1,388.5	3,785.2
(a) Value of input (Millions of pesos)	56.4	187.0	243.4	203.9	447.3
(b) Gross product : value added (Millions of pesos)	843.4	1,310.0	2,153.3	1,184.6	3,337.9

SOURCE : ECLA.

It has already been shown that in 1953 crop and stock farming together generated 37 per cent of Colombia's gross product, and that in the immediately preceding years their relative importance had been declining. Although this trend might be expected to become progressively more marked as other activities expanded still further, there is also a need for the absolute levels of production to be raised considerably, with the twofold aim of improving diet and supplying industry with the raw materials it requires.

(c) *Active population*

The active agricultural population in 1953 was approximately 2,214,600 persons, and represented 53.8 per cent of the total active population. During the past 30 years the composition of Colombia's active population had been changing, and this had led to a reduction in the relative importance of the farming sector. In the course of 1953 this active population produced 478 million days' work, with a value of 2,137 million pesos, probably distributed as indicated in table 153.

As can be seen, the largest number of working-days was devoted to production, and only a small percentage (6.5) to various investment activities.

TABLE 153. COLOMBIA : DISTRIBUTION OF WORKING-DAYS IN THE AGRICULTURAL SECTOR

	Millions of working-days	Millions of pesos
<i>Production</i>		
Crops	208.1	786.0
Pasture and livestock management	178.9	734.7
Farm administration	26.4	396.0
Transport of products to market	15.3	45.9
Miscellaneous	18.2	70.9
Total production	446.9	2,033.5
<i>Investment</i>		
Renewal of pastures	10.0	30.0
Other investments : land reclamation, renewal and extension of plantations, etc.	21.0	73.5
Total investment	31.0	103.5
GRAND TOTAL	477.9	2,137.0

SOURCE : ECLA. See annex V, "Determination of input in the agricultural sector in 1953".

TABLE 154. COLOMBIA : ESTIMATE OF POTENTIAL LABOUR CAPACITY OF THE ACTIVE AGRICULTURAL POPULATION

	Active population (Thousands of persons)	Days worked per capita per annum		Potential capacity (Thousands of working days)	
		Maximum	Average	Maximum	Average
Professionals, managers, and office personnel	5	300	275	1,500	1,375
Transport workers, artisans, operatives, mechanics, etc.	36	280	250	10,080	9,000
Independent farmers and stock-breeders	945	300	275	283,500	259,875
Family help	606	250	200	151,500	121,200
Employees	19	290	250	5,510	4,750
Workers	573	280	220	160,440	126,060
Other types	31	290	220	8,990	6,820
Total agricultural personnel	2,215			621,520	529,080

SOURCE : ECLA, with the assistance of technical experts from the Ministry of Agriculture.

An estimate of the potential annual labour capacity which the current active agricultural population could muster suggests the conclusion that surplus manpower existed or that the labour force was inefficiently utilized. In fact, as may be seen from table 154, the potential days worked might be anything from a minimum of 529 million to a maximum of 621.5 million.

A comparison of the figures showing the potential labour capacity with those of the actual days worked leads to the conclusion that only 90.4 per cent of the average available potential was being utilized, and scarcely 76.9 per cent of the maximum potential capacity (see table 155) ; in other words, between 9.6 and 23.1 per cent — according to circumstances — of the potential labour force of the active agricultural population was idle. This means that a sector of the population, composed probably of wage-earners, share-croppers and owners of *minifundios*, was affected by a temporary unemployment much more severe than is reflected in the average of 216 days' work per employed person which results from a comparison of the active farm population with the effective input of labour measured in working-days. Table 155 establishes the degree of employment of the active agricultural population in relation, first, to the complete year of 365 days ; secondly,

to the average number of working days per active person in the light of the maximum estimated potential capacity of the labour force available ; and thirdly, to the average number of working days per active person according to the estimate of the mean potential capacity of the available labour force.

In all the cases noted a considerable waste of available labour capacity is to be seen. In relation to the whole year, 149 days were lost, or practically 40 per cent of the year.

This surplus of rural labour is among the obstacles to the improvement of the techniques used in Colombian agriculture, and one of the causes of its low productivity. The plentiful supply of unskilled or semi-skilled labour sets a low level of wages, which has a close connexion with the standard of living of the country population. In addition, low wages are a powerful deterrent to investment in improvements aimed at increasing production. In this connexion it may be well to mention that the relatively high technical level which can be observed in rice — and cotton-planting in large areas recently reclaimed — in the department of Tolima, for instance — may be explained, *inter alia*, by the evident dearth of labour, which could not be counteracted because of the virtual immobility of the country population.

TABLE 155. COLOMBIA : DEGREE OF EMPLOYMENT OF THE ACTIVE AGRICULTURAL POPULATION

	In relation to whole year (365 days)		In relation to the average maximum potential capacity		In relation to the average mean potential capacity	
	Number	Percentage	Number	Percentage	Number	Percentage
Days worked	216	59.2	216	76.9	216	90.4
Days not worked	149	40.8	65	23.7	23	9.6
TOTAL	365	100.0	281	100.0	239	100.0

SOURCE : ECLA.

(d) Productivity of labour

One of the most striking, and so far little investigated, characteristics of Colombian agriculture is the low yield of labour. In relation to the country's other productive activities, the agricultural sector is the one where productivity is lowest, whether measured in terms of the gross product or through the value added per active person (see table 156).

On account of the relative position of the agricultural labour force, which represents 53.8 per cent of the country's active population and attains barely 48 per cent of the productivity registered in other sectors of the economy, its unsatisfactory level of productivity is the factor which determines the low average for the country as a whole.

Within the agricultural sector itself, notable variations in productivity occur as between crop and stock farming. The gross product per active person in the case of the former is 1,859 pesos, while in stock farming it reaches only 1,021 pesos. The incidence of this latter activity

— absorbing as it does 47.7 per cent of the entire farm population — helps to bring down the average productivity per unit of labour (see table 157).

TABLE 156. COLOMBIA : LABOUR PRODUCTIVITY IN VARIOUS SECTORS, MEASURED IN TERMS OF VALUE ADDED PER ACTIVE PERSON

	Value added per active person (Pesos at 1953 prices)	Active population (Thousands of inhabitants)
Average productivity of the economy as a whole	2,195	4,118.0
Productivity in the agricultural sector ...	1,507	2,214.6
Productivity in other sectors *	2,995	1,903.0
Productivity in the manufacturing sector	5,898	263.0

SOURCE : ECLA.

* Including manufacturing industry.

TABLE 157. COLOMBIA : PRODUCTIVITY OF ACTIVE POPULATION IN TERMS OF VALUE ADDED AND REMUNERATION OF LABOUR IN VARIOUS AGRICULTURAL ACTIVITIES

	Coffee	Other crops	Total for crops	Livestock	Total for agriculture
Active population (Thousands of persons)	335.9	822.3	1,158.2	1,056.4	2,214.6
Productivity per active person (Pesos)	2,511	1,593	1,859	1,121	1,507
Productivity per day worked (Pesos)	11.64	7.37	8.61	5.2	6.98
Value of production per man/day worked (Pesos)	12.42	9.42	9.58	6.1	7.92

SOURCE : ECLA.

Within the crop sector itself there are substantial differences, since coffee provides a gross product per active person considerably higher than that obtained from agriculture as a whole, and from other crops, besides being 2.5 times that of stock farming. It is not improbable that the production of bananas for export and the cultivation of cane for the sugar industry register productivity levels which equal or exceed those of coffee. Nevertheless, not even the highest figure for labour productivity in coffee-growing rises above the average for non-agricultural activities.

To supplement the preceding over-all data, the differing

inputs of labour per hectare farmed in Colombia were established for the principal crops, and the productivity expressed in terms of production per working-hour. These results appear in table 158, where they are compared with similar statistics for the United States.

Comparison of these figures reveals very wide disparities, due partly to unequal yields; however, most of the difference stems from the heavier input of labour per hectare in Colombia. In the case of maize, for example, the labour input is sixteen times greater if the comparison is made in terms of unit of area, and thirty-six times if measured by unit of product harvested.

TABLE 158. COLOMBIA : INPUT OF LABOUR PER HECTARE AND PER QUINTAL (100 KILOGRAMMES) FOR SELECTED CROPS IN COLOMBIA AND THE UNITED STATES ^a

Crop	Man/hours per hectare		Yield in quintals per hectare		Man/hours per quintal	
	Colombia	United States	Colombia	United States	Colombia	United States
Rice	649	36.3	19.2	27.0	34	1.3
Sesame	389	—	5.9	—	66	—
Cotton	548	—	—	—	—	—
Coffee	653	—	4.6	—	142	—
Cacao	431	—	4.7	—	92	—
Barley	324	14.3	13.2	14.7	26	1.0
Beans	701	47.2	5.9	13.8	119	3.4
Maize	520	32.0	11.0	22.0	47	1.3
Potatoes	860	166.9	53.0	166.8	16	1.0
Tobacco	3,177	1,154.0	11.4	14.3	279	81.0
Wheat	342	10.9	9.7	11.5	35	1.0
Yucca	837	—	114.5	—	7	—
Panela	945 ^b	—	54.5	—	17 (26) ^c	—
Sugar	540 ^d	—	64.5	—	8 (10) ^e	—
Bananas	387	—	100.0	—	4	—
Plantains	315	—	79.2	—	4	—

SOURCE : For Colombia : yields supplied by Ministry of Agriculture. Other data prepared by ECLA. For the United States : United States Department of Agriculture, Agriculture Research Service : " Labor used for Field Crops ", *Statistical Bulletin* No. 144 (Washington, D.C., June 1954).

^a For Colombia, 1953. For the United States, average 1950-53.

^b Including labour used in cultivating, cutting and loading cane.

^c Including item *b*, and in addition, the labour employed in hauling the cane and manufacturing the sugar.

^d Including only cultivation, cutting and loading cane.

^e Including item *d*, and in addition, labour involved in hauling the cane and manufacturing the *panela*.

TABLE 159. CHILE, ECUADOR AND COLOMBIA : LABOUR INPUT IN MAN/HOURS PER HECTARE AND PER 100 KILOGRAMMES FOR SELECTED CROPS

Crop	Man/hours per hectare			Man/hours per 100 kilogrammes		
	Chile	Ecuador	Colombia	Chile	Ecuador	Colombia
Wheat	202	—	342	17	—	35
Barley	196	—	324	12	—	26
Rice (Traditional method)	474 ^a	1,041	649 ^a	14	55	34 ^a
Rice (By modern techniques)	—	309	—	—	12	—
Maize	427	—	520	30	—	47
Beans	432	—	701	47	—	119
Potatoes	592	—	860	6	—	16
Cacao	—	320	431	—	152	92
Bananas (Traditional method)	—	413	387 ^a	—	2	4 ^a
Bananas (By modern techniques) ...	—	258	—	—	1	—
Cane for sugar (Traditional method) ^b	—	1,593	540 ^a	—	45	8 ^a
Cane for sugar (By modern techniques) ^b	—	327	—	—	6	—
Cane for <i>panela</i> (Traditional method) ^b	—	1,856	945 ^a	—	195	17 ^a
Cane for <i>panela</i> (By modern techniques) ^b	—	976	—	—	43	—

SOURCE : Chile : ECLA, *Preliminary survey of the technique of economic development* (E/CN.12/295, March 1953). Colombia : Ministry of Agriculture, and ECLA estimates.

^a Average for the country.

^b Excluding labour employed in cultivation, cutting and hauling the cane.

For potatoes, labour input in Colombia is five times higher per unit of area, and 16 times per 100 kilogrammes. In tobacco, it is only 2.8 times greater per unit of area, and 3.4 times per unit of product obtained. This latter is the only crop in which the difference in productivity between Colombia and the United States is not abnormally large. In all others, it is evident that Colombia has a long road to travel before the gap can be narrowed which separates the productivity of its agricultural labour from that of a highly technified agriculture such as exists in the United States.

Comparison with Chile in the case of similar crops — in every instance — reveals differences in labour productivity unfavourable to Colombia, whether the unit of comparison is the labour input per metric quintal harvested, or per unit of area. In Chile, for example, the cultivation of a hectare of rice takes 474 hours, and the harvesting of each quintal 14 hours; while in Colombia 649 hours per hectare and 34 hours per quintal harvested are required. In potato-growing the labour inputs in Chile and Colombia are 592 and 860 hours per hectare respectively, and 6 and 16 hours per metric quintal picked. In maize the disparity is slightly less, but in the cultivation of beans Colombia employs practically twice as much labour per hectare as is needed in Chile, and 12.5 times more per quintal of product (see table 159).

If a comparison is made with Ecuador, these differences practically disappear, and there are some crops — cacao, sugar-cane for *panela* — in which Colombia shows a higher productivity. In the statistics for Ecuador can be seen the great difference in productivity resulting from the application of modern techniques instead of traditional methods. It may now be asked whether

similar situations arise in Colombia, which might serve as examples of what, and how much, can be done to improve the productivity of agricultural labour. The cases cited in table 160 show that enough instances exist in the country to indicate the path that should be followed.

TABLE 160. COLOMBIA : LABOUR INPUT IN SELECTED CROPS

Crop and locality	Man/hours per hectare	Yield per hectare (Quintals)	Man/hours per quintal
<i>Rice</i>			
Lórica-Córdoba : traditional method	1,062	9.6	111
El Carmen-Bolívar : traditional method	819	6.4	128
Average for the country	649	19.2	34
Ibagué-Tolima : semi-mechanized irrigation system	477	32.0	15
Saldaña-Tolima : semi-mechanized irrigation system	391	34.4	6
<i>Potatoes</i>			
Average for the country	860	53.0	16
Bogotá-Sabana : mechanized system	531	98.0	5
Medellín : mechanized system ...	693	120.0	5
<i>Wheat</i>			
Average for the country	342	9.7	35
Bogotá : semi-mechanized system	135	14.0	10

SOURCE : *Caja de Crédito Agrario*, Ministry of Agriculture, and data collected by ECLA.

The decrease in the use of labour per hectare in rice-growing at Ibagué and Saldaña in Tolima is due chiefly to the use of machinery for most of the cultivation, and the application of weed-killers. Although permanent irrigation helped to keep down the weeds, it absorbed more labour in the levelling and rolling of the land, and in the work of irrigation itself. The higher yield per hectare is the result of a combination of factors, *viz.*, well-prepared land, the use of irrigation, improved seed, timely weed control, and quick mechanized harvesting. The reduction in man/hours per hectare and the better unit yield give a high degree of labour productivity when this is measured in man/hours per metric quintal of grain harvested. At Saldaña, for example, the level of productivity is 18 times higher than at Lórica in Córdoba, and more than six times the average for the whole country.

As far as potato-growing is concerned, in the examples presented, relating to Bogotá and Medellín, mechanization of the work of preparing the soil as well as of some of the operations involved in care of the crop resulted in an appreciable reduction of the labour employed per hectare. In each case the increase in the unit yield was due fundamentally to the use of mineral and organic fertilizers, efficient pest control and proper preparation of the soil. The final outcome was an increment in labour productivity per metric quintal harvested, three times larger than the average for the country.

Mechanization, the use of improved seed, and the application of fertilizers in wheat-growing have also brought about a considerable improvement in labour productivity, whether measured per hectare or per unit of product harvested.

The poor standards of productivity in crop and stock farming result in low *per capita* income levels, which in turn greatly limit the rural sector's consumption of and demand for goods and services from the rest of the economy.

The following factors account for the low productivity of agricultural labour in Colombia: (a) the unrelieved predominance of the *minifundio* or farm of uneconomic size, whose soil is worked to exhaustion point in order to produce vegetable foodstuffs and coffee for export, as well as, on the other hand, the over-extensive nature of stock-breeding, which is generally carried on in large or medium-sized farms; (b) the smallness of the stock of capital, which implies backward farming techniques and results in (i) low unit yields, owing to the limited spread of technology, the chief obstacles being the prevalence of small-scale crop farming and the traditional methods still predominating in stock-breeding; and (ii) lack of mechanization.

The size of existing farm units is a problem of which the study falls outside the scope of the present work. It may, however, be asked if *minifundios* can be prevented from multiplying in those areas which have already been partitioned, or at least from being introduced in areas where they do not yet exist, whether these are constituted by privately-owned land or by virgin land intended for settlement.

The problem of low technological standards is closely allied to that of possible increases in agricultural investment, and to the establishment of research and extension services, so as to make available to farmers not only the benefits directly accruing from such research, but a series of elementary measures known to technicians, which would permit a more rational use of the soil.

(e) *Capital in agriculture*

One aspect intimately related to the composition of the gross product and the unsatisfactory productivity of labour is the amount of capital invested in the agricultural sector. Many negative aspects of Colombian agriculture can be largely explained by the low level and composition of agricultural assets, in absolute terms as well as per active worker.

The determination of agricultural assets for the year 1953, of which the calculations and methodology are explained in Annex IV of the present study, includes fixed and working capital. The former covers investment in sites for purposes of weeding, irrigation and clearing of forested land, and for various building activities, as well as plantations, artificial pasturage, livestock, machinery and equipment; the latter relates to an estimate of the capital used during 1953 to finance operating expenses.

The calculation referred to leads to the conclusion that in the year in question agricultural assets — including livestock — represented 36 per cent of the country's entire stock of capital, which again emphasizes the relative importance of this sector in the Colombian economy. The composition of these assets affords data which might help to explain the existence of backward production techniques (see table 161). In fact, investment in livestock and in soil improvement (irrigation projects, weeding and clearing) would seem to have amounted to about 61.5 per cent of the whole stock of capital, while investment in buildings, installations, and fencing constituted only 15.1 per cent, and in equipment and machinery barely 1.7 per cent.

So pronounced a disequilibrium, especially as regards investment in working equipment, hampers the widespread application of modern farming methods which would help to improve the productivity of labour.

The distribution of assets between the crop and livestock sectors shows that the former absorbed 67.9 per cent — chiefly in the form of land and livestock (79.7 per cent) — while only a very small percentage was invested in improvements and buildings so as to rationalize and intensify their utilization, whether through the obtaining of better-quality fodder or its storage for use in times of scarcity, etc.

In contrast, crop farming, which provided 63.3 per cent of over-all agricultural production, carried only 32.1 per cent of total farm assets. In this sector, too, investment in machinery and equipment was strikingly low, amounting to only 4.9 per cent of the total. The percentage of capital invested in buildings was higher (36.4 per cent), owing chiefly to installations in the coffee

TABLE 161. COLOMBIA : DISTRIBUTION OF STOCK OF CAPITAL AMONG THE MAIN AGRICULTURAL ACTIVITIES

(Millions of pesos)

	Coffee	Other crops	Total for crops	Stock farming	Total for agriculture
Total capital invested (Fixed and working)	1,300	1,798	3,098	6,546	9,644
(A) Working capital	208	464	672	736	1,408
(B) Fixed capital *	1,092	1,334	2,426	5,810	8,236
Soil improvements	166	545	711	1,631	2,342
Plantations and artificial pasturage	312	123	435	252	687
Buildings, installations and fences	609	519	1,128	330	1,458
Livestock	—	—	—	3,585	3,585
Machinery and equipment	5	147	152	12	164

SOURCE : ECLA.

* After depreciation and at replacement cost.

sector. Plantation improvements occupied a position of some importance (14.0 per cent of the total), 317 million pesos out of 435 million being invested in coffee. Of the working capital, which represented nearly 22 per cent, a major proportion (81 per cent) was used for the remuneration of labour, and only a small percentage presumably went towards acquiring fertilizers (2 per cent), pesticides (0.7 per cent) and fuels and lubricants (1.5 per cent).

Within the agricultural sector proper, it was in coffee that the heaviest investment was registered, for although this activity occupied only about 29 per cent of the total cultivated area, it possessed 4.2 per cent of all agricultural assets. This high percentage was attributable to the capital invested in plantations and installations.

Once the extent and composition of agricultural assets have been ascertained, importance attaches — on account of their incidence on labour productivity — to the establishment of availabilities per active person and the relationship with other activities.

In 1953 the stock of capital per active person — including livestock — was 4,355 pesos, or about 45 per cent less than the average for the country as a whole.

The more highly capitalized was the livestock sector, with 6,197 pesos per active person as against 2,675 pesos in the crop sector (see table 162). If livestock is excluded, investment per active person falls on an average to only 2,100 pesos, and in this case too it is stock-farming — with 2,106 pesos — that just exceeds the over-all average for agriculture, and that of the crop sector in particular. Within the latter, coffee had the most capital invested per active person, since the average of 3,251 pesos was double that corresponding to the other crops.

The livestock sector, which had the most capital invested in soil improvements, also had the lowest amount in buildings, installations, fencing, machinery and equipment, a kind of investment which would ensure more efficient utilization of the land.

The productivity of labour was particularly affected by the low rate of investment per active person in machinery and equipment. In fact, out of an average investment in both crop and stock farming of 4,355 pesos per active person, only 74.1 pesos (or 1.7 per cent) represented investment in machinery. The crop sector was more highly capitalized in this respect, for in absolute terms

TABLE 162. COLOMBIA : COMPOSITION OF STOCK OF CAPITAL IN AGRICULTURE AS A WHOLE AND IN SELECTED ACTIVITIES, 1953

	Coffee	Other crops	Total for crops	Stock farming	Total for agriculture
Active population (Thousands)	335.9	822.3	1,158.2	1,056.4	2,214.6
Total stock of capital per active person (Pesos)	3,870.2	2,186.5	2,674.8	6,196.5	4,354.7
Fixed capital, excluding livestock, per active person	3,251.0	1,622.3	2,094.6	2,106.2	2,100.2
Capital in buildings, installations and fences per active person (Pesos)	1,813.0	631.2	973.9	312.4	658.4
Capital in machinery and equipment per active person (Pesos)	14.9	178.8	131.2	11.4	74.1
Capital in soil improvements per active person (Pesos)	494.2	662.8	613.9	1,543.9	1,057.5

SOURCE : ECLA.

TABLE 163. COLOMBIA : VALUE ADDED (GROSS PRODUCT) PER UNIT OF CAPITAL
IN CROP AND STOCK FARMING, 1953

	Coffee	Other crops	Total for crops	Stock farming	Total for agriculture
Value added (Millions of pesos) . .	843.3	1,310.0	2,153.3	1,184.6	3,337.9
Invested capital (Millions of pesos) *	1,092.0	1,334.0	2,426.0	5,810.0	8,236.0
Product-capital ratio	0.772	0.982	0.888	0.204	0.405

SOURCE : ECLA.

* Fixed capital, including livestock.

it had available 12 times more capital per active person than the livestock sector. In the latter, such investment was equivalent to almost 2 per mil. In the coffee sector it was equally small, and although it would admittedly be impossible to mechanize all operations in the present state of technological progress, there are undeniably many ways in which more capital in the shape of machinery and equipment could be incorporated. The group classified as "Other crops" enjoyed the largest share in both absolute and relative terms, with 8.2 per cent of the total *per capita* investment in machinery, 12 times more than in the coffee sector. It is precisely to this sector — which in 1953 cultivated nearly 2.1 million hectares and employed 822,300 people — that priority should be given in future efforts to intensify investment in machinery.

All these data point to the need for improving current techniques through additional investment in agriculture. And this process should also include a change in the composition of agricultural assets, greater relative importance being accorded to purchases of equipment and machinery, as well as to buildings, installations, fences and working capital.

(f) *Value added per unit of capital*

Now that the capital availabilities per active person in the various sectors have been analysed and a study made of their incidence on the productivity of labour, it is equally important to establish the value added per unit of capital, since this is a measure of the efficiency with which capital resources have been utilized, which in turn reflects the degree of technical progress attained.

In 1953 the product capital ratio in the over-all agricultural sector was 0.40 in comparison with 0.35 as the average for the country. Hence agriculture's situation in this respect would seem to be better than that of the country as a whole. Industry, in contrast, had a ratio of 0.51.

From table 163, which shows the product capital ratio in different sectors, it can be seen that it was the relatively high figure for the crop sector which caused the over-all average to exceed that registered for the country as a whole. In fact, the ratio for the crop sector was 0.89, while for livestock it was only 0.20.

The low ratio in the livestock sector is most significant, and indicates under-utilization of the capital resources

available. It is in this sector that extensive farming methods are still widely prevalent, resulting in an unsatisfactory degree of utilization of social capital and — as was seen earlier — a low value added per unit of land and the lowest productivity per active person.

In crop farming, the ratio is much more favourable, and more so still if coffee is excluded; in fact, the ratio in the coffee sector is 0.77, as against 0.98 in other crops and 0.89 for the sector as a whole.

(g) *Degree of land utilization measured in terms of gross product*

The time has now come to analyse the degree to which the land is utilized in terms of value added per unit of area. If a specific analysis is made of some of the principal sectors, the ratio referred to will serve in turn as an index of the technical level prevailing in each. From the data given in table 164, it can be deduced that in 1953 the value added per hectare utilized was only 112 pesos.

The relationship between the livestock and crop sectors is equally significant, and again clearly shows the effect of the present level of stock farming on the over-all agricultural economy. The value added per hectare in the livestock sector was 44.10 pesos as compared to an average of 742.5 pesos in agriculture proper, and 1,014 pesos in the coffee sector.

(h) *Distribution of income*

The different aspects analysed — such as the various ratios established, which are to a large extent indicative of the low technical standards prevailing in Colombian crop and stock farming — are reflected, in the last analysis, in disparities between the net *per capita* income of the rural sector and that of the rest of the economy and the average for the country. *Per capita* net income for 1953 seems to have been only 497 pesos per annum in rural areas, as compared with 669 pesos for the country as a whole (see table 165).

The active rural population in 1953 was 2,215,000, and according to the structure of farming units may be grouped as under :

Workers and small-scale farmers	2,065,000
Large-scale entrepreneurs	150,000
Total active population	2,215,000

TABLE 164. COLOMBIA : AREA CULTIVATED, VALUE ADDED PER HECTARE, TOTAL AND BY SECTORS, 1953

	Coffee	Other crops	Total for crops	Stock farming	Total for agriculture
Area cultivated ^a	831	2,069	2,900	26,870	29,770
Value added ^b	843.3	1,310.0	2,153.3	1,184.6	3,337.9
Value added per hectare ^c	1,014.8	633.2	742.5	44.1	112.1
Total capital (including working capital) ^b	1,300	1,798	3,098	6,546	9,644
Fixed capital ^b	1,092	1,334	2,426	5,810	8,236
Fixed capital excluding livestock ^b	1,092	1,334	2,426	2,225	4,651
Total capital per hectare ^c	1,564	869	1,068	244	324
Fixed capital per hectare ^c	1,314	645	837	216	277
Fixed capital per hectare excluding livestock ^c	1,314	645	837	83	156

SOURCE : ECLA.

- ^a Thousands of hectares.
- ^b Millions of pesos.
- ^c Pesos.

TABLE 165. COLOMBIA : ESTIMATE OF THE DISTRIBUTION OF NET INCOME AMONG THE RURAL POPULATION BY WORKERS, SMALL-SCALE FARMERS AND LARGE-SCALE ENTREPRENEURS

	Population (Thousands of inhabitants)	Net income ^a (Millions of pesos)	Per capita net income (Pesos)
Rural population	6,240	31,102	497
Workers and small-scale farmers	5,816	2,192	377
Large-scale entrepreneurs	424	910	2,146

SOURCE : ECLA.

- ^a Excluding depreciation and indirect taxes.

The total rural population—including families and dependants—comprised 6,240,000 inhabitants, who shared the 3,120 million pesos of the net product generated by crop and stock farming. When existing differences in the size of rural enterprises—which in turn cause considerable disparities in the distribution of net income—are taken into account, it is worth while to attempt to estimate the distribution of income within the two principal groups of the rural population referred to, that is, workers and small-scale farmers on the one hand, and, on the other, large-scale entrepreneurs. The income of the first group would seem to cover all wages and salaries paid, plus a certain percentage of the profits due to entrepreneurs working small-holdings. For this purpose profits are assumed to have been distributed on a *pro rata* basis between the small- and large-scale entrepreneurs in proportion to the area which each group occupies. Such a criterion might well be rejected on the grounds that, broadly speaking, it is the big enterprises which own most of the grazing land producing the least income; but this fact would be offset by the higher technical standards prevailing on these farms. The results of these calculations appear in table 165, and reveal substantial differences between the two groups. In the case of workers and small-scale entrepreneurs, in-

come is far lower than the average already shown for the rural population, and furthermore would seem to be 44 per cent lower than that registered for the country as a whole.

(i) *Per capita consumption in rural families* ⁶⁸

Low income levels of necessity determine low levels of consumption among rural families. On the basis of a partial survey of income and expenditure in this sector—made by the Rural Social Security Department (*Departamento Técnico de la Seguridad Social Campesina*) of the Colombian Ministry of Labour—the consumption figure in question was only 337 pesos *per capita* in 1953, while it stood at 790 pesos for the urban sectors and 530 for the country as a whole. In other words, the consumption of these rural families was 57 and 26 per cent below urban consumption and that of the country as a whole, respectively.

TABLE 166. COLOMBIA : COMPOSITION OF CONSUMPTION IN RURAL FAMILIES, 1953

	Per cent
Foodstuffs	63
Manufactured goods other than foodstuffs	24
Services	13
TOTAL	100

SOURCE : ECLA, on the basis of a partial survey of income and expenditure of rural families carried out by the Ministry of Labour (*Departamento Técnico de la Seguridad Social Campesina*).

On the other hand, the composition of consumption reveals that foodstuffs accounted for most of the expenditure of the rural household, services absorbing a very small percentage owing to the lack of water, electricity, transport, etc., in rural areas. Manufactured goods other than foodstuffs also took up a very low percentage of the family budget (see table 166).

⁶⁸ Excluding consumption of public goods and services.

B. ALTERNATIVE PROJECTIONS OF AGRICULTURAL AND LIVESTOCK DEVELOPMENT

I. GENERAL DATA ON WHICH HYPOTHESES ARE BASED

In the preceding sections of this chapter an analysis was made of availabilities of foodstuffs and agricultural raw materials for industry; and the conclusion was reached that there is a deficit of foodstuffs, even though only a small proportion of requirements is satisfied with imports, while a very large share of the non-alimentary raw materials utilized by Colombia's industry comes from abroad. It was also seen that exports of a single commodity — coffee — constitute the main source of foreign exchange, which implies that any fluctuation in the prices and quantum of exports decisively affects the whole economy of the country.

The study of past trends in the development of agricultural production for domestic consumption revealed that its growth was not quite as satisfactory as might have been expected in view of the country's vast natural resources. These, if duly mobilized, might permit not only an improvement in food supplies but also the substitution of domestic production for a large proportion of the foodstuffs at present imported; an exportable surplus might even be left, which would help to reduce the relative importance of coffee in Colombia's foreign trade.

The purpose of the present chapter is to present some hypotheses on the way in which agricultural production would have to develop in the future for the average diet of the Colombian people to be improved, domestic production to be substituted for imports and exports to be diversified in such a way as to reach a stage of agricultural development compatible with a given rate of growth of real *per capita* income for the economy as a whole.

An assumption as to the needful future structure and volume of agricultural production would provide guidelines for the Government's agrarian policy, as regards both investment and other measures which condition and stimulate the agricultural production process, such as those relating to credit, research and extension, prices and marketing, transport and storage, taxation, etc. The determination of production targets in line with a given hypothesis entails appraisal of the role to be played in future production increases by an extension of the cultivated area, in so far as such increases cannot be achieved solely through improved yields originating in the widespread use of better farming techniques. The areas to be reclaimed once defined, the proportion to be rendered cultivable by any or all of the possible means — irrigation, drainage, flood control and clearing — must then be discussed and assessed. Which crops are to be expanded, and which systems of reclamation are most consistent with the country's resources and will provide the best return on investment, are further apposite questions. Both the expansion of the agricultural area and the improvement of farming techniques will provide a basis for a partial forecast of mechanization requirements. This will affect the import, industry and energy sectors, among others, and will enable an approximate

estimate to be made of future labour requirements in the agricultural sector.

The value of the hypotheses herein formulated, with their several alternatives, lies essentially in their methodological nature. Not only are the statistical instruments necessary for this kind of analysis indicated, but also the criteria that should be borne in mind in choosing between the various alternatives which often arise during the course of the work. It should be added that the unreliability of many of the statistics used, the absence of others and the lack of basic studies on aspects which have had to be analysed in the light of assumptions and estimates, do not detract from the value of the general conclusions. In spite of these shortcomings, it is possible to obtain a clear view of the magnitude of the problems which must be solved if the country's agricultural production is to attain a rate of growth consonant with the hypotheses for the over-all development of the Colombian economy.

These hypotheses were fully discussed in the opening chapters of the present study, and finally reduced to one postulating relatively rapid growth (hypothesis *A*) and another assuming a moderate growth rate (hypothesis *B*). Both will be taken as a general background of reference for the analysis contained in the following sections.

It should also be recalled that elsewhere in the present study an analysis is made of the prospects for an expansion of exports, expressed in terms of a maximum and a minimum hypothesis, for which purpose various opinions on foreign market possibilities for Colombian products are taken into account. Since these postulates bear no relation to the projected rate of development of national income, the maximum agricultural exports assumption was adopted for both hypotheses as to the growth of this sector, on the following grounds: (1) the two hypotheses on the growth of the capacity to import postulate future levels which may be considered inadequate in comparison with the requirements determined by demographic and income growth, and this suggests that the country would have to make the greatest possible effort to take advantage of its exportable resources; (2) the effort required to produce the volume assumed on the maximum exports hypothesis is only slightly greater than that required for the hypothesis of minimum exports. Moreover, the production of certain commodities such as coffee, which is dependent upon perennial plantations already established or well on the way to formation, has prospects of exceeding even the maximum export and maximum domestic consumption levels. The export volumes projected for other products — bananas, tobacco, rice, maize and cotton fibre — although important for the future of Colombia's economy, constitute but a tiny marginal fraction of world trade in the commodities in question.

The inadequacy of the capacity to import has also led to the formulation of assumptions as to the substitution of domestic production for agricultural imports in so far as available data show this to be feasible. It is possible that research bringing new data to light may show that the country possesses resources whereby it could produce in the near future all goods for which a partial substitution has been postulated, or freeze imports at their 1953 level.

II. PROJECTIONS OF DEMAND FOR AGRICULTURAL COMMODITIES

1. Background data

The projections of demand for agricultural products in 1960 and 1965 are based on the two over-all hypotheses for the rate of growth of aggregate *per capita* consumption discussed in the opening chapters, and on the coefficients of income-elasticity of demand established for each commodity.

As has already been noted elsewhere in this study, the coefficients of income-elasticity were derived from two different sources. The first of these was the fluctuation of consumption of direct agricultural foodstuffs in periods which — according to the data available for each commodity — ranged in length from 28 years (1925-53) to 5 years (1948-53). In most cases a long-term coefficient and a coefficient for more recent years were calculated. The second source was constituted by the findings of the survey of income and expenditure of 1,500 urban families made in 1953, and some similar surveys in the rural environment carried out in 1954. The final selection of the elasticity coefficients was based firstly on certain assumptions as to future changes in the composition of the population as a result of increasing urbanization in Colombia, a process which will naturally cause some modification of dietary habits; and secondly, on the desirability of attaining adequate nutritional targets. Beef provides a case in point, in that its income-elasticity coefficients were found to stand at 0.6 per cent according to urban surveys, at 0.34 per cent for the long term and at less than 0.25 per cent over the short term (1948-53). For the reasons stated above, 0.6 was chosen as a working coefficient, since it was considered that the coefficient characteristic of the short term was the result of transient supply shortages rather than of a real contraction of demand. The latter has always been active, as is demonstrated by the coefficient obtained through the surveys. A similar procedure was applied to the coefficients of most of the remaining livestock commodities.

The basis for projecting the demand for processed foodstuffs in 1960-65 was the rate of growth of the industries concerned as determined in the analysis of the industrial sector.⁶⁹ The selected coefficients of income-elasticity of demand and the growth percentages of the food industries are given in table 167.

This table shows that vegetable foodstuffs for direct consumption, which registered low and sometimes negative coefficients, were all essentially calorie-producing foods, while protein foods had higher coefficients. The latter group includes foods of animal origin, the coefficients for which stand very close to or above unity, with the exception of mutton and goat-flesh, which contribute but little to the Colombian diet. A high income-elasticity of demand is also apparent for processed foodstuffs, with the exception of coffee and rice.

The same table presents average coefficients, estimated at 0.5 for direct foodstuffs and at 0.9 for processed food-

TABLE 167. COLOMBIA: COEFFICIENTS OF THE INCOME-ELASTICITY ON DEMAND FOR COMMODITIES FOR DIRECT CONSUMPTION AND PROCESSED FOODSTUFFS, AND RATE OF GROWTH OF DEMAND FOR PROCESSED PRODUCTS

Product	1953		1960	
	Direct consumption	Consumption of processed foodstuffs	Hypothesis A Direct consumption	Hypothesis B Direct consumption
A. Coefficients				
Wheat	0.0	—	0.0	0.0
Flour, bread, etc.	—	0.8		
Maize	0.1	—	0.09	0.11
Barley	0.0	—	0	0
Beer	—	1.6		
Potatoes	0.5	—	0.46	0.54
Yucca	0.0	—	0.0	0.0
Other tubers	-0.1	—	-0.09	-0.11
Plantains	0.1	—	0.0	0.0
Bananas	0.3	—	0.27	0.32
Other fruit	0.2	—	0.18	0.21
Sugar	—	1.0		
Panela	-0.2	—	-0.18	-0.21
Molasses	-0.2	—	-0.18	-0.21
Spirits	—	1.6		
Garlic and onions	0.4	—	0.36	0.43
Tomatoes	0.5	—	0.46	0.54
Other vegetables	0.6	—	0.55	0.64
Beans	0.3	—	0.27	0.32
Other pulses	0.5	—	0.46	0.54
Coconut	0.0	—	0.0	0.0
Beef	0.6	—	0.55	0.64
Pork	0.9	—	0.82	0.96
Mutton	0.0	—	0.0	0.0
Goat-flesh	0.0	—	0.0	0.0
Poultry	1.0	—	0.91	1.07
Offal	0.6	—	0.55	0.64
Eggs	1.3	—	1.18	1.39
Fresh milk	1.0	—	0.91	1.07
Cheese	1.0	—	0.91	1.07
Butter	1.0	—	0.91	1.07
Lard	0.8	—	0.73	0.86
Fish	0.6	—	0.55	0.64
Cacao	—	0.8	—	—
Coffee	—	0.35		
Rice	—	0.3		
Vegetable fats and oils	—	1.5		
Average coefficient	0.5	0.9	0.5	
B. Percentage increase				
	<i>Between 1960 and 1965</i>			
	<i>Hypothesis</i>			
	A	B		
Flour, bread, etc.	29.5	26.1		
Beer	50.6	40.9		
Spirits	56.8	44.7		
Cacao	29.0	25.3		
Coffee	17.6	17.2		
Rice	16.8	16.2		
Vegetable oils and fats	47.2	38.4		

⁶⁹ See Part Two, chapter III.

stuffs. It is thus assumed that demand for these commodities will tend to increase proportionately less than total consumption of goods and services. Expenditure on foodstuffs for direct consumption, which absorbed 36 per cent of total consumer outlays in 1953, would drop to 32 per cent in 1960 according to hypothesis A and to 34 per cent on hypothesis B ; and to 29 and 31 per cent, respectively, in 1965. The share in total expen-

diture corresponding to processed foodstuffs would fall from 14.3 per cent in 1953 to 13.9 per cent in 1960 and 13.7 per cent in 1965, on hypothesis A, and to 14.1 and 13.9 per cent respectively in the case of hypothesis B. According to the projection of total expenditure on goods and services, annual *per capita* expenditure on direct and processed foodstuffs will increase, in relation to the base year (1953), on the lines shown in table 168.

TABLE 168. COLOMBIA : PROJECTION OF ANNUAL *per capita* EXPENDITURE ON FOODSTUFFS

Foodstuffs	1953		1960		1965	
	Pesos	Percentage of total	Pesos	Percentage of total	Pesos	Percentage of total
<i>Hypothesis A</i>						
For direct consumption	214.0	75.9	245.0	74.2	270.0	72.8
Percentage increase over 1953 ..	—	—	14.5		26.2	
Processed consumer goods	67.8	24.1	85.2	25.8	101.0	27.2
Percentage increase over 1953 ..			25.7		49.0	
TOTAL	281.8	100.0	330.2	100.0	371.0	100.0
Percentage increase over 1953 ..	—		17.2		31.7	
<i>Hypothesis B</i>						
For direct consumption	214.0	75.9	230.0	75.2	248.0	74.1
Percentage increase over 1953 ..			7.5		15.9	
Processed consumer goods	67.8	24.1	76.0	24.8	86.5	25.9
Percentage increase over 1953 ..			12.1		27.6	
TOTAL	281.8	100.0	306.0		334.5	100.0
Percentage increase over 1953 ..	—		8.6		18.7	

SOURCE : ECLA.

TABLE 169. COLOMBIA : RATE OF GROWTH APPLIED IN PROJECTING DEMAND FOR AGRICULTURAL COMMODITIES CONSUMED BY NON-FOODSTUFFS INDUSTRIES

	Percentage increase			
	Between 1953 and 1960		Between 1960 and 1965	
	Hypothesis A	Hypothesis B	Hypothesis A	Hypothesis B
Wheat	24.6	11.3	29.1	26.1
Maize	—	—	—	—
Rice	8.7	4.3	17.2	16.2
Yucca	—	—	—	—
Tobacco	19.0	9.5	25.4	22.4
Cotton fibre	51.8	33.0	34.5	29.1
Sisal (fique)	51.8	33.0	34.5	29.1
Rubber	179.6	161.2		
Wool	51.8	33.0	34.5	29.1

SOURCE : ECLA. See chapter III.

To judge from present demand trends, the composition of food consumption would necessarily alter, inasmuch as expenditure on processed foodstuffs would tend to absorb a progressively larger share of total expenditure on food.

It now remains to define the bases for the projection of demand for some agricultural foodstuffs used in non-foodstuffs industries, for others used both in human diet and as animal feeds, and lastly for commodities assumed to have export prospects, apart from those traditionally sent abroad.⁷⁰

The demand for the first group, namely, agricultural commodities used by non-foodstuffs industries, was projected according to the rates of growth of the industries using them as raw materials, as deducible from the estimates in the appropriate chapter. Table 169 presents the rates of industrial growth applicable to these commodities.

In order to project the demand for agricultural products to be used as animal feed, the income-elasticity coefficients of livestock products such as milk, eggs, pork and poultry were used. It must, of course, be recognized that the method used for projecting demand for feeds should have been based mainly on a calculation of balanced rations for each animal species and on the

⁷⁰ *Statistical Appendix*, table 74, for the distribution of food supplies in 1953. In each case the proportions taken into account included those corresponding to human consumption, losses, non-alimentary manufactures, seed and animal feed.

number of head that would have to be submitted to this diet for a given amount of livestock products to be obtained. This procedure would have to be adopted at a more advanced stage of the work, when the by-products of the food-processing industries would also be included.

Elsewhere in this study ⁷¹ an account is given of future maximum and minimum prospects for the absorption of certain traditional Colombian exports, viz., coffee, bananas and tobacco, in the world market. Foreign market trends for maize, rice, cotton fibre and cacao are favourable, and Colombia should take advantage of them to improve its export trade. Since a larger output than is required for domestic consumption could be produced without difficulty, a moderate expansion of exports of these commodities was postulated for 1960 and a somewhat more substantial increase for 1965. The programme of the national cacao campaign indicates that the country could become self-sufficient by 1960. Since there is every indication that the campaign is likely to continue after that date, it was assumed that by 1965 there would be an exportable surplus of cacao with ample sales prospects on the world market.

In order to satisfy the meat requirements resulting from projection *A*, it was assumed that the country would have to adopt the necessary measures to promote the development of the livestock sector in general and of cattle farming in particular, since this species contributes most of the livestock products consumed by the population. Demand for livestock products is lower according to hypothesis *B* than in the case of *A*. Since the same degree of technical improvement and the same livestock development policy for cattle are postulated in both hypotheses, and since the same production level would thus be reached, hypothesis *B* envisages the possibility of cattle exports equivalent to the difference between the projection of domestic demand and the expected production level.

The projections of demand for direct and processed foodstuffs in 1960 once formulated, it was necessary to work out the resultant average diet for that year. Since it was clear that, notwithstanding a substantial improvement, the average recommended diet would not be attained, it was decided to maintain the same income-elasticity coefficients for the projection of demand in 1965 as for 1960. The slight discrepancies that may be noted are due to the allowances that had to be made for the presumable future decline in the proportion of total consumer expenditure on goods and services which will correspond to expenditure on foodstuffs.

All the projections of the demand for agricultural products were formulated on the basis of gross consumption in the case of foodstuffs, raw materials and feeds consumed within the country and of net shipments in that of exports. This implies that once the projections of demand for the various groups of commodities have been combined under the single head of products, adjustments must be made for losses during the interval between the product's leaving the farm or port of unloading (when it is imported) and its purchase by the consumer, or export.

Losses of agricultural commodities are particularly heavy in Colombia owing to the tropical climate and to serious transport and above all storage and marketing deficiencies. The present analysis is based on the premise that this situation will considerably improve in the future, in view of the projects under way throughout the country with regard to transport and communications as well as to the construction of silos, granaries, markets, slaughter-houses and freezing-plants. Table 170 presents estimates of the actual and presumable percentages of loss for agricultural commodities in 1953, 1960 and 1965.

TABLE 170. ESTIMATES OF LOSSES OF AGRICULTURAL COMMODITIES AS A PERCENTAGE OF TOTAL SUPPLIES

Commodity	1953	1960	1965
Wheat	9.0	8.0	6.0
Wheat flour	5.0	4.0	3.0
Maize	17.0	15.0	12.0
Unhulled rice	11.0	10.0	8.0
Barley	4.0	3.0	2.0
Oats	5.0	4.0	3.0
Potatoes	18.0	17.0	15.0
Yucca	10.0	9.0	8.0
Other tubers	7.0	7.0	7.0
Sugar	2.0	2.0	2.0
Panela	5.0	5.0	5.0
Molasses	5.0	5.0	5.0
Bananas	11.0	10.0	9.0
Plantains	7.0	7.0	7.0
Other fruit	20.0	18.0	15.0
Garlic and onions	6.0	6.0	5.0
Tomatoes	17.0	15.0	12.0
Other vegetables	10.0	9.0	8.0
Beans	11.0	10.0	9.0
Other pulses	7.0	7.0	6.0
Coffee	1.0	1.0	1.0
Cacao	3.0	3.0	2.0
Oil-seeds	5.0	4.0	3.0
Lard	5.0	4.0	3.0
Butter	5.0	4.0	3.0
Cheese	8.0	7.0	5.0
Milk	9.5	7.0	5.0
Eggs	12.5	11.0	9.0
Fresh beef	10.0	8.0	6.0
Fresh pork, mutton, goat-flesh and poultry meat	5.0	5.0	4.0
Offal	10.0	8.5	7.0
Beer and spirits	0.5	0.5	0.5

SOURCE : ECLA estimates.

The next step after projecting demand and estimating the volume of agricultural products required to meet it is to consider the prospects for satisfying the demand in question out of domestic production, or, failing this, with imports. For this purpose, an estimate should first be made of the aggregate land available for extension of the agricultural area and of the possibility of increasing unit yields by improving technical standards in the different aspects of crop farming. Consideration should also be given to the fact that for certain commodities, such as wheat, for instance, even if all the requisites for

⁷¹ See Part One, chapter II.

attaining self-sufficiency were present, imports would still subsist, since the environment would preclude the cultivation of certain grades and qualities, at least for the present.

As regards available land, in the sub-tropical and hot climatic zones there would seem to be no immediate limit to the possibility of extending the cultivated area. In the cool zone, however, which is relatively small, serious problems would arise in relation to the expansion requirements for certain crops, such as wheat and barley, which cannot be grown in sub-tropical or tropical areas. In order to allocate the maximum space to these crops, the following assumptions have been adopted with respect to the extension of the area for the other crops which can be grown in any kind of climate: (a) the additional land required for maize, tuber — except potatoes — and tomatoes would have to be located in the sub-tropical or hot climatic zones; (b) the increment in the area to be used for garlic, onions and other vegetables would be distributed equally between all climatic levels; and (c) extra space for fruit, beans and other pulses would be distributed among the three zones in proportion to the area at present under these crops in the climatic belts concerned.

In the production increments determined by the projection of demand, an important role must apparently be assigned to the improvement of yields. This assump-

tion is based on the fact that investment per unit of product is a good deal lower for the improvement of techniques than for reclamation of virgin soil. In the latter case, apart from the specific investment required for opening up the new land, additional investment is necessary, for instance, in fences, housing, etc. within the farm, and, outside it, in means of communication and transport and other urban and rural services which are generally available in areas already brought under cultivation, where yields can be improved. Moreover, advanced farming techniques — besides resulting in a better utilization of available labour — entail an increase in the productivity of labour and a consequent rise in income per unit of working time. The assumptions adopted for yield increments are warranted by the research carried out in Colombia to date, which leads to the conclusion that the continuance, improvement and expansion of such activities, in line with recently approved programmes, would probably result in still higher average yields than those selected for the purposes of this analysis.

All this also implies the reinforcement and expansion of agricultural extension and training services, reproduction and distribution of improved seeds and supply of fertilizers, pesticides and other elements required by farmers for their activities in general and for an improvement of unit yields.

TABLE 171. COLOMBIA: ESTIMATE OF AVERAGE CROP YIELDS PROJECTED FOR 1960 AND 1965

Product	Average 1951-1953	Maximum target		Target for 1960			Target for 1965		
		Percentage	Total	Percentage	Increase	Total	Percentage	Increase	Total
(Quintals per hectare)									
Sesame	6.0	100	12.0	30	1.8	7.8	50	3.0	9.0
Rice (paddy)	17.9	100	35.9	20	3.6	21.5	40	7.2	25.1
Cotton fibre	2.1	200	6.3	70	1.5	3.6	90	1.9	4.0
Cotton seed	4.0	200	12.0	70	2.8	6.8	90	3.6	7.6
Coffee	5.0	50	7.5	10	0.5	5.5	20	1.0	6.0
Bananas	88.1	100	176.2	15	13.2	101.3	25	22.0	110.1
Plantains	79.1	—	—	—	—	79.1	—	—	79.1
Cacao	4.6	100	9.2	30	1.4	6.0	40	1.8	6.4
Sugar-cane for sugar	67.8	50	101.7	20	13.6	81.4	30	20.3	88.1
Sugar-cane for <i>panela</i>	59.4	50	89.1	5	3.0	62.4	10	5.9	65.3
Sugar-cane for molasses	53.2	50	79.8	5	2.7	55.9	10	5.3	58.5
Barley	12.2	50	18.3	20	2.4	14.6	30	3.7	15.9
Beans	5.2	100	10.4	10	0.5	5.7	20	1.0	6.2
Sisal (fique)	6.0	—	—	—	—	6.0	—	—	6.0
Maize	11.1	100	22.2	20	2.2	13.3	40	4.4	15.5
Potatoes	53.7	80	96.7	20	10.7	64.4	40	21.5	75.2
Tobacco	10.8	50	16.2	20	2.2	13.0	25	2.7	13.5
Wheat	8.3	60	13.3	15	1.2	9.5	25	2.1	10.4
Yucca	109.2	50	163.8	5	5.5	114.7	10	10.9	120.1
Garlic and onions	12.5	200	37.5	10	1.2	13.7	20	2.5	15.0
Aniseed	5.0	—	—	—	—	5.0	—	—	5.0
Rubber	2.5	—	—	—	—	2.5	—	—	2.5
Coconut	7.5	—	7.5	—	—	7.5	—	—	7.5
Fruit	66.2	—	—	5	3.3	69.5	10	6.6	72.8
Vegetables	76.5	50	114.7	5	3.8	80.3	10	7.7	84.2
Pulses	8.0	50	12.0	5	0.4	8.4	10	0.8	8.8
Tomatoes	54.0	50	81.0	5	2.7	56.7	10	5.4	59.4
Other tubers	42.9	—	—	—	—	42.9	—	—	42.9

SOURCE: ECLA estimates.

Table 171 presents the average yields registered in Colombia during 1951-53, the peak levels which could be reached under optimum technical conditions, and those projected as attainable in 1960 and 1965 through an increase in the relative importance of advanced and mechanized farming techniques.

An improvement of livestock yields is also assumed, on the basis of increments in livestock density, in meat per animal and in the rate of slaughter. All this could be achieved through a development policy for the more intensive application of the technical knowledge already available.⁷²

It has already been noted that the average density of the livestock population stands at 1.1 head per hectare. There are, however, numerous examples of stock farms where a density of 1.5 head can be supported with fair pasture management and of as much as 2 or more head per hectare with really sound management. A more satisfactory sub-division of the grazing-grounds would suffice to improve the rotation of livestock. Again, the more intensive development of dairy or double-purpose breeds would substantially help to raise average livestock density. There are some dairy farms in various parts of the country on which the cattle are turned out to graze part of the time, and part of the time are kept in the cowsheds and given cut grass (either fresh or stored in silos), and where the livestock density exceeds 3 head per hectare.⁷³ Allowance is also made for the fact that in recent years the country's livestock population was larger than at present, which suggests that the carrying capacity of the grazing-grounds is greater when traditional farming practices are maintained.

Increased meat yields per animal would have to derive from improvements in the quality and quantity of forage, and from other measures such as improvement of breeds, sanitary campaigns, slaughter within the production areas or transport of cattle on the hoof by lorry or by air to the consumer centres. The significance of the extent to which creole breeds have been improved by selection or crossbreeding with exotic strains has already been noted. When the latter are well chosen, they introduce greater hardiness, faster growth, better weight and larger meat yields per animal. It is assumed that sanitary campaigns would have to be intensified. With respect to the transport problem, the new roads under construction are permitting on an increasing scale the transport of cattle on the hoof in a few hours from the production areas to the consumer centres. Moreover, several enterprises have recently been successfully established for the slaughtering of cattle at several localities in the eastern llanos and the transport of the meat by air. It is thus

possible to avoid long journeys, which usually result in a death-rate of at least 10 to 12 per cent and in a loss of 20 to 30 per cent of the animal's weight. An enterprise of this kind has been operated for some years in the Department of Bolívar. The cattle are slaughtered in the production area and yield an average of 270 kilogrammes of carcase meat per head, which can be compared very favourably with the average of not more than 200 kilogrammes recorded for the country as a whole. Clearly, an over-all improvement in stock farming and in slaughter and transport system would inevitably entail higher availabilities of animals for slaughter in relation to total stocks, apart from increases in these latter. Table 172 presents the assumptions as to increases in meat per animal, rate of slaughter and livestock density which are later used to estimate, on the basis of projections of demand for livestock products, the number of animals that would have to be slaughtered, cattle stocks that would be required and the area on which this animal population could thrive.

TABLE 172. COLOMBIA : ESTIMATE OF THE MARGIN OF INCREASE FOR CATTLE AND PIG YIELDS

	Density of livestock population (Head per hectare)	Carcass meat (Kilogramme per head)	Rate of slaughter (Percentage of livestock population)
<i>Cattle</i>			
1953	1.11	198.5	11.5
Possible increment, as percentage over 1953	100.0	40	50
<i>Target for 1960</i>			
Percentage over 1953	17.0	5.0	5.0
Net increase	0.19	10.0	0.57
Total	1.30	208	12.00
<i>Target for 1965</i>			
Percentage over 1953	22.0	12.0	9.0
Net increase	0.24	21.8	1.0
Total	1.35	222.3	12.00
<i>Pigs</i>			
1953	1.11	60.0	50.0
Possible increment, as percentage over 1953	—	30	40
<i>Target for 1960</i>			
Percentage over 1953	17.0	2.0	5.0
Net increment	0.19	1.2	2.5
Total	1.30	61.2	52.5
<i>Target for 1965</i>			
Percentage over 1953	22.0	4.0	9.0
Net increment	0.24	2.5	4.5
Total	1.35	62.5	54.5

SOURCE : ECLA estimates.

The projected increments for 1960 and 1965 shown in this table do not seem excessive in view of the fact that in Brazil between 1945 and 1952 the rate of cattle slaughter increased by 12.6 per cent, while stocks expanded by 26.4 per cent. Much the same is true of

⁷² See the present chapter, section V, point 6.

⁷³ Some dairy farms located around the city of Barranquilla in the Department of Atlántico (a typical hot-climate area) are remarkable in that cattle density exceeds 4 head per hectare. The ECLA study group even found one in Galapa, which kept from 90 to 109 head of cattle on 19 hectares all the year round. The mean density given by dividing the number of animal months by the area stood at 4.5 head per hectare as the average for a whole year. Similar cases were noted in the highlands of the cool zone surrounding the city of Medellín, which are partly used for dairy farming, as well as on the Bogotá savannah and in some localities in the Department of Boyacá.

Argentina, where the rate of slaughter rose by 26.7 per cent during the same period.

It should be added that hypotheses A and B postulate the same estimate of yield increases for both livestock and crops, because investment and extension programmes are to a certain extent independent of the pattern or rate of the growth of income, even though the results of such programmes may decisively affect income increments. It is to the country's interest, then, to concentrate on the implementation of such programmes, no matter what the rate of growth of demand.

2. Projections of demand

With the aid of the statistical instruments already analysed and the background data outlined in the first part of this chapter, projections of demand in 1960 and 1965 were formulated for both hypotheses. For this purpose it was necessary to bear in mind the intended use or uses of the different products, which were accord-

ingly classified in the following groups: (a) foodstuffs for direct consumption; (b) processed consumer goods; (c) materials for non-foodstuff industries; (d) products intended for feed; (e) commodities for export.

(a) Foodstuffs for direct consumption

This heading covers all those products which require no industrial processing before consumption. Naturally, the group also includes the directly consumable portion of certain products of which the main bulk reaches the consumer only after processing and transformation (wheat and barley, for example). Since *panela* and molasses are made on the farms which themselves grow the cane, they are classified as foodstuffs for direct consumption, with the exception of the proportion allocated to such industries as that of spirits, for example. Similar treatment has been accorded to cheese and butter produced on dairy farms, while the milk used in factories turning out milk products is regarded as an intermediate product.

TABLE 173. COLOMBIA : PROJECTION OF EXPENDITURE ON COMMODITIES FOR DIRECT CONSUMPTION, 1953-60

Hypothesis B

Commodity	1953			1960			1965		
	Gross aggregate consumption ^a (Thousands of tons)	Gross per capita consumption (Grammes)	Per capita expenditure	Per capita expenditure	Gross per capita consumption (Grammes)	Aggregate gross consumption (Thousands of tons)	Per capita expenditure	Gross per capita consumption (Grammes)	Aggregate gross consumption (Thousands of tons)
Wheat	6.6	545	0.37	0.37	545	7.7	0.37	545	8.6
Maize	388.1	32,045	9.84	10.06	32,761	464.0	10.24	33,347	519.1
Barley	21.0	1,734	0.98	0.98	1,734	24.6	0.98	1,734	27.5
Potatoes	412.8	34,085	13.76	14.66	36,314	514.3	15.64	38,742	614.7
Yucca	729.5	60,234	9.37	9.37	60,234	853.0	9.37	60,234	955.7
Plantains	788.0	65,065	10.91	10.91	65,065	921.4	10.91	65,065	1,032.4
Other tubers	27.9	2,304	0.47	0.46	2,255	31.9	0.45	2,206	35.0
<i>Panela</i>	538.0	44,422	20.99	20.59	43,576	617.1	20.04	42,412	672.9
Molasses	38.8	3,204	0.68	0.66	3,110	44.0	0.64	3,016	47.8
Bananas	250.5	20,684	3.75	3.94	21,732	307.8	4.13	22,780	361.4
Other fruit	408.4	33,721	11.26	11.68	34,679	491.1	12.08	36,176	574.0
Coconut	3.0	248	0.79	0.79	248	3.5	0.79	248	3.9
Garlic and onions	22.5	1,858	2.10	2.24	1,982	28.1	2.39	2,115	33.6
Tomatoes	33.2	2,741	2.07	2.24	2,966	42.0	2.43	3,218	51.1
Other vegetables	117.0	9,661	4.59	4.96	10,440	147.8	5.37	11,303	179.3
Beans	42.2	3,484	4.25	4.41	3,615	51.2	4.56	3,738	59.3
Other pulses	55.8	4,607	4.75	5.06	4,908	69.5	5.39	5,228	82.9
Meat :									
Beef	253.8	20,956	46.29	50.73	22,966	325.2	55.82	25,270	401.0
Pork	51.9	4,285	12.52	14.11	4,829	68.4	16.01	5,479	86.9
Mutton	4.6	380	0.93	0.93	380	5.4	0.93	380	6.0
Goat-flesh	2.2	182	0.46	0.46	182	2.6	0.46	182	2.9
Poultry	24.3	2,006	6.46	7.38	2,292	32.5	8.38	2,602	41.3
Offal	22.8	1,883	3.54	3.82	2,016	28.6	4.13	2,197	34.9
Fish	20.6	1,700	3.71	4.01	1,837	26.0	4.34	1,989	31.6
Eggs	45.4	3,749	10.75	12.79	4,460	63.2	15.42	5,378	85.3
Lard	7.4	611	1.67	1.85	677	9.6	2.06	754	12.0
Milk	540.0	44,588	15.62	17.85	50,953	721.6	20.26	57,833	917.6
Milk for cheese	619.1	51,119	8.61	9.83	58,362	826.5	11.16	66,259	1,051.3
Milk for butter	265.4	21,914	2.51	2.86	24,969	353.6	3.25	28,374	450.2
			214.00	230.00			248.00		

SOURCE : ECLA estimates.

^a See *Statistical Appendix*, table 74.

Demand for the group of products for direct consumption was projected by taking as a starting-point *per capita* expenditure on these goods, in 1953 for the 1960 projection, and in 1960 for the 1965 projection. In both cases, the relevant projections are in line with the general pattern of future expenditure on goods and services, estimated in accordance with assumptions as to the increase in *per capita* income.

Expenditure once projected on the basis of the coefficients of income-elasticity of demand given in earlier tables, the required *per capita* availabilities of each product — that is, the amount at the consumer's disposal in the retail market — was calculated, in terms of gross consumption. These figures were weighted by the estimated number of inhabitants in 1960 and 1965, and the over-all gross consumer requirements of the population in these years were thus deduced.

Table 173 gives the results obtained for one of these projections — hypothesis *B* — in full detail; similar estimates for hypothesis *A*, with reference to both periods, are to be found in the Statistical Appendix, table 75. As may be observed, the products whose consumption would tend to increase a good deal more than the over-all average are those which are characterized

by a high coefficient of income-elasticity of demand, and among these are all animal products and some agricultural commodities, such as vegetables and potatoes. Dried pulses, with the exception of beans, are very close to the average consumption increment. Products with a declining *per capita* consumption are those whose income-elasticity coefficient is negative, i.e., *panela*, molasses and some tubers.

(b) Processed consumer goods

In the following chapter, which deals with all aspects of industry, the projection of demand for processed consumer goods is analysed and formulated in terms of value. Here it is given merely in quantitative terms, with the object of later ascertaining the share of processed foodstuffs in diet, and providing a link with the tables in which the total availability of agricultural products will be estimated. The gross quantities absorbed by industry during the base-year (1953) were used to formulate the 1960 projections, which in turn were taken as a basis for assessing what would have to be absorbed in 1965. To these quantities were applied the percentages of growth of the industries concerned deriving from the analysis and projections of demand formulated for this latter sector.

TABLE 174. COLOMBIA : PROJECTIONS OF DEMAND FOR PROCESSED FOODSTUFFS

Commodity	Gross consumption						Increase in 1960 over 1953	Increase in 1965 over 1960	Increase in 1965 over 1953
	1953		1960		1965				
	Total (Thousands of tons) *	Per capita (Grammes)	Total (Thousands of tons)	Per capita (Grammes)	Total (Thousands of tons)	Per capita (Grammes)			
<i>Hypothesis A</i>									
Wheat	176.3	14,557	256.8	18,131	332.6	20,962	45.7	29.5	88.7
Barley	76.5	6,317	138.8	9,801	209.0	13,172	81.4	50.6	173.2
Oats	5.1	421	7.0	496	8.4	531	37.2	20.0	64.7
Rice	210.1	17,348	266.8	18,836	311.6	19,638	27.0	16.8	48.3
<i>Panela</i>	18.0	1,486	34.5	2,436	54.1	3,410	91.7	56.8	200.6
Molasses	12.0	991	23.0	1,624	36.1	2,275	91.7	57.0	200.8
Milk	25.5	2,105	48.9	3,450	76.3	4,481	91.8	56.0	199.2
Oil-seeds	26.8	2,213	47.3	3,340	69.6	4,386	76.5	47.1	159.7
Sugar	196.5	16,225	302.4	21,350	394.9	24,264	53.9	30.6	101.0
Cacao	22.6	1,866	32.9	2,324	42.4	2,672	45.6	28.9	87.6
Coffee	40.0	3,304	51.5	3,637	60.6	3,819	28.7	17.7	51.5
Aniseed	1.9	157	3.6	257	5.6	353	89.5	55.6	194.7
<i>Hypothesis B</i>									
Wheat	176.6	14,557	230.3	16,265	290.4	18,302	30.6	26.1	64.7
Barley	76.5	6,317	111.7	7,886	157.4	9,920	46.0	40.9	105.7
Oats	5.1	421	6.5	457	8.0	503	27.4	23.1	56.9
Rice	210.1	17,348	256.1	18,084	297.6	18,756	21.9	16.2	41.6
<i>Panela</i>	18.0	1,486	27.0	1,907	39.1	2,464	50.0	44.8	117.2
Molasses	12.0	991	18.0	1,272	26.0	1,639	50.0	44.4	116.7
Milk	25.5	2,105	38.3	2,702	55.7	3,510	50.2	45.4	118.4
Oil-seed	26.8	2,213	38.6	2,724	53.4	3,365	44.0	38.3	99.2
Sugar	196.5	16,225	263.9	18,638	335.9	21,170	34.3	27.3	70.9
Cacao	22.6	1,866	29.5	2,085	37.0	2,332	30.5	25.4	63.7
Coffee	40.0	3,304	49.1	3,468	57.5	3,624	22.7	17.1	43.7
Aniseed	1.9	157	2.8	201	4.1	258	7.4	46.4	115.8

SOURCE : ECLA estimates.

* See *Statistical Appendix*, table 74.

It should be explained that by gross quantity is understood the product purchased by industrial concerns, after deduction of losses between the farm and the factory. Sugar and oil-seeds were treated somewhat differently, their projections having been made in terms of the finished product ready for consumption.

Table 174 shows the calculations for the projection of demand for agricultural intermediate products for the foodstuffs industry. As can be seen, the percentage increases over base-year consumption are quite substantial, since almost all processed consumer foodstuffs showed much higher coefficients of income-elasticity of demand than did commodities for direct consumption.

(c) Diet

After projection of the *per capita* and total demand for direct consumer or processed goods, their content of calories and proteins was calculated. The results are given in detail in the Statistical Appendix (tables 76 and 77), while the most important findings are summarized in table 175.

It may be noted that in the case of hypothesis A — where the more rapid rate of growth is postulated — projected consumption of foodstuffs would not attain, even by 1965, the protein and calorie levels recommended for 1953 by the *Instituto Nacional de la Nutrición*. On the other hand, the projected availabilities point to a change in the composition of diet by 1960, which would become more marked by 1965, to judge from the fact that consumption of protein foods is expanding faster than that of calorie foods. This is chiefly because the foodstuffs for direct consumption which are richest in protein — those of animal origin, vegetables and pulses — would necessarily, according to the projections of demand, increase more rapidly than the others.

If the figures in table 175 are compared with those of table 168 above, it will be seen that the growth of protein consumption would be parallel to that of total expenditure on foodstuffs, while consumption of calories would increase more slowly. The explanation can be found in the same table, where it may be noted that expenditure on processed consumer foodstuffs would have to rise considerably faster than expenditure on direct consumer products. This suggests a shift in the composition of food consumption from direct to processed products, which are inevitably more costly. The partial replacement of direct foodstuffs with a high calorie content — maize, yucca and *panela* — by processed goods of similar food value — wheat and its derivatives, beer and sugar — makes virtually no contribution towards raising the caloric content of diet, although improving it hygienically.

Table 176 gives the annual cost per daily calorie for each of the direct foodstuffs and for processed foods in the aggregate, estimated on the basis of the price structure existing in 1953. This table is proof of the contention that the cost of calories is higher in processed foodstuffs than in most related products for direct consumption.

(d) Commodities for non-foodstuffs industries

This group includes all non-foodstuffs, as well as those commodities which, though intrinsically foods, are required by non-alimentary industries; starch, for instance, which is used in the textile, printing, and book-binding industries.

In formulating the projection of demand for commodities for non-alimentary industries, over-all gross consumption, in terms of the natural product, was taken as the point of departure, and the percentage growth of the appropriate consumer industries was then applied to it.

TABLE 175. COLOMBIA : DAILY *per capita* REQUIREMENTS OF CALORIES AND PROTEINS, IN ACCORDANCE WITH PROJECTIONS OF DEMAND FOR FOODSTUFFS

	1953			1960		1965	
	Effective consumption	Recommended by the Instituto de Nutrición for 1953	Percentage of recommended target attained	Projected consumption	Percentage of recommended target available	Projected consumption	Percentage of recommended target available
<i>Hypothesis A</i>							
Calories (Number)	2,108	2,642	79.8	2,334	88.3	2,510	95.0
Percentage increase over 1953 . . .				10.7		19.1	
Proteins (Grammes)	45	76.5	58.8	52	70.0	57	74.5
Percentage increase over 1953 . . .		—		15.6		26.7	
<i>Hypothesis B</i>							
Calories (Number)	2,108	2,642	79.8	2,222	84.2	2,353	89.1
Percentage increase over 1953 . . .				5.4		11.2	
Proteins (Grammes)	45	76.5	58.8	48	62.7	52	68.0
Percentage increase over 1953 . . .				6.7		15.6	

SOURCE : ECLA estimates.

TABLE 176. COLOMBIA : ESTIMATES OF ANNUAL COST
PER DAILY CALORIES
(Pesos at 1953 prices)

Commodity	Per capita expenditure 1953	Annual cost per daily calorie
Maize	9.84	0.04
Potatoes	13.76	0.19
Yucca	9.37	0.05
Plantains	10.91	0.07
Other tubers	0.47	0.09
Bananas	3.75	0.11
Other fruit	11.26	0.33
Coconut	0.79	0.49
Garlic	2.10	1.24
Tomatoes	2.07	1.92
Other vegetables	4.59	0.55
Beans	4.25	0.15
Other pulses	4.75	0.12
Meat :		
Beef	46.29	0.35
Pork	12.52	0.27
Sheep	0.93	0.33
Goat flesh	0.46	0.34
Poultry	6.46	0.46
Offal	3.54	0.59
Fish	3.71	0.84
Fresh milk	15.62	0.23
Milk for cheese	8.61	0.29
Milk for butter	2.51	0.20
Eggs	10.75	0.80
Lard	1.67	0.12
Processed consumer goods	89.94	0.20
Beer		1.16
Spirits and wine		9.36

SOURCE : ECLA estimates.

For lack of information, the same structure of demand as existed in 1953 for all the commodities in this group was maintained in the projections. It is not impossible that a more detailed study might disclose, for example, the feasibility of substituting the consumption of maize or yucca starch for that of wheat (see the relevant estimates in table 177).

TABLE 177. COLOMBIA : AGGREGATE GROSS CONSUMPTION
OF COMMODITIES UTILIZED BY NON-FOODSTUFFS INDUSTRIES
(Thousands of tons)

Commodity	Hypothesis A			Hypothesis B		
	1953	1960	1965	1953	1960	1965
Wheat	7.1	10.3	13.3	7.1	9.7	10.0
Maize	11.5	13.5	15.1	11.5	11.5	12.9
Rice	4.6	5.8	6.8	4.6	4.8	5.6
Yucca	10.0	11.7	13.1	10.0	10.0	11.2
Tobacco	20.0	23.8	29.8	20.0	21.9	26.8
Cotton fibre	28.8	43.7	58.8	28.8	38.3	49.4
Sisal (<i>fique</i>)	12.0	18.2	24.5	12.0	16.0	20.7
Rubber	6.2	17.3		6.2	16.1	
Wool	8.4	12.8	17.2	8.4	11.2	14.5

SOURCE : ECLA estimates.

(e) Feeds

The criterion provisionally adopted for projecting the consumption of cattle feed has already been described. The same structure of demand as in the base-year was maintained, and to this were applied the elasticity coefficients of the livestock products obtained on the basis of utilization of such agricultural commodities as feed. Table 178 shows the relevant projections.

TABLE 178. COLOMBIA : AGGREGATE CONSUMPTION
OF ANIMAL FEEDS

Commodity	Hypothesis A			Hypothesis B		
	1953	1960	1965	1953	1960	1965
Maize	250.0	329.0	392.0	250.0	287.0	337.7
Barley	1.0	1.3	1.6	1.0	1.1	1.3
Yucca	43.5	57.2	68.2	43.5	50.0	58.8
Plantains	95.5	125.7	150.0	95.5	109.7	129.1
Panela	14.0	18.4	22.0	14.0	16.1	18.9
Molasses	11.0	14.5	17.3	11.0	12.6	14.8
Bananas	7.1	9.3	11.1	7.1	8.2	9.6
Milk	83.0	109.2	130.3	83.0	95.3	112.1

SOURCE : ECLA estimates.

TABLE 179. COLOMBIA : PROJECTIONS OF GROSS
AGGREGATE EXPORTS
(Thousands of tons)

Commodity	Hypothesis A			Hypothesis B		
	1953	1960	1965	1953	1960	1965
Maize	—	100.0	200.0	—	100.0	200.0
Rice ^a	28.1	50.0	50.0	28.1	50.0	50.0
Bananas	196.2	300.0	350.0	196.2	300.0	350.0
Coffee	397.9	432.0	480.0	397.9	432.0	480.0
Tobacco	5.0	10.0	15.0	5.0	10.0	15.0
Cotton fibre	—	10.0	30.0	—	10.0	30.0
Cattle ^b	—	—	—	—	26.5	40.6
Cacao	—	—	5.0	—	—	5.0

SOURCE : ECLA estimates.

^a In terms of unhulled rice.

^b In terms of tons of meat.

(f) Export commodities

Elsewhere in this study,⁷⁴ an analysis was made of the potential external demand for coffee and bananas, which are Colombia's traditional agricultural exports. Maximum and minimum export projections were then formulated. For the reasons previously explained, the projection adopted here was that of maximum exports of both products. A study of world trade in agricultural commodities indicated certain possibilities for Colombian export of maize, cotton fibre, tobacco, cacao and cattle. The country's estimated exportable surpluses of these products are marginal in comparison with the corresponding world trade. Table 179 assembles the projections of coffee and banana exports, and estimates of exports

⁷⁴ See Part One, chapter II.

of the other commodities mentioned. (All quantities are expressed in terms of net exports, that is to say after deduction of losses between farm and port of shipment.)

(g) *Total requirements of agricultural commodities for gross consumption and net export*

The method adopted for the establishment of the total quantity of each commodity which would have to be available in order to satisfy projected demand, in accordance with its possible use or uses, may be studied in detail in the *Statistical Appendix*, table 78, 79, 80 and 81. Table 180 simply sums up the results of these estimates.

TABLE 180. COLOMBIA : AGGREGATE AVAILABILITIES REQUIRED FOR GROSS CONSUMPTION AND EXPORTS

(Thousands of tons)

Commodity	1960	1965	1960	1965
	Hypothesis A		Hypothesis B	
Wheat	274.8	354.5	245.9	309.0
Maize	911.1	1,147.1	862.5	1,079.7
Barley	164.7	238.1	137.4	186.2
Oats	7.0	8.4	6.5	8.0
Rice	322.6	368.4	310.9	353.2
Potatoes	541.3	656.4	514.3	614.7
Yuca	921.9	1,037.0	913.0	1,025.7
Plantains	1,047.1	1,182.4	1,021.1	1 161.5
Other tubers	31.9	35.0	31.9	35.0
<i>Panela</i>	651.4	731.2	660.2	730.9
Molasses	80.2	100.5	74.6	88.6
Bananas	628.8	740.9	616.0	721.0
Other fruit	506.8	593.5	491.1	574.0
Coconut	3.5	3.9	3.5	3.9
Garlic and onions ..	29.4	35.8	28.1	33.6
Tomatoes	44.6	55.0	42.0	51.1
Other vegetables ...	157.7	194.7	147.8	179.3
Beans	52.4	61.3	51.2	59.3
Other pulses	73.2	88.8	69.5	82.9
Meat :				
Beef	351.7	441.6	351.7	441.6
Pork	76.0	98.6	68.4	86.9
Mutton	5.4	6.0	5.4	6.0
Goat-flesh	2.6	2.9	2.6	2.9
Poultry	36.5	48.3	32.5	41.3
Offal	30.7	38.0	28.6	34.9
Fish	27.8	34.2	26.0	31.6
Eggs	74.1	103.1	63.2	85.3
Lard	10.5	13.3	9.6	12.0
Milk	970.5	1,280.5	855.2	1,085.4
Milk for cheese	930.8	1,229.4	826.5	1,051.3
Milk for butter	399.4	526.4	353.6	450.2
Oil-seeds	47.3	69.6	38.6	53.4
Sugar	302.4	394.9	263.9	335.9
Cacao	32.9	47.4	29.5	42.0
Coffee	483.5	540.6	481.1	537.5
Aniseed	3.6	5.6	2.8	4.1
Tobacco	33.8	44.8	31.9	41.8
Cotton fibre	53.7	88.8	48.3	79.4
Sisal (<i>fique</i>)	18.2	24.5	16.0	20.7
Rubber	17.3	48.4	16.1	41.9
Wool	12.8	17.2	11.2	14.5

SOURCE : ECLA estimates.

(h) *Estimate of production required to fulfill projections of domestic consumption and exports*

Aggregate requirements to fulfill the projections of domestic demand in terms of gross consumption and of external demand in terms of net exports having been determined, adjustments must be made for losses occurring between harvesting (in the case of domestically-produced commodities) or shipment in the country of origin (in the case of imports), and the time when the product reaches the consumer. To this end, reasonable reductions were made in the base-year percentages of loss for the years 1960 and 1956, as has already been seen.⁷⁵ The result of these calculations would give total aggregate requirements at the farms or at ports of unloading, in line with the projections of demand.

(i) *Import substitution*

Hence the first question to be considered is how far certain commodities traditionally imported would still have to be purchased abroad, in order next to establish the quantities which would have to be domestically produced. There are grounds for the belief that Colombia could in future substitute domestic production for all its imports of cacao, milk products, cotton and oil-seeds, regardless of the intensity of demand in coming years. In contrast, there are certain limitations to the complete replacement of wheat and barley imports.

In the case of hypothesis A, the volumes of wheat and barley which would have to be imported were arrived at through the assumption that the land suitable for their cultivation would not be unlimited, although the greater part of future increases in demand would be covered with domestic production. For this reason wheat and barley imports for 1960 were assumed to have been frozen at their 1953 levels. The same procedure was applied to barley for 1965, but not to wheat, for which the limits to the available soil meant that a moderate increase in imports was envisaged for 1965. In accordance with hypothesis B — that of more moderate growth — the availability of soils would permit an appreciable reduction in imports of both cereals in 1960 and the entire elimination of barley imports in 1965 ; this would not be possible in the case of wheat, owing to the necessity of importing hard varieties or *Triticum aestivum*.

It was assumed that on any hypothesis domestic production of aniseed would be able to satisfy the total expansion of demand, as well as replacing imports.

So far as rubber and wool are concerned, it was assumed that a major part of the additional requirements determined by the projections of demand would have to be met with imports. This assumption was selected principally for want of data on the possibilities of achieving production increments rapidly and economically and on a scale commensurate with demand.

After import and seed requirements had been calculated, the domestic production necessary to fulfil total estimated needs was deduced for each commodity.

Tables 82, 83, 84 and 85 of the *Statistical Appendix* give the estimates of adjustments for losses, imports,

⁷⁵ See table 170.

TABLE 181. COLOMBIA : PROJECTIONS OF THE CONTRIBUTIONS OF PRODUCTION AND IMPORTS TO GROSS AVAILABILITIES OF AGRICULTURAL COMMODITIES

(Thousands of tons)

	Hypothesis A				Hypothesis B			
	1960		1965		1960		1965	
	Imports	Production	Imports	Production	Imports	Production	Imports	Production
Wheat	100.0	221.5	103.3	301.6	75.5	213.8		299.7
Maize		1,091.1		1,322.9		1,032.9		1,245.1
Barley	35.0	144.0	40.8	214.6	3.2	147.8		239.4
Oats		—		—		—		—
Rice		378.0		418.4		364.0		401.1
Potatoes		767.0		882.8		728.4		826.4
Yucca		1,013.1		1,127.2		1,003.3		1,114.9
Plantains		1,125.9		1,271.4		1,108.7		1,248.9
Other tubers		36.9		40.8		36.9		40.8
Panela		685.7		769.7		694.9		769.4
Molasses		84.4		105.8		78.5		93.3
Bananas		698.7		814.2		684.4		792.3
Other fruit		618.0		698.2		598.9		675.3
Coconut		3.5		3.9		3.5		3.9
Garlic and onions		32.7		39.2		31.2		36.8
Tomatoes		52.5		62.5		49.4		58.1
Other vegetables		173.3		211.6		162.4		194.9
Beans		64.5		74.0		63.0		71.5
Other pulses		84.1		100.6		79.8		93.9
Meat :								
Beef		382.3		469.8		382.3		469.8
Pork		80.0		102.7		72.0		90.5
Mutton		5.7		6.2		5.7		6.2
Goat-flesh		2.7		3.0		2.7		3.0
Poultry		38.4		50.3		34.2		43.0
Offal		33.6		40.9		31.3		37.5
Fish		27.8		34.2		26.0		31.6
Eggs		83.3		113.3		71.0		93.7
Lard		10.9		13.7		10.0		12.4
Milk		2,473.9		3,196.1		2,188.5		2,723.1
Milk for cheese								
Milk for butter								
Oil-seeds		49.3		71.8		40.2		55.1
Sugar		308.6		403.0		269.3		342.8
Cacao		33.9		48.4		30.4		42.9
Coffee		488.3		546.0		485.9		542.9
Aniseed		3.6		5.6		2.8		4.1
Tobacco		33.8		44.8		31.9		41.8
Cotton fibre		53.7		88.8		48.3		79.4
Sisal (<i>fique</i>)		18.2		24.5		16.0		20.7
Rubber	16.1	1.2	46.8	1.6	14.9	1.2	40.3	1.6
Wool	11.4	1.4	15.7	1.5	9.8	1.4	13.0	1.5

SOURCE : ECLA estimates.

seed requirements, and the domestic production needed to satisfy future internal and external demand. In table 181 only the final production and import figures thus arrived at are given.

(j) Variations in agricultural production

The purpose of table 182 — which is based on the detailed calculations included in tables 86, 87, 88 and 89 of the *Statistical Appendix* — is to sum up the variations that would inevitably be registered in production

of agricultural commodities, singly and in the aggregate, on both hypotheses of demand. Variations in over-all agricultural production in terms of value, in comparison with the base year 1953, are given in table 183.

These variations are sizeable if compared with what they would be were production to increase in the future at the same rate as between 1925 and 1953. On the other hand, it must be recalled that the projected production increments, large though they may appear, do not reach the point of satisfying, even on the maximum hypothesis

1. *Influence of higher yields*

Estimates have previously been made of the optimum unit yields that could be attained over an indeterminate period, and of the rates of growth that might be reached in 1960 and 1965 with techniques currently used or easy to adopt in Colombia. As has already been stated, the same estimates of increases in yields are applied alike to the projections of demand according to hypotheses A and B.

2. *Influence of improved soil utilization and the extension of the area under cultivation*

For reasons of methodology, before going into the question of how far the land already farmed might be more efficiently utilized and how far the area under cultivation and pasturage might be extended, it must be established how much land would be required for crops, singly and in the aggregate, and for pasture, in order to attain the production targets set up by the hypotheses formulated, on the assumption that the yields obtained would be those envisaged in tables 171 and 172. Table 185 represents an endeavour to define

TABLE 185. COLOMBIA : INCREASE IN THE AREA UNDER CULTIVATION
(Thousands of hectares)

Commodity	Hypothesis A		Hypothesis B	
	1953 to 1960	1953 to 1965	1953 to 1960	1953 to 1965
Wheat	58.2	115.0	50.0	113.2
Maize	120.4	153.5	76.6	103.3
Barley	45.6	82.0	48.2	97.6
Rice	4.8	-4.3	-1.7	-11.2
Potatoes	4.1	2.4	-1.9	-5.1
Yucca	12.3	17.9	11.5	16.8
Plantains	22.3	40.7	20.2	37.9
Other tubers	1.6	2.5	1.6	2.5
Panela	—	7.9	1.4	7.8
Molasses	2.1	5.1	1.0	2.9
Bananas	24.0	29.0	22.6	27.0
Other fruit	11.9	18.9	9.2	15.8
Coconut	0.7	1.2	0.7	1.2
Garlic and onion	3.9	6.1	2.8	4.5
Tomatoes	1.3	2.5	0.7	1.8
Other vegetables	4.6	8.1	3.2	6.1
Beans	28.1	34.3	25.5	30.3
Other pulses	25.1	39.3	20.0	31.7
Oil-seeds	69.8	87.9	48.5	53.8
Sugar	8.9	16.7	4.1	9.9
Cacao	24.5	43.6	18.7	35.0
Coffee	56.8	79.0	52.4	73.8
Aniseed	5.2	9.2	3.6	6.2
Tobacco	4.0	11.2	2.5	9.0
Cotton fibre	82.2	155.0	67.2	131.5
Sisal (<i>fique</i>)	10.3	20.8	6.7	14.5
Rubber	0.8	2.4	0.8	2.4
TOTAL	633.4	987.9	496.1	820.2

the area required for each crop.⁷⁶ It should be explained that for lack of information, no mention is made here of the practice in certain parts of the country of growing some crops more than once on the same soil, within the calendar year or a part of it. This omission is probably not very important, provided it is recalled that without substantial use of fertilizers and proper crop-rotation the perpetuation of this practice in the future would be undesirable if rapid soil deterioration were to be avoided. Should it be persisted in without technical improvements, increases in the area under cultivation must be considered so as to permit the depleted land to lie fallow. A rough estimate indicates that the difference between the area effectively utilized, and the total area under crops that are sown and harvested on the same land more than once a year, is in any case considerably less than the tracts that are allowed to lie completely fallow, often for long periods. All this suggests the advantages of further research. In the first place, it should be ascertained to what extent and in what crops repetition is occurring; how far the practice is beneficial and whether it should or should not be continued; how much land is left fallow each year, and why; and how far this land could be utilized by alternating crops with artificial pasturage, etc.

It can be seen from table 185 that the required extension of the area used for crops in the aggregate is relatively small. The largest absolute increases would be for wheat, maize, barley, oil-seeds and cotton. The case of potatoes is interesting, since the area under this crop would rather tend to decrease in the future, if the assumptions as to yield increments are fulfilled; for these alone would be sufficient to satisfy the growth of demand. Something similar might happen with respect to rice, by 1965.

In order to establish the area extension required for stock farming in accordance with the estimated growth of future demand for livestock products, the first step, for methodological reasons, must be to calculate the number of head which would have to be slaughtered to meet the demand for meat; and the next, to deduce from that figure the stocks which would have to be available, allowances being made for the possibility of raising the meat yield per animal slaughtered, as well as the percentage of animals for slaughter in relation to the livestock inventory as a whole. In this context table 186 should be consulted. An examination of the animal population statistics shows that stocks of cattle would have to increase from 12.3 million in 1953 to 15.3 million in 1960 and 16.9 million in 1965; this is equivalent to an increment of 24.4 per cent in 1960, in relation to the base-year, and 37.4 per cent in 1965. It has already been seen that Brazil — a tropical country like Colombia — increased its cattle stocks by 26.4 per cent in the seven-year interval between 1945 and 1952, while the rate of slaughter of domestically produced livestock also rose substantially. Paraguay — another tropical country — enlarged its stocks of cattle during the same period by 26.8 per cent, while the slaughter rate of domestic livestock, calculated as a percentage

⁷⁶ See *Statistical Appendix*, tables 90, 91, 92 and 93 for full details of the method whereby the estimates contained in this table were reached.

SOURCE : ECLA estimates.

* See *Statistical Appendix*, tables 90-93.

TABLE 186. COLOMBIA : DETERMINATION OF NUMBER OF ANIMALS FOR SLAUGHTER AND ANIMAL STOCKS REQUIRED TO SATISFY PROJECTED DEMAND

	Increase over 1953						
	1953	1960			1965		
		Percentage	Net	Total	Percentage	Net	Total
<i>Cattle</i>							
Rate of slaughter (Percentage of stocks)	15.5	14.3	0.5	12.0	8.7	1.0	12.5
Carcase meat (Kilogrammes per head)	198.5	5.0	10.0	208.5	12.0	23.8	222.3
<i>Hypotheses A and B</i>							
Carcase meat (Thousands of tons)	282.0	35.6	100.3	382.3	66.6	87.5	469.8
Number of animals slaughtered (Thousands) ..	1,420.3	29.1	413.3	1,833.6	48.8	693.1	2,113.4
Stock required (Thousands of head)	12,300.0	24.2	2,980.0	15,280.0	37.5	4,607.2	16,907.2
<i>Pigs</i>							
Rate of slaughter (Percentage of stocks)	50	5	2.5	52.5	9.0	4.5	54.5
Carcase meat (Kilogrammes per head)	60	2	1.2	61.2	4.2	2.5	62.5
<i>Hypotheses A</i>							
Carcase meat (Thousands of tons)	54.6	46.5	25.4	80.0	88.1	48.1	102.7
Number of animals slaughtered (Thousands) ..	909.5	43.7	397.7	1,307.2	80.7	733.7	1,643.2
Stock required (Thousands of head)	1,819.0	36.9	670.9	2,489.9	65.8	1,196.0	3,015.0
<i>Hypotheses B</i>							
Carcase meat (Thousands of tons)	54.6	31.9	17.4	72.0	65.8	35.9	90.5
Number of animals slaughtered (Thousands) ..	909.5	29.4	267.0	1,176.5	59.2	538.5	1,448.0
Stock required (Thousands of head)	1,819.0	23.2	421.9	2,240.9	46.1	837.9	2,656.9
<i>Sheep</i>							
Rate of slaughter (Percentage of stocks)	20	—	—	20	—	—	20
Carcase meat (Kilogrammes per head)	18	—	—	18	—	—	18
<i>Hypotheses A and B</i>							
Carcase meat (Thousands of tons)	4.8	18.7	0.9	5.7	29.2	1.4	6.2
Number of animals slaughtered (Thousands) ..	268.2	18.1	48.5	316.7	28.4	76.2	344.4
Stock required (Thousands of head)	1,341.0	18.1	242.5	1,583.5	28.4	381.0	1,722.0
<i>Goats</i>							
Rate of slaughter (Percentage of stocks)	31.0	—	—	31	—	—	31
Carcase meat (Kilogrammes per head)	14.7	—	—	14.7	—	—	14.7
<i>Hypotheses A and B</i>							
Carcase meat (Thousands of tons)	2.3	17.4	0.4	2.7	30.4	0.7	3.0
Number of animals slaughtered (Thousands) ..	153.6	19.6	30.1	183.7	32.9	50.5	204.1
Stock required (Thousands of head)	496.0	19.5	96.6	592.6	32.7	162.4	658.4
<i>Horses, asses and mules</i>							
<i>Hypotheses A and B</i>							
Stocks (Thousands of head)	1,933.0	—	—	1,933.0	—	—	1,933.0

SOURCE : ECLA estimates.

of the inventory, increased from 11.7 per cent in 1945 to 17.5 per cent in 1949, declining to 11.7 per cent again by the end of the period.

In the examples given it can be seen that the expansion of cattle stocks projected for Colombia is more moderate than that attained by other countries in comparable conditions, and that the increments are not incompatible with a higher percentage of slaughter. Once the machinery for promoting, encouraging and fostering cattle develop-

ment had been finally assembled, production targets equal or superior to those determined by the projection of demand on hypothesis A would have to be attained. With this in mind, the same rate of growth was retained for hypothesis B ; in this case a smaller volume of domestic demand would leave an exportable surplus of cattle.

Equally moderate are the postulates for the growth of the stock of pigs, which would have to increase only in relation to the domestic demand for pork ; this was

determined for each hypothesis, although in both cases the same assumptions were adopted as to increments in meat yield per animal, rate of slaughter and density of the pig population. This procedure takes account of the fact that pig-feed largely derives from agricultural commodities whose production is far more elastic than that of cattle forage, which requires the formation of permanent artificial pastures, fences, etc.

The projected coefficient of elasticity of demand for mutton and goat-flesh was nil, and the estimated expansion of stocks of sheep and goats is very small. It is both possible and desirable that Colombia may possess regions where these species could be rationally and economically bred, but no data on the subject were available when this study was made.

As regards the equine species, it was assumed that stocks would remain constant throughout the entire period covered by the projections, although there are

grounds for believing they would tend rather to decrease, owing to improved means of communication and the progressive growth of motor transport.

The object of table 187 is to reduce the stocks of different kinds of animals to homogeneous cattle units. With respect to its consumption of forage, it was assumed that a fully-grown cow or bull, taken as a unit of larger livestock, is equivalent to 5 average-type pigs of comparable age, reared at pasture; to 4 sheep; to 8 goats; and to 1.3 horses, donkeys or mules. As the estimated stocks of certain species differed from one projection to another, separate calculations were made for hypotheses A and B. The same table was used to weight livestock inventories — measured in homogeneous units — by the coefficients of density of the livestock population, and to determine the area of pasturage which would have to be available in the future in accordance with the different projections of demand for livestock products.

TABLE 187. COLOMBIA : ANIMAL STOCKS (TOTAL AND IN TERMS OF CATTLE) AND DETERMINATION OF THE PASTURE AREA

	Stocks ^a			Coefficients 1953	Stock in terms of cattle		
	1953	1960	1965		1953	1960	1965
<i>Hypothesis A</i>							
Cattle	12,300	15,280.0	16,907.2	1.000	12,300	15,280	16,907
Pigs	1,819	2,489.9	3,015.0	0.200	146	199	241
Sheep	1,341	1,583.5	1,722.0	0.250	335	396	430
Goats	496	592.6	658.4	0.125	62	74	82
Horses, asses and mules	1,933	1,933.0	1,933.0	0.750	1,450	1,450	1,450
TOTAL					14,293	17,399	19,100
Density of animal population ^b (Head per hectare)					1.11	1.30	1.35
Pasture area (Thousands of hectares)					12,915	13,384	14,156
Increase in the pasture area over 1953 (Thousands of hectares)						469	1,241
Percentages						3.6	9.6
Increase of pasture area over 1960 (Thousands of hectares)							772
Percentages							5.8
<i>Hypothesis B</i>							
Cattle	12,300	15,280.0	16,907.2	1.000	12,300	15,280	16,907
Pigs	1,819	2,240.9	2,656.9	0.200	146	180	213
Sheep	1,341	1,583.5	1,722.0	0.250	335	396	430
Goats	496	592.6	658.4	0.125	62	74	82
Horses, asses and mules	1,933	1,933.0	1,933.0	0.750	1,450	1,450	1,450
TOTAL					14,293	17,380	19,082
Density of animal population ^b (Head per hectare)					1.11	1.30	1.35
Pasture area (Thousands of hectares)					12,915	13,369	14,135
Increase in the pasture area over 1953 (Thousands of hectares)						454	1,220
Percentages						3.5	9.4
Increase of pasture area over 1960 (Thousands of hectares)							766
Percentages							4.8

SOURCE : ECLA estimates.

^a See table 186.

^b See table 172.

TABLE 188. COLOMBIA : SUMMARY OF AGGREGATE INCREASES IN CROP AND PASTURE AREAS ^a

(Thousands of hectares)

	Area utilized in 1953	1960		1965		
		Total	Increase over 1953	Total	Increase over 1960	Increase over 1953
<i>Hypothesis A</i>						
Crops	2,900	3,533	633	3,888	355	988
Livestock (Pasture area)	12,915	13,384	469	14,156	772	1,241
TOTAL	15,815	16,917	1,102	18,044	1,127	2,229
Percentage increase in area			7.0		6.7	14.1
Percentage increase in production			37.9		22.4	68.8
<i>Hypothesis B</i>						
Crops	2,900	3,396	496	3,720	324	820
Livestock (Pasture area)	12,915	13,369	454	14,135	766	1,220
TOTAL	15,815	16,765	950	17,855	1,090	2,040
Percentage increase in area			6.0		6.5	12.9
Percentage increase in production			37.3		16.0	59.3

SOURCE : ECLA estimates.

^a See tables 185 and 187.

As may be seen from table 188, increases in the area used for crops and livestock would amount, on hypothesis A, to a total target of 1,102,000 hectares for 1960, with a further 1,127,000 by 1965. In the case of hypothesis B, the corresponding increments would have to be 950,000 hectares in 1960 and another 1,090,000 by 1965.

On the assumption that these larger yields could be obtained, the new areas required would signify increases over the area utilized in 1953, of 7.0 per cent for 1960 and 14.1 for 1965 on hypothesis A ; and 6.0 per cent for 1960 and 12.9 per cent for 1965 on hypothesis B. If these percentages of expansion are compared with the percentage increases in production, it will be seen that most of the additional output would have to come from an improvement in yields.

The time has now come to study and define the sources from which extensions of the farming area would have to derive. It has already been established that in this connexion first priority should be assigned to better utilization of the land at present farmed. To judge from available data, it should be possible to take over from the livestock area land which at present is inefficiently utilized either (a) as artificial pasture (which could be should be turned over to crops without requiring much improvement) ; (b) as permanent natural grass-land (which could be converted into artificial pasturage or rendered more productive through irrigation, and then utilized either for artificial pasturage or for crops) ; or (c) as natural seasonal grass-lands (which could be improved through irrigation, drainage, flood control etc., and then either cultivated or developed as artificial pasturage for stock farming).

Before the amount of land that would have to be taken over from the livestock area is specified, the additional natural pasture requirements of stock farming itself should be reviewed, together with the advisability of providing further space for certain crops by means of irrigation, drainage, flood control, etc.

As regards the needful extensions of the area under cultivation, it must be remembered that the cool zone is subject to considerable limitations where total availabilities of cultivable land are concerned. Of the 1.5 million hectares of cultivable soil apparently existing in this zone, 490,000 were already under crops in 1953. It is estimated that the cultivated area should not be expanded to more than 700,000 hectares, in view of the need for annual crops to be rotated with artificial pasturage in a proportion of 50 per cent for each. An analysis of the situation also makes it clear that these goals could be reached only by means of a series of drainage, flood control and irrigation works in various parts of the cool zone. Table 189 assembles estimates of area increments for hypotheses A and B, detailing those required for crops definitely belonging to the cool zone and for others that can equally well be grown both in cool and in sub-tropical and hot climates.⁷⁷ Increases needed for crops which can be cultivated only in the sub-tropical and torrid zones are given as an aggregate figure.

The additional areas required for essentially cool-climate crops are fairly large, and would be still greater

⁷⁷ See part A of this chapter, section IV, point 2 : "Possibilities of expansion", where a definition will be found of the criteria used for determining the distribution by zones of the additional areas for crops that can be grown indiscriminately either in cool or in medium and hot climates.

if the desirability of introducing rotation with artificial pastures in farms at present exclusively under crops were taken into account. If this practice were adopted, it is estimated that not less than 60 per cent of the

necessary increment would have to come from land that would need improvements such as drainage, irrigation, and flood control, and the remaining 40 per cent from land in good condition currently used for livestock.

TABLE 189. COLOMBIA : BREAK-DOWN OF CULTIVATED LAND BY CLIMATIC LEVELS

(Thousands of hectares)

	1953			1960			1965		
	Total area	Cool areas	Sub-tropical and hot areas	Total area	Cool areas	Sub-tropical and hot areas	Total area	Cool areas	Sub-tropical and hot areas
<i>Hypothesis A</i>									
Wheat	175	175	—	233.2	233.2	—	290.0	290.0	—
Barley	53	53	—	98.6	98.6	—	135.0	135.0	—
Maize	700	105	595	820.4	105.0	715.4	853.5	105.0	748.5
Potatoes	115	115	—	119.1	119.1	—	117.4	117.4	—
Other tubers	7	5	2	8.6	5.0	3.6	9.5	5.0	4.5
Garlic and onions	20	5	15	23.9	6.0	17.9	26.1	8.2	17.9
Tomatoes	8	1	7	9.3	1.0	8.3	10.5	1.0	9.5
Other vegetables	17	6	11	21.6	9.0	12.6	25.1	10.5	14.6
Beans	85	5	80	113.1	5.0	108.1	119.3	5.0	114.3
Other pulses	75	5	70	100.1	5.0	95.1	114.3	5.0	109.3
Fruit	77	7	70	88.9	8.0	80.9	95.9	8.0	87.9
Other crops	1,568	8	1,560	1,896.6	—	1,896.6	2,091.3	—	2,091.3
TOTAL *	2,900	490	2,410	3,533.4	594.9	2,938.5	3,887.9	690.1	3,197.8
<i>Increase over 1953</i>									
Thousands of hectares				633.4	104.9	528.5	987.9	200.1	787.8
Percentages				21.8	21.4	21.9	34.1	40.8	32.7
<i>Increase over 1960</i>									
Thousands of hectares							354.5	95.2	259.3
Percentages							10.0	16.0	8.8
<i>Hypothesis B</i>									
Wheat	175	175	—	225.0	225.0	—	288.2	288.2	—
Barley	53	53	—	101.2	101.2	—	150.6	150.6	—
Maize	700	105	595	776.6	105.0	671.6	803.3	105.0	698.3
Potatoes	115	115	—	113.1	113.1	—	109.9	109.9	—
Other tubers	7	5	2	8.6	5.0	3.6	9.5	5.0	4.5
Garlic and onions	20	5	15	22.8	5.0	11.9	24.5	5.0	19.5
Tomatoes	8	1	7	8.7	1.0	7.7	9.8	1.0	8.8
Other vegetables	17	6	11	20.2	8.0	12.2	23.1	10.0	13.1
Beans	85	5	80	110.5	5.0	105.5	115.3	5.0	110.3
Other pulses	75	5	70	95.0	5.0	90.0	106.7	5.0	101.7
Fruit	77	7	70	86.2	7.0	79.2	92.8	8.0	84.8
Other crops	1,568	8	1,560	1,828.2	—	1,828.2	1,986.5	—	1,965.5
TOTAL *	2,900	490	2,410	3,396.1	580.3	2,815.8	3,720.2	692.7	3,027.7
<i>Increase over 1953</i>									
Thousands of hectares				496.1	90.3	444.0	820.2	202.7	617.5
Percentages				17.1	18.4	18.4	28.3	41.4	25.6
<i>Increase over 1960</i>									
Thousands of hectares							324.1	112.4	211.7
Percentages							9.5	19.4	7.5

SOURCE : ECLA estimates.

* See *Statistical Appendix*, tables 90 to 93.

Extensions of the area under sub-tropical and hot-climate crops, which in absolute figures are more important than those of the cool zone, could be obtained in the first instance from good land at present under artificial pasture for livestock; secondly from permanent natural grasslands, currently used for stock, but susceptible of improvement by irrigation; and, thirdly, through the clearing of forested areas. Crops for which the additional land would require irrigation include rice, tobacco, sugar-cane for processing and some cotton, cacao, maize, bananas, etc. Table 190 gives the minimum estimate of the area which would have to be brought under irrigation in the next few years. Probably more thorough research might establish the need for yet more irrigation in the hot-climate areas.

TABLE 190. COLOMBIA: SUB-TROPICAL AND TROPICAL CROPS WHICH WOULD REQUIRE IRRIGATION WORKS FOR EXTENSION OF THEIR AREA

(Minimum estimate: thousands of hectares)

Crops	Hypothesis A			Hypothesis B		
	1960	1965	Total	1960	1965	Total
Rice	5.0	—	5.0	—	—	—
Sugar-cane for processing	8.9	7.8	16.7	4.1	5.8	9.9
Tobacco	4.0	7.2	11.2	2.5	6.5	9.0
Others	32.1	30.0	62.1	18.4	22.7	41.1
TOTAL	50.0	45.0	95.0	25.0	35.0	60.0

SOURCE: ECLA estimates.

If it is borne in mind that each hectare reclaimed through irrigation, drainage, and/or flood control entails reclamation of another hectare for rotation with artificial pasturage, the total area requiring such improvement would be double that already determined for crops. Table 191 summarizes the pertinent estimates.

TABLE 191. AREAS WHERE IRRIGATION, DRAINAGE AND/OR FLOOD CONTROL SHOULD BE IMPROVED

(Thousands of hectares)

	Hypothesis A			Hypothesis B		
	1960	1965	Total	1960	1965	Total
<i>In cool-climate areas</i>						
Drainage	70	70	140	60	70	130
Drainage and irrigation .	50	45	95	50	45	95
Irrigation	—	15	15	—	15	15
TOTAL	120	130	250	110	130	240
<i>In sub-tropical and hot areas</i>						
Irrigation	100	90	190	50	70	120
TOTAL	100	90	190	50	70	120
Total irrigation in all climatic zones	100	105	205	50	85	135
GRAND TOTAL	220	220	440	160	200	360

SOURCE: ECLA estimates.

Apart from land which would have to be irrigated, part of the artificial pasturage would also have to be taken over for crops, and part of the natural grasslands for artificial pastures. As can be seen in table 192, for both hypotheses the same degree of variation in the use of the soil is assumed.

TABLE 192. COLOMBIA: EXTENT OF LIVESTOCK AREA TO BE TAKEN OVER FOR CROPS OF ARTIFICIAL PASTURE

(Thousands of hectares)

	Hypotheses A and B		
	1960	1965	Total
Area under artificial pasture to be taken over for crops	100	100	200
Area under perennial natural pasture to be taken over for artificial pasture	100	200	300

SOURCE: ECLA estimates.

The purpose of table 193 is to indicate the total area which, it is assumed, would have to be taken over from stock farming for the uses described in the preceding paragraphs and the relevant tables.

The data accumulated now make it possible to determine the sources of new areas which would have to be reclaimed or incorporated in order to provide the required expansion of cultivable land (see table 194).

In order to establish the sources of the necessary increases in pasturage, due account must be taken of the proportions of the livestock area that would be irrigated and drained, used for artificial pastures and turned over to crops.⁷⁸ Of these three groups of areas, 50 per cent of the land under seasonal natural pasture destined for irrigation and drainage would be returned to stock farming as artificial pasture, to help supply the required increase in pasturage, together with 100 per cent of the permanent natural pastures earmarked for conversion to artificial pasture. Areas in the third category, that is, land which was previously artificial pasture, would not continue to be used for livestock, but would be devoted entirely to crops. Of course the loss of such land would at first result in a reduction of the grazing-grounds, but these would be expanded again later as part of the land was brought under artificial pasture. However, in this connexion it must be remembered that the total gross area returned to livestock does not imply an increase in pasture equal to the amount restored, but a smaller increment, given by the difference between the total area returned and the pasturage represented by the land withdrawn from stock farming. An illustrative example will make this clearer. Let it be supposed that 100,000 hectares of permanent natural grassland are withdrawn from stock farming to form artificial pasture. Since one hectare of natural grassland

⁷⁸ To prevent misunderstanding, it should be explained that the livestock area comprises the whole of the land utilized for stock farming, which in 1953 would seem to have amounted to some 28 million hectares. By the forage area is meant the carrying capacity of the livestock area expressed in terms of homogeneous units of artificial pasture.

TABLE 193. COLOMBIA : SOURCE AND USE OF THE LAND TAKEN OVER FROM THE LIVESTOCK AREA

(Thousands of hectares)

	Source 1960				Source 1965			
	Artificial pasture	Permanent natural pasture	Seasonal natural pasture	Total	Artificial pasture	Permanent natural pasture	Seasonal natural pasture	Total
<i>Hypothesis A</i>								
<i>Use</i>								
Directly for crops	100			100	100			100
Directly for artificial pasture		100		100		200		200
Drainage and irrigation ...			220	220			220	220
TOTAL	100	100	120	420	100	305	115	520
<i>Hypothesis B</i>								
Directly for crops	100			100	100			100
Directly for artificial pasture		100		100		200		200
Drainage and irrigation ...			160	160			200	200
TOTAL	100	100	150	360	100	200	200	500

SOURCE : ECLA estimates.

has a forage coefficient of 0.333, this means that the 100,000 hectares withdrawn are equivalent to only 30,000 hectares of forage area. If the 100,000 hectares now covered with artificial pasture — the gross increment — with a forage coefficient equal to unity, are then returned to stock farming, the net gain in forage area will be only 70,000 hectares, since the other 30,000 will merely compensate for the forage capacity of the 100,000 hectares of natural grassland originally detached.

TABLE 194. COLOMBIA : SOURCE OF INCREMENTS IN CROP AREA

(Thousands of hectares)

	Source	1960	1965	Total
<i>Hypothesis A</i>				
I. Artificial pasture		100	100	100
II. Drainage and irrigation		110	110	220
III. Total (I plus II)		210	210	420
IV. Increments required *		633	355	988
V. Balance to be obtained by clearing (IV—III)		423	145	568
<i>Hypothesis B</i>				
I. Artificial pasture		100	100	200
II. Drainage and irrigation		80	100	180
III. Total (I plus II)		180	200	380
IV. Increments required *		496	324	820
V. Balance to be obtained by clearing (IV—III)		316	124	440

SOURCE : ECLA estimates.

* See table 188.

Table 195 gives estimates of the forage capacity of land which it is assumed would have to be withdrawn from stock farming, and the net and gross increases, in terms of forage area, in that part of such land which would have to be restored to its original uses.

Once it has been ascertained what net increases would accrue to the forage area from this source, it is easy to determine the margin of expansion that would have to be achieved through the clearing of virgin land.

Table 196 shows, in summarized form, the areas which would have to be improved by means of irrigation, drainage, and clearing, so as to provide the additional land required for the future expansion of crop and stock farming, in accordance with the projections of demand.

3. The formation of artificial pastures

The new artificial pastures which would have to be formed in order to provide the forage required for the increased numbers of livestock would be determined by the gross increase in forage area, firstly in land which had been reclaimed by means of irrigation and drainage, and secondly in permanent natural grassland, which, it is assumed, would be sown to artificial pasture. Table 197 assembles estimates of the total area of artificial pasture which should be formed.

4. Distribution of livestock area

Table 198 shows the distribution of the livestock area, taking into account the withdrawal of areas for different purposes, referred to in the preceding pages. From the same table can be deduced the figures for the net increase in artificial pasturelands.

TABLE 195. COLOMBIA : GROSS AND NET INCREASE IN AREA UNDER FORAGE PLANTS IN LAND TAKEN OVER FROM LIVESTOCK AREA, AND DETERMINATION OF LAND TO BE CLEARED IN ORDER TO COVER ADDITIONAL PASTURE REQUIREMENTS

	1960				1965			
	Irrigation and drainage	Artificial pasture	Crops	Total	Irrigation and drainage	Artificial pasture	Crops	Total
<i>Hypothesis A</i>								
I. Gross increase	110 ^a	100 ^b	—	210	110 ^a	200 ^b	—	310
II. Area taken over from livestock area	220 ^c	100 ^c	100 ^c	420	220 ^c	200 ^c	100 ^c	520
III. Forage plants coefficient	0.100	0.333	1.000	—	0.100	0.333	0.100	—
IV. Equivalence in terms of artificial pasture (II × III)	22	33	100	155	22	67	100	189
V. Net increase (I—IV)	88	67	—100	55	88	133	—100	121
VI. Total net increase of forage plants area				469 ^d				772 ^d
VII. Area to be cleared in order to meet the net total increase of forage plants area (VI—V)				414				651
<i>Hypothesis B</i>								
I. Gross increase	80 ^a	100 ^b	—	180	100 ^a	200 ^b	—	300
II. Area taken over from livestock area	160 ^c	100 ^c	100 ^c	360	200 ^c	200 ^c	100 ^c	500
III. Forage plants coefficient	0.100	0.333	1.000	—	0.100	0.333	1.000	—
IV. Equivalence in terms of artificial pasture (II × III)	16	33	100	149	20	67	100	187
V. Net increase (I—IV)	64	67	—100	31	80	132	—100	113
VI. Total net increase of forage plants area				454 ^d				766 ^d
VII. Area to be cleared in order to meet the net total increase of forage plants area (VI—V)				423				653

SOURCE : ECLA.

^a See table 191.

^b See table 192.

^c See table 193.

^d See table 188.

TABLE 196. COLOMBIA : SUMMARY OF AREAS TO BE RECLAIMED FOR CROPS AND LIVESTOCK

(Thousands of hectares)

	1960			1965			Grand total		
	Crops	Livestock	Total	Crops	Livestock	Total	Crops	Livestock	Total
<i>Hypothesis A</i>									
Drainage, irrigation	100	110	220 ^a	110	110	220 ^a	220	220	440
Clearing	423 ^b	414 ^c	837	145 ^b	651 ^c	796	568	1,065	1,633
TOTAL	533	524	1,057	255	761	1,016	788	1,285	2,073
<i>Hypothesis B</i>									
Drainage, irrigation	80	80	160	100	100	200	180	180	360
Clearing	316 ^b	423 ^c	777	124 ^b	653 ^c	749	440	1,076	1,526
TOTAL	396	503	937	224	753	949	620	1,256	1,886

SOURCE : ECLA estimates.

^a Out of the over-all total given in table 191, 50 per cent for livestock and 50 per cent for crops.

^b See table 194.

^c See table 195.

TABLE 197. COLOMBIA : ESTIMATE OF TOTAL AND NET AREA TO BE BROUGHT UNDER ARTIFICIAL PASTURE ^a

	Hypothesis A		Hypothesis B	
	1960	1965	1960	1965
I. Gross increase in land reclaimed by irrigation and drainage	110	110	80	100
II. Replacement of natural pasture by artificial	100	200	100	200
III. Area to be obtained by clearing	414	651	423	653
IV. Gross increase (I + II + III)	624	961	603	953
V. Replacement of pastureland to be taken over for crops	-100	-100	-100	-100
VI. Total net increase (IV - V) ..	524	861	503	853

SOURCE : ECLA estimates.

^a See tables 193 and 195.

5. Sources of the increase in production

Some degree of priority is assigned to the factors affecting the expansion of agricultural production. The relationships established are applied to both the growth hypotheses alike. In table 199 — based on the detailed calculations to be found in the *Statistical Appendix*, tables 94, 95, 96 and 97 — an estimate is made of the extent to which each of these factors would contribute to the expansion of production in the case of each of the hypotheses formulated. From this table it can be seen that, according to the hypotheses, between 63 and 67 per cent of the increased production would be obtained from an improvement in yields, and the rest from an extension of the area under cultivation. The part obtained through better utilization of the land currently farmed is attributed implicitly to the action of both the factors referred to, since both characteristics are involved — increased yields, and extension of the area utilized.

TABLE 198. COLOMBIA : DISTRIBUTION OF THE LIVESTOCK AREA

(Thousands of hectares)

	1953			1960		1965	
	Real area	Forage plants equivalent	Forage plants area in terms of artificial pasture	Real area	Forage plants area in terms of artificial pasture	Real area	Forage plants area in terms of artificial pasture
<i>Hypothesis A</i>							
Artificial pasture	10,070	1,000	10,070	10,594	10,594	11,455	11,455
Permanent natural pasture	5,000	0.333	1,665	4,900	1,632	4,700	1,565
Seasonal natural pasture	11,800	0.100	1,180	11,580	1,158	11,360	1,136
TOTAL	26,870	—	12,915	27,074	13,384	27,515	14,156
Net increase in artificial pasture * ...							
In relation to 1953					524		1,385
In relation to 1960							861
<i>Hypothesis B</i>							
Artificial pasture	10,070	1,000	10,070	10,577	10,577	11,420	11,420
Permanent natural pasture	5,000	0.333	1,665	4,900	1,632	4,700	1,565
Seasonal natural pasture	11,800	0.100	1,180	11,600	1,160	11,400	1,140
TOTAL	26,870	—	12,915	27,077	13,369	27,520	14,135
Net increase in artificial pasture							
In relation to 1953					503		1,356
In relation to 1960							853

SOURCE : ECLA estimates.

* The figures for net increases are those given in table 197, and any discrepancies noted in comparison of the artificial pasture areas in the different years are due to rounding. See also tables 187 and 188.

It should be pointed out that in a similar study carried out by ECLA on the programming of development in Chile in 1952, the conclusion was reached that 63 per cent of the increase in agricultural production would there be derived from an improvement in yields, and the remaining 37 per cent from extension of the cultivated area.⁷⁹ Very similar findings were arrived at in the *Plan*

de Desarrollo Agrícola y de Transportes devised by Chilean technical experts and recently approved by the Chilean Government.⁸⁰

⁷⁹ See *Preliminary Study on the Technique of Programming Economic Development* (E/CN.12/292).

⁸⁰ Chilean Ministry of Agriculture and Development Corporation, *Plan de Desarrollo Agrícola y de Transportes* (1954).

TABLE 199. COLOMBIA : FACTORS ACCOUNTING FOR EXPANSION OF AGRICULTURAL PRODUCTION

(Millions of pesos at 1953 prices)

Crop	Hypothesis A				Hypothesis B			
	Value of absolute expansion deriving from increase in				Value of absolute expansion deriving from increase in			
	1953 to 1960		1953 to 1965		1953 to 1960		1953 to 1965	
	Yield	Area	Yield	Area	Yield	Area	Yield	Area
Wheat	18.2	15.3	39.6	45.9	17.6	10.9	39.3	45.0
Maize	39.7	24.3	82.6	32.4	37.6	13.6	77.7	20.2
Barley	10.2	23.8	21.5	42.8	10.4	25.2	24.0	51.0
Rice	23.4	9.7	44.4	3.6	22.5	5.4	42.6	-1.0
Potatoes	28.0	6.5	55.5	4.5	26.0	-0.6	52.0	-4.4
Yucca	5.8	11.4	12.3	18.6	5.8	10.2	12.1	17.3
Plantains	—	18.5	—	33.8	—	16.7	—	31.5
Other tubers	—	1.4	—	2.2	—	1.4	—	2.2
Panela	9.9	15.8	20.8	30.1	10.0	18.5	20.8	30.0
Molasses	0.7	2.6	1.6	5.3	0.6	1.7	1.4	3.4
Bananas	10.7	18.6	19.2	23.8	10.5	17.1	18.7	21.7
Other fruit	8.8	23.6	19.0	37.5	8.5	18.2	18.4	31.2
Coconut	—	1.5	—	2.7	—	1.5	—	2.7
Garlic and onions	4.1	6.7	9.1	10.8	3.8	4.9	8.5	8.0
Tomatoes	0.7	2.7	1.6	4.6	0.6	2.0	1.5	3.5
Other vegetables	2.4	10.2	5.6	18.1	2.2	7.2	5.2	13.6
Beans	5.1	8.0	10.7	10.9	5.0	6.7	10.4	9.0
Other pulses	2.8	14.1	6.4	22.0	2.7	11.2	6.0	17.7
Sugar	0.6	11.6	1.0	20.8	0.5	7.9	0.9	14.9
Cacao	16.6	23.1	28.6	41.5	14.9	17.4	25.4	33.2
Coffee	104.0	140.4	213.2	166.4	103.6	135.2	212.0	160.3
Aniseed	—	4.4	—	7.8	—	3.1	—	5.3
Tobacco	6.8	3.8	10.8	13.0	6.5	1.8	10.1	10.1
Cotton fibre	60.3	38.6	113.7	79.7	54.1	30.2	101.6	66.5
Sisal (<i>fique</i>)	—	6.2	—	12.5	—	4.0	—	8.7
Rubber	—	0.4	—	1.3	—	0.4	—	1.3
Copra	—	0.5	—	0.5	—	0.5	—	0.5
Sesame	9.4	25.2	18.9	31.7	7.1	17.6	12.7	19.5
Cottonseed	5.5	3.6	10.4	7.5	4.9	2.3	9.3	5.5
Livestock production	537.4	50.2	992.9	132.9	404.5	48.6	775.7	130.7
TOTAL	911.1	522.7	1,739.4	865.2	759.9	441.4	1,486.3	759.1
Percentage increase for each factor	63.5	36.5	66.8	33.2	63.3	36.7	66.2	33.8

SOURCE : ECLA estimates.

IV. UTILIZATION AND PRODUCTIVITY OF LABOUR

When the problems inherent in the utilization of labour were studied, it was found that in the agricultural sector there was a considerable demographic surplus on the one hand, and low productivity of manpower on the other. It has already been seen that the active population works an average of only 216 days in the year, and that low productivity is due — among other causes — to low unit output and to a lack of capital goods — namely, of machinery.

The projections of agricultural production for 1960 and 1965 establish considerable increases on both hypotheses, and these must necessarily be linked with an improvement in productivity, if the present disparities between the rural sector and other activities are to be reduced, and if at the same time part of the population

increase is to be used to supply the labour required by the development of other sectors of the economy.

The study of agricultural investment therefore takes into account the various possibilities for improving and intensifying the work of agricultural research and extension, as well as for increasing the availabilities of fertilizers, soil amendments, insecticides and pesticides. The estimates of increases in yields, which may be found in previous pages, take into consideration the present status of agricultural research, the prospects for its development in the next few years, the extent to which its findings are disseminated and the application of technical methods of protecting crops and conserving the fertility of the soil. The new input of labour per hectare was established with a fair degree of accuracy, on the basis of an intensification of mechanization, the investment for which was also forecast. Both aspects

TABLE 200. COLOMBIA : PRODUCTIVITY OF LABOUR IN THE AGRICULTURAL SECTOR MEASURED THROUGH PRODUCTION PER WORKING-DAY IN 1953, AND TARGETS FOR 1960 AND 1965 IN ACCORDANCE WITH THE TWO HYPOTHESES UNDER CONSIDERATION

(Kilogrammes per 9-hour working day)

Crop	1953	Hypothesis A		Hypothesis B	
		1960	1965	1960	1965
<i>Cereals</i>					
Wheat	25.6	31.7	38.5	29.7	34.7
Maize	19.8	28.9	38.7	27.1	34.4
Barley	34.1	50.4	63.6	47.1	56.8
Rice	23.4	43.0	58.4	37.1	46.5
<i>Pulses</i>					
Beans	7.6	8.1	9.4	7.8	8.7
Others	16.0	18.7	21.0	17.9	19.5
<i>Tubers and vegetables</i>					
Potatoes	55.5	79.5	98.9	74.9	92.8
Yucca	123.1	123.4	136.4	123.3	133.5
Garlic and onions	10.4	11.4	12.8	11.4	12.9
Tomatoes	33.3	41.8	44.1	0.3	43.0
Other vegetables	21.2	25.1	26.3	23.8	25.5
Other tubers	59.1	58.8	58.8	58.8	58.8
<i>Fruit</i>					
Bananas	232.6	247.0	275.1	246.9	275.1
Plantains	226.2	226.0	226.0	225.9	226.0
Other fruit	138.1	144.8	161.8	144.7	158.2
<i>Oil-seeds</i>					
Sesame	13.6	20.0	23.7	19.0	22.5
Cacao	9.8	12.5	13.4	12.5	13.4
Coconut	16.7	18.6	18.6	18.6	18.6
<i>Sugar-cane</i>					
For <i>panela</i>	32.1	34.7	38.2	33.9	36.5
For molasses	40.8	48.6	52.7	45.6	47.7
For sugar	108.0	150.7	172.9	150.7	172.8
<i>Coffee</i>	6.4	7.1	7.4	7.1	7.4
<i>Raw materials</i>					
Cotton	4.2	6.9	8.3	6.5	7.7
Rubber	2.6	2.6	2.6	2.6	2.6
Sisal (<i>fique</i>)	12.5	12.5	14.0	12.5	13.3
Tobacco	3.2	3.7	4.2	3.7	4.1
Aniseed	8.9	8.9	8.0	8.9	8.9

SOURCE : See *Statistical Appendix*, tables 98, 99 and 100.

combined — better yields and smaller inputs of labour — would determine an increase in productivity which is given, for both hypotheses and for the years 1960 and 1965, in table 200.⁸¹ For purposes of comparison, the productivity of labour in 1953 is also included.

⁸¹ See *Statistical Appendix*, tables 98, 99 and 100, for the detailed calculations summarized in this table.

1. Crop sector

In the case of either hypothesis there would be possibilities of a substantial increase in productivity in a number of crops, the differences arising solely from the degree of mechanization assumed ; both hypotheses are based on the premise that yields will develop equally.

TABLE 201. COLOMBIA : VALUE OF AGRICULTURAL PRODUCTION, NUMBER OF DAYS WORKED AND PRODUCTIVITY OF LABOUR IN TERMS OF PRODUCTION PER DAY'S WORK

	1953	Hypothesis A		Hypothesis B	
		1960	1965	1960	1965
Value of production (Millions of pesos) *	2,401.7	3,248.7	3,881.9	3,150.8	3,740.6
Number of days worked (Millions)	208.1	228.9	238.8	228.3	241.1
Production per day's work (Pesos)	11.54	14.19	16.26	13.80	15.51

SOURCE : ECLA.

* At 1953 prices.

As regards cereals in general, there should be considerable increases in productivity, though these would be smaller in the case of hypothesis B, owing to the lesser degree of mechanization assumed. Where wheat and barley were concerned, the explanation lies in bigger yields and the mechanization of preliminary operations and harvesting.

In maize such increments would be obtained from improved yields, mechanized soil preparation, weeding with cultivators, possibly the application of weed-killers, and more widespread use of shelling-machines. In the case of rice, they are accounted for by the fact that expansion would require the use of newly-irrigated areas, where yields would be better ; nor must the possibility of mechanizing much of the work be overlooked, whether in soil preparation or harvesting. If this were done, on either hypothesis productivity in 1965 might double the 1953 figure.

Among the tubers, the greatest increases would be registered for potatoes, owing to the larger yields predicted and to saving of labour through the mechanization of soil preparation and weeding. Yucca, on the other hand, offers scant prospects of development, partly because it is grown on smallholdings where the introduction of mechanical and technical improvements is difficult.

It was judged wiser not to reckon with any radical changes in banana production, despite existing possibilities. Moreover, it is not unlikely that here the greatest progress will take place in plantations yet to be formed. The most serious obstacles to a major improvement are the heavy inputs required for harvesting, combined with transport and communications problems.

Among the oleaginous crops, sesame would depend principally upon improved yields for expansion. As regards sugar-cane, productivity would depend on whether the cane was for *panela*, molasses or refined sugar. The first is in fact usually grown by smallholders, and it seems unlikely that much could be achieved in the way of substituting improved varieties for those in use at present. It is also very probable that existing installations will not be replaced by others with a higher degree of efficiency, which would economize manpower in the manufacturing process. The sugar industry, in contrast, does offer scope for improvement both in the growing of the crop itself and in the mechanization of installations.

In the case of coffee, large increases in yields per hectare are assumed ; these would involve the widespread performance of certain additional operations, which could be mechanized only partially or with difficulty, and which in the upshot would imply an increased input of labour per hectare. Even so, *per capita* productivity might be raised in 1960 and to a greater extent by 1965, since the heavier labour input per hectare would be more than offset by the increment envisaged in production per hectare.

The two variables mentioned may follow favourable trends for cotton. In fact, progressively better techniques have been improving production per hectare and should continue to do so. Moreover, the expansion of the crop will also improve personnel efficiency in picking, apart from the economy in manual labour in soil preparation and weeding which should result from the more widespread use of machinery.

There are, however, other crops in which such a satisfactory development is deemed improbable. Among them may be mentioned some vegetables, the tuber group, plantains, coconuts, etc. The lack of research on improvement of current varieties ; the insignificance of the crops themselves, which offers little prospect of short-term modification ; the fact that such crops are peculiar to smallholdings ; and the difficulty of mechanization, may all be cited as the principal factors which would tend to retard any very definite future improvement in labour productivity.

The criteria used in the analyses of the various crops are somewhat conservative, since the only technological improvements taken into consideration are those which are relatively easy to introduce. In 7 and 12 years' time it would not be surprising if fresh innovations appeared which the country could assimilate successfully. The attainment of the labour productivity targets is contingent upon the fulfilment of the diverse basic assumptions as to agricultural research, the application and dissemination of its findings in the farming community, the importation of mechanized equipment, and so forth.

Such, then, are the most significant changes likely to occur in the productivity of manpower in each particular crop. It will also be interesting to measure the effect that they may have on the agricultural sector as a whole. To this end, table 201 shows the quantum of produc-

tion in the years 1960 and 1965, according to the two production hypotheses, together with the number of days that would have to be worked in each case.

The figures in table 201 show that in the case of the hypothesis of greater development, the productivity level of 1953 would rise by 25 and 47 per cent in 1960 and 1965 respectively; although the corresponding figures for the other hypothesis are lower — 25 and 38 per cent — they are still significant. And on both hypotheses it is in the earlier period, from 1953 to 1960, that the greatest effort would have to be made and the annual rate of growth would be highest.

An increase in productivity naturally causes a slight rise in the number of working days in relation to the production increments. For example, on hypothesis *A*, which assumes that production would exceed that of 1953 by 38 and 69 per cent in 1960 and 1965 respectively, these improvements would entail only 10.0 and 14.7 per cent more working-days.

2. Livestock sector

The livestock sector displays some special characteristics not only as regards 1953, but also as to what may be expected of it in future. It has already been seen that labour-productivity levels in stock farming, measured from the standpoint of value added, are far below those of the crop sector in particular, and of agriculture in general. The data assembled, which seem to indicate that productivity in the livestock sector might with advantage be raised more rapidly than in the other agricultural activities, are not compatible either with the characteristic features of stock farming itself or with the lines along which it is developing at present. As in the case of crop farming, improvements in labour productivity may derive either from an increase in production per unit of area, or from a reduction of the manpower employed.

However, any research or genetic improvements, and their application on a substantial scale, require a much longer term than is the case with crop farming. Such practices, as well as those aimed at raising sanitary and hygienic standards and improving the quality and utilization of pasture, call for a great deal more personal supervision than at present by the stock farmers themselves. Although a progressive change of attitude on the part of these entrepreneurs is not out of the question, the circumstances noted must be taken into account in the different projections.

On account of the present low level of productivity, similar efforts towards increased mechanization and enclosure of pastures are envisaged on both hypotheses. Thus, in the calculation of labour input in cattle herding, a similar decrease is postulated in both cases, and it is estimated that a higher density of fencing would more than offset increases originating in other fields of activity — sanitary aspects, for instance — where improvements would have to be introduced. As regards horses, asses, mules, pigs, sheep and goats, no radical changes in labour input are contemplated. Some saving is envisaged for poultry-farming, since it is felt that an expansion of

production would derive mainly from industrial establishments that were technically organized.

Table 202⁸² shows the total inputs of labour in the care of livestock. The discrepancy in the number of working-days according to the two hypotheses for the years 1960 and 1965 is due chiefly to the larger stock of dairy cattle, pigs and poultry assumed on hypothesis *A*, to meet increased demand. As will be recalled, a similar development of cattle production was postulated for both hypotheses.

TABLE 202. COLOMBIA: DIRECT INPUT OF WORKING-DAYS IN THE LIVESTOCK SECTOR, IN 1953 AND IN 1960 AND 1965 IN ACCORDANCE WITH HYPOTHESES A AND B

(Millions of working-days)

	Hypothesis A			Hypothesis B	
	1953	1960	1965	1960	1965
Care of livestock ...	140.2	163.5	168.9	159.0	161.3
Pasture management and renewal	48.7	53.8	63.0	53.7	62.9
TOTAL	188.9	217.3	231.9	212.7	224.2

SOURCE: ECLA.

In the calculation of labour input in the care of natural and artificial pastures, as well as in renovation of the latter, the greater attention which they will have to be accorded in future is taken into account. However, as an increase in mechanization is also envisaged — equal for both hypotheses — a slight economy in working-days per hectare is thought possible, in spite of the additional labour required in the care of pastures.

In table 202, the figures for days worked will be seen to be noticeably alike on the two hypotheses; this is due to the great similarity of the livestock areas in both cases.⁸³ The small variations are due merely to differences in the numbers of smaller livestock.

It is equally interesting to establish the variations in labour productivity in the livestock sector on the basis of production per working-day, in accordance with the two hypotheses. The relevant calculations are shown in table 203.

On both assumptions considerable increases would take place. Hypothesis *A* postulates 24 and 48 per cent in comparison to 1953 for 1960 and 1965 respectively, and hypothesis *B*, 18 and 39 per cent. As these increments are practically parallel to what might be achieved in the crop sector, the differences between the two sectors already indicated would persist. A greater effort might possibly secure a more marked improvement in labour productivity in stock farming, in which case the gap would be narrowed. But as the circumstances now attending stock farming seem likely to remain largely

⁸² See *Statistical Appendix*, table 101, for further details of estimated labour inputs in care of livestock.

⁸³ See *Statistical Appendix*, table 102, for further details of estimated labour inputs in care and renovation of pastures.

TABLE 203. COLOMBIA : PRODUCTIVITY PER DAY'S WORK IN THE LIVESTOCK SECTOR

	1953	Hypothesis A		Hypothesis B	
		1960	1965	1960	1965
Value of livestock production (Millions of pesos) *	1,383.5	1,971.1	2,509.3	1,836.6	2,289.9
Number of days (Millions)	188.8	217.3	231.9	212.7	224.2
Production per day's work (Pesos) *	7.32	9.07	10.82	8.63	10.21

SOURCE : ECLA.

* At 1953 prices.

unchanged, a somewhat limited degree of development, such as is assumed here, is felt to be more feasible.

3. Other activities

Under this heading are considered labour inputs in farm management and similar professional services ; miscellaneous activities which are difficult to list in detail ; time employed by some smallholders in transporting their produce to market ; and finally working-days spent in what are regarded as investment operations, such as land reclamation, renovation and extension of plantations, formation of new artificial pasturage, building fences, etc.

A greater input of working-days devoted to farm management is assumed, especially in the case of the maximum development hypothesis, since the nature of various work programmes for the attainment of the targets set up entails more personal attention on the part of owners, as well as more staff for activities of this kind.

For "Miscellaneous activities", the same criterion is retained as for 1953, i.e., that such operations will continue to absorb 5 per cent of all days worked directly in stock and crop farming.

Only very small increases are estimated for the transport of produce to market, as owing to future improvements in marketing systems and means of communication the farmer himself should no longer need to devote a great deal of attention to such activities as these.

TABLE 204. COLOMBIA : ESTIMATE OF WORKING-DAYS TO BE USED FOR "OTHER ACTIVITIES"

(Millions of working-days)

	1953	Hypothesis A		Hypothesis B	
		1960	1965	1960	1965
Management and profes- sional services	24.6	28.0	31.0	27.5	30.0
Miscellaneous activities ..	20.0	22.3	25.0	22.0	24.7
Transport to market	15.3	15.5	16.0	15.5	16.6
Investment	21.0	24.0	23.0	23.4	22.5
TOTAL	80.9	89.8	95.0	88.4	93.8

SOURCE : ECLA.

A rough estimate was made of work which connotes investment, taking into account the machinery which would be available for the clearing and reclamation of land, the area of new pasturage to be formed, the new fences to be put up, etc. The pertinent figures are given in table 204.

4. Aggregate productivity in the agricultural sector, and active population required

Once the total number of working-days required is known, variations in productivity must be determined and calculations made of the active population that

TABLE 205. COLOMBIA : TOTAL NUMBER OF WORKING-DAYS REQUIRED IN 1960 AND 1965 IN ACCORDANCE WITH HYPOTHESES A AND B

(Millions of working-days)

	1953	Percentage	Hypothesis A			Hypothesis B				
			1960	Percentage	1965	Percentage	1960	Percentage	1965	Percentage
Crops	208.1	43.5	228.9	42.7	238.8	42.2	228.3	43.1	241.1	43.1
Livestock	188.9	39.5	217.3	40.5	231.9	41.0	212.7	40.2	224.2	40.1
Other activities ...	80.9	17.0	89.8	16.8	95.0	16.8	88.4	16.7	93.8	16.8
TOTAL	477.9	100.0	536.0	100.0	565.7	100.0	529.4	100.0	559.1	100.0

SOURCE : ECLA.

would be needed for agriculture during the years covered by both hypotheses. Table 205 shows how, broadly speaking, the percentage of working-days employed in the crop sector gradually decreases, while a corresponding increase occurs in the livestock sector.

As the increases in working-days are far less than those assumed for production, an improvement in productivity is thus obtained, still in terms of volume of production per working-day, as established in table 206.

For obvious reasons, the highest productivity would be achieved in the case of hypothesis *A*, which postulates 23 per cent in 1960 and 43 per cent in 1965, in relation to 1953. Although on the other hypothesis, the figures would be smaller — 24 and 36 per cent — they are still by no means negligible.

It still remains to determine the active population that would be necessary. This will depend on the number of days that each active person can work during the year. When the different aspects of manpower were studied, it was estimated that under-development existed in the rural areas in Colombia, since only 216 days were worked per active person per annum. It was also pointed out that working-days for the active population in agriculture could easily range from a minimum of 240 to a peak estimate of 280 yearly.

To give some idea of the variations which would take place in the active agricultural population in the case of each hypothesis, according to the number of days worked *per capita*, table 207 contains calculations for the diverse alternatives, which vary from the 216 working-days corresponding to 1953, to the optimum estimate of 280 *per capita*.

The difference in the active population required in each year or on either hypothesis, according to whether the estimated number of days worked is 216 or 280, exceeds 500,000 persons.

Of all these alternatives, the one selected in the case of hypothesis *A* is that the number of days worked would increase from 216 in 1953 to 230 in 1960 and 250 in 1965. Hypothesis *B* assumes that the number of man/days worked per annum would remain static until 1960, and that a slight improvement in the second period would bring it up to 225 days. In the choice of these alternatives, allowance was made for the disparity of effort represented by the production goals of each hypothesis, the demand for manual labour in non-agricultural sectors in the two cases of differing income growth, and various other structural aspects which help to determine the degree of employment of the existing active population.

TABLE 206. COLOMBIA : PRODUCTIVITY PER WORKING-DAY IN THE AGRICULTURAL SECTOR IN 1960 AND 1965 IN ACCORDANCE WITH HYPOTHESES A AND B

	1953	Hypothesis A		Hypothesis B	
		1960	1965	1960	1965
Value of agricultural production (Millions of pesos)	3,785.2	5,219.8	6,391.2	4,987.4	6,030.5
Total number of days worked (Millions)	477.9	536.0	565.7	529.4	559.1
Production per working-day (Pesos)	7.9	9.74	11.30	9.42	10.79

SOURCE : ECLA.

TABLE 207. ACTIVE POPULATION REQUIRED IN 1960 AND 1966 (HYPOTHESES A AND B) ACCORDING TO THE NUMBER OF DAYS WORKED *per capita per annum*

	1953	Hypothesis A		Hypothesis B		
		1960	1965	1960	1965	
Total number of days worked (Millions)	477.0	536.0	565.7	529.4	559.1	
<i>Thousands of active persons</i>						
Days worked annually per active person :	216	2,215	2,481	2,619	2,451	2,588
	225		2,382	2,514	2,353	2,485
	230		2,330	2,460	2,302	2,431
	240		2,233	2,357	2,206	2,330
	250		2,144	2,263	2,118	2,236
	260		2,062	2,176	2,036	2,150
	270		1,985	2,095	1,961	2,071
	280		1,914	2,020	1,891	1,997

SOURCE : ECLA.

TABLE 208. COLOMBIA : PRODUCTIVITY PER ACTIVE PERSON IN TERMS OF THE VOLUME OF PRODUCTION IN 1960 AND 1965, IN ACCORDANCE WITH HYPOTHESES A AND B

	1953	Hypothesis A		Hypothesis B	
		1960	1965	1960	1965
Agricultural production (Millions of pesos) *	3,785.2	5,219.8	6,391.2	4,987.4	6,030.5
Value added (Millions of pesos)	3,337.8	4,602.8	5,635.8	4,397.9	5,317.7
Active population (Thousands) required on the basis of 216 days worked <i>per capita per annum</i> in 1953, 230 in 1960 and 260 in 1965	2,215	2,330	2,263	2,451	2,485
Value of annual <i>per capita</i> production (Pesos)	1,711	2,240	2,824	2,035	2,427
Productivity (Value added per active person) (Pesos)	1,509	1,975	2,490	1,794	2,140

SOURCE: ECLA.

* At 1953 prices.

With the estimates of the active population completed, the variations in productivity per active person must still be established, and this information is summarized in table 208.

The progress achieved in productivity per working-day, in conjunction with the greater number of days worked in the year, results in improvements in productivity which according to hypothesis A would amount to 31 per cent in 1960 and to 65 per cent in 1965 in relation to 1953. The expansion would be slower in the case of hypothesis B, especially in the first stage (24 per cent), mainly because the number of days worked would remain static. As this number increased in the second stage, the increment would become more significant, reaching a level of 42 per cent higher than in 1953.

V. INVESTMENT

The following sections contain an estimate of the investment that would be necessary to attain the objectives previously described. The analysis will cover investment aimed at extending the agricultural area on the one hand, and at improving yields on the other. Mention will also be made of investment in mechanization and rural housing.

1. Irrigation and drainage

In calculating investments in irrigation and drainage an average cost of 1,000 pesos per hectare was assumed for irrigation works, 1,150 pesos for works including both irrigation and drainage, and 150 pesos for drainage works alone. Clearing of the land for cultivation was estimated at 200 pesos and reclamation for pasturage at 100 pesos per hectare. Table 103 of the *Statistical Appendix* comprises the estimates of aggregate investment in irrigation and drainage works and in clearing, for hypothesis A and B and for the years 1960 and 1965.⁸⁴

⁸⁴ See table 209 below for a summary of the aggregate results of this and the other calculations described in the following paragraphs.

It is assumed that investment in irrigation and drainage, as well as in clearing, does not undergo depreciation through use, and that therefore no item for replacements need be included under this head.

2. Plantations

Table 104 in the *Statistical Appendix* comprises the figures for the extension of the areas under permanent plantations and sugar-cane, estimates of cost per hectare in each case of expansion, and the net investment that would be necessary to bring such new areas into production. Renovation costs were assessed on the basis of the plantations which existed in 1953 and of those now projected, at their original estimated investment value. The annual rates of renovation adopted correspond to the period of economic production estimated for each species, as shown in table 105 of the *Statistical Appendix*.

For new plantations, depreciation was assessed on the basis of linear development of investment in each period covered by the projections. Table 106 in the *Statistical Appendix* shows the estimated net and gross investment that would be required for existing plantations and those projected in the present study.

3. Artificial pastures

Net investment in the formation of artificial pastures that would be required to increase the forage area, and renovation costs for existing and projected pasturelands, were estimated by the method described in the case of permanent plantations. The average useful life of a tract of artificial pasture is calculated to be 10 years, and the cost of formation 50 pesos per hectare. Here only special direct expenditure is considered, that is, outlays on seeds, soil preparation — not clearing — and the necessary labour. Table 107 in the *Statistical Appendix* contains the figures for extension of the area under artificial pasture and the corresponding investment, and table 108 shows the estimated net investment, renovation costs and gross investment for the two periods covered by the

projections. Expenditure on renovation of the new pasturage covers only that relating to the net increase shown in the table mentioned.

4. Fences

To estimate investment in new barbed wire fences, the density of the fencing existing in 1953 was calculated. This would seem to have amounted to 19.30 linear metres per hectare under crops, and 17.40 linear metres for each hectare used for forage. On this basis an estimate was made of fence requirements for all the areas to be cleared, which would thus be provided with the same proportion of fencing as the land already farmed in 1953. A similar procedure was followed for that part of the livestock area which would have to be taken over for crops. Since the difference in the density of fences per hectare between the forage and crop areas is 1.90 linear metres, fencing on all the stock farming land transferred to crops would have to be increased by the amount of that difference.

It should be recalled that part of the increments in yields — especially in the case of livestock, in so far as the density of the animal population is concerned — would come from an improvement in pasture management, which would imply a reduction in the size of grazing-grounds, and, to this end, heavier investment in fencing. This is why the projected increase in the density of fences in 1960 is equivalent to 25 per cent in relation to 1953, and a further 15 per cent in 1965 over the 1960 figure (see *Statistical Appendix*, table 109).

Investment in replacement is estimated on the assumption that fences would last an average of 15 years. The depreciation quota for new fences is calculated on the basis of a linear increment in the investment corresponding to each of the periods covered by the hypotheses. In table 110 estimated net and gross investment requirements for fences are presented.

5. Buildings and installations

Table 111 in the *Statistical Appendix* gives estimates of the net investment that would have to be placed in farm buildings and installations. The criteria used in projecting such investment differ for each item and on each hypothesis, as will be explained below.

Hypothesis *A*, in so far as it relates to the development of the population, assumes that the rural population will be smaller in 1960 and 1965 than in 1953, while hypothesis *B* postulates that it will increase throughout the period covered by the projection. On these bases, it is calculated that on hypothesis *A* the number of farm dwellings might be 10 per cent and 18 per cent higher in 1960 and 1965, respectively, than in 1953. On hypothesis *B*, new investment in farm dwellings would increase at the same estimated rate as the population.

In the group "Other buildings" appearing in the table referred to, the projection was made in accordance with the rate of growth of agricultural production on each of the hypotheses, augmented in both cases by 10 per cent in 1960 and 18 per cent in 1965. A similar method was applied to the projection of new investment in the group "Other installations".

It is assumed that new investment in coffee and *panela* installations would necessarily rise in proportion to the expansion of the production concerned on each hypothesis.

To calculate depreciation on new investment, linear growth of the latter is assumed for each of the periods covered by the projections.

An annual depreciation rate of 2 per cent was selected for dwellings, and 3 per cent for other buildings and for installations.

Table 112 in the *Statistical Appendix* shows the net and total investment required to cover the expansion of farm buildings and installations.

6. Mechanization

To estimate the future increase in mechanization, it was necessary to distinguish between machinery for which 1953 inventory figures were obtainable, and that for which only the original over-all value paid by the farmers was known. The first group is called "Classified farm machinery", and the second "Unclassified farm machinery".

The density per hectare of each type or species of machinery was deduced for the first group, for which purpose the number of units existing in 1953 was compared with the total area sown to those crops for which it was possible to utilize them. The probable increase in their density in 1960 and 1965 was next assessed, on the basis of the density in 1953, and the possibility and advisability of intensifying the utilization of each type or species of machinery. It was also taken for granted that increases in the crop and livestock areas would have to be made up of flat ground. The higher densities thus estimated were applied to hypothesis *A*.

Densities in the case of hypothesis *B* were taken to be 60 per cent of those postulated by hypothesis *A* for machinery for the crop sector, and the same as in hypothesis *A* for tractors and other machinery to be used on stock farms.

The purpose of table 113 in the *Statistical Appendix* is to determine the number of units desirable in each type of machinery. Net increments over the base year (1953) are also noted.

Table 114 in the *Statistical Appendix* gives an estimate of average unit prices for each type of machinery and of the net investment called for by the proposed increases in mechanization.

As regards the unclassified group of machinery — of which only the original total value in the base year is known — it was estimated that the minimum additional requirements over and above 1953 stocks should reach, in accordance with hypothesis *A*, 20 per cent by 1960, and 40 per cent by 1965. In the case of hypothesis *B*, the increments are equivalent to 60 per cent of those envisaged for hypothesis *A*. Table 115 in the *Statistical Appendix* is intended to show estimated investment in unclassified agricultural machinery.

To calculate investment in replacement, with respect both to base-year and projected additional stocks, the average useful life of the different types of machinery

was estimated, as can be seen in table 116 of the *Statistical Appendix*. Replacement expenditure on farm machinery is detailed in tables 117 and 118 of the *Appendix*.

To estimate investment in the replacement of net additions to farm machinery, separate assumptions were postulated for the linear growth of stocks in each of the two periods covered by the projections. Table 118 in the *Statistical Appendix* shows net and total investment in agricultural machinery.

It may be remarked that the hypotheses of the increases in mechanization are consistent with the hypotheses of improvements in the productivity of labour per unit of cultivated area.

The investments analysed under the preceding heads are essentially those aimed at extending the agricultural area and improving its utilization. The following paragraphs will be devoted to an analysis of investment to increase yields. It must be made clear that the scanty basic information available allowed of only rough assumptions. The resulting figures for this type of investment, nevertheless, give some idea of the magnitude of the problems that would have to be solved in order to improve supplies of fertilizers and pesticides, and of pedigree stud animals. An impression may also be formed of the resources needed for more comprehensive activities in the fields of agricultural research, extension and control services. Obviously, the perfecting of this kind of work would call for more detailed investigation of all aspects of new investment in the agricultural sector.

7. Fertilizers

To estimate investment in fertilizers, account was taken of the degree in which they were utilized in 1953, which was exceptionally low, and of the necessity to make much greater use of them, in combination with the other technical measures proposed, in order to attain the projected increases in unit yields. In this context, consideration was given to the satisfactory results already obtained in the various experiments carried out in Colombia with different crops. It was also assumed that fertilizers would not be applied to all crops, since problems would be created by the lack of research and the difficulty of agricultural extension because of the existence of innumerable small farms. Hence it was deduced that 50 per cent of the cultivated area could be fertilized in 1960 and 1965. With this prospect in mind, estimates were made of average consumption of fertilizers per hectare under crops, which proved moderate, but which might perhaps be sufficient to contribute to a considerable improvement in unit yields. The consumption of fertilizers per hectare under cultivation envisaged for 1960 was increased by 30 per cent for 1965.

Table 119 in the *Statistical Appendix* comprises estimates of the net investment that would be entailed by the increased application of fertilizers in both projections for 1960 and 1965. The additional consumption in one year was taken as investment, since once the fertilizers were applied to the crop the investment would be returned to the farmer at the end of some months, through the improvement of his harvest. The same

table gives the total annual consumption of pure nutrient calculated for each type of fertilizer, on both hypotheses.

Lastly, table 120 of the *Appendix* shows the total investment required by the increase in fertilizer consumption.

8. Pesticides

Control of plant and animal pests and diseases is fast spreading in Colombia, in view of the successes achieved through the use of resistant species and varieties and the employment of pesticides.

The use of the latter has become almost universal in the areas where crops such as tobacco, cotton, potatoes and bananas for export—to name only a few—are grown. The application of weed-killers is also becoming common. The results, evidenced by better harvests, warrant the estimate that the average consumption of pesticides per hectare under cultivation in 1960 and 1965 should exceed that registered in 1953 by 50 and 100 per cent respectively.

Table 121 in the *Statistical Appendix* contains estimates of the total and net investment that would be entailed by this increase in the use of pesticides. As with fertilizers, the additional expenditure over one year is considered as investment, since it returns to the farmer in the form of improved harvests, sometimes even obtained twice yearly.

9. Imports of pedigree livestock

It has already been observed that an increase in livestock yields would largely have to be sought in an improvement of the breeds which make up the bulk of the country's inventories. Mention has also been made of the advantages of crossing certain foreign strains with the beef and dairy cattle of creole stock.

This was the factor borne in mind in the projecting of investment in imports of stud animals. In the case of cattle, technical experts from the Ministry of Agriculture consider annual average imports of 5,000 bulls and 4,000 breeding heifers sufficient to achieve the desired improvements within a reasonable time.

The need to import stud animals of other species is also taken into account. Table 122 in the *Statistical Appendix* contains estimates of investment in pedigree stock.

For the reasons adduced elsewhere in this study, a similar volume of investment is envisaged for both hypotheses of economic growth, so far as livestock production is concerned.

10. Development services

Research is one of the vital aspects of any attempt at agricultural development. In the long run the productivity of capital in this field probably exceeds that of any other investment aimed at agricultural expansion. In recent years much progress in the relevant techniques has been achieved in Colombia, but research is still proceeding on a rather limited scale in relation to the country's requirements. Important results have already

TABLE 209. COLOMBIA : PROJECTIONS OF AGRICULTURAL INVESTMENT

(Millions of pesos at 1953 prices)

	1953 to 1960			1960 to 1965			Total for 1953-65		
	Net Investment	Replacements	Total	Net Investment	Replacements	Total	Net Investment	Replacements	Total
<i>Hypothesis A</i>									
<i>Investment to increase the area farmed</i>									
Irrigation and drainage	168.0	—	168.0	167.3	—	167.3	335.3	—	335.3
Clearing	126.0	—	126.0	94.1	—	94.1	220.1	—	220.1
Plantations	111.8	227.5	339.3	69.6	178.3	247.9	181.4	405.8	587.2
Artificial pastures	31.2	363.4	394.6	48.0	279.4	327.4	79.2	642.8	722.0
Fences	51.7	73.8	125.5	44.2	68.3	112.5	95.9	142.1	238.0
Buildings and installations ...	457.6	468.2	925.8	377.4	388.6	766.0	835.0	856.8	1,691.8
TOTAL	946.3	1,132.9	2,079.2	800.6	914.6	1,715.2	1,746.9	2,047.5	3,794.4
Mechanization	125.5	257.9	383.4	95.1	249.2	344.3	220.6	507.1	727.7
TOTAL	1,071.8	1,390.8	2,462.6	895.7	1,163.8	2,059.5	1,967.5	2,554.6	2,522.1
<i>Working capital</i>									
For more extensive use of fertilizers	87.5	—	87.5	46.6	—	46.6	134.1	—	134.1
For more extensive use of fungicides	8.3	—	8.3	8.8	—	8.8	17.1	—	17.1
For increasing improved strains of livestock	86.0	—	86.0	61.0	—	61.0	147.0	—	147.0
Other working capital requirements *	526.3	—	526.3	429.0	—	429.0	955.3	—	955.3
TOTAL	708.1	—	708.1	545.4	—	545.4	1,253.5	—	1,253.5
GRAND TOTAL	1,779.9	1,390.8	3,170.7	1,441.1	1,163.8	2,604.9	3,221.0	2,554.6	5,775.6
<i>Hypothesis B</i>									
<i>Investment to increase the area farmed</i>									
Irrigation and drainage	116.5	—	116.5	147.3	—	147.3	263.8	—	263.8
Clearing	105.5	—	105.5	90.1	—	90.1	195.6	—	195.6
Plantations	94.3	225.0	319.3	61.5	174.1	235.6	155.8	399.1	554.9
Artificial pastures	30.2	363.0	393.2	47.6	278.8	326.4	77.8	641.8	719.6
Fences	50.2	73.5	123.7	43.6	67.8	111.4	93.8	141.3	235.1
Buildings and installations ...	354.5	460.9	815.4	212.1	368.6	580.7	566.6	829.5	1,396.1
TOTAL	751.2	1,122.4	1,873.6	602.2	889.3	1,491.5	1,353.4	2,011.7	3,365.1
Mechanization	87.6	243.6	331.2	78.5	222.4	300.9	166.1	466.0	632.1
TOTAL	838.8	1,366.0	2,204.8	680.7	1,111.7	1,792.4	1,519.5	2,477.7	3,997.2
<i>Working capital</i>									
For more extensive use of fertilizers	83.6	—	83.6	44.1	—	44.1	127.7	—	127.7
For more extensive use of fungicide	7.6	—	7.6	8.3	—	8.3	15.9	—	15.9
For increasing improved strains of livestock	86.0	—	86.0	61.0	—	61.0	147.0	—	147.0
Other working capital requirements *	518.0	—	518.0	305.5	—	305.5	82.5	—	823.5
TOTAL	695.2	—	695.2	418.9	—	418.9	1,114.1	—	1,114.1
GRAND TOTAL	1,534.0	1,366.0	2,900.0	1,099.6	1,111.7	2,211.3	2,633.6	2,477.7	5,111.3

SOURCE : See *Statistical Appendix*, tables 103-122.

* Estimate based on the figure for 1953 and the increase in the quantum of agriculture production.

been obtained in the study of new varieties of wheat, maize, potatoes, beans, cotton, coffee, cacao, sugar-cane, etc. ; in the application of fertilizers and pesticides ; in the understanding of soil conservation problems ; and in certain aspects of stock farming. But such results have been applied only in limited areas. Consequently, there is still vast scope for research, both as to specific crops and stock farming and as to cultivation techniques and livestock management, the latter being spheres in which little or nothing has been done.

Moreover, extension activities are still conducted on a limited scale, and their range should be broadened in order that the results of research may be applied in practice.

It is assumed that agricultural training programmes for technical experts and for crop and stock farmers would have to be reinforced, and that agricultural and livestock control and protection services, as well as those handling seed distribution, insemination and other farm requirements, should be improved.

Broadly speaking, all these functions are at present the responsibility of the Ministry of Agriculture the agricultural services of the departmental authorities, the *Caja de Crédito Agrario*, the *Federación de Cafeteros*, the *Instituto de Fomento Algodonero*, the *Federación de Arroceros*, the *Asociación de Ganaderos*, etc.

For want of data, the joint total expenditure of all these organizations on agricultural development could be only roughly estimated, at about 32 million pesos in 1953.

It has been estimated that this annual level of expenditure would have to be doubled in the next few years, and that the best results could be obtained by close liaison between the various organizations concerned.

In these circumstances, annual expenditure on development services should rise to 64 million pesos on both hypotheses. Consequently, investment would total 224

million pesos in the period 1953-60 and 160 million in 1960-65.

11. Total investment

Table 209 summarizes the aggregate investment required to attain the targets set in the projections of demand for agricultural products. This table does not include increments in animal stocks, except for imports of stud animals. In any case, the value of aggregate increases in livestock numbers is included later when the productivity of capital is analysed.

12. Investment to be effected in foreign currency

The following criteria were adopted in order to make a very provisional estimate of foreign exchange investment requirements. The value of imported equipment for irrigation and drainage works is estimated at 15 per cent of total investment. Imports of equipment for clearing are grouped under machinery and tractors. Local currency alone would be necessary for investment in plantations and artificial pastures. It is assumed that domestic industry would provide all the wire and staples required for fences, as well as installations for coffee, *panela*, cacao, etc.

According to estimates, the domestic industry would provide 15 per cent of all investment requirements for mechanization in 1960, and 25 per cent in 1965, on both hypotheses. Fertilizers would be imported, with the exception of 5,400 tons of phosphates, 12,000 tons of nitrogen, and the whole of the lime needed, all of which items would be supplied by domestic production. All investment in pesticides would require foreign exchange, since these would have to be imported ; the same would apply to stud animals. Foreign exchange for the purchase of equipment and other materials would account for 5 per cent of total investment in development services. Table 210 presents the relevant figures for each hypothesis.

TABLE 210. COLOMBIA : PROJECTIONS OF ANNUAL FOREIGN EXCHANGE REQUIREMENTS

	Millions of pesos at 1953 prices				Millions of dollars *			
	Hypothesis A		Hypothesis B		Hypothesis A		Hypothesis B	
	1953-60	1960-65	1953-60	1960-65	1953-60	1960-65	1953-60	1960-65
<i>Investment during the period</i>								
(Annual averages)								
Irrigation and drainage ...	3.6	5.0	2.5	4.4	1.2	1.7	0.9	1.5
Mechanization	46.6	58.5	35.5	45.1	16.1	20.2	12.2	15.6
Improved livestock	12.3	12.2	12.3	12.2	4.2	4.2	4.2	4.2
TOTAL	62.5	75.7	50.3	61.7	21.5	26.1	17.3	21.3
<i>Annual imports</i>								
Fertilizers	70.8	112.2	67.4	106.4	24.4	38.7	23.2	36.7
Fungicides	18.4	27.2	17.7	26.0	6.3	9.4	6.1	9.0
Development services	1.6	1.6	1.6	1.6	0.6	0.6	0.6	0.6
TOTAL	90.8	141.0	86.7	134.0	31.3	48.7	29.9	46.3
GRAND TOTAL	153.3	216.7	137.0	195.7	52.8	74.8	47.2	67.6

SOURCE : ECLA estimates.

* For the dollar estimates an exchange rate of 2.90 to the dollar was utilized.

13. *Productivity of investment*

Productivity of fixed capital seems to have stood at 0.39 in 1953. In virtue of the new investment, a considerable improvement is postulated for 1960 and 1965 on hypothesis *A*, since the product capital ratio would vary from 0.45 to 0.49 between these two periods. Table 211 gives the appropriate figures.

The analysis of new investment by uses shows that capital intended to improve yields would have a product

capital ratio of 1.98 in 1960 and 2.24 in 1965 on hypothesis *A*, and of 1.67 and 1.94 respectively, on hypothesis *B*, while total gross new investment would attain product capital ratios only slightly higher than those estimated for total capital during the years in question. This confirms previous statements to the effect that the investment in the agricultural sector of which the productivity would be highest, would be that designed to increase yields on the basis of an improvement in farming techniques. Table 212 presents estimates on the productivity of new investment.

TABLE 211. COLOMBIA : PRODUCTIVITY OF CAPITAL

(Millions of pesos)

	Hypothesis A		Hypothesis B	
	1960	1965	1960	1965
Stock of capital in 1953 :				
Total ^a	9,644.3	9,644.3	9,644.3	9,644.3
Fixed ^b	8,236.7	8,236.7	8,236.7	8,236.7
Net increase over 1953 :				
Total ^a	1,779.9	3,221.0	1,534.0	2,633.6
Fixed ^b	1,253.6	2,265.7	1,016.0	1,810.1
Increase in livestock population over 1953 ^c	776.0	1,211.0	757.0	1,184.0
Stock of capital :				
Total ^a	12,200.2	14,076.3	11,935.3	13,461.9
Fixed ^b	10,266.3	11,713.4	10,009.7	11,230.8
Agricultural production (Value added) ^d . . .	4,602.8	5,635.8	4,397.9	5,317.7
Annual increment in livestock population ^e .	93.7	75.2	91.4	73.8
TOTAL	4,696.5	5,711.0	4,489.3	5,391.5
Productivity of capital :				
Total	0.38	0.41	0.38	0.40
Fixed	0.46	0.49	0.45	0.48

SOURCE : ECLA estimates.

^a Including working capital.^b Excluding working capital.^c Figures for the increase in livestock (thousands of head), evaluated at producer prices.^d The value added was estimated at 88.18 per cent of agricultural production.^e Annual value added, estimated at 84.6 per cent of "c".

TABLE 212. COLOMBIA : PRODUCTIVITY OF NEW INVESTMENT

(Millions of pesos at 1953 prices)

	Hypothesis A		Hypothesis B	
	1953-60	1953-65	1953-60	1953-65
Investment to increase yields	405.8	682.2	401.2	674.6
Net investment to increase the area farmed	1,071.8	1,967.5	838.8	1,519.5
Total net investment	1,477.6	2,649.7	1,240.0	2,194.1
Value added of production increments :				
Deriving from increases in yields	801.8	1,530.7	668.7	1,307.9
Deriving from the expansion of the area farmed	460.0	761.4	388.4	668.0
Annual increment in livestock population	110.8	87.0	108.1	85.4
Total increment	1,372.6	2,379.1	1,165.2	2,061.3
Marginal productivity of investment to increase yields	1.98	2.24	1.67	1.94
Marginal productivity of investment to increase the area farmed	0.43	0.39	0.46	0.44
Marginal productivity of total investment	0.93	0.90	0.94	0.94

SOURCE : ECLA estimates.

Chapter III

ANALYSIS OF THE INDUSTRIAL SECTOR

I. INTRODUCTION

One of the most striking features of Colombia's economic development during the last twenty years has been the accelerated rate of industrialization achieved. This rapid growth of industry was accompanied not only by substantial increases in the productivity of the national economy, and a consequent rise in income, but also by important changes in the distribution of the population between urban and rural areas, in the composition of imports and in the possibility of raising the rate of investment.

The contribution of industry was decisive in securing a high rate of growth for Colombia's economic development during the post-war years. In fact, whilst in the economy as a whole the *per capita* gross product increased from 1945 to 1953 at an average annual rate of 3.6 per cent, in the industrial sector the annual increment in the *per capita* gross product amounted to 6.9 per cent over the same period, thus mitigating the effects of the relatively slow development of the other sectors.

This means that industry has of late come to represent a higher percentage of total national income in Colombia than in any other Latin American country, with the single exception of Argentina. According to preliminary estimates for 1954, the share of the industrial sector in the whole of the gross product was 24.1 per cent in Argentina, 21.0 per cent in Colombia — including both manufacturing and artisan sectors (17.2 per cent and 3.8 per cent respectively) — between 18 and 19 per cent in Brazil, Chile and Mexico and 18.7 per cent in the region as a whole. Even allowing for the caution required in dealing with statistics,¹ considerable significance attaches to the position thus held by Colombia's industry, especially when it is remembered that average *per capita* income is lower in this country than in several of the others mentioned.

An accurate assessment of the part played by industrial expansion in Colombia's economic development is important not merely from the point of view of a historical analysis of events, but mainly because of its potential significance for the prospects of future development. For the rate of increase of real income between the years 1945 and 1953 to be maintained, for example,

¹ The principal reason for such caution lies in the differing coverage of industrial censuses. The percentage for Colombia was determined on the basis of (1) the preliminary results of the 1953 Industrial Census, taking into consideration all the establishments covered by the survey, which included a proportion of manual industries, and (2) an estimate of the artisan sector not included in the 1953 Industrial Census.

it would be necessary for the manufacturing sector not only to maintain in its turn the rapid rate of development already achieved, but even to surpass it, in order to offset the adverse influences likely to be exerted by other factors. In fact, a substantial proportion of the increment in real income during the post-war period is attributable to the considerable improvement in the terms of trade; in the first half of 1955, however, they deteriorated to a marked degree, and it would be extremely hazardous to forecast a new recovery whereby 1953 levels could be exceeded to the same extent as were those of preceding years from 1945 onward. Only through an intensification of the development of the producer sectors would it be possible to prevent a falling-off in the rate of growth attained during the post-war period.

Furthermore, the effect of the improvement in the terms of trade not only contributed to the rapid rise in real income, but also appreciably expanded the capacity to import. This enabled import requirements — of consumer goods as well as of intermediate products and capital goods — to be met with some degree of ease. Nevertheless, if the projections of the capacity to import are set over against the greater demand for manufactured goods which would result from the probable increase in income and the development of the productive sectors, it is clear that one of the prerequisites for such development would be the stimulation of import substitution. Even though numerous opportunities for substitution present themselves in other sectors of the economy, it will undoubtedly be industry that continues to bear the brunt of this process. Some assessment of the approximate volume of manufactured goods which will be required in the future as well as a comparison of this estimate with the probable capacity to import, is therefore indispensable for an appraisal of the effort that must be put into industrial expansion in order to achieve a given rate of growth for *per capita* income.

An opportunity will arise later for more detailed consideration of a number of comparisons which show that in Colombia the demand for manufactured goods has tended to increase much more rapidly than income. This conclusion is, of course, generally applicable; in the case of the Colombian economy, however, it is not merely a consequence of the rise in income, but is also strengthened by other factors. Among these, special mention should be made, firstly, of the extent to which current *per capita* consumption of several kinds of manufactured goods differs from that registered in other countries where the *per capita* income is similar; and,

secondly, of the high rate of growth of the urban population.

Furthermore, it is not only the demand for end consumer goods which must be met by industrial development. The expansion of the producer sectors themselves also demands larger supplies of the raw materials and intermediate products needed in the process of production, as well as of the capital goods required to increase productive capacity. This underlines one of the most striking features of Colombia's industry, which has concentrated on the production of direct consumer goods, while that of durable consumer goods, intermediate products and capital goods has lagged behind. Consequently, a high degree of import substitution has been attained in non-durable consumer goods, but imports have continued to account for a considerable percentage of the supply of other types of manufactured products (not less than 49.5 per cent of durable consumer goods, 29.0 per cent of intermediate products, and 62.3 per cent of capital goods).

Hence, not only is the rapid development of industry as a whole an essential condition for the maintenance of a high rate of growth of income, but important modifications will have to take place in the composition of the manufacturing sector itself. The establishment of industry upon a broader basis, so as to include hitherto under-developed lines of production, will increase income from manufacturing and facilitate the replacement of imports which may prove difficult to finance within the future capacity to import. It will also impart greater stability to the industrial nucleus, making it rather more independent of any unfavourable international contingencies which may arise. It was precisely these limitations of productive capacity with respect to intermediate products and capital goods which, during certain periods in the past, prevented Colombia's industry from making the fullest possible response to strong incentives to import substitution; it is sufficient to point out, for example, that it was between the years 1940 and 1945 that industry in Colombia registered one of the lowest rates of growth in the last twenty years.

It must be acknowledged that considerable progress has recently been made in this direction, notably through the construction of the Paz del Rio iron and steel works and the development of certain basic chemicals industries. The exigencies of future development will probably call for further efforts of similar scope; the need may arise, for instance, for a rapid and intensive expansion of the mechanical and metallurgical industries, and of numerous branches of the chemicals industry.

Apart from actual quantitative increases in the supply of domestically manufactured goods, it is also to be expected that a process already in evidence in the course of previous industrial development will be intensified: namely, the changeover from artisan trades to industry proper. Several indices show that the relative importance of artisan labour within manufacturing as a whole is still considerable, and that it even predominates in many specific branches of industry. Operation on a larger scale and the adoption of modern production techniques might in the future have favourable repercussions on the

productivity of industry, while the consequent decrease in production costs might expand consumption.

In the following analysis an attempt is made to deal with these problems as a whole, and to set up a general framework within which the alternative prospects for industrial development and their various problems may be methodically examined. The analysis of these prospects is based on the characteristics of demand, current levels and conditions of production, productive capacity, manpower requirements, availability and future requirements of intermediate products and capital goods, projections of the capacity to import, import substitution needs, and so forth. Due attention is also paid to the influence exerted upon industrial development by tariff, fiscal and credit policy, by the present and possible future distribution of industrial production among the various geographical areas, and by the role of foreign capital and techniques in the industrial sector.²

The first stage of the analysis is devoted exclusively to an examination of the characteristics of demand for the various types of manufactured goods. This was given priority in the belief that only through an assessment of the volume and composition of future demand, and the projections of the capacity to import, can the development needs of industry as a whole, and of its principal branches, be deduced. In the second stage, the historical development of Colombian industry and its present characteristics are examined, so as to prepare a basis for an assessment of future development possibilities and the main obstacles and incentives which may present themselves. In the third and final stage, the data already given will be used to draw up alternative projections of the future demand for manufactured goods, to examine the form in which imports and domestic production may contribute to the satisfaction of such demand, and to consider the requirements in terms of raw materials, intermediate products, capital goods and other inputs which the programmed development of domestic industrial production would imply.

II. ANALYSIS OF THE DEMAND FOR MANUFACTURED GOODS

1. *Availability of manufactured goods in 1953, by sectors of origin and use*

An analysis of the demand for manufactured goods must be based on detailed statistical research to establish what proportion of income was spent on manufactured goods as a whole, and by categories, taking into account the volume of end goods available, broken down by producer industries, and the volume of intermediate products classified under both the branch of industry producing them and the manufacturing sector by which they are to be used. Furthermore, among end products a distinction must also be made between non-durable consumer goods, durable consumer goods and capital goods.

² In the following sections, these aspects are related to over-all industrial production and to its main branches. A more detailed examination of specific industrial sectors is to be found in annex IX: "Manufactured goods: characteristics of production and demand in the main branches of industry".

The need for a classification of this kind principally arises from the differing criteria upon which estimates of the future behaviour of demand for each of these types of product may be based. For example, it will be reasonable to assume that fluctuations in the demand for consumer goods principally depend upon the growth of real income (or, to be more exact, on that of the real

per capita income available for consumption); the income-elasticity coefficients derived from various sources can therefore be used as projection criteria. The demand for intermediate products is in its turn determined by the amount of those commodities required for the processing of end goods. In the case of intermediate products not manufactured locally, demand will also depend

TABLE 213. COLOMBIA : COMPOSITION OF INPUT AND OUTPUT OF T

(Thousa...)

Raw materials and intermediate products

Producer industry	Consumer industry →	Raw materials and intermediate products										
		Foodstuffs	Beverages	Tobacco	Textiles	Footwear and clothing	Wood and cork	Wooden furniture	Paper	Printed matter	Leather	Rubber
Agricultural and livestock production ⁴	Total	1,222,388	46,328	30,465	50,664	11,565	9,310	423	112	—	27,462	7,177
	Domestic	1,187,524	37,311	30,465	60,664	11,565	9,310	423	112	—	27,462	1,277
	Imports	34,864	9,017	346	36,526	11	—	14	—	—	—	5,900
Mining	Total	937	—	—	96	10	—	10	—	—	250	5
	Domestic	837	—	—	96	10	—	10	—	—	250	—
	Imports	100	—	—	—	—	—	—	—	—	—	5
Foodstuffs	Total	110,164	15,501	12	25	—	—	—	5	—	15	—
	Domestic	97,666	15,284	12	25	—	—	—	5	—	15	—
	Imports	12,498	217	—	—	—	—	—	—	—	—	—
Beverages	Total	14	43,960	4	10	—	5	—	10	—	10	—
	Domestic	14	37,788	4	10	—	5	—	10	—	10	—
	Imports	—	6,172	—	—	—	—	—	—	—	—	—
Tobacco	Total	—	—	—	—	—	—	—	—	—	—	—
	Domestic	—	—	—	—	—	—	—	—	—	—	—
	Imports	—	—	—	—	—	—	—	—	—	—	—
Textiles	Total	10,999	2,080	85	36,550	126,522	—	900	600	176	1,267	7,827
	Domestic	10,797	2,069	85	16,734	115,813	—	436	302	114	1,095	3,207
	Imports	202	11	—	19,816	10,709	—	464	298	62	172	4,617
Footwear and clothing	Total	—	—	—	—	—	—	—	—	—	—	—
	Domestic	—	—	—	—	—	—	—	—	—	—	—
	Imports	—	—	—	—	—	—	—	—	—	—	—
Wood and cork	Total	305	607	815	27	1,172	16,557	13,134	60	130	153	—
	Domestic	305	607	815	27	1,072	16,557	13,129	60	130	153	—
	Imports	—	—	—	—	100	—	5	—	—	—	—
Wooden furniture	Total	—	—	—	—	—	—	—	—	—	—	—
	Domestic	—	—	—	—	—	—	—	—	—	—	—
	Imports	—	—	—	—	—	—	—	—	—	—	—
Pulp and paper	Total	8,391	141	2,563	704	687	—	54	7,153	17,629	111	—
	Domestic	7,816	31	631	704	507	—	15	1,260	748	100	—
	Imports	575	110	1,932	—	180	—	39	5,893	16,881	11	—
Printing and engraving, etc.	Total	439	1,315	2,636	1,198	37	—	—	3	—	—	—
	Domestic	413	1,315	2,636	1,198	37	—	—	3	—	—	—
	Imports	26	—	—	—	—	—	—	—	—	—	—
Leather	Total	—	—	—	10	53,198	—	561	—	52	9,193	7
	Domestic	—	—	—	10	50,175	—	557	—	48	9,034	7
	Imports	—	—	—	—	3,023	—	4	—	4	159	—
Rubber	Total	—	—	—	—	1,536	—	8	20	23	23	70
	Domestic	—	—	—	—	1,521	—	8	20	—	21	20
	Imports	—	—	—	—	15	—	—	—	23	2	50
Chemicals	Total	10,762	7,296	537	57,401	1,065	137	822	708	1,612	6,463	1,547
	Domestic	3,842	2,094	46	40,314	845	—	573	352	50	2,477	14
	Imports	6,920	5,202	491	17,087	220	137	249	356	1,562	3,986	1,407
Petroleum derivatives, and coal ⁵	Total	—	—	—	—	—	—	—	—	—	16	5
	Domestic	—	—	—	—	—	—	—	—	—	16	2
	Imports	—	—	—	—	—	—	—	—	—	—	3
Cement, ceramics, glass, etc.	Total	171	8,707	—	—	—	—	328	—	—	35	—
	Domestic	112	8,201	—	—	—	—	271	—	—	33	—
	Imports	59	506	—	—	—	—	57	—	—	2	—
Mechanical and metallurgical industries	Total	2,432	12,076	845	35	1,466	755	1,178	230	532	903	27
	Domestic	799	6,914	12	35	939	117	668	86	100	526	—
	Imports	1,633	5,162	833	—	507	638	510	144	432	377	27
Other industries	Total	984	1,029	35	366	2,726	155	140	103	416	1,233	1,537
	Domestic	557	186	35	359	2,214	10	55	13	90	285	62
	Imports	427	843	—	7	512	145	85	90	326	948	91

upon the capacity to import, and will be closely linked to the volume of import substitution achieved; this means that the composition of input in each sector must be taken into consideration, so as to determine the amount of intermediate purchases from other sectors which will have to be made if a given level of production is to be reached. Lastly, the demand for capital goods

arises from the investment requirements of the different sectors, due heed being paid in each case to necessary expansions of production, to the product-capital ratios concerned and to the margins of idle capacity possibly existing in these sectors. With the aim of facilitating an analysis of this kind, a table has been prepared, showing in outline the whole pattern of transactions between the

MANUFACTURING SECTOR, AND AVAILABILITY OF MANUFACTURED GOODS, 1953

(pesos)

emicals	Petro- leum deriva- tives and coal	Cement' ceramics and glass	Metallur- gical industries	Other industries	Total sales to manu- facturing sector	Sales to other sectors of pro- duction	Sales to final demand sectors ^b					Produc- tion plus imports of manu- factured goods	Availa- bility of manu- factured goods ^c
							Total	Exports ^a	Capital goods	Durable consumer goods	Non- durable consumer goods			Fuels and lubri- cants
15,539	—	—	279	—	1,468,607	—	—	—	—	—	—	—	—
12,665	—	—	279	—	1,379,051	—	—	—	—	—	—	—	—
2,874	—	—	—	—	89,556	—	—	—	—	—	—	—	—
4,555	62,953	21,733	130	—	90,724	—	—	—	—	—	—	—	—
4,069	62,953	17,430	130	—	85,783	—	—	—	—	—	—	—	—
486	—	4,303	—	—	4,939	—	—	—	—	—	—	—	—
679	—	—	37	—	126,438	14,200	1,615,631	806,000	—	—	809,631	—	1,756,269
558	—	—	—	—	113,602	14,200	1,603,849	806,000	—	—	797,849	—	1,731,651
121	—	—	—	—	12,836	—	11,782	—	—	—	11,782	—	24,618
1,568	—	—	—	—	45,581	2,300	444,532	—	—	—	444,532	—	492,413
1,551	—	—	—	—	39,392	2,300	437,308	—	—	—	437,308	—	479,000
17	—	—	—	—	6,189	—	7,224	—	—	—	7,224	—	13,413
—	—	—	—	—	—	—	99,416	10	—	—	99,406	—	99,406
—	—	—	—	—	—	—	96,688	10	—	—	96,678	—	96,678
—	—	—	—	—	—	—	2,728	—	—	—	2,728	—	2,728
638	—	—	149	—	187,787	12,000	329,223	2,040	576	332	326,275	—	529,010
198	—	—	149	—	151,000	12,000	317,277	2,040	—	—	315,237	—	480,277
440	—	—	—	—	36,787	—	11,946	—	576	332	11,038	—	48,733
—	—	—	25	—	25	—	364,768	410	—	—	364,358	—	365,793
—	—	—	25	—	25	—	361,597	410	—	—	361,187	—	361,622
—	—	—	—	—	—	—	3,171	—	—	—	3,171	—	3,171
2,022	—	584	3,067	—	38,633	1,200	13,622	110	7,729	786	4,997	—	53,455
2,009	—	380	2,593	—	37,837	1,200	10,313	110	7,203	—	3,000	—	49,350
13	—	204	474	—	796	—	3,309	—	526	786	1,997	—	4,105
—	—	—	—	—	—	—	45,806	10	10,796	35,000	—	—	45,806
—	—	—	—	—	—	—	45,806	10	10,796	35,000	—	—	45,806
—	—	—	—	—	—	—	—	—	—	—	—	—	—
5,092	—	5,302	1,786	—	49,613	100	13,419	15	253	891	12,260	—	63,132
2,773	—	4,920	1,538	—	21,043	100	9,231	15	—	500	8,716	—	30,374
2,319	—	382	248	—	28,570	—	4,188	—	253	391	3,544	—	32,758
1,349	—	—	31	—	7,008	—	68,197	30	—	5,075	63,092	—	75,205
1,319	—	—	31	—	6,952	—	64,216	30	—	4,000	60,186	—	71,168
30	—	—	—	—	56	—	3,981	—	—	1,075	2,906	—	4,037
21	—	—	42	—	63,156	—	25,043	3,130	1,418	19,706	789	—	88,199
21	—	—	25	—	59,949	—	23,836	3,130	1,000	19,706	—	—	83,785
—	—	—	17	—	3,207	—	1,207	—	418	—	789	—	4,414
95	—	—	650	—	3,055	—	70,924	5	37,586	15,179	18,154	—	73,979
95	—	—	285	—	2,150	—	60,408	5	31,413	13,000	15,990	—	62,558
—	—	—	365	—	905	—	10,516	—	6,173	2,179	2,164	—	11,421
29,857	220	5,895	2,921	—	127,241	17,056	184,339	480	17,020	1,173	165,665	—	328,635
9,618	—	4,130	1,228	—	65,712	3,830	137,459	480	11,300	—	125,679	—	207,001
20,239	220	1,765	1,693	—	61,529	13,226	46,879	—	5,720	1,173	39,986	—	121,634
5,255	—	—	62	—	5,391	—	137,853	690	—	—	—	137,163	143,244
453	—	—	62	—	552	—	80,629	690	—	—	—	79,939	81,181
4,802	—	—	—	—	4,839	—	57,224	—	—	—	—	57,224	62,063
5,534	—	7,533	228	—	22,536	—	178,266	1,300	148,784	27,454	728	—	200,802
1,792	—	5,851	—	—	16,260	—	161,413	1,300	140,373	19,740	—	—	177,673
3,742	—	1,682	228	—	6,276	—	16,853	—	8,411	7,714	728	—	23,129
1,889	—	10	45,195	—	67,816	3,624	757,437	440	616,771	135,457	4,770	—	828,877
1,449	—	—	7,926	—	19,591	—	153,948	440	115,787	37,399	322	—	173,539
440	—	10	37,269	—	48,225	3,624	603,489	—	500,984	98,057	4,448	—	655,338
1,301	—	1,615	2,146	9,397	23,178	—	38,037	40	1,410	15,134	21,462	—	61,215
689	—	1,540	300	6,397	13,352	—	16,451	40	—	—	16,411	—	29,803
612	—	75	1,846	3,000	9,826	—	21,586	—	1,401	15,134	5,051	—	31,412

TABLE 213. COLOMBIA : COMPOSITION OF INPUT AND OUTPUT OF T

(Thousa

Producer industry	Consumer industry —>	Raw materials and intermediate product										
		Foodstuffs	Beverages	Tobacco	Textiles	Footwear and clothing	Wood and cork	Wooden furniture	Paper	Printed matter	Leather	Rubbe
Domestic production : total		1,310,682	111,800	34,741	120,176	184,718	25,999	16,145	2,223	1,280	41,477	5,54
Manufacturing sector		122,321	74,489	4,276	59,416	173,143	16,689	15,712	2,111	1,280	13,765	4,27
Other sectors		1,188,361	37,311	30,465	60,760	11,575	9,310	433	112	—	27,712	1,27
Imports : Total ^a		57,304	27,240	3,602	73,436	15,277	920	1,427	6,781	19,290	5,657	13,68
Manufactures		22,340	18,223	3,256	36,910	15,266	920	1,413	6,781	19,290	5,657	7,73
Other commodities		34,964	9,017	346	36,526	11	—	14	—	—	—	5,95
Other expenditure on imports : total		61,461	25,860	2,286	44,608	15,214	845	1,311	3,492	7,674	3,987	7,30
Manufactures		24,264	17,388	2,067	22,425	15,199	845	1,297	3,492	7,674	3,987	4,22
Other commodities		37,197	8,472	219	22,183	14	—	14	—	—	—	3,07
Expenditure abroad		7,702	5,360	686	13,608	2,909	175	272	1,292	3,674	1,251	2,60
Manufactures		3,303	3,674	621	6,844	2,907	175	269	1,292	3,674	1,251	1,57
Other commodities		4,399	1,686	65	6,764	2	—	3	—	—	—	1,03
Customs duties		32,888	12,550	1,000	16,700	8,070	367	570	1,100	—	1,043	2,69
Manufactures		12,823	8,362	904	8,394	8,062	367	564	1,100	—	1,043	1,52
Other commodities		20,065	4,188	96	8,306	8	—	6	—	—	—	1,17
Expenditure within the country		20,871	8,000	600	14,300	4,234	303	469	1,100	4,000	1,693	2,00
Manufactures		8,138	5,352	542	7,187	4,230	303	464	1,100	4,000	1,693	1,13
Other commodities		12,733	2,648	58	7,113	4	—	5	—	—	—	87
Imports : total ^b		118,765	53,100	5,888	118,044	30,490	1,765	2,738	10,273	26,964	9,644	20,99
Manufacturing sector		46,604	35,611	5,323	59,335	30,465	1,765	2,710	10,273	26,964	9,644	11,96
Other sectors		72,161	17,489	565	58,709	25	—	28	—	—	—	9,03
Domestic production plus imports : Total		1,429,447	164,900	40,629	238,220	215,208	27,764	18,883	12,496	28,244	51,121	26,53
Manufacturing sector		168,925	110,100	9,599	118,751	203,608	18,454	18,422	12,381	28,244	23,409	16,23
Other sectors		1,260,522	54,800	31,030	119,469	11,600	9,310	461	112	—	27,712	10,30
Fuel and energy consumption		14,887	10,300	239	8,441	839	557	342	1,455	574	832	1,12
Fuels and lubricants		11,570	6,350	135	3,613	339	262	127	1,383	162	453	58
Electric energy		3,317	3,950	104	4,828	500	295	215	72	412	379	53
Value added		287,317	303,800	55,820	233,616	145,575	21,029	26,581	16,423	42,650	31,832	34,90
Gross value of production		1,731,651	479,000	96,688	480,277	361,622	49,350	45,806	30,374	71,168	83,785	62,55
Remunerations		68,846	57,700	12,703	85,745	44,192	6,830	10,366	5,148	21,677	11,946	7,90
Salaries and wages		62,323	47,500	11,166	74,640	41,391	6,402	9,779	4,629	19,606	11,004	7,09
Social security contributions		6,523	10,200	1,537	11,105	2,801	428	587	519	2,071	942	81
Number of persons employed		44,893	13,575	9,123	36,594	57,234	7,191	9,851	2,053	8,360	6,122	2,73

SOURCE : ECLA, on the basis of official statistics.

^a Estimate of values at factors sales prices, obtained by deducting 20 per cent from the corresponding f.o.b., values. ^b Except as regards exports, a certain degree of under-estimation of final demand for domestically produced commodities is implicit in these figures, because the value of production of end goods was determined by deduction of demand for intermediate products (assessed in terms of factory values at destination) from the gross value of production at factory sales prices. ^c Production plus imports minus exports. ^d Including forest and fishery products, and game. ^e See explanation as to treatment of this sector in the NOTE to the table. ^f Valued at factory prices in country of origin. ^g Raw materials and intermediate products, in terms of factor values at destination; and goods, in terms of c.i.f. values plus customs duties (including only manufactures).

NOTE : In the first place, a distinction is drawn in the table between transactions of the two following types : those conducted between enterprises, and involving raw materials and intermediate products ; and those relating to end goods not due to undergo any subsequent transformation, which are again broken down by consumer goods — durable and non-durable — capital goods and exports.

Furthermore, all goods whether from domestic sources or imported, are classified under the sector in which they are produced (producer industry or industry of origin). Thus the distribution of production and imports of each type of good is shown horizontally, and in the case of raw materials and intermediate goods the sector of destination is given (consumer industry or industry of destination) whereas end goods are classified in the several categories indicated.

Vertically, each of the columns corresponding to raw materials and intermediate products represents the purchases which the sector concerned had to make in order to meet its own production needs. The goods are thus classified by industry of origin.

various branches of industry, and the distribution of end products (see table 213). A note contained in a special annex to this study gives a brief description of the sources, methodology and limitations of the data included in this table ;³ it seems desirable, however, to lay emphasis here on certain of its more important aspects.

According to the data thus prepared, total production and imports of manufactured goods together amounted to 5,700 million pesos in 1953,⁴ or a little over 60 per cent of aggregate available goods and services. Industrial production stood at about 4,200 million pesos, repre-

sented in its turn more than 45 per cent of total available goods and services. The apparent discrepancy resulting from a comparison between the contribution of the industrial sector to national income on the one hand, and the total availability of goods and services on the other, emphasizes the extent of the interdependence of industry and the remaining sectors of the economy, especially that of agriculture, as a high percentage of agricultural products requires some final transforming process before being exported or becoming available for consumption. The figures in table 214 summarize certain of the most important over-all aspects included in table 213.

These figures also underline other important features of demand for manufactured goods in 1953. In the first

³ See annex VII.⁴ Including, for reasons to be indicated later, the value of total production of green coffee.

MANUFACTURING SECTOR, AND AVAILABILITY OF MANUFACTURED GOODS, 1953 (continued)

pesos)

	Sales to final demand sectors ^b											Production plus imports of manufactured goods	Availability of manufactured goods ^c	
	Petroleum derivatives and coal	Cement, ceramics and glass	Metallurgical industries	Other industries	Total sales to manufacturing sector	Sales to other sectors of production	Total	Exports ^a	Capital goods	Durable consumer goods	Non-durable consumer goods			Fuels and lubricants
39,259	62,953	34,251	14,608	6,397	2,012,253	33,630	3,580,421	814,710	317,872	129,345	2,238,563	79,939	4,161,476	3,346,766
22,525	—	16,821	14,199	6,397	547,417	—	—	—	—	—	—	—	—	—
16,734	62,953	17,430	409	—	1,464,836	—	—	—	—	—	—	—	—	—
36,135	220	8,421	42,140	3,000	314,536	16,850	806,083	—	524,462	126,841	97,556	57,224	1,042,974	1,042,974
32,775	220	4,118	42,140	3,000	220,041	—	—	—	—	—	—	—	—	—
3,360	—	4,303	—	—	94,495	—	—	—	—	—	—	—	—	—
18,382	110	4,604	18,026	2,326	217,491	10,790	362,211	—	137,317	81,831	93,094	49,969	515,252	515,252
16,662	110	2,261	18,026	2,326	142,251	—	—	—	—	—	—	—	—	—
1,720	—	2,343	—	—	75,240	—	—	—	—	—	—	—	—	—
6,880	40	1,604	8,026	800	56,886	3,208	154,405	—	99,858	24,150	18,575	11,822	199,086	199,086
6,230	40	794	8,026	800	41,473	—	—	—	—	—	—	—	—	—
650	—	810	—	—	15,413	—	—	—	—	—	—	—	—	—
5,500	30	2,000	5,000	800	90,267	4,044	207,806	—	37,459	57,681	74,519	38,147	266,790	266,790
4,988	30	978	5,000	800	54,940	—	—	—	—	—	—	—	—	—
512	—	1,022	—	—	35,327	—	—	—	—	—	—	—	—	—
6,002	40	1,000	5,000	726	70,338	3,538	—	—	—	—	—	—	49,376	49,376
5,444	40	489	5,000	726	45,838	—	—	—	—	—	—	—	—	—
558	—	511	—	—	24,500	—	—	—	—	—	—	—	—	—
54,517	330	13,025	60,166	5,326	532,027	27,640	1,168,294	—	661,779	208,672	190,650	107,193	1,558,226	1,558,226
49,437	330	6,379	60,166	5,326	362,292	—	—	—	—	—	—	—	—	—
5,080	—	6,646	—	—	169,735	—	—	—	—	—	—	—	—	—
93,776	63,283	47,276	74,774	11,723	2,544,280	61,270	4,748,723	814,710	979,651	338,017	2,429,213	187,132	5,719,702	4,904,992
71,962	330	23,200	74,365	11,723	909,709	—	—	—	—	—	—	—	—	—
21,814	62,953	24,076	409	—	1,634,571	—	—	—	—	—	—	—	—	—
4,773	1,056	16,423	3,530	493	65,861	—	—	—	—	—	—	—	—	—
2,509	703	13,035	2,108	336	43,674	—	—	—	—	—	—	—	—	—
2,264	353	3,388	1,422	157	22,187	—	—	—	—	—	—	—	—	—
108,452	16,842	113,974	95,235	17,587	1,551,335	—	—	—	—	—	—	—	—	—
207,001	81,181	177,673	173,539	29,803	4,161,476	—	—	—	—	—	—	—	—	—
32,853	9,110	35,358	39,790	6,537	456,710	—	—	—	—	—	—	—	—	—
29,610	8,051	31,398	36,490	6,017	407,098	—	—	—	—	—	—	—	—	—
3,243	1,059	3,960	3,300	520	49,612	—	—	—	—	—	—	—	—	—
13,304	1,553	22,290	22,317	4,480	261,671	—	—	—	—	—	—	—	—	—

ilarly, the columns for end goods, consumer goods, capital goods and exports broken down by industries of origin.

Although, broadly speaking, the table therefore represents the basic conception of input-output matrix, attention must be drawn to at least two limitations which should be borne in mind. These are as follows:

(a) *Method of valuation of imports.* The indication of the quantum of imports is important both from the standpoint of determining availabilities of manufactured goods and in order to assess possible import substitutions. However, the methods of valuation required for the obtaining of these two objectives are to some extent incompatible. In order to calculate total consumption of manufactures, these latter must be valued at domestic market prices, so that not only the c.i.f. value but also customs duties are included. If, on the other hand, the aim is to quantify possible import substitutions for each type of product, certain items which, like customs duties, do not

represent expenditure in the industrial sector itself, must be disregarded. The solution adopted in table 213 is more or less eclectic and not entirely consistent. The estimates given in connexion with the distribution of imports by industries of origin correspond to the factory value in the supplier country, while other expenditure incurred in the process of effecting such imports is shown separately; in addition, totals for intermediate products represent values at the consumer factory — including, that is, factory value at source, expenditure abroad, customs duties and expenditure within the country — whereas for final goods the c.i.f. figures plus customs duties are given as total values.

(b) *Distribution of domestic production.* From the direct estimates it was possible to work out the figures for purchases of intermediate products, to which factory values at destination are thus assigned; production of end goods, on the other hand, was estimated by deduction of intermediate transactions from gross production values, and is thus valued at producer prices slightly under-estimated.

place it may be noted that about 20 per cent of total production was exported, the principal item being coffee,⁵ while exports of typically industrial goods were of very little significance.

Of the aggregate availability of manufactured goods, about 20 per cent was constituted by intermediate products, which are absorbed in the production process itself and therefore do not enter the market for end goods; these latter accounted for the remaining 80 per cent of available manufactured goods. The ratio between

⁵ As explained in annex VII mentioned earlier, the broad definition of the manufacturing sector covers very primary stages in the processing of agricultural products; within the foodstuffs industries, for example, coffee-threshing is included, so that exports of this commodity appear as produced by the industrial sector.

end and intermediate products (1.8 to 1, approximately), reflects in turn the large proportion of imports within the supply of manufactured goods, for it is much less favourable than in more highly developed countries.⁶ In fact, the higher the share of imports in availabilities of manufactured goods, the lower will be the requirements of intermediate products.

Intermediate manufactured products were almost entirely absorbed by the industrial sector itself, the relatively small quantities destined for other sectors being chiefly composed of fertilizers, insecticides and a few by-products sold to the agricultural sector, and explosives for mining.

⁶ The input-output matrices prepared by the United States (1939) and Italy (1950) show similar ratios of 1 to 1 approximately.

TABLE 214. COLOMBIA : AVAILABILITY OF MANUFACTURED GOODS, 1953

(Thousands of pesos)

	Total	Domestic products	Imported products
Production and imports	5,719,702	4,161,476	1,558,226
Exports	814,710	814,710	—
<i>Availability</i>	4,904,992	3,346,766	1,558,226
Intermediate products	970,979	581,047	389,932
For use in the industrial sector	909,709	547,417	362,292
For use in other sectors	61,270	33,630	27,640
<i>End goods</i>	3,934,013	2,765,719	1,168,294
Capital goods	979,651	317,872	661,779
Durable consumer goods	338,017	129,345	208,672
Non-durable consumer goods	2,429,213	2,238,563	190,650
Fuels and lubricants	187,132	79,939	107,193

SOURCE : Figures taken from table 213.

Of the value of available end goods — slightly more than 3,900 million pesos — more than 2,700 million (or about 70 per cent) were contributed by consumer goods ; 25 per cent by capital goods ; and the remaining 5 per cent by fuels and lubricants. Almost 88 per cent of the consumer goods were for direct consumption, the balance being durable consumer goods. The amount of capital goods is worthy of emphasis, since their high proportion of the whole reflects a very satisfactory rate of gross investment.

About one-third of available manufactured goods was imported, indicating the considerable influence exerted by supplies from foreign markets. It should be borne in mind, however, that in these statistics the relative significance of imports appears exaggerated from some points of view, as the figures take into account not only the value of the goods in the producer factory, but also the other expenses mentioned. This outlay assumes considerable proportions (see table 215).

The share of imports in the availability of intermediate manufactured products was more pronounced than in that of end goods (40 and 30 per cent respectively). Among the latter, the proportion represented by imports was very high in the availability of capital goods and durable consumer goods (68 and 62 per cent respectively), and by no means inconsiderable in the case of fuels and lubricants (57 per cent of total availability). On the other hand, a progressive decline had reduced non-durable consumer goods to a very low level (barely 7.8 per cent of the total for this item).

These statistics give some indication of the form which a future import substitution policy would necessarily have to assume, shifting from production of non-durable consumer goods to the manufacture of intermediate products, capital goods and durable consumer goods.

TABLE 215. COLOMBIA : ESTIMATED COMPOSITION OF THE VALUE OF IMPORTS, 1953

(Thousands of pesos)

<i>Intermediate products</i>	
Factory value in country of origin	236,891
Expenditure abroad	44,681
Customs duties	58,984
Expenditure in the importer country	49,376
Factory value at destination	389,932
Percentage difference between factory values in country of origin and at destination	64.6 %
<i>End goods</i>	
Factory value in country of origin	806,083
Expenditure abroad	154,405
Customs duties	207,806
CIF value plus customs duties	1,168,294
Percentage difference between factory value in country of origin and CIF value plus customs duties	44.9 %

SOURCE : ECLA, on the basis of official statistics.

(a) *Intermediate products*

Table 216 allows of a more accurate assessment of the source of available intermediate products in 1953, broken down by industrial sectors.

It will be seen that the most significant figures are those for the textile, chemicals, foodstuffs, and mechanical and metallurgical industries, which in the aggregate contributed about 68 per cent of the total of goods of this type.

Although imports accounted for only 29 per cent of total available intermediate products,⁷ in two of the four branches mentioned more than half the available goods were imported : almost 52 per cent in the case of the chemicals industries, and more than 72 per cent in that of the mechanical and metallurgical industries. The proportion of imports was very low for processed foodstuffs, and could easily have been reduced even further, as imports partly competed with domestic production, for which the country possessed idle capacity that might well have been better exploited. Neither was the relative share of imports of intermediate products very large in the textile industry, and it tended to be progressively reduced. As will be pointed out in detail in annex IX to this study — which describes certain branches of industry at greater length — various factors determined its maintenance until 1953. These included the unsatisfactory quality of products necessary for certain types of made-up goods ; problems of protection (woollen yarns) ; the lack of specialized production equipment (canvas for tyres), and so forth. Little by little, however, many of these difficulties are being solved.

⁷ The figures included in this and the following tables are only estimates of the factory value of imports in the country of origin : they do not, therefore, coincide with those used in previous tables. The share of imports is thus *ipso facto* larger than the above figures would indicate.

TABLE 216. COLOMBIA : AVAILABILITY OF MANUFACTURED INTERMEDIATE PRODUCTS, BY PRODUCER INDUSTRIES, 1953

(Thousands of pesos)

Producer industry	Total	Domestic production	Imports	Imports as percentage of total availability
Foodstuffs	140,638	127,802	12,836	9.1
Beverages	47,881	41,692	6,189	12.9
Textiles	199,787	-163,000	36,787	18.4
Wood and cork	39,833	39,037	796	2.0
Pulp and paper	49,713	21,143	28,570	57.5
Printing, engraving, etc.	7,008	6,952	56	0.8
Leather	63,156	-59,949	3,207	5.1
Rubber	3,055	2,150	905	29.6
Chemicals	144,297	-69,542	74,755	51.8
Cement, ceramics, glass, etc.	22,536	16,260	6,276	27.8
Mechanical and metallurgical industries	71,440	19,591	51,849	72.6
Other industries *	28,594	13,929	14,665	51.3
TOTAL	817,938	581,047	236,891	29.0

SOURCE : ECLA, on the basis of official statistics.

* Includes small items comprising footwear and clothing, and petroleum and coal derivatives.

Among the remaining types of intermediate goods imports, those for the lumber, printing and leather industries were negligible, whereas beverages, rubber goods, cement, ceramics, glass and similar products accounted for rather more ; and lastly, a high proportion

of intermediate goods consisted of imports for the paper industry, comprising not only intermediate products to be used in the actual production of paper and board, but also other manufactured goods for intermediate purposes (mainly newsprint and printing paper).

TABLE 217. COLOMBIA : DEMAND FOR MANUFACTURED INTERMEDIATE PRODUCTS BY CONSUMER INDUSTRIES, 1953

(Thousands of pesos)

Consumer industry	Domestic production	Imports *	Total	Demand for intermediate products other than manufactures
Foodstuffs	122,321	46,604	168,925	1,260,522
Beverages	74,489	35,611	110,100	54,800
Tobacco	4,276	5,323	9,599	31,030
Textiles	59,416	59,335	118,751	19,469
Footwear and clothing	173,143	30,465	203,608	11,600
Wood and cork	16,689	1,765	18,454	9,310
Wooden furniture	15,712	2,710	18,422	461
Pulp and paper	2,111	10,273	12,384	112
Printing, engraving, etc.	1,280	26,964	28,244	—
Leather	13,765	9,644	23,409	27,712
Rubber	4,273	11,960	16,233	10,303
Chemicals	22,525	49,437	71,962	21,814
Petroleum and coal derivatives	—	330	330	62,953
Cement, ceramics, glass, etc.	16,821	6,379	23,200	24,076
Mechanical and metallurgical industries ...	14,199	60,166	74,365	409
Other industries	6,397	5,326	11,723	—
TOTAL	547,417	362,292	909,709	1,634,571

SOURCE : ECLA, on the basis of official statistics.

* Factory value at destination, including, therefore, customs duties and other expenditure within the country.

If the problem is now examined not from the point of view of the sectors of origin of intermediate products, but from that of the consumer industries, it may be demonstrated that approximately 36 per cent of aggregate industrial consumption of raw materials and intermediate products during 1953 was composed of those goods which had already undergone a transforming process of some kind, the remainder consisting of raw materials from other sectors, among which agricultural products predominated (see the corresponding figures in table 217). Nevertheless, if foodstuffs industries, in which the share of agricultural products is of paramount importance, are excluded, it may be assumed that manufactured goods constituted more than two-thirds of Colombian industry's total requirements of raw materials and intermediate products.

Apart from these foodstuffs industries, the only other branches of industrial activity for which a major part of the raw materials came from non-manufacturing sectors were those relating to tobacco, and petroleum and coal derivatives. The share of manufactured and non-manufactured intermediate products was more or less equal in the textile, leather and cement, ceramics and glass industries. The proportion represented by the former was much higher in those of beverages, wood and rubber, and almost 100 per cent in the footwear and ready-made clothing, wooden furniture, paper, printed matter, chemicals and mechanical and metallurgical industries. This relatively high proportion of manufactured intermediate products is a further indication of the concentration of industrial development mainly upon final processing, to the detriment of intermediate goods production.

It must be repeated that imports accounted for a high proportion of available intermediate manufactured products, the paper, printing, rubber, chemicals and mechanical and metallurgical industries being almost entirely dependent upon them. A more detailed examina-

tion will be made later of the great extent to which Colombian industry depends upon imports, not only for its supply of manufactured intermediate products, but also for many raw materials produced by other sectors, mainly because of the comparatively underdeveloped state of the production of several agricultural raw materials.

Even though demand for intermediate products as a whole is conditioned by the growth of production of end goods, a more complete integration of industry and a shifting of the process of import substitution towards this type of product will offer the intermediate branches of industry much wider opportunities of development than those available to the branches producing end goods.

(b) Consumer goods

Table 218 summarizes data on the composition by producer industry of non-durable consumer goods available in 1953. As may be noted, almost one-third of the availability of this type of goods was made up of commodities produced by the foodstuffs industry, although emphasis should once more be laid on the fact that, from the point of view of industrial production proper, the products included here usually represent only very primary transformations of agricultural commodities.⁸ The second contribution in order of importance was that of beverages, with a total availability to the value of about 450 million pesos. It was in this industry — especially in the production of beer — that one of

⁸ These figures could by no means justify an assumption that Colombia's foodstuffs industries have developed considerably. On the contrary, consumption of typical processed foods — as, for example, the products of the canning industry — is very small; moreover, except for one or two large groups this is one of the branches of manufacturing activity where productivity is lowest on account of the marked prevalence of production by artisan methods.

TABLE 218. COLOMBIA : AVAILABILITY OF MANUFACTURED NON-DURABLE CONSUMER GOODS, BY PRODUCER INDUSTRIES, 1953

(Thousands of pesos)

Producer industry	Total	Domestic production	Imports	Imports as a percentage of total availability
Foodstuffs	809,631	797,849	11,782	1.4
Beverages	444,532	437,308	7,224	1.6
Tobacco	99,406	96,678	2,728	2.7
Textiles	326,275	315,237	11,038	3.4
Footwear and clothing	364,358	361,187	3,171	0.9
Paper and paper products	12,260	8,716	3,544	28.9
Printing, engraving, etc.	63,092	60,186	2,906	4.6
Rubber	18,154	15,990	2,164	11.9
Chemicals	165,665	125,679	39,986	24.1
Other industries *	32,746	19,733	13,013	39.7
TOTAL	2,336,119	2,238,563	97,556	4.2

SOURCE : ECLA, on the basis of official statistics.

* Including small items comprising leather goods, cement, ceramics, glass and similar products, wood and the products of the mechanical and metallurgical industries.

TABLE 219. COLOMBIA : AVAILABILITY OF DURABLE CONSUMER GOODS,
BY PRODUCER INDUSTRIES, 1953*(Thousands of pesos)*

<i>Producer industry</i>	<i>Total</i>	<i>Domestic production</i>	<i>Imports</i>	<i>Imports as percentage of total availability</i>
Wooden furniture	35,000	35,000	—	—
Printing, engraving, etc.	5,075	4,000	1,075	21.2
Leather	19,706	19,706	—	—
Rubber	15,179	13,000	2,179	14.4
Cement, ceramics, glass, etc.	27,454	19,740	7,714	28.1
Mechanical and metallurgical industries	135,456	37,399	98,057	72.4
Other industries *	18,316	500	17,816	97.3
TOTAL	256,186	129,345	126,841	49.5

SOURCE : ECLA, on the basis of official statistics.

* Including very small items comprising certain textiles, wood, paper products and chemicals.

the most spectacular expansions was recorded, and that the largest industrial enterprises in the country were formed. Similar figures were registered for textiles (excluding intermediate output sold to other productive sectors), footwear and ready-made clothing, amounting in the aggregate to about 30 per cent of the availability of non-durable consumer goods. Finally, another important contribution was that of consumer goods produced by the chemical industries.

The share of imports in the total availability of non-durable consumer goods was already very low in 1953 — on an average, only 4.2 per cent. Nevertheless, the volume of imports in the pulp and paper and chemicals industries remained substantial. In the case of these latter, although they include items produced by traditional branches of domestic industry, such as soap, candles and matches, almost one-fourth of the goods available was supplied by imports; this was chiefly due to the strong preponderance of pharmaceutical and analogous products, of which the notable progress made by domestic production had not yet been able to cover any substantial proportion.

A high percentage of the availability of durable consumer goods (about 53 per cent) came from the mechanical and metallurgical industries. As these are under-developed in Colombia, this constituted yet another factor determining a large proportion of imports. The contribution of imports to the availability of goods produced by the cement, ceramics and glass industries was also significant, although in a very secondary degree, while domestic production was responsible for the whole or for a major share of output in wooden furniture and in leather and rubber goods (see table 219).

Taken in the aggregate, the total availability of all manufactured consumer goods (durable and non-durable) in 1953 may be estimated at about 2,800 million pesos, valued at manufacturers' prices.⁹ In view of the fact

⁹ Including, in the case of imports, c.i.f. value plus customs duties.

that total private consumption stood at a little over 7,000 million pesos, it may be concluded that manufactured goods accounted for almost 40 per cent of total consumer expenditure on goods and services.¹⁰ In this proportion processed foodstuffs, which constituted about one-third of the total manufactured goods thus valued, are of course included, so that expenditure on other types of goods represented about 28 per cent of total consumption. The statistics given below present a clearer picture of the position of manufactured goods within total consumption (see table 220).

TABLE 220. COLOMBIA : SHARE OF CONSUMPTION
OF MANUFACTURED GOODS IN TOTAL CONSUMPTION, 1953*(Millions of pesos)*

Total consumption	7,048
Direct foodstuffs	2,590
Manufactured products :	
Foodstuffs	821
Non-foodstuffs	1,946
Expenditure on services	1,691
Manufactured goods as a percentage of total	39.2%

SOURCE : ECLA, on the basis of official statistics.

While the figures in table 220 give some indication of the share of manufactured goods in total consumer expenditure on goods and services in 1953, it is necessary to make a more careful examination of other aspects which may be of special interest in analysing the future prospects of demand for manufactured goods. Particular importance seems to attach to an attempt at separate treatment of the characteristics of this demand in two

¹⁰ An under-estimate of the relative importance of manufactured consumer goods in total expenditure on goods and services is implicit in this and in subsequent comparisons, as distribution costs are not computed.

clearly defined sectors of Colombia's population, the urban and the rural, whose total expenditure is very differently distributed. The significance of this distinction lies in the fact that the rates of growth recorded for both sectors have differed widely, owing to the rapidity of the process of urbanization. As the consumption of manufactured goods is generally very low in rural areas, and a part of the latter's population is virtually excluded from certain types of consumption, this shift towards the urban areas has a marked effect on total demand for industrial goods.

TABLE 221. COLOMBIA: ESTIMATED DISTRIBUTION OF AVAILABLE INCOME FOR CONSUMPTION IN URBAN AND RURAL AREAS, 1953

(Millions of pesos)

	Total	Urban *	Rural
Foodstuffs :			
Total	3,411	1,990	1,421
Direct	2,590	1,439	1,151
Processed	821	551	270
Other manufactured goods	1,946	1,398	548
Manufactured goods : Total	2,767	1,949	818
Services	1,691	1,400	291
Total available income for consumption	7,048	4,788	2,260

SOURCE: ECLA, on the basis of official statistics.

* Including public consumption.

The statistical data available are too incomplete for any reasonably accurate quantitative computation to be made of distribution trends in total expenditure on goods and services in Colombia's urban and rural areas. Nevertheless, thanks to a survey recently carried out by the National Administrative Department of Statistics¹¹ some estimates can be formulated which at least give an idea of the extent to which these trends differ. In fact, the results of this investigation may be considered as representative of the composition of consumption in the urban areas, so that if they are compared with the total estimates previously presented, the approximate composition of expenditure in rural areas can be deduced.¹² It must be taken into account that out of the total income available for consumption about 68 per cent corresponded to the urban sector, and the

¹¹ The enquiry took the form of a detailed survey of the income and expenditure of 1,500 workers' and employees' families in seven large towns in Colombia: Bogotá, Medellín, Cali, Barranquilla, Bucaramanga, Manizales and Pasto. The aggregate population of these seven towns amounts to 1,950,000 inhabitants, and represents about 38 per cent of total urban population.

¹² Another important survey carried out by the Rural Social Security Department of the Ministry of Labour (*Departamento Técnico de la Seguridad Social Campesina del Ministerio del Trabajo*), although with different aims and coverage from the foregoing investigation, confirmed some of the results thus obtained as regards the total proportion of expenditure on foodstuffs.

remainder — some 4,800 and 2,300 million pesos respectively — to the rural sector (see table 221).

It may be noted that the share of total expenditure devoted to foodstuffs was much larger in the rural areas, though the proportion of processed foodstuffs was at the same time considerably lower. However, the greater relative importance of foodstuffs was largely offset by the reduction in services — especially housing services — so that in relative terms there was no decrease in the proportion of the budget used to buy other manufactured goods. Nevertheless, the very low income level limited purchases of the latter to the most essential commodities, mainly articles of clothing. Thus urbanization had repercussions not only on over-all demand for manufactured goods, but especially on certain types of industrial products, consumption of which in the rural areas was insignificant.

This last aspect may be better illustrated by an analysis of the composition of consumption of manufactured goods in urban and rural areas by types of commodity, (see the corresponding figures in table 222). From the statistics given, it may be deduced, in the first place, that while for the country as a whole manufactured durable consumer goods represented approximately 10 per cent of total consumption of manufactured products, the proportion corresponding to the urban sector amounted to 14 per cent and that of the rural to only 2 per cent. These discrepancies were not very marked with regard to the share of total expenditure in processed foodstuffs, beverages and tobacco; the relative importance of textiles and clothing was higher in the rural sector, where that of other types of manufactured goods was considerably lower.

TABLE 222. COLOMBIA: ESTIMATED COMPOSITION OF CONSUMPTION OF MANUFACTURED GOODS IN URBAN AND RURAL AREAS, 1953^a

(Millions of pesos)

Type of manufactured product	Total	Urban	Rural
	(1)	(2)	(3)
<i>Manufactured non-durable consumer goods</i>	2,336	1,418	918
Foodstuffs	810	484	326
Beverages	445	286	159
Tobacco	99	52	47
Textiles	326	126	200
Footwear and clothing	364	260	104
Paper and paper products	12	8	4
Printed and engraved matter, etc. . .	63	46	17
Rubber goods	18	16	2
Chemicals	166	112	54
Miscellaneous products	33	28	5
<i>Manufactured durable consumer goods</i> .	256	239	17
TOTAL	2,592	1,657	935

SOURCE: ECLA, on the basis of official statistics.

^a Excluding customs duties and other import costs.

TABLE 223. COLOMBIA : COMPOSITION OF EXPENDITURE ON GOODS AND SERVICES IN SAMPLE OF URBAN FAMILIES, BY INCOME STEPS

(Pesos per capita)

	Monthly expenditure						Monthly income					
Total	25.30	39.00	49.50	55.80	68.70	79.30	89.20	109.50	99.10	147.00	189.50	
1. Non-manufactured goods	10.99	13.55	14.89	16.40	18.97	20.36	19.71	23.60	23.27	25.46	26.32	
2. Manufactured goods	12.38	16.70	19.46	22.50	27.74	32.66	32.39	40.47	37.40	47.72	70.29	
(a) Non-durable consumer goods ..	11.73	15.56	18.10	20.37	25.59	28.80	27.58	35.29	31.92	41.46	52.96	
Foodstuffs	6.15	7.16	8.23	8.42	10.42	10.92	11.86	13.06	11.27	13.64	16.44	
Beverages	0.42	0.58	0.76	0.98	1.39	1.36	1.40	1.21	2.20	3.38	3.87	
Tobacco	0.45	0.65	0.72	0.81	0.95	0.84	1.06	1.02	1.07	1.36	1.87	
Textiles	0.67	1.07	1.28	1.60	1.92	2.84	2.09	3.26	2.40	3.79	5.22	
Footwear and clothing	1.68	2.77	3.15	3.97	5.61	7.30	4.72	9.47	7.74	10.54	13.49	
Paper and paper products ..	0.03	0.05	0.07	0.09	0.10	0.08	0.15	0.20	0.19	0.25	0.46	
Printed and engraved mat- ter, etc.	0.07	0.13	0.18	0.21	0.32	0.45	0.53	0.59	0.67	1.00	1.22	
Chemicals	1.17	1.71	1.98	2.21	2.48	2.67	2.84	3.49	3.27	3.70	5.83	
Miscellaneous products	1.12	1.44	1.73	2.08	2.40	2.34	2.93	2.99	3.11	3.80	4.56	
(b) Durable consumer goods	0.65	1.14	1.36	2.13	2.15	3.86	4.81	5.18	5.48	6.26	17.33	
Leather goods	0.02	0.04	0.06	0.09	0.12	0.15	0.14	0.29	0.26	0.30	0.48	
Cement, ceramics, glass, etc. .	0.05	0.09	0.10	0.13	0.17	0.25	0.20	0.31	0.28	0.27	0.55	
Furniture	0.18	0.27	0.37	0.60	0.86	1.22	0.94	1.82	1.45	0.82	1.74	
Other products of the mecha- nical and metallurgical industries	0.40	0.74	0.83	1.31	1.00	2.24	3.53	2.76	3.49	4.87	14.56	
3. Miscellaneous services	1.93	8.75	15.15	16.90	21.99	26.28	37.10	45.43	38.43	71.82	92.89	

SOURCE : ECLA, on the basis of official statistics.

TABLE 224. COLOMBIA : COMPOSITION OF EXPENDITURE ON MANUFACTURED GOODS IN SAMPLE OF URBAN FAMILIES, BY TYPES OF COMMODITY

(Percentages)

Commodity	Families with incomes	
	under 80 pesos per number (1)	over 80 pesos per number (2)
Total manufactured goods	100.0	100.0
Non-durable consumer goods	91.4	82.9
Foodstuffs	39.0	29.0
Beverages	4.2	5.3
Tobacco	3.4	2.8
Textiles	7.1	7.3
Footwear and clothing	18.6	20.1
Paper and paper products	0.3	0.6
Printed and engraved matter, etc. .	1.0	1.8
Rubber goods	—	—
Chemicals	9.3	8.4
Miscellaneous products	8.5	7.6
Durable consumer goods	8.6	17.1
Leather goods	0.4	0.6
Cement, ceramics, glass, etc.	0.6	0.7
Wooden furniture	2.6	3.0
Other products of the mechanical and metallurgical industries	5.0	12.8

SOURCE : ECLA, on the basis of official statistics.

In the last issue, of course, these divergent features of demand are attributable not merely to the intrinsic fact that the population concerned is urban or rural, as the case may be, but to the substantial differences in average *per capita* income, which in 1953 were approximately 924 pesos and 326 pesos *per capita* in the urban and rural sectors respectively. However, it would be difficult in this case to speak of a more or less uniform income-elasticity of the demand for manufactured goods, as in dealing with incomes of this size the change from one income level to another implies very substantial modifications in the whole composition of demand. Hence, estimates of prospective demand for manufactured goods should take into account not only the increase in average *per capita* income in the over-all economy, but also the distribution of this income between the urban and rural sectors of the population.

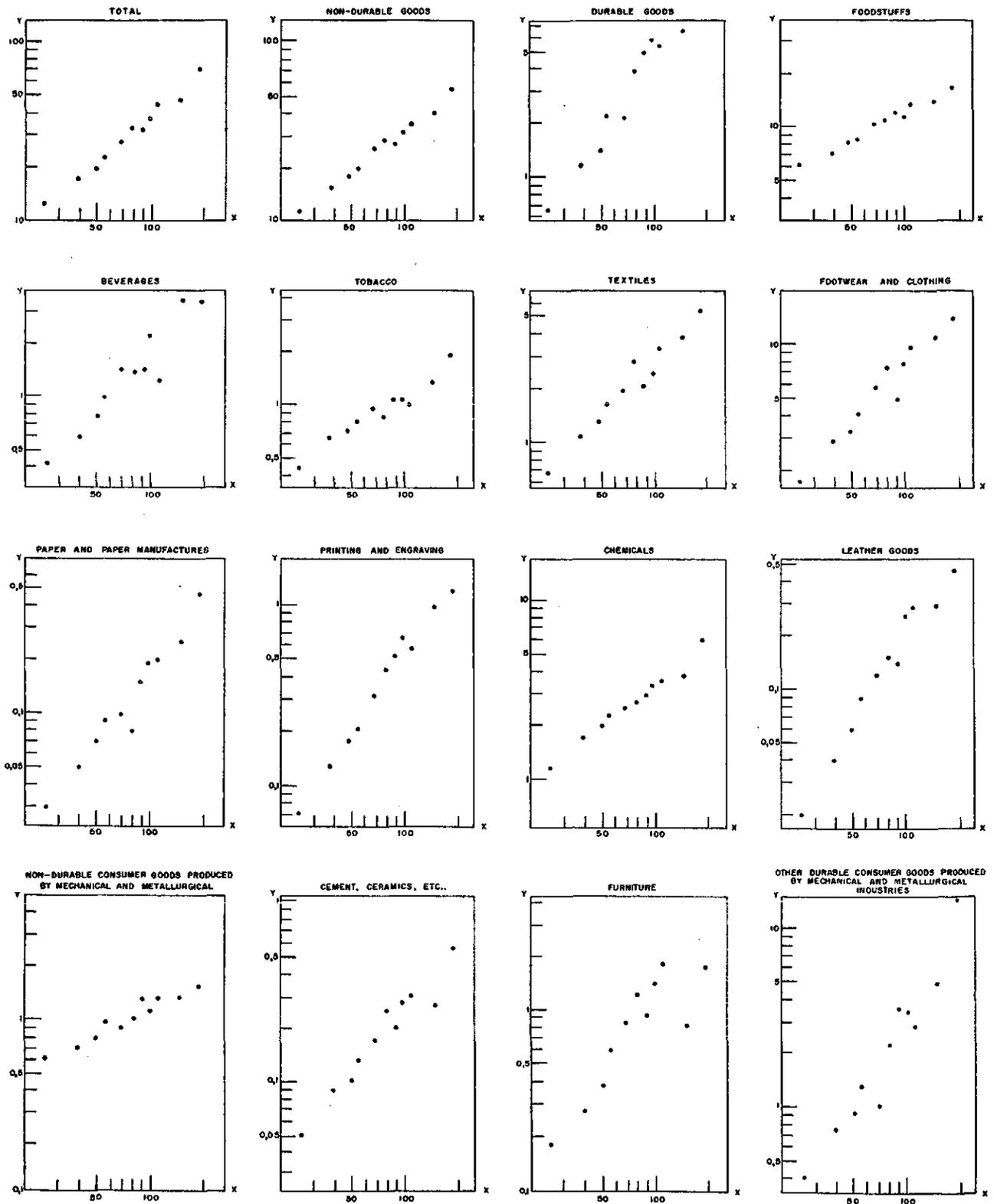
Within the urban sector itself, a pronounced and much more uniform influence was exerted by the rise in *per capita* income on the volume and composition of demand for manufactured goods. The survey of the income and expenditure of 1,500 families, to which allusion has already been made, shows how, as *per capita* income increased, the share of this income used to purchase manufactured goods also rose (from 12 pesos monthly *per capita* in families with a total *per capita* income of less than 30 pesos, to 70 pesos in families where the income is more than 150 pesos). From these data may also be deduced the distribution of this expanded demand between durable and non-durable consumer

FIGURE XIII. COLOMBIA : RATIO BETWEEN *per capita* INCOME AND *per capita* CONSUMPTION OF MANUFACTURED GOODS IN THE SAMPLE OF URBAN FAMILIES

(Pesos *per capita*, monthly average, 1953)
(Logarithmic scale)

Y = Average *per capita* income.

X = *Per capita* consumption of the goods concerned.



goods, and among the various types of product included in each of these categories (see details in table 223).¹³ Some of the principal aspects of this question are summarized in table 224, in which the only distinction drawn is between families where the average monthly income per member is over or under 80 pesos.

TABLE 225. COLOMBIA : INCOME-ELASTICITY COEFFICIENTS OF DEMAND FOR VARIOUS TYPES OF MANUFACTURED GOODS, IN SAMPLE OF URBAN FAMILIES, 1953

Total manufactured goods	0.82
Non-durable consumer goods	0.80
Durable consumer goods	1.50
<i>Non-durable consumer goods</i>	
Processed foodstuffs	0.53
Beverages	1.19
Tobacco	
Textiles	1.01
Footwear and clothing	1.10
Paper and paper products	1.35
Printed and engraved matter, etc.	1.45
Chemicals	0.71
Miscellaneous products	1.43
<i>Durable consumer goods</i>	
Furniture	1.00
Leather goods	1.60
Rubber goods	1.15
Cement, ceramics, glass, etc.	1.20
Metal goods	1.70
Miscellaneous products	1.43

SOURCE : ECLA, on the basis of official statistics.

The figures included in the foregoing tables are significant enough to render more detailed comment superfluous. Nevertheless, it is interesting to attempt a more accurate quantitative estimate of the repercussions of increases in *per capita* income on consumption of manufactured goods as a whole and on its principal component groups. Figure XIII shows the ratios between total *per capita* income and *per capita* consumption for each of these groups, so that in every case average ratios may be deduced to illustrate the way in which increases in income tended to influence the demand trends concerned.¹⁴ The results of these comparisons are summarized in table 225.

¹³ The statistics in this table sum up the results of the survey for only six of the seven towns it embraced, as the complete tabulation of the expenditure of Bogotá families was not available in time. It should also be pointed out that the original classification of expenditure was different from that adopted here, as a re-distribution of numerous items was effected so that their data could be compared with the over-all figures for domestic production and imports of manufactured goods.

¹⁴ In annex IX of this study similar ratios are shown not only for the groups enumerated here but also for a number of subsidiary groups, so as to demonstrate the modifications that take place in the internal composition of each of these general categories. The demand for textiles may be taken as an example of an income-elasticity coefficient which, in the last issue, is only a product of the very different coefficients for cotton, wool or artificial fibre goods.

As may be noted, the results of the survey show, for this group of urban families, an income-elasticity of demand for manufactured goods which is both positive and lower than unity. This would suggest that future increases in *per capita* income are likely to determine an accompanying rise in the demand for manufactured goods, but might tend to reduce the share in total consumption of expenditure on commodities of this type.

Such a conclusion seems somewhat surprising, in view of the many other factors indicating a much more pronounced expansion of demand for manufactured goods. It has, however, already been pointed out that the findings of the survey cannot be considered valid for the country as a whole, since they reflect the existing state of affairs in a specific sector of the population, and do not, for instance, take into account the additional demand created by the process of urbanization.

Furthermore, the individual components of this overall coefficient must be examined. In the first place, due consideration should be given to the substantial difference between the coefficients for non-durable and those for durable manufactured consumer goods, which are 0.8 and 1.5 respectively. It can thus be seen that while the tendency of the former is to absorb a decreasing proportion of the higher available income, the relative importance of the latter in total consumption tends to increase rapidly.

In the case of non-durable consumer goods, the low income-elasticity registered seems to be mainly attributable to the influence of processed foodstuffs.¹⁵ These, indeed, constituted almost 35 per cent of total expenditure on manufactured goods for direct consumption, so that they form a considerable item within the group, yet the average coefficient recorded for such foodstuffs stood at only 0.53, which largely accounts for the low over-all coefficient registered for the entire group. In fact, if only manufactured goods for direct consumption, other than foodstuffs, are taken into account, the figure rises to 0.94.

Apart from foodstuffs, the only other commodities in this category which showed coefficients lower than unity were tobacco and chemical products. As regards the former, the coefficient for cigarettes was 0.7, while for cigars it was only 0.1, which implies a virtual stabilization of *per capita* consumption, whatever the income level reached. The aggregate coefficient for chemical products stood at 0.71, being determined by an elasticity rather higher than this in the case of pharmaceutical products (0.78), lower in that of soap (0.52), very small in that of matches, and negative in that of candles.

In contrast, among manufactured goods for direct consumption the groups which registered the highest elasticity were those of books and other printed matter and of paper products (with coefficients of 1.45 and 1.35 respectively) ; but the share of these two groups in total consumer expenditure was almost negligible.

For beverages, the income-elasticity revealed by the survey was also considerably higher than for non-

¹⁵ Including rice, sugar, coffee, flour and meal, etc.

durable consumer manufactured goods in the aggregate (1.19). The magnitude of this coefficient was largely due to that of spirits (1.71), since that of beer, despite the marked increases in consumption during recent years, was lower (1.07), and that of gaseous beverages was smaller still (0.88).

Other groups which accounted for a high proportion of total consumer expenditure were those of textiles and clothing, including footwear. According to the results of the survey, their share is likely to become even larger as *per capita* income rises. For these two groups combined, the income-elasticity coefficient was as much as 1.08, being rather higher for clothing (1.10) than for textiles (1.01).

Again, the high over-all coefficient for durable consumer goods (1.5) was also determined by considerable variations in its component coefficients, though none of them was lower than unity. The highest pertained to items manufactured by the mechanical and metallurgical industries (1.7) and to manufactured leather goods (1.6), while lower values were recorded for the coefficients of ceramics and china (1.2), of rubber goods (1.15) and of furniture (1.0).

The differences between all these coefficients thus provide some indication of the pronounced modifications which are liable to take place in the composition of demand for manufactured consumer goods. At the same time, considered together with the opportunities for import substitution existing in every case, they are indicative of the extent of the growth which may be expected in each branch of the industrial sector producing commodities of this type.

(c) Capital goods

Capital goods represented a relatively high proportion (about 19 per cent) of the availability of manufactured goods in 1953. If domestic production as well as imports is valued at manufacturers' prices, the availability of machinery, equipment, accessories and construction

materials works out at about 845 million pesos, a total which increases by 137 million if expenditure abroad and customs duties paid on capital goods imports are also taken into consideration. Even this latter figure is of course only a partial indication of the total volume of investments made in Colombia in the course of the year under review, as it does not include all the value added in building and public works, nor the cost of installing machinery and equipment ready for use. The data in table 226 show the sources of available capital goods.

About 73 per cent of total available capital goods was produced by the mechanical and metallurgical industries, this group comprising all machinery, equipment and means of transport. Another considerable contribution was that of the cement, ceramics, glass and other similar industries; this consisted mainly of building materials which also absorbed almost the whole output of the lumber industry. The figures for wooden furniture corresponded to an estimate of that part of the industry's output destined not for direct consumption, but to meet the requirements of industry, trade and other services; the contributions of the rubber industry consisted of tyres for buses, lorries and tractors and those of the chemical industry were mainly paint.¹⁶

The statistics in table 226 also show that little more than 60 per cent of the total availability of capital goods was imported. Considerable though it is, this percentage is nevertheless not truly representative of the extent to which Colombia depends upon other countries for the satisfaction of its requirements in this class of goods. This is because, in the first place, the costing methods used for domestic manufactures and imports are not strictly comparable, as in the latter only their value at manufacturers' prices in the country of

¹⁶ In this, as in many other cases, more or less arbitrary criteria have had to be adopted for classification purposes, and these are naturally open to discussion from various points of view. In this specific instance, all building materials, including paint, were placed under the heading of capital goods.

TABLE 226. COLOMBIA : AVAILABILITY OF CAPITAL GOODS, BY PRODUCER INDUSTRIES, 1953

(Thousands of pesos)

Producer industry	Total	Domestic production	Imports	Imports as percentage of total availability
Wood and cork	7,729	7,203	526	6.8
Wooden furniture	10,796	10,796	—	—
Rubber	37,586	31,413	6,173	16.4
Chemicals	17,020	11,300	5,720	33.6
Cement, ceramics, glass, etc.	148,784	140,373	8,411	5.6
Mechanical and metallurgical industries	616,771	115,787	500,984	81.2
Other industries *	3,648	1,000	2,648	72.6
TOTAL	842,334	317,872	524,462	62.3

SOURCE : ECLA, on the basis of official statistics.

* Including small items comprising leather goods, textiles and paper products.

origin is included.¹⁷ Again, under the heading of domestic production numerous activities were classified which do not really represent the incorporation of new capital goods into the total availability, such as those connected with repairs to motor vehicles, and other workshop activities included within the mechanical and metallurgical industries. Finally, it should be borne in mind that almost the whole of the mechanical and metallurgical industry in operation in Colombia in 1953 relied upon imports for a very high percentage of its supply of raw materials and intermediate products.

These comments underline the fact that until 1953 the real possibilities of expanding the productive capacity of Colombia's economy continued to depend to a very high degree on supplies from foreign markets, and, therefore, were largely contingent upon the fluctuations of the capacity to import. More recently, the entry into production of the iron and steel plant at Paz del Río has already begun to change this situation, and at the same time the certainty of a regular supply of basic raw materials may provide a vigorous incentive to greater development of the transforming industries.

¹⁷ If other import costs for these goods, including customs duties, were taken into consideration, the proportion corresponding to capital goods imports would increase to 68 per cent.

The nature of the statistical information available makes it difficult to determine the distribution of capital goods by the sectors in which they will be used. Some attempt to do so should, however, be made at least for imports of capital goods, so that the relative importance in 1953 of the various branches of the economy and of Colombia's industry within demand for this type of goods may be examined (see table 227).

It may be seen that construction materials constituted less than 15 per cent of total capital goods imports, while the remaining 85 per cent was made up of machinery, equipment, spare parts, etc. It is difficult to estimate the distribution of capital goods by sectors of the economy, as about one-third of their volume consists of equipment and implements which could be used in several sectors indiscriminately.

The value of such machinery and equipment as may be directly attributed to primary activities, including agriculture and mining, represented rather less than 10 per cent of the total, while those for the transforming industry amounted to about 25 per cent. Lastly, the item headed "other activities" absorbed about 35 per cent of imports of this type of assets, the high proportion being chiefly due to the heavy purchases of transport equipment, in which a noteworthy increase took place during 1953.

TABLE 227. COLOMBIA : DISTRIBUTION OF CAPITAL GOODS IMPORTS BY SECTORS OF DESTINATION, 1953

(C.i.f. values: thousands of pesos)

Industry of destination	Industry of origin			Total (4)
	Cement, ceramics, glass and similar industries (1)	Mechanical and metallurgical industries (2)	Other industries (3)	
Total	11,878	581,049	21,644	614,571
A. Building materials	8,508	79,380	6,418	94,306
B. Machinery and equipment	3,370	501,669	15,226	520,265
(1) Primary industries	—	43,306	4,338	47,644
(2) Transformer industries	2,975	123,500	1,852	128,327
Foodstuffs	—	5,882	155	6,037
Beverages	—	2,090	—	2,090
Tobacco	—	228	—	228
Textiles	—	16,273	637	16,910
Footwear and clothing	—	13,075	94	13,169
Wood and cork	—	2,127	—	2,127
Pulp and paper	—	1,371	160	1,531
Printing, engraving, etc.	—	5,262	—	5,262
Leather	—	1,435	159	1,594
Rubber	—	1,200	—	1,200
Chemicals	419	164	—	583
Petroleum and coal derivatives	—	956	—	956
Mechanical and metallurgical industries	—	7,511	—	7,511
Unspecified	2,556	65,926	647	69,129
(3) Other activities	—	180,132	4,390	184,522
(4) Unspecified	395	154,731	4,646	159,772

SOURCE: ECLA, on the basis of official statistics.

Within the transforming industry itself it is again difficult to distribute capital goods imports among its principal branches. Out of about 48 per cent which could be specifically attributed to given branches, the figures for the textile and for the footwear and clothing industries were the highest, while those for the mechanical and metallurgical, foodstuffs, and printing and engraving industries were also sizeable.

In order to make a tentative examination of the volume of possible future requirements of capital goods, elsewhere in the present study the total stock of capital by sectors is estimated and ratios are deduced with respect to the value of production which enable projections to be made of the volume of capital goods required for production to attain a given rate of growth. An indication is also given of the fluctuations which have been taking place during the last twenty-five years in product-capital ratios, as well as of some of their determining factors. It may be stated here in anticipation that although productive capacity expanded during the post-war period more rapidly than production itself, to such an extent that in 1953 idle capacity existed in many sectors, there are numerous factors which tend to suggest that future requirements of capital goods will grow more rapidly than industrial production as a whole. This is vouched for by the vast possibilities of improvement in the mechanization of agriculture, for example; by the absorption in large- and medium-scale industry of artisan production — though this still predominates in many branches of manufacture — and by the greater development prospects open to the industries producing durable consumer goods and intermediate products as well as capital goods themselves. All these branches as a general rule need a higher rate of investment per unit of production.

2. Demand for manufactured goods during the period 1937-53

(a) Changes in the supply pattern of manufactured goods by types of commodity

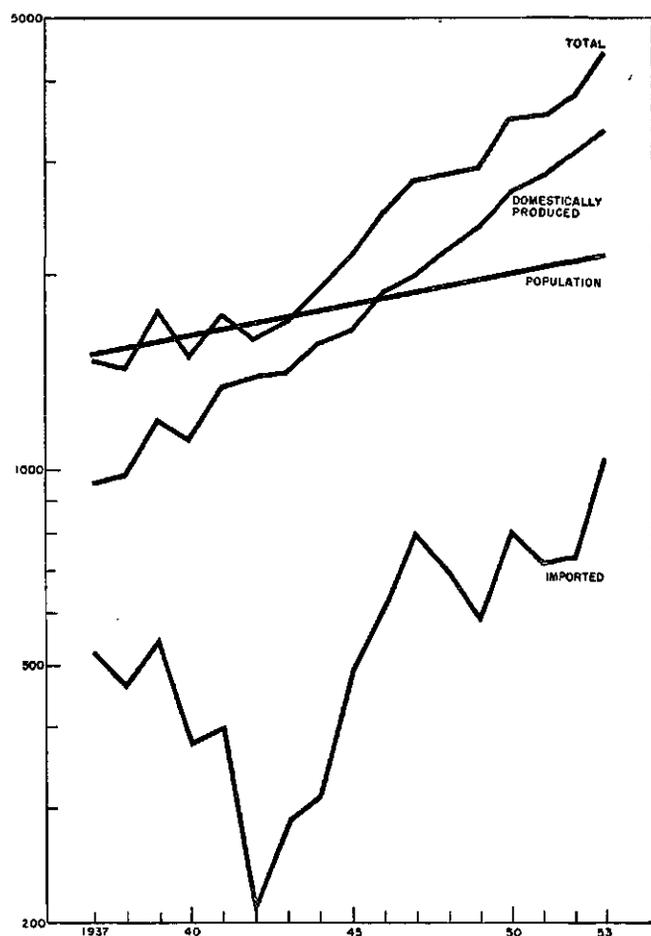
While an analysis of the availability of manufactured goods in 1953 suggests many interesting conclusions, their general application needs to be verified in some way which will free them from possible influences exerted by special circumstances affecting the situation in any given year. Again, any assessment of the future prospects of demand for manufactured goods must necessarily be based largely on the experience of previous periods. Hence a backward projection based on most of the data for 1953 discussed in the foregoing paragraphs was attempted. In this way it was possible to complete estimates covering the evolution of the availability of manufactured goods during the period 1937-53.

Figure XIV illustrates fluctuations in the aggregate availability of manufactured goods throughout this period, valued at constant 1953 prices so that the significance of these fluctuations in real terms can be assessed. It may be seen that total availabilities were practically trebled between 1937 and 1953, which implies an average cumulative rate of growth of 7 per cent

annually. This rate of growth considerably exceeded that of the population, with the result that the volume of manufactured goods available *per capita* increased by 4.7 per cent annually, as against an increment of only 3.1 per cent in total average *per capita* income.

FIGURE XIV. COLOMBIA : AVAILABILITY OF MANUFACTURED PRODUCTS, 1937-53

(Millions of pesos at 1950 prices)
(Semi-logarithmic scale)



In their different ways, domestic production and imports each contributed to this exceptional increase in the availability of manufactured goods. In the case of domestic products the increment was 248.2 per cent between 1937 and 1953, which gives an annual average of 8.1 per cent,¹⁸ whilst imports increased by 99.4 per cent. During the war years there was some interruption of the trend towards expansion, due to relative stagnation of domestic production and a marked decline in imports. The increase in domestic production was

¹⁸ It would not be sufficient to take the additional availability of domestically manufactured goods as an indication of the increase in the quantum of industrial production, which is the subject of specific estimates in the next chapter. The main discrepancy arises from the fact that in considering availability, an exaggerated incidence is attributed to foodstuffs, whilst in the quantum indices weightings are based entirely upon the appropriate values added.

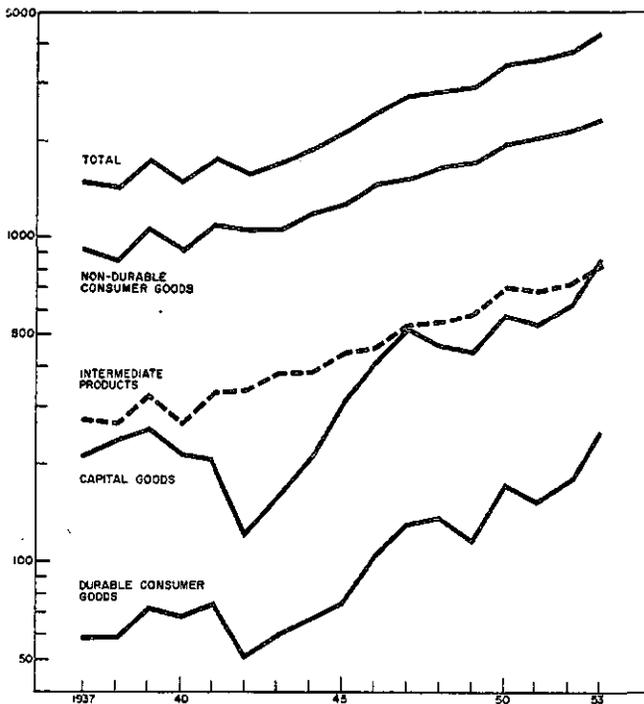
steady after the war, whilst imports — within a generally rising trend — showed marked short-term fluctuations.

Within this aggregate growth of available manufactured goods, widely divergent increments may be seen in the various types of product. Non-durable consumer goods — which cover the highest proportion of total availability — have shown the slowest rate of growth, their relative share having declined from approximately 61 per cent during 1937-39 to only 56 per cent during 1951-53 (see figure XV, and the relevant figures in the *Statistical Appendix*, tables 123 and 124).

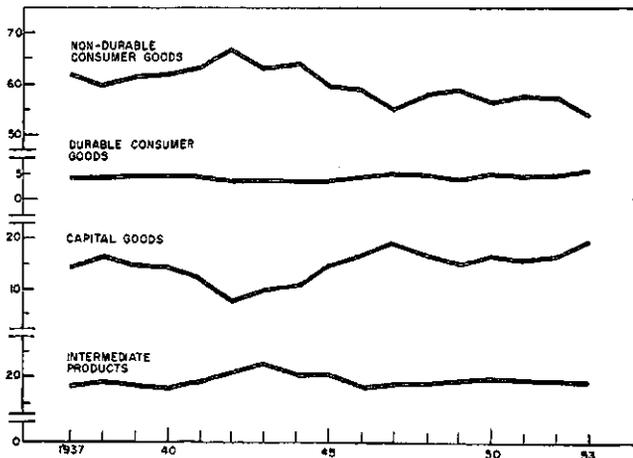
FIGURE XV. COLOMBIA : AVAILABILITY OF MANUFACTURED GOODS, BY TYPES OF PRODUCT

(Semi-logarithmic scale)

A : VALUES IN MILLIONS OF PESOS AT 1950 PRICES
(Natural scale)



B : PERCENTAGE COMPOSITION



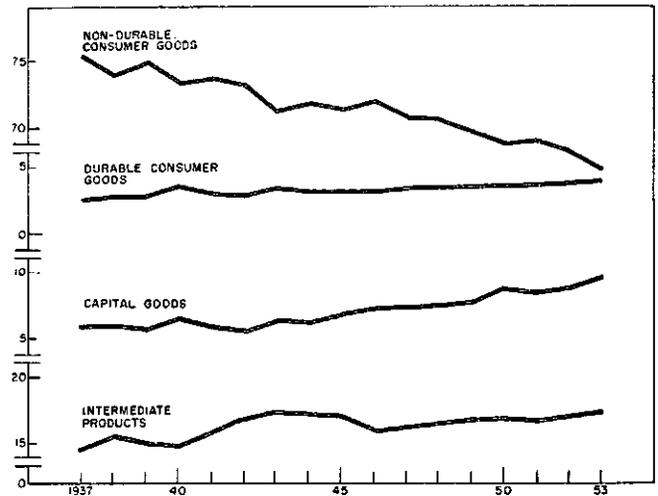
Supplies of durable consumer goods, on the other hand, more than quadrupled between 1937 and 1953, registering a more marked expansion than any other group except fuels and lubricants, with a relative share in total availabilities that rose from 4 per cent in 1937-39 to 5 per cent in 1951-53. Thus the proportion represented by durable and non-durable consumer goods in the aggregate did not show so pronounced a decline, falling from 65 per cent to 61 per cent between the two three-year periods mentioned.

FIGURE XVI. COLOMBIA : PROPORTION OF TOTAL AVAILABILITY OF MANUFACTURED GOODS REPRESENTED BY THE VARIOUS TYPES OF MANUFACTURED PRODUCT

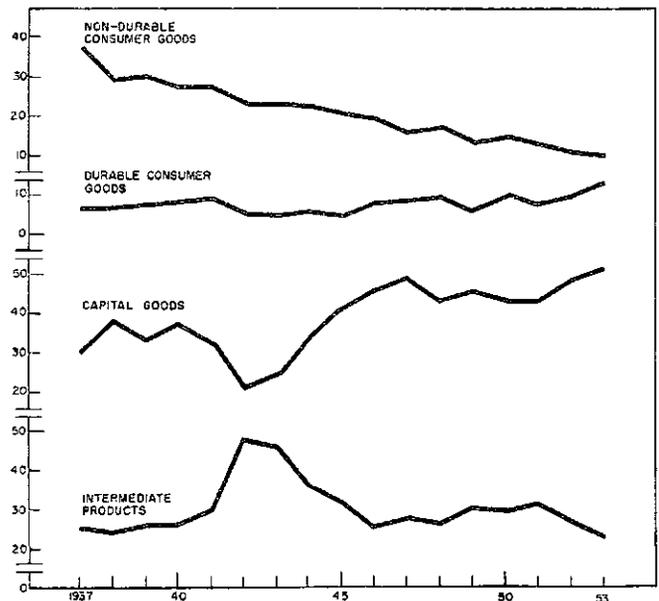
(Percentage of total availability)

(Natural scale)

A : DOMESTIC MANUFACTURED PRODUCTS



B : IMPORTED MANUFACTURED PRODUCTS



This decrease in the relative importance of consumer goods within the total supply of manufactured goods was partly an inevitable consequence of the greater measure in which national production contributed to the supply in question. In fact, the expansion of domestic production of necessity demanded substantially larger availabilities of intermediate products and capital goods ; this explains why the relative participation of the former rose between 1937-39 and 1951-53 from a little more than 18 to approximately 19 per cent of the total, whilst that of the latter increased from 15 to 17 per cent between the two three-year periods.

The possibility that a less pronounced increase in consumer goods in relation to total available manufactured products was due partly to an uneven distribution of the increment in income cannot, however, be entirely disregarded. It is probable, in fact, that the real income of the wage-earning sectors did not rise proportionately to the substantial improvement in the productivity of the economy as a whole.¹⁹

Two causes contributed to the decrease in the relative importance of non-durable consumer goods in the total supply of manufactured goods ; first, the rate of increase of domestic production of this type of goods was lower than that of other manufactured goods, and secondly, there was a marked contraction in the absolute volume of the imports concerned. During 1937-39, non-durable consumer goods accounted for about 75 per cent of industrial production, whilst by 1951-53 this proportion had declined to 68 per cent. Imports of this type of product fell by 47.1 per cent between the two three-year periods, dropping from 32.4 to 10.8 per cent of total imports of manufactured goods.

Figure XVI shows the variations in the share of each type of manufactured product within the total availability, whether of domestic origin or imported (see the relevant data in the *Statistical Appendix*, tables 125, 126, 127 and 128). It may be seen that in both cases the changes in composition are similar — mainly characterized by the reduced relative importance of non-durable consumer goods already mentioned — but that they are much more notable in the case of imports.

These differing rates of increase and changes in composition caused substantial modifications in the share of imports in Colombia's total supply of manufactured goods. The following are the most significant facts which should be noted :²⁰

(i) A marked decline in imports within the total availability. Despite an absolute increase in imports, the proportion they represented decreased from approximately 33 per cent between the years 1937-39 to a little more than 20 per cent during 1951-53, as a result of the more rapid expansion of domestic industrial production.

(ii) A much sharper curtailment of the proportion of imports in the availability of non-durable consumer goods. Even in absolute terms, imports of this type of goods diminished, which logically signified a drastic reduction of their participation in the total supply ; it fell from 17.5 to only 4 per cent between the two three-year periods. The major part of the increment in domestic production thus largely replaced imports rather than increasing Colombia's total supply of non-durable consumer goods.

(iii) A less marked decrease in durable consumer goods, capital goods and intermediate products. As regards the first category, domestic demand was sufficient not only to absorb the considerable increment in Colombia's own production, which was five times greater in 1953 than in 1937, but also to necessitate further increases in imports, although to a lesser degree. As a result, the share of imports was reduced from slightly more than 56 per cent in 1937-39 to approximately 41 per cent in 1951-53. A similar situation arose in the case of capital goods, domestic production of which in 1953 was six times that of 1937, although its contribution to the total supply was insufficient for this expansion to reduce the absolute total of imports ; on the contrary, imports were more than trebled between these years, although their share in the total declined from 73.9 to 58.3 per cent between the periods 1937-39 and 1951-53. The availability of domestically produced intermediate products increased fourfold between 1937 and 1953, and at the same time imports were almost doubled ; the proportion represented by the latter therefore declined from 45.0 to 29.5 per cent between the two three-year periods.

(iv) An increase in the relative share of imports in the supply of fuels and lubricants. Although domestic production over the whole period exceeded the volume of imports, this expansion failed to meet total demand, and it was necessary to purchase an even greater proportion abroad. Thus the share of imported fuels and lubricants rose from one-third in 1937-39 to almost 38 per cent in 1951-53.

It would therefore appear that non-durable consumer goods constituted the only line in which there was a true import substitution. Other types of manufactured products showed a reduction in the relative importance of imports, but owing to the pressure of internal demand and the smaller volume of domestic production since the beginning of the period under review the increase in the latter was insufficient to meet total demand, and therefore compatible with a marked expansion of imports.

Thus in 1953 almost one-quarter of the aggregate availability of manufactured goods came from imports, which provided approximately half the total supply of durable consumer goods, more than 62 per cent of that of capital goods, 29 per cent of that of intermediate products, slightly more than 42 per cent of that of fuels and lubricants, and a very small percentage of that of non-durable consumer goods. These statistics show that substitution in this last-named item is nearing its limits, although there remain great possibilities in the other four categories.

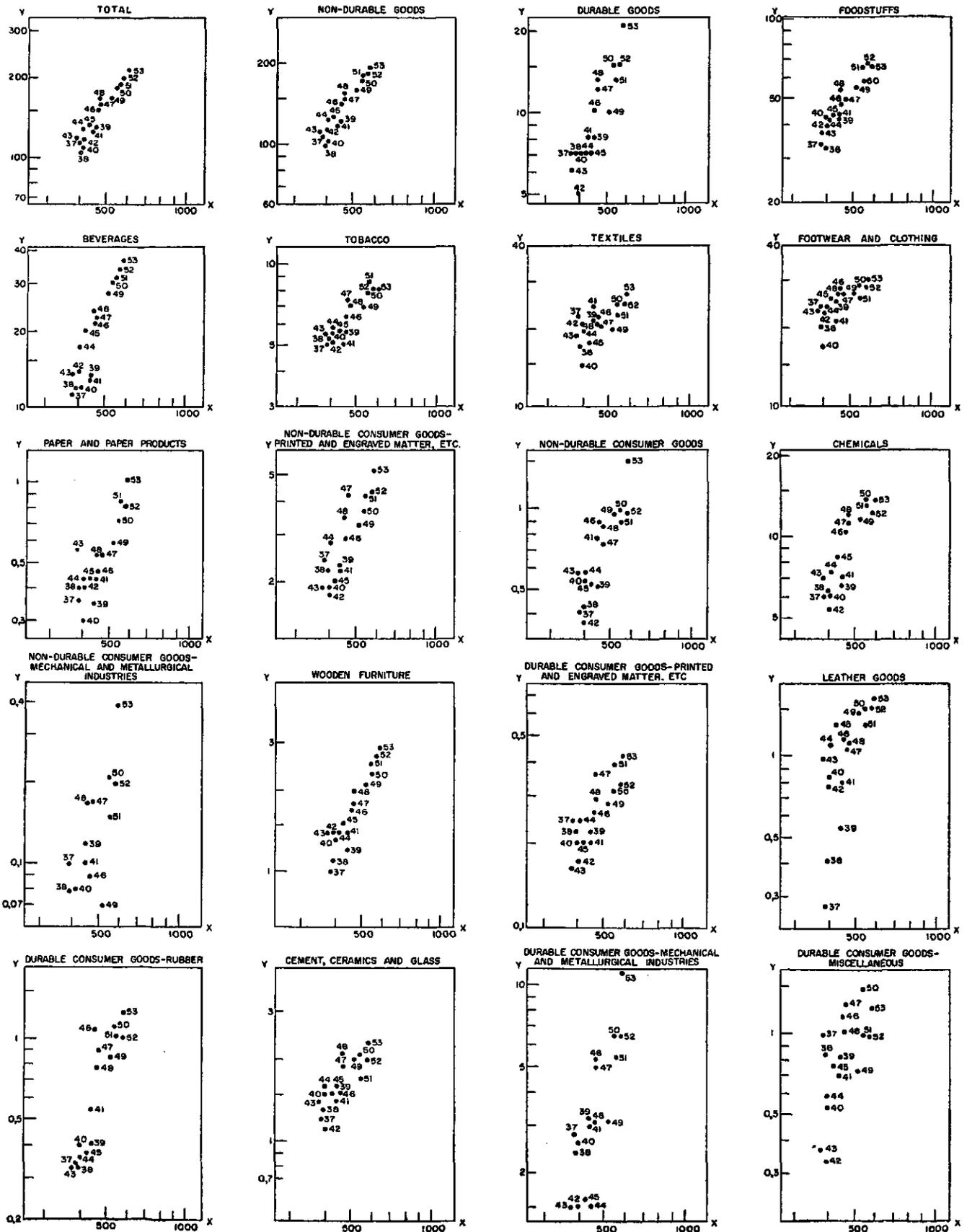
¹⁹ Statistics will be given later of the possible variations in the share of wages and salaries in total value added, together with comments on the difficulties of a quantitative assessment of this type.

²⁰ A more detailed appreciation of these changes may be obtained from a study of the *Statistical Appendix*, tale 129.

FIGURE XVII. COLOMBIA : RATIO BETWEEN TOTAL *per capita* PRIVATE CONSUMPTION AND *per capita* CONSUMPTION OF MANUFACTURES, 1937-53

(Pesos per capita at 1953 prices) (Logarithmic scale)

Y = *Per capita* consumption of the manufactures concerned. X = Total *per capita* private consumption.



(b) *Evolution of supplies of manufactured consumer goods and its relation to changes in total income*

Apart from these general conclusions regarding the evolution of the supply of manufactured goods as a whole during the period 1937-53, a more detailed examination of the trends in manufactured consumer goods appears to be necessary. An analysis of the characteristics of demand for this type of goods during the period in question enables the prospective tendencies of demand to be more accurately estimated. These estimates in turn facilitate the quantification of future increases in production and imports of consumer goods, and the possible significance of such increases as regards the necessary supply of intermediate products and capital goods.

It is particularly interesting to analyse the relationships during this period between the fluctuations of demand for the various types of manufactured consumer goods, and those of population and real income. These comparisons allow a calculation to be made of historical coefficients of income-elasticity of demand for these products, which may be confronted with those resulting from the survey of income and expenses of 1,500 families in 1953, to examine how far the two sets of figures are compatible, or to show which cases need additional background information to explain the discrepancies encountered.

These relationships are illustrated in figure XVII, which compares the statistics of total *per capita* expenditure on goods and services since 1937 with the respective consumption of the various types of manufactured goods. A summary of the quantitative results appears in table 228.

One of the most significant facts thus emphasized is that in general the *per capita* consumption of manufactured goods increased much more rapidly than total *per capita* consumption of goods and services, thereby indicating a high income-elasticity.

Such a conclusion appears somewhat incompatible with that reached for 1953 on the basis of the survey of family income and expenditure, although this is partly attributable to purely statistical causes.²¹

Reference has already been made to one of these causes, which is that the survey may be considered to apply to only one sector of the Colombian population, whilst these over-all comparisons more adequately indicate demand in the country as a whole. The effect of the more rapid development of urban centres on the consumption of manufactured goods, in particular, cannot be reflected in calculations based upon the survey, which covered

²¹ In fact, there is no strict uniformity of concept in the two calculations. The survey compares the various branches of consumption with *total per capita income*, whereas here they are compared with *total per capita consumption*. The coefficients in the latter instance will generally tend to be higher than in the former, since the proportion of savings within total income will also tend to rise as income increases. Strictly speaking, in this case the term used should be "consumption-elasticity" of demand, which is in fact the concept employed in the chapters giving estimates of future demand; for purely practical reasons, however, such figures will still be referred to as coefficients of "income-elasticity".

only families already resident in such areas; on the other hand it is definitely taken into account in historical comparisons.

TABLE 228. COLOMBIA: COEFFICIENTS OF INCOME-ELASTICITY OF DEMAND FOR MANUFACTURED CONSUMER GOODS, 1937-1953

	1937-53	1947-53
<i>Total manufactured consumer goods</i>	1.60	1.40
<i>Non-durable consumer goods</i>	1.50	1.30
Processed foodstuffs	1.70	1.03
Beverages	2.72	1.66 ^a
Tobacco	1.50	0.60
Textiles	n.s.	1.40
Footwear and clothing	1.10	1.00 ^b
Paper and paper products	2.50	3.00
Printed and engraved matter, etc.	2.80	1.80
Chemicals	2.00	0.50
Non-durable metal goods	2.50	3.40
Other non-durable goods	2.10	1.40
<i>Durable consumer goods</i>	2.70	2.10
Wooden furniture	2.50	1.50
Leather goods	4.50	1.40
Rubber goods	2.70	1.80
Cement, ceramics, glass, etc.	1.80	0.30
Products of the mechanical and metallurgical industries	4.50	3.10
Other durable goods	0.70	0.40

SOURCE: ECLA, on the basis of official statistics.

^a 1945-53.

^b 1949-53.

The latter, however, have other important limitations. First, from the statistical point of view, if the period examined is sufficiently long, the margins of error are much wider both for consumption figures for each product, and for income. Secondly, consumption often tends to indicate the degree of availability rather than the demand. Finally, the results are affected by consumer habits, price variations in the different groups of goods, and many other factors which are difficult to take explicitly into account.

The ratios obtained show very marked variations. The most characteristic fact is that the high income-elasticity indicated by a study of the complete period 1937-53 is notably reduced if only the post-war years are examined. In fact, the corresponding coefficients for total manufactured goods are 1.60 for the whole period and only 1.40 for 1947-53, which considerably reduces the discrepancies with the coefficient based on the 1953 survey.

It is important to emphasize this gradual change in the behaviour pattern of demand for manufactured goods, since at first sight it is not easy to understand that the growth of the proportion of this type of product within total consumption should have followed a downward trend. This process may have been largely caused by the rise in the relative prices of foodstuffs in recent

years ; in fact, because of the inelasticity of this type of consumption such price increases absorbed a higher proportion of family budgets, thus reducing the amount of income available for purchases of manufactured products.

The downward movement in the income-elasticity of demand for manufactured goods is apparent not only in the aggregate, but also in almost all the principal groups. The coefficient for non-durable consumer goods was 1.5 for 1957-53 and fell to 1.3 for the years 1947-53 ; the reduction was even more marked in the case of durable consumer goods, which registered coefficients of 2.7 and 2.1 for these two periods respectively.

Textiles and clothing constitute one of the few exceptions to this over-all trend, the reduction of income-elasticity being less clearly defined. The time series in this case also closely approximates to that obtained on the basis of the 1953 survey ; the coefficients in both instances are very near to unity.

To sum up, it may be concluded that a historical comparison of the demand for manufactured goods with the fluctuations of *per capita* income during the period 1937-53 indicates results which vary considerably from those derived from an analysis of the 1953 survey. The discrepancy lies in the generally higher levels of the historical coefficients, although these become rather more comparable if taken over a shorter period. As both investigations contain interesting elements, and are concerned with different aspects of the over-all problem, it appears advisable to consider the two simultaneously, if their findings are to be used as a basis for hypotheses of future variations in demand for manufactured goods.

III. HISTORICAL DEVELOPMENT AND PRESENT SITUATION OF INDUSTRY IN COLOMBIA

In the previous section an attempt was made to define the characteristics of demand for manufactured goods since the pre-war years, especially in 1953, thereby permitting the accumulation of data as a basis for a reasonable forecast of the size and composition of future demand. It is now essential to examine the capacity of Colombia's industry to help in meeting this future demand, taking into account the historical background of its development and the present situation and problems of the manufacturing sector.

The rate of development in recent years, and the conditions under which this progress has been made, are in fact the main criteria by which the possibilities of future development can be judged. It is necessary to consider not only the manner in which production has increased, but also productive capacity and the factors which have determined the extent of its utilization. The conditions under which industry has developed must also be considered, in order to determine what incentives or difficulties have assisted or retarded this development. Finally, a detailed examination must be made of the repercussions of all these factors on the present industrial situation, analysing the volume and composition of manufactured goods, installed capacity in the main industrial branches and the manner in which this is

utilized, specific problems of raw materials availabilities, competition from imports, the characteristics of fiscal and credit policy as regards industrial development, etc.

1. *Analysis of industrial development during the period 1925-53*

(a) *Rate of growth of industry as a whole and the principal factors which affected it*

Colombian industry has attained one of the highest percentages of the gross national product registered in Latin America, even surpassing the figures for Brazil, Chile and Mexico. This high relative standing of industry, however, was reached much later in Colombia than in the other countries ; in fact, the share of the industrial sector in the gross national product, which in 1953 reached 21 per cent, was only about 10 per cent in 1925 and approximately 13 per cent during the pre-war years (average for the three-year period 1937-39).

This relative delay in Colombia's industrialization suggests that it was affected by important historical factors which hampered the early stages of industrial development, and whose subsequent removal opened up possibilities for a very rapid improvement. In view of the fact that Colombia has the fourth highest population in Latin America, and therefore enjoys a reasonably high market potential, it seems difficult to account for the delay in forming an industrial nucleus of any importance.

One of the retarding factors may possibly have been a limited capacity for external payments, which made it difficult to purchase the necessary production equipment. The value of Colombia's total exports in 1928 was only slightly more than 200 million dollars, or some 31 dollars *per capita*, a similar figure to that shown by Mexico, but very much lower than in the case of Chile (95 dollars *per capita*) and of Argentina (150 dollars *per capita*). Later, whilst the volume of exports of other countries declined sharply during the depression of the 'thirties, afterwards recovering with relative slowness, the volume of Colombian exports expanded almost uninterruptedly until the Second World War, in addition to which the post-war period saw a substantial improvement in the terms of trade.²²

At all events it is evident that, at least during the early 'twenties, Colombia's situation was far more unfavourable as regards foreign currency resources which could be used for the import of capital goods.

It was not until the second half of the 'twenties that there were any appreciable contributions of foreign capital. In other Latin American countries foreign capital assisted in financing the expansion of productive capacity not only in export activities but also in the development of means of transport, power, etc. Colombia, on the other hand, had to finance even the expansion of export — the chief of which was coffee — mainly

²² It is interesting to note, for instance, how the situation had changed by 1953, when Colombia's exports amounted to 596 million dollars and Chile's to only 412 million. The *per capita* figures were thus much closer ; 49 and 68 dollars in Colombia and Chile respectively.

from domestic savings, which naturally reduced the possibilities of any serious investment in the manufacturing sector.

The great geographical difficulties constitute another basic factor which must be taken into account when analysing the characteristics of industrial development in Colombia, although they had a somewhat contradictory influence. In the first place, these difficulties gave rise to a number of important population centres more or less isolated from one another, without adequate means of communication, and therefore with but few opportunities for trade; consequently it was hardly possible to speak of a national market for domestic industrial production, which owing to these circumstances could only rely on sales to the population of one specific area. To this must be added the low level of *per capita* income (approximately 100 dollars in 1925), which constituted yet another factor limiting demand for manufactured goods. On the other hand, these geographical difficulties afforded a natural protection to the industries which developed in the interior of the country, because of the extremely high internal transport costs affecting imported commodities.

At all events, the adverse influence seems to have had more effect than the protective, and was only mitigated to any large extent as a result of the substantial public investments, financed by foreign capital, which were made in the second half of the 'twenties, chiefly to improve communications.

Labour availability also appears to have been a delaying factor in industrial development. The productivity of the agricultural population was probably relatively high compared to that of non-agricultural workers, since the former largely specialized in producing for export; this naturally meant that there was less incentive for the population to shift from agriculture to other activities. It must be recognized that the situation was very different as regards that part of the population occupied in agriculture for domestic consumption, since in this case the existence of certain factors—especially of an institutional nature—had reduced labour mobility almost to nothing, given the prevailing land tenure system and the geographical distribution of the population.

Hence it does not seem to have been by accident that the first industrial nucleus was formed in Antioquia. First, one of the largest population centres was to be found there, and the district also enjoyed one of the relatively highest levels of income. Secondly, Antioquia was the principal coffee-producing centre, thereby receiving a major share of the benefits accruing from exports and possessing the greatest real possibilities of financing investment in the manufacturing sector. In addition, the limited size of the area that could be used for the cultivation of coffee was, to some extent, the cause of a shift of capital to the development of cultivation in other regions, but was also an incentive to utilize available capital for investment in non-agricultural activity within the Department.

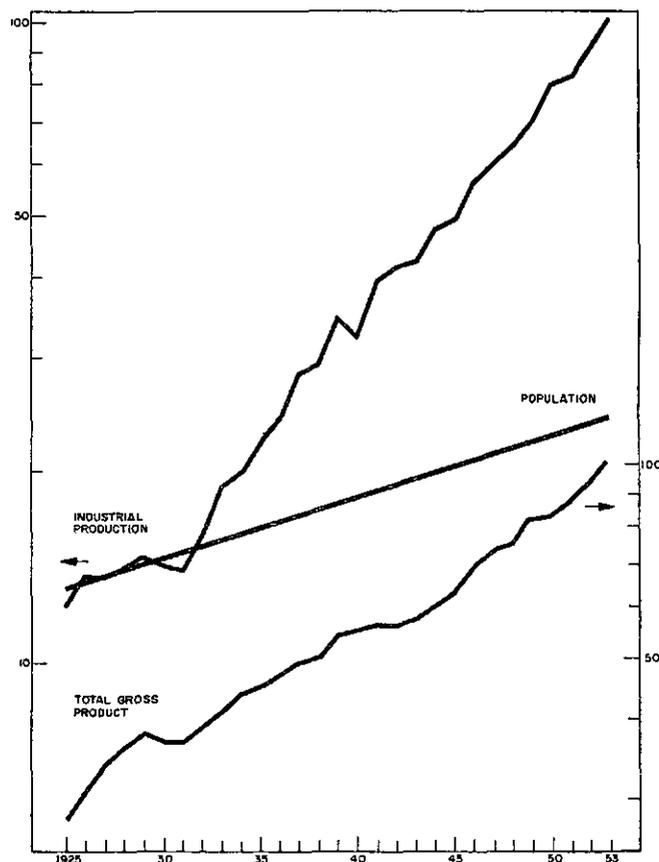
Its status as principal coffee-exporting centre placed Antioquia in a better situation with respect to means of

communication, since priority was necessarily given to facilities for the transport of coffee. Thus, for instance, of public investment made in the second half of the 'twenties to improve communications, some 50 per cent was allocated to the province of Antioquia. While conditions were thus relatively favourable for the supply of certain imported raw materials and intermediate products, internal transport costs from the coast for imported end products were still sufficiently high to form a natural protection for local industries.

Antioquia also enjoyed other advantages, one of the most important being a greater available capacity for the generation of electric energy. In 1934, for instance, the plants in Antioquia had a higher capacity than those of Cundinamarca and had presumably been in operation for a longer period.

FIGURE XVIII. COLOMBIA: QUANTUM INDEX OF TOTAL INDUSTRIAL PRODUCTION, 1925-53

(Semi-logarithmic scale)



When the adverse influence of some of the factors described was weakened, industry developed rapidly. Between 1925 and 1953 it expanded in real terms at a cumulative annual rate of 7.8 per cent, as against rates of 4.6 per cent for the aggregate gross product, and only 2.9 per cent for the agricultural sector. This average figure of 7.8 per cent is the result of widely varying rates of growth during the whole of this period, both in production and in productive capacity. Four stages may

be distinguished, namely, the interval from 1925 to the depression at the beginning of the 'thirties ; the period 1933-39 ; the war years ; and finally the phase commencing in 1945 (see figure XVIII, and the relevant data in the *Statistical Appendix*, table 130).

The lowest increment in industrial production of the whole period was that recorded between 1925 and 1930, when the average annual rate of increase was less than 3 per cent. The adverse influence of the isolation of local markets probably still affected the situation, and therefore from the point of view of demand there was insufficient incentive for a more rapid expansion. This slow increase in production contrast sharply with the considerable investments in the manufacturing sector, which increased the productive capacity of industry by more than 50 per cent.²³ To these investments placed in the manufacturing sector proper, must be added public investment in transport and other services, mainly energy, which later permitted a better utilization of productive capacity. Although during this stage no substantial industrial development was achieved, many of the conditions were created which later conduced to the accelerated expansion of production.

To the effect of these investments other factors were added in the following stage which helped to give a greater impetus to industrial development. First, the depression of the 'thirties and the consequent reduction of the capacity to import made it impossible to maintain the level of supply of manufactured goods from foreign markets, and therefore provided a strong incentive for import substitution. Imports, in fact, declined from 137 million dollars in 1929 to only 33 million in 1932, an exceptionally severe curtailment, even though proportionally less than that suffered in other Latin American countries.

Another favourable factor was the tariff reform of 1931. This was the first attempt at protection by the use of customs duties not only as a source of national income but also as a means of ensuring a favourable competitive position for certain branches of domestic industry as against imported products. Although the protectionist effect of this tariff was only temporary, since it was established on the basis of specific duties, which meant that its value was progressively reduced by later price increases, there is no doubt that it acted as an important additional incentive to the development of several industries, and helped to transform regional into national markets.

Under these favourable conditions, industry showed an average annual rate of increase of 10.8 per cent between 1933 and 1939, probably the highest for the whole period. Although this rate of expansion is impressive in itself, the low initial level must be taken into account, as well as the considerable influence thus exerted by increments which, in absolute terms, do not appear so exceptional. In the meantime, there was very little diversification of industrial production, in which

foodstuffs industries (represented by very simple transformations of agricultural commodities) predominated together with tobacco, whilst there was little activity in textiles, beverages, leather and leather goods, and cement played a very small part ; the chemicals industries — with the exception of the manufacture of soap, candles and matches — as well as the mechanical and metallurgical industries, were practically non-existent. This limited diversification of industrial productive capacity prevented the stimuli offered during this period of industrial development from producing an even higher rate of growth, and confined expansion to those types of production already established in Colombia, no important new lines being introduced.

In assessing the part played by the depression of the 'thirties in stimulating industrial development, it is interesting to compare the situation in Colombia with that prevailing in Brazil. In the latter country the reduction of the capacity to import was more marked than in Colombia, which made the necessity for import substitution more urgent. In Brazil, furthermore, there was already a fairly large steel industry, and industry in general was on a much wider basis. Other important factors affected the Brazilian situation ; the prohibition of new coffee plantations, for instance, diverted investment resources to other sectors — mainly that of manufacturing — whilst Colombia tended to protect coffee through the creation of the *Fondo de Estabilización* and the *Federación Nacional de Cafeteros*.

One of the characteristics of industrial development during this period was the contrast between the marked expansion of production and the relative stagnation of productive capacity. Capital goods imports in fact decreased much more notably than the capacity to import, and investment in the manufacturing sector remained at a very low level. The increase in production was therefore made possible only by more efficient utilization of available capacity, which furthermore explains why the diversification of industrial production did not progress, and why production of those items for which some installed capacity already existed in Colombia was strengthened instead.

It is also important that this last characteristic of industrial development during the period 1933-39 should be taken into account when analysing the increase which took place in the following period, that of the war years. The difficulties of supply from foreign markets, and a fresh reduction in the capacity to import, gave rise to new incentives for the expansion of industrial production during this period and intensified the need for import replacement. The average rate of growth of industrial production between the years 1939 and 1945 was nevertheless only 6 per cent per year, much lower than in the previous and subsequent periods, and also lower than the figure for other Latin American countries during the same years. This incapacity of Colombian industry to benefit to a greater degree from the powerful stimuli described was precisely the result of the limited basis of productive capacity, and more especially of the almost entire absence of a mechanical and metallurgical industry and of other branches of manufacture of intermediate products.

²³ The variations of productive capacity and their relation to production increases are discussed in detail later, together with estimates of the stock of capital in industry and analyses of fluctuations in the product/capital ratio.

The various encouraging factors did in fact promote activity in a number of industrial branches, but for lack of both domestic and import possibilities these were unable to create a reasonable productive capacity with sufficient speed. The older branches of production often reached the limit of their installed capacity, the utilization of which had been increasing during the whole of the previous period.

Such factors thus gave an anticipatory glimpse of one of the characteristics which post-war industrial development would necessarily display. In the first place, the limit reached in the installed capacity of many of the relatively older branches of industry and the upsurge of new activities introduced during the war emphasized the necessity for expansion of industrial productive capacity, with the result that capital goods imports — above all those for the manufacturing sector — increased rapidly as from the early post-war years, reaching much higher figures in 1947 than in any previous period.²⁴ It is worth noting that the industrial development of previous years helped to make possible these heavy imports of machinery and equipment, since the creation of an internal source of supply of many types of manufactured consumer goods left almost 50 per cent of the total availability of foreign exchange for capital goods imports.

Production itself did not rise as rapidly as productive capacity, which implied a reversal of the process of improvement in the product capital ratio that had been taking place since the depression. In any case, the expansion of industrial production during the post-war period showed a considerable increase over that of the previous period. A cumulative average annual rate of 9.4 per cent was attained between 1945 and 1953.

This increase was to a large extent due to the development of new industries during the war, and to the subsequent creation of others, which offset the relatively slow advance in the older branches. Thus, the period in question was characterized not only by rapid growth but also by changes in the composition of industrial production, which tended toward diversification and included a number of new production lines.

It must be remembered at the same time that this period witnessed one of the most marked rates of growth both of *per capita* income and of urban population, which also implied substantial increases in demand for manufactured products.

On the other hand, the recovery of the capacity to import and the normalization of foreign trade, at least during the early post-war years, tended to discourage industrial development, since the customs tariff gave inadequate protection to the majority of manufactured products against competition from imported goods. This inefficacy of the customs tariff, however, was offset by other protectionist measures, chiefly consisting of a quantitative control of imports, until the adoption of a new tariff in 1951.

It would be appropriate, at this juncture, to recall some of the features of this tariff reform which were

mentioned in Part Two, chapter I. In the first place, and as regards its formal aspect, it was established on a basis of both specific and *ad valorem* duties, which was aimed at preventing the weakening of its protectionist character commensurately with increases in the prices of imported products. In the second place, the new tariff was in general designed to give greater protection to end consumer goods industries, imposing relatively low taxes on intermediate products and capital goods. As will be shown later, this basic principle underlying the 1951 tariff may have covered the immediate short-term requirements of industrial development, but the possibility must be taken into account that it may not be equally adequate to meet future needs, because of the high degree of import substitution in this type of goods, and the probably necessity of speeding up the growth of production lines which may not be sufficiently encouraged by the present tariff protection applied to them.

Examination of the annual figures for the expansion of industrial production during the post-war period shows that there was only one phase of relative stagnation, i.e., when the increment scarcely amounted to 2.6 per cent. This was perhaps largely due to the restrictive monetary policy pursued at that time and also to civil disturbances in various parts of the country. In 1952 the rate of growth again increased; by 1953 it was nearly 10.2 per cent higher than in the previous year, and maintained its upward movement during 1954 at least.

(b) *Changes in the composition of industrial production and in certain basic characteristics of the manufacturing sector*

Apart from the over-all rate of growth of industrial development, certain important changes within the manufacturing sector are worth analysing in detail.

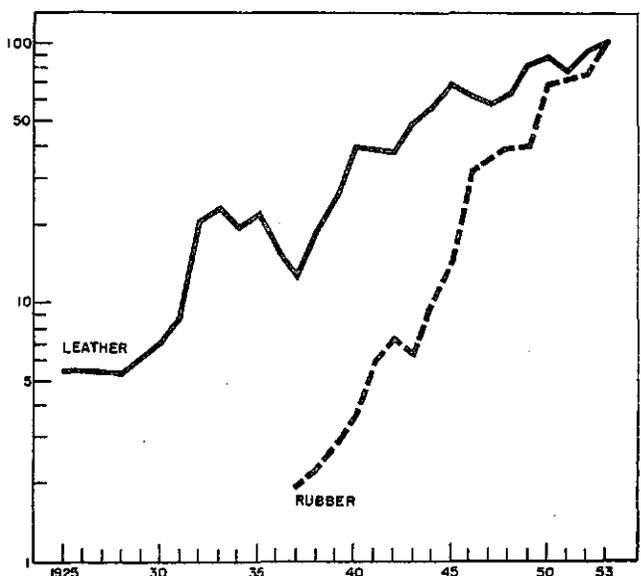
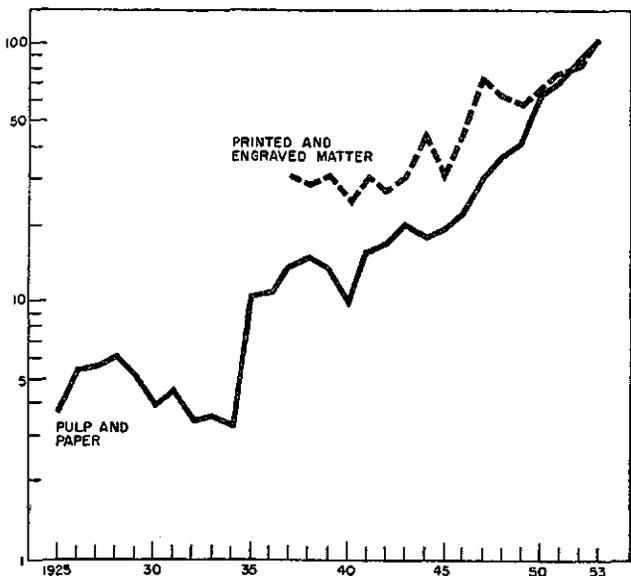
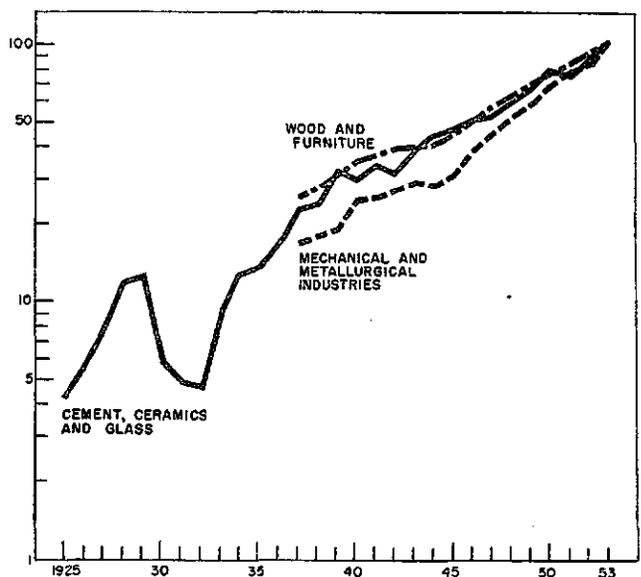
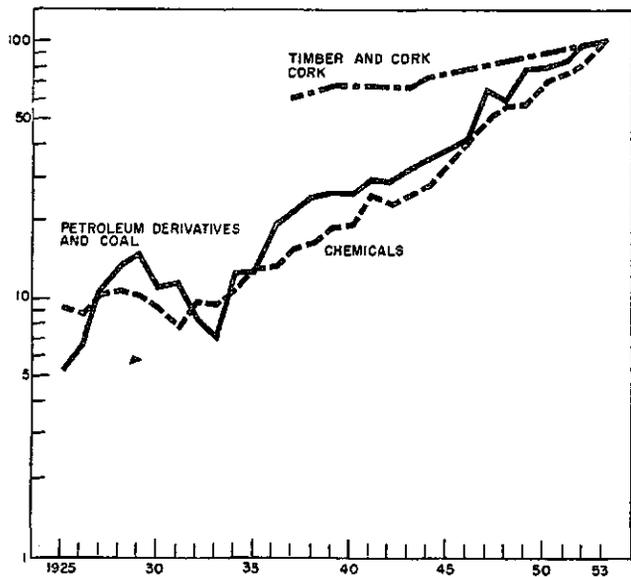
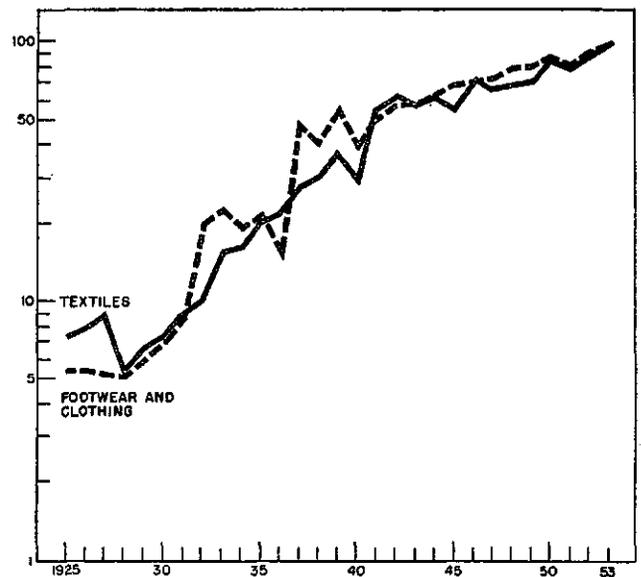
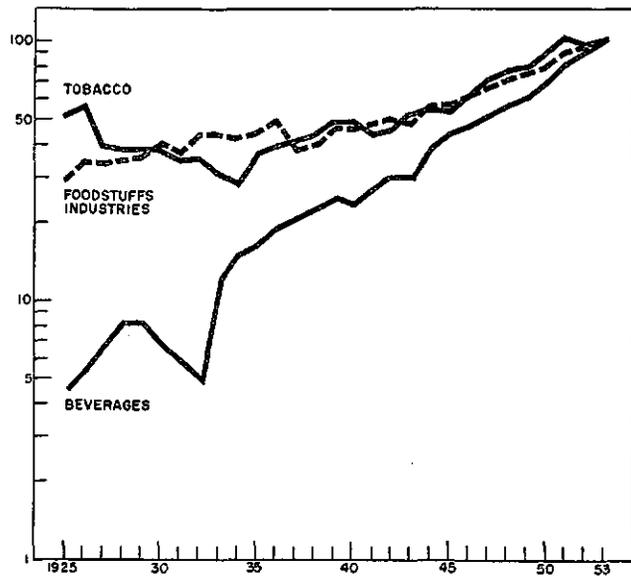
(i) In the first place, as the outcome of the differing rates of increase shown by the various branches, the composition of industrial production was considerably changed. As can be seen from figure XIX, while the total volume of industrial production increased almost eightfold between 1925-29 and 1953, the tobacco industry expanded by scarcely more than 100 per cent and the foodstuffs industries were only trebled. Much greater increments were recorded for the beverages, textiles, footwear and clothing, chemicals and cement, ceramics and glass industries (see the relevant yearly data in the *Statistical Appendix*, tables 130 and 131, and the "Note on sources and methods used in the construction of the quantum indices of industrial production", included in a special annex to this report).²⁵

In 1925-29 the foodstuffs industries — principally the threshing of coffee and of certain cereals, and sugar processing and refining — made up approximately half Colombia's total industrial production. The very character of their activities imposed upon them a rate of growth more or less parallel to that of the agricultural sector which caused them progressively to lose their relative importance within aggregate industrial produc-

²⁴ Part of this equipment was naturally used for modernization and replacement of obsolete equipment, but most of it was intended directly to increase productive capacity.

²⁵ Annex VIII.

FIGURE XIX. COLOMBIA : QUANTUM INDICES OF INDUSTRIAL PRODUCTION BY BRANCHES OF INDUSTRY (1953=100)
(Semi-logarithmic scale)



tion. Their share diminished recently to less than 19 per cent in terms of value added,²⁶ a level slightly above that reached by the textile industries and lower than that of beverages. Only lately have certain new production lines begun to develop which may offer possibilities of a much more rapid rate of development in the future; one example of these is the canned foodstuffs industry, although it is of little importance to date.

The tobacco industry has had a somewhat similar history. As a whole, it shows the lowest rate of increase recorded during the entire period, undoubtedly as a result of the stagnation in cigar production, whilst the output of cigarettes increased to a much more marked degree.

The beverages industry, which in 1925 represented less than 9 per cent of the total value added by the manufacturing sector, registered one of the most remarkable and persistent increases, coming to constitute by 1953 the most important branch of industrial production in Colombia, with a value added of more than 300 million pesos, compared to a little more than 1,500 million for the entire manufacturing sector.

The textile industry increased even more rapidly than the beverages industry until the war years. Thence forward, however, the rate of increase fell off considerably, in spite of developments in textiles based on rayon and other artificial fibres.²⁷ Consequently, the relative importance of the textile industry, which had risen from approximately 12 per cent during the years 1925-29 to 20 per cent in 1944, declined slightly from then on, until in 1953 it covered only 15 per cent of the value added by the industry.

A similar tendency appears in the footwear and clothing industries, the relative importance of which dropped from 15 per cent in the period 1937-39 to 9 per cent in 1953, mainly on account of clothing, since in footwear a marked increase continued. This conclusion appears somewhat surprising in view of the creation and development of large ready-made-clothing establishments; their growth, however, does not seem to have been based exclusively upon an expansion of production, but rather on a shift of small-scale industrial and artisan production towards mass production.

Amongst other relatively old-established branches of industrial production, the leather industry showed an increase almost as great and sustained as that of beverages although its relative importance continued to be fairly low, amounting to approximately 2 per cent in 1953. Growth seems to have been slower in the wood

and cork industries, judging from statistics which do not go back further than 1937, and slightly more rapid in the case of wooden furniture manufacture.

Up to the war years, the chemicals industries expanded at a rate very similar to that of industrial production as a whole, but their subsequent development was much more rapid. This was principally due to the fact that many new products were added in the post-war period to the traditional output of soap, candles, matches and similar items. These new activities were mainly concerned with the manufacture of intermediate products, especially artificial fibres (small-scale production of which had already begun before the war) and, more recently, soda, apart from the development of a number of enterprises manufacturing pharmaceutical products. As a result, the relative importance of the chemicals industries rose from 3.7 per cent in 1937-39 to 7 per cent in 1953.

The cement, ceramics, glass and similar industries showed one of the sharpest upward trends, although few important new lines were initiated. Their expansion was principally due to the spectacular development of the cement and asbestos-cement industries, and in a lesser degree to that of glass, whilst those of ceramics and other clay products expanded more slowly. This group of industries as a whole increased its share in the total value added by the manufacturing sector from 6 per cent in 1925-29 to more than 7 per cent in 1953.

In relatively less important branches such as those of petroleum and coal derivatives, and paper and associated products, there were also marked increases, especially in the latter, by virtue of the contribution made by domestic production of certain types of paper and board during the last few years.

A completely new branch of the manufacturing sector which was practically non-existent before the war, and which developed very rapidly, is the rubber industry. This registered the highest rate of increase in the last fifteen years of the period, without doubt because of its newness, although its share in total industrial production was still not very large, being approximately 2 per cent in terms of value added in 1953.

It is difficult to establish with any accuracy the rate of development of the mechanical and metallurgical industries. The purely provisional estimates employed here show that after the pre-war period — and especially in the last five or six years considered — these were the industries registering the greatest expansion, with the single exception of rubber. The importance of this increase must in any case be assessed with regard to the absolute level at which it took place, since it obviously concerns one of the sectors of the manufacturing industry with the most retarded development. Even including repair and maintenance, which do not always constitute effective contributions to the supply of manufactured products, its relative importance in total industry was barely 3.6 per cent in 1937-39, and even after the intensive development mentioned above rose only to 6.1 per cent.²⁸

²⁶ Whilst the analysis of the availability of manufactured products contained in section II of this chapter is based on the gross value of production in each branch, in the present section only the appropriate values added are considered. This is because the latter concept is more adequate for measuring the contribution of each branch of industry from the point of view of the income produced by the manufacturing sector, since it reduces the relative importance of such branches as the foodstuffs industries, which in many cases represent no more than simple transformations of the products of other sectors. In terms of gross value the foodstuffs industries continue to account for the highest proportion of Colombia's total industrial production.

²⁷ The actual production of artificial fibres is included under the chemicals industries.

²⁸ These figures should be compared, for example, with the relative importance attained by the mechanical and metallurgical industries in Chile, which, in 1948, already represented nearly 13 per cent of the value added by the manufacturing industry.

Finally, an examination of the rate of industrial development, taking into account not specific established industries, but the character of the articles produced, will reveal a notable similarity between the production of end goods and of intermediate products. In other types of economies this might be perfectly logical, but in the case of Colombia (where a large proportion of intermediate products is imported) it shows that, in spite of the intensive industrial development, it was not possible to reduce industry's dependence on imports.

The latter characteristic is of course unlikely to appear in future industrial development, at least if the rate of increase achieved in earlier periods is to be maintained. In fact, any reduction of the capacity to import would give rise to serious difficulties in supplying intermediate products to the growing industrial nucleus, and would give a strong impetus to the development of this type of production. It must also be remembered that one of the factors favouring the rate of development so far shown by industry has been the possibility of import replacement; this substitution process, however, is almost complete in the case of the majority of manufactured consumer goods, which in this field would limit future development to meeting the increase in domestic demand, whilst in intermediate products there would still be many possibilities for substitution.

(ii) Apart from the over-all expansion of the manufacturing sector, and the variations which occurred in the composition of industrial production, it is worth while to note the changes in manufacturing methods. There are several factors which indicate that industrial production proper increased much more rapidly than artisan production.²⁹ At the same time, even industrial production itself tended to concentrate a greater volume of output in large manufacturing units, to the detriment of small- and medium-scale industries. The extent of such changes is, however, very difficult to appraise from the data available.

An approximate indication of some of these changes may be obtained by comparing the population censuses for 1938 and 1953. These show that the active population in productive artisan labour and homecrafts increased between these two periods by 36 per cent, whilst the increment in those employed in industry proper amounted to 92 per cent.

Without minimizing the significance of these tendencies, it is necessary to remember that artisan production continues to occupy a very high percentage of the total population employed in the manufacturing sector. The same censuses indicate that in 1938 approximately 77 per cent of this total was represented by artisan employment, a figure which only recently was reduced to 72 per cent. The preliminary results of the industrial census of 1953 show that the average number of persons employed per establishment was less than six.

This high proportion of artisan labour resulted from the contribution of many branches of the foodstuffs

²⁹ The criteria adopted for estimating variations in the quantum of industrial production, which are described in annex VIII, tend in general to include artisan production. It is important to remember this when examining the evolution of industrial production proper, of which the rate of increase thus appears to be under-estimated.

industry, the hard fibre textiles industry, part of the tobacco industry, a major proportion of the clothing industry, certain branches of the chemicals industry, etc.³⁰ To a varying degree it may be seen, however, that in all cases the relative importance of this type of production is tending to decrease. It is only recently, for instance, that large enterprises have appeared in the ready-made clothing industry, especially in the manufacture of men's clothing, whilst two relatively new textile packing firms have already absorbed an appreciable percentage of the sisal (a hard fibre obtained from the plant known as *agave*, *fique* or *cabuya*) manufactured in Colombia.

The variations in the distribution of industrial enterprises according to their capital are also indicative of the tendency towards a greater concentration of industrial production into larger units. While the industrial census of 1945 showed that less than 26 per cent of the total industrial capital belonged to firms with a capital of more than 5 million pesos, the *Directorio Industrial* of 1953 indicated that between these two years the percentage rose to more than 58 per cent.³¹ From the same sources it may be deduced that in 1945 only 1.3 per cent of the total number of undertakings had a capital of more than half a million pesos, whilst by 1953 this proportion had risen to 3.4 per cent.

Naturally, these changes did not all result from the concentration of production in existing industries, since some arose from the creation of a number of new enterprises which operated in a large scale from their initiation, such as the steel mills, soda and rayon factories and some rubber plants. At the same time, however, especially in the chemicals and metallurgical industries, a number of new firms have been established which do not represent any marked progress in this direction.

The necessity for operating with larger units of production has also modified the organization and financing of manufacturing enterprises. Thus, for example, according to research carried out by the *Superintendencia de Sociedades Anónimas*, the number of firms organized as stock companies increased between 1940 and 1952 by 69 per cent, their invested capital by 367 per cent, their total assets by 531 per cent and their net profits by 382 per cent.³² It may likewise be estimated that for some years past more than 60 per cent of the capital invested in industry has been put into stock companies. The chief branches of production in which stock companies have achieved the greatest relative importance have been the textiles, beer, cement, cigarettes and sugar industries, which are precisely those with the highest

³⁰ In this respect see section III, point 2, "Present characteristics of industry", where a more detailed analysis is made.

³¹ These comparisons have only relative significance and should not be taken too literally. This is due firstly to the rise of the general price level which makes the monetary figures not directly comparable; the ground covered by the *Directorio Industrial* was, on the other hand, much more limited and a relatively high percentage of small establishments was therefore presumably omitted. Even in the 1953 census no information was requested regarding capital, for which reason it cannot be used to offset the corresponding deficiency in the comparisons.

³² *Revista de la Superintendencia de Sociedades Anónimas*, September 1953.

concentration of production in a few enterprises, that are usually the most modern and efficient. It is worth mentioning, however, that in spite of the large-scale development of this type of organization, the rate of increase of stock companies seems to have declined considerably in the last ten years or so; taxation may partly account for this, since the fiscal burden has weighed more heavily on them than on other types of company.

There have also been other interesting changes in forms of financing, especially in new industrial enterprises. Possibly the most characteristic event in this connexion is the increasing participation of public investment in the manufacturing sector. In fact, it is only since the years 1941-42 that the public sector has taken a more direct part in the industrialization process; before that period its activity was confined to the creation and development of public services, mainly energy and transport. The relative importance of public investment within the total for industry was thus 4.4 per cent in 1941 and 16.2 per cent in 1942; this proportion subsequently fell slightly, but rose again to 12.2 per cent in 1951 and 21.7 per cent in 1952. It should be noted that the increased share of public investment in industrial development has not meant any reduction in private investment, which on the contrary has considerably expanded in absolute terms.

This public investment activity has largely been due to the necessity for creating basic industries whose heavy capital requirements could not easily be met from private sources. An outcome of this need was the establishment in 1941 of the *Instituto de Fomento Industrial*, the main objects of which were the setting-up of a steel industry, the development of certain chemicals industries and the study of the possibilities of large-scale coal mining. The Institute also took part in the creation of a number of smaller enterprises, which have gradually been transferred to the private sector. The *Banco de la República* has also assisted with a number of investments, chiefly in a soda plant and in the exploitation of salt deposits.

Another important change in the methods of financing industrial growth is related to the increasingly significant role of foreign capital. Historically, foreign contributions have played no part in the industrial development of the country, as until the war years there was hardly any direct foreign investment in the manufacturing sector. Since then, however, such investment, both direct (mainly in collaboration with local capital) and in the form of loans,³³ has been fairly considerable.

The importance of the foregoing comments derives from both their usefulness for an analysis of the historical development of Colombian industry, and the significance which they may have for future development. A reduction in the relative proportion of artisan labour will tend to increase industrial productivity, and will therefore reflect upon production costs, and help to expand

demand through an adjustment of relative prices in favour of the consumer. This must be borne in mind when examining the effect of future increments in industrial production upon manpower requirements, since the increases in the total population employed by the manufacturing sector will not necessarily equal those in production itself. Moreover, the tendency to concentrate industrial production in larger units will probably demand a higher rate of capital investment per unit of production, which would mean that investment in the manufacturing sector would expand more rapidly than industrial production.

(c) *Attitude of the Government towards industrial development*

Elsewhere in this study a detailed analysis is made of the role of the public sector in the development of the Colombian economy as a whole, and in that of its principal sectors. However, in view of the fact that mention has been made of official action in relation to various aspects of industrial development described above, it would be well to summarize briefly here the chief conclusions as to the part played by official economic policy in creating incentives or obstacles to industrial development.

In general terms, it may be stated that until 1940 measures adopted by the public sector exerted only an indirect influence upon industrial development. Amongst these measures was public investment in social capital (especially in transport and energy) which helped to create a more favourable climate for industrialization. On the one hand, these investments provided basic supplies of electric energy for industrial consumption; on the other, the improvement of transport not only facilitated the supply of raw materials and the means of production, but also served the main object of contributing to an expansion of the markets by bringing the more isolated parts of the country into closer contact. The rise in public expenditure also tended to increase demand for manufactured goods, thus adding to the incentives for their production.

The measures which approached most nearly to direct aid to industrial development were the tariff reform of 1931 and, later, the policy of quantitative control of imports in force during the years 1933 to 1937. Although the basic intention behind these measures was defence of the balance of payments rather than a deliberate attempt to assist industrialization, their outcome was a strong protective barrier which stimulated the growth of industries producing substitutes for imports.

From 1940 onwards, official action in the field of industrial development was better planned and more direct. The intention to play a more active part in national industry was stated unequivocally in decree No. 1157, dated 18 June 1940, which outlined a general plan for the encouragement of economic activities, and specifically mentioned a development programme in the manufacturing sector. According to this, it was to be decided which of the basic and primary transforming industries working with national raw materials had been unable to develop satisfactorily with the aid of private enter-

³³ A detailed description will be given later of the branches of the manufacturing industry to which these contributions have been made, as well as of the effects upon their development (see section III, point 2, sub-paragraph (g)).

prise, the *Instituto de Fomento Industrial* thereupon being established for their benefit. A further decree passed in the following month included a specific list of industries qualified for such assistance, amongst them being the steel, soda and similar industries ; various incentives were offered for their development, mainly in the field of taxation.

During the post-war years exchange controls were maintained in order to assist the many new industries which (although on a small scale) had begun operations during the war under the stimulus of the low capacity to import and the difficulties of obtaining manufactured products from foreign markets. This control of imports was all the more necessary since the protectionist influence of the 1931 tariff had completely disappeared, owing to the fact that it was based on specific duties whose effect had been progressively decreasing as a result of a rise in the price of imported goods. A free import policy was in force only during the years 1946-47, but it resulted in the rapid exhaustion of foreign exchange reserves and necessitated a return to exchange controls in 1948. It is worth mentioning, however, that this liberalization of import policy does not seem to have had any significant effect upon the rate of increase of domestic industrial production, which suggests that a large part of the available foreign exchange was probably in the hands of the companies themselves, who used it for capital goods imports, thereby preventing the entry of competitive products.³⁴

Finally, the protection of industry by means of tariff policy was re-established in 1951, when a reform came into force which imposed both specific and *ad valorem* duties.

Broadly speaking, it may be concluded that several aspects of the policy of the public sector constituted important incentives to industrial development. Nevertheless, these should be considered jointly with other measures which do not appear to have been so advantageous, above all, those concerned with credit and taxation policies.

Throughout the whole of the period under review, there was no investment credit available for the manufacturing sector, which meant that its expansion was basically financed by the re-investment of profits.

From 1940 onwards, certain measures were adopted which were aimed at improving credit availabilities for industry, but they had little practical effect. For example, the *Banco Central Hipotecario* was authorized to issue mortgage bonds whose product would be used for loans to industry, and to act as an intermediary in the placing of bonds issued by the companies themselves and backed by their fixed assets. In practice, however, these provisions have never been fulfilled, since the total volume of loans has been very low and has mainly resulted from compulsory investment in these bonds by insurance companies.

From 1950 onwards, an attempt was made to encourage private banks to grant credit to industry, one of the

objects being to facilitate the consolidation of investment in fixed capital made by the enterprises themselves by means of short-term bank loans. The commercial banks were authorized to invest a certain proportion — 7 per cent in 1954 — of their deposits in industrial loans of up to five years' maturity, but this system also failed to produce any appreciable results. The situation of the private banks tends to make them limit their activities to commercial loans. They must hold an adequate rediscountable portfolio, conditioned not only by the solvency of the firms concerned, but also by the imposition of a maximum term of ninety days for this type of operation. The maximum interest on rediscountable drafts is 6 per cent, while for other types of borrowing it is much higher, and becomes a heavy burden on long-term loans.

The law which created the *Caja Agraria* made provision for the formation of an industrial credit section ; the volume of credit granted, however, has been only very small, amounting to not more than 1 million pesos.

One of the few undertakings set up to issue long-term loans that has had a certain amount of success is the *Banco Popular*, which grants credit up to five years, but here too there have been many difficulties. In the first place, only 50 per cent of the resources of the Bank were allotted to the manufacturing sector, whilst a large proportion was earmarked for consumer loans ; secondly, the actual amount of each loan is small, so that they are primarily a means of financing small and artisan-type industries ; and, finally, they are not true investment loans, since they usually expire at the end of about two years.

The enterprises themselves have thus not only had to bear almost the whole burden of financing expansion, but have also been obliged to meet their considerable working capital requirements. These are abnormally high in the case of Colombian industry, owing to the necessity for large stocks of raw materials and intermediate products for the manufacturing process ; for the advance financing of most purchases of agricultural raw materials ; and even for the financing of a considerable proportion of surplus stocks of finished products.

Fiscal policy has not been very favourable to industrial development either. Higher tax rates — which have reached 38 per cent of the assessable net income — have been placing an increasing load on the manufacturing sector, which since 1935 has become the principal source of tax revenue, its contribution recently amounting to 60 per cent of total payments by the different enterprises. It should be noted, however, that this additional contribution from the manufacturing sector does not appear to have retarded the rate of investment, since private investment during the post-war period increased even more rapidly than taxes ; it is therefore probable that the increments in industrial productivity were large enough to offset the heavier burden of taxation.

In this connexion, some mention should be made of those features of the 1953 tax reform that gave a new structure to the taxation system, and thereby provoked considerable discussion as to its possible repercussions

³⁴ In fact, the proportion of capital goods in the over-all import pattern was fairly high during the years mentioned.

on future industrial development. Such discussions were mainly concerned with the differential treatment given to stock companies, which places them in a less favourable situation than other forms of company organization. This differentiation had already become evident under the previous system, which tended to discriminate against stock companies, but under which they also received certain compensations. Stock companies were subject to a progressive tax, but their dividends were exempt; while other companies were taxed in proportion to their profits, with a progressive tax for individual members. The reform intensified this differentiation, since, in the case of stock companies, a tax on dividends was added to the progressive tax on the company, whereas the proportional tax — raised from 2 to 3 per cent — was maintained in the case of private companies.³⁵

Although the influence of Government policy on industrial development in Colombia is discussed only in very general terms in this study, a slightly more detailed examination should be made of two of the aspects referred to above, i.e., the main characteristics of the 1951 tariff and its importance under present industrial conditions, and the part played by the *Instituto de Fomento Industrial*.

(i) The fact that the market, at least initially, was not always large enough to justify the installation of enterprises of an economic size, the consequent difficulties in the way of specialization and the frequent necessity for diversified production within the same firm; the very shortage of capital, which often made large-scale undertakings impossible; the need to use large amounts of imported raw materials; the difficulties inherent in the initiation of new national activities; the scarcity of technicians and skilled labour; all these are among the many factors which would have made it impossible to envisage any appreciable industrial development on the basis of open and permanent competition with imports.

This conclusion emphasizes the importance of the tariff policy as an incentive to the development of industry as a whole and to that of its chief branches. From the latter point of view the fundamental purpose of the 1951 tariff reform seems to have been to give strong protection to end consumer goods industries and to certain agricultural products, all intermediate products being regarded as raw materials and consequently subject to a low rate of duty. In 1952, customs duties represented an average surcharge of approximately 48 per cent over the c.i.f. values of imported consumer goods, whilst the average surcharge was 24 per cent for raw materials and intermediate products, and only 6 per cent for capital goods.

Although this classification may have been more or less adequate for industrial requirements some years ago, it must be remembered that at the stage of development attained by Colombian industry in recent years — with its many new lines of production and corresponding changes in industrial composition — it is difficult

for any customs tariff to give adequate protection over a long period. The very requirements of growth may call for considerable modifications in order to reconcile the tariff system with the changes in the composition of industrial production, and with the development needs of the various branches of the manufacturing sector. Colombian industry at present seems to have reached the stage at which a number of intermediate products which had previously been considered as raw materials for industry as it was then are beginning to be manufactured domestically, and for which the tariff protection is no longer adequate. At the same time it is quite possible that sufficient tariff protection may enable many capital goods industries to expand, especially those producing relatively simple machinery and equipment.

On the other hand it may well be that tariff protection exceeds the true requirements of other industrial items, which have acquired a certain maturity and reasonable level of productivity.

One of the important aspects which should be examined in more detail is whether the present tariff offers sufficient encouragement to the development of intermediate goods industries. The significance of this is firstly due to the fact that the greatest possibilities for future import substitution lie in this direction, a circumstance which, apart from constituting in itself a factor of considerable interest because of the limited prospects of the capacity to import, offers the likelihood of a much more rapid rate of development than may be hoped for in those branches of production which have already succeeded in meeting a high percentage of the country's needs. In the second place, the development of this type of industry will probably contribute most to reducing the market dependence upon imported raw materials that is mentioned later as one of the chief characteristics of Colombia's industry at present (see point 2, subparagraph (g)).

The production of certain capital goods, for which there are even greater possibilities of development, shows similar features; an expansion in this direction might also make a valuable contribution to the process of import substitution.

As it is therefore difficult to make a general statement as to whether or not the present tariff gives adequate protection, it would be better to investigate carefully the way in which it affects the various branches of manufacturing activity. The following pages will give only a few of the impressions received during the preparation of this study, to serve as a general indication of the situation, and will therefore in no sense present a profound analysis of the existing situation in each case, but rather a report of opinions on the subject.

It is estimated that in 1953 the cotton textile industry enjoyed adequate tariff protection, especially if it is remembered that the majority of its products were included in the list of prohibited imports, and were therefore subject to the exceptionally high surcharge of 40 per cent; the same conditions applied to woven goods of silk and artificial fibre. The surcharge on woollen cloth was also very heavy, though this did not entirely relieve domestic industry from import competition

³⁵ Taxation policy is dealt with at greater length in Part Two, chapter I.

because of the very marked consumer preference for the imported product, in spite of the considerable price difference resulting from the tariff surcharges. These were lower on woollen yarn, since it was not subject to the 40 per cent surcharge and the compulsory absorption quotas had been suspended; apart from which, dumping had practically forced the wool-spinning mills to operate at well below capacity.

Beverages and tobacco enjoyed, on the whole, adequate protection.

The rubber and plastic industries had no protection problem as regards the production of inner tubes and tyres. Protection was also adequate for the majority of other rubber products, although in the case of some items, such as high quality rubber shoes and hosepipe, it was considered insufficient. A similar situation existed as regards plastic products, protection being regarded as satisfactory for some items and inadequate for others.

The situation of the paper and board industry merits a more detailed analysis, because of the import volume of several products which could be manufactured domestically. In general, the tariff is considered to be low for board and paper, but sufficiently high for packing and boxes, as also for other paper products, aluminium foil being quoted as an exception.

The tariff was also adequate for the footwear and ready-made clothing branches, the majority of whose products had figured previously on the list of prohibited imports.

In the case of the foodstuffs industry the situation was more ambiguous, as, for instance, a large proportion of the capacity of the national mills stood idle, while heavy imports of flour were effected. In the canning industry, the tariff, although high, was held to be insufficient for certain items of production.

As regards the cement, ceramics and glass and similar industries, cement enjoyed the natural protection of its own characteristics, while it was believed that proper protection was given to the glass industry for the manufacture of coloured containers but not for certain types of plain glass. Protection was deemed insufficient for the china and ceramics industry, which also had to face a dumping problem.

In the chemicals industries the average surcharges on intermediate products were only about 13 per cent in 1952, but this low protection seemed to have no effect on several of the principal lines of production. For the manufacture of artificial fibres, matches, industrial gases, soda and other items protection was considered to be sufficient. In general tariffs were very high for pharmaceutical products, with the exception of antibiotics. Surcharges were also thought to be high enough in the case of the paint industry, although some criticisms were expressed to the effect that this branch was adversely affected by excessive duties on some of the raw materials it required, apparently arising from an unsuitable customs classification. The protection for some acids was also felt to be adequate, though too low to permit the inauguration of new lines of production.

Finally it was considered that the iron and steel transforming industries were not receiving due protec-

tion. The average duties on imported metal products in 1953 were not more than 10 per cent, and on many finished products were only about 6 per cent.

Although the foregoing enumeration would suggest that the customs tariff—with few exceptions—gave efficient protection, it must be remembered that the industries referred to were already in existence and that some assessment should also be made of the incentives thus provided to the establishment of other branches of production, some of which have perhaps not been developed precisely because of the tariff problems that were anticipated.

It must be recognized that the planning of a protectionist policy presents serious difficulties, if due regard is paid not only to those industries already in operation, but also to an evaluation of the branches that offer the best prospects of future development. Present necessities are frequently in conflict with long-term requirements. To take capital goods imports as an example, a policy of low customs tariffs encourages domestic investment, with favourable effects upon production costs, but at the same time it is possible that a limitation of the capacity to import would encourage the development of domestic production of certain types of machinery and equipment, which naturally would depend entirely upon adequate tariff protection. The same applies to many intermediate products which tend to enjoy preferential treatment as raw materials for subsequent transforming processes, so that domestic production of these goods is less likely to be attempted.

Such difficulties seem to indicate that the protectionist policy should be defined within a general framework, which takes into account the outlook for industrial development and assesses the more immediate possibilities, the assistance which may be needed, and the effect which the resulting modifications may have upon other branches of the manufacturing sector.

(ii) The work of the *Instituto de Fomento Industrial*, which was created to encourage the development of certain basic industries, is another of the ways in which Government economic policy has stimulated the growth of domestic industry. Through this organization the initial basic studies for certain industries have been made, and financial resources for their installation have been provided. Following the example of other development institutions in Latin America, the Institute has succeeded in transferring these contributions to private capital once the enterprises concerned have achieved a certain degree of consolidation; it is thus possible to recover the contributions and to employ them in the promotion of new undertakings.

Since 1941 the *Instituto de Fomento Industrial* has taken part in the initial organization of various existing companies, outstanding among which are the *Empresa Siderúrgica Nacional de Paz del Río*, the *Planta de Soda* and the *Industria Colombiana de Llantas*. Among smaller firms may be mentioned the *Unión Industrial de Astilleros de Barranquilla (UNIAL)* in the mechanical and metallurgical field; the Mangle industries, the *Compañía de Productos Químicos Sulfúricos*, the *Compañía Nacional de Cloro y sus Derivados* and other chemicals industries;

the *Industria Colombiana de Pesca Marítima* and the *Matadero Frigorífico de Villavicencio* among foodstuffs; and the *Consortio Industrial de Santander* for fats and oils and for hard-fibre woven goods, etc.

The Institute has also studied other important activities, especially the large-scale development of coal mining — chiefly in the deposits in the Valle del Cauca and El Cerrejón — which may possibly become an item of some weight in the country's exports; the installation of a domestic pulp and paper industry; and the creation of a synthetic ammonia and nitrogen fertilizer plant.

Although some of these enterprises have met with considerable difficulties and have not achieved the success they expected, their efforts as a whole appear to have contributed substantially to the industrial development of the country in recent years.

It seems clear, however, that the resources of the Institute are too restricted for undertakings of wider scope. Its capital barely amounts to 10 million pesos, which is only a fraction of the total assets of the companies which it has helped to promote.

At the same time, the study of specific projects, and direct assistance in their initial financing, naturally constitute a most useful contribution to industrial development. But alongside these activities, others of a more far-reaching nature, embracing the analysis and dissemination of information on the prospects for overall industrial development, appear to be necessary; if these are carried out by impartial organizations they may serve as a general guide to private capital.

Research into possible lines of industrial development and an evaluation of the outlook for the national market, of prospects for import substitution, of raw materials availabilities, and of the approximate size of the investments required, etc., might provide an incentive to private enterprise and at the same time channel investment into those sectors of manufacturing activity which offer the best development prospects.

This type of work is all the more necessary under present industrial conditions, inasmuch as a greater diversification of national production is advisable, particularly in intermediate products and capital goods. A diversion of investment towards these branches of the manufacturing sector will probably be one of the requisites for maintaining the same rate of industrial development in the future as in recent years. The possibilities of import substitution in manufactured consumer goods are already very few, although the necessity for continuing the process of replacement still exists in view of the apparently limited prospects for the capacity to import. On the other hand, from the standpoint both of the present market and of its future development, there are great possibilities for the growth of industries manufacturing intermediate products and certain types of capital goods.

(d) *Influence of industrial development on the composition of imports*

The development of domestic industrial production has not been incompatible with a parallel expansion — although much less marked — in imports; on the

contrary, industrial development has directly or indirectly called for heavier imports. The growing industrialization of the country has had most effect, however, on the composition of imports by types of product.

Although such changes are described in detail in other chapters, it should be noted, at this juncture, that the most important modification has consisted in a considerable reduction in non-durable consumer goods. If the composition of imports during the five years prior to the crisis of the 'thirties is examined, it may be seen that this type of goods comprised more than half total imports, whereas, in 1953, they barely represented 10 per cent.

One of the most marked reductions took place in textiles, which represented more than a quarter of total imports during 1925-29, whilst in 1953 they accounted for only 2 per cent.

The relative falling-off in foodstuffs, beverages and tobacco, although important, was not so marked; from more than 15 per cent of total imports in 1925-29, the share of these commodities dropped to 6 per cent in 1953. Imports of hides and leather goods, lumber and wooden manufactures, and goods manufactured from non-metallic ores practically ceased.

There were moderate increases in the relative share of imports of paper and paper products, chemicals, non-edible oils and fats, and fuels and lubricants. It must again be emphasized that within each of these groups appreciable changes in composition took place, which led to an increment in the relative importance of intermediate goods, whilst imports of finished products tended to disappear.

It is interesting to note the important part played by the development of industries manufacturing substitutes for imported consumer goods, especially the textile industry, which progressively released greater quantities of foreign exchange for additional imports of machinery and equipment, raw materials and intermediate products, thereby conducing to a much more favourable composition of imports for the country's economic development.

The figures in table 229 represent the composition of imports in 1953.

TABLE 229. COLOMBIA : COMPOSITION OF IMPORTS, 1953
(Percentages of total)

Non-manufactured goods	1.8
Manufactured goods	98.2
Consumer goods :	
Total	21.2
Non-durable	9.4
Durable	11.8
Intermediate products	26.8
Capital goods :	
Total	45.1
Building materials	6.9
Machinery and equipment	38.2
Fuels and lubricants	5.1

SOURCE : ECLA, on the basis of official statistics.

Manufactured goods thus represented 98 per cent of total imports in 1953 (including certain foodstuffs such as flour and meals, which require only very little processing). Capital goods accounted for nearly 45 per cent, and more than a quarter consisted of intermediate products, while consumer goods registered a total of a little more than 20 per cent, in which durable consumer goods predominated.

The basic characteristic of the import substitution process was therefore that it chiefly affected consumer goods — and more especially direct consumer goods — whilst the development of industries manufacturing substitutes for intermediate products and capital goods lagged behind. This may be largely attributed to the size of the domestic market, the relative smallness of which constituted a less serious obstacle for industries producing consumer goods; on the other hand it is likely that similar possibilities have only recently presented themselves for intermediate products, whilst capital goods, which require a wider market, have still to pass through the most difficult phase. On the whole, the present composition of imports seems to show that as future development needs tend to demand further efforts at substitution, the prospects open to consumer goods will be correspondingly limited, and such endeavours will have to be directed chiefly towards the development of industries manufacturing substitutes for other types of product.

The substitution process in the case of consumer goods has been furthered by a tariff policy which has given preferential protection to the development of this type of industry. It is doubtful, now that these objectives have been attained, and the industries in question have achieved a much higher degree of maturity and efficiency, whether the incentive provided by the present protectionist policy will also suffice to encourage the continuation of the import substitution process in any new branches that may be initiated.³⁶

2. Present characteristics of industry

(a) Volume and composition of industrial production in 1953

According to the preliminary results of the 1953 Industrial Census, which was carried out by the National Administrative Department of Statistics, and covered nearly 47,000 establishments, the gross value of industrial production in that year was more than 4,000 million pesos, with a value added of nearly 1,600 million. The figures in table 230 show the distribution of these values among the various branches of industry.³⁷

³⁶ In sub-paragraph (c) a fairly detailed examination is made of the way in which the present customs duties affect the various branches of industry, and some specific cases are cited where these duties do not appear to have provided sufficient incentive for development on a larger scale.

³⁷ There are some minor discrepancies between the figures in this table and those published up to now by the Department of Statistics. This is due firstly to the fact that the results of the first manual tabulation of the census have been used for this study, without including subsequent corrections; and, secondly, to the fact that the classifications and content of each of the industrial groups do not completely coincide.

TABLE 230. COLOMBIA: COMPOSITION OF INDUSTRIAL PRODUCTION, BY BRANCHES OF INDUSTRY, 1953

(Thousands of pesos)

Industry	Gross value of production	Value added by production
Foodstuffs	-1,731,651	287,317
Beverages	~479,000	303,800
Tobacco	96,688	55,280
Textiles	~480,277	233,616
Footwear and clothing	~361,622	145,575
Wood and cork	49,350	21,029
Wooden furniture	45,806	26,581
Pulp and paper	30,374	16,423
Printing, engraving, etc.	71,168	42,350
Leather	83,785	31,832
Rubber	62,558	34,902
Chemicals	-207,001	108,452
Petroleum and coal derivatives	81,181	16,842
Cement, ceramics, glass, etc.	-177,673	113,974
Mechanical and metallurgical industries	173,539	95,235
Other industries	29,803	17,587
TOTAL	4,161,476	1,551,335

SOURCE: ECLA, on the basis of official statistics.

Foodstuffs industries accounted for approximately 42 per cent of the gross value of industrial production, although in value added their relative share was far less, amounting to only 18.5 per cent of the total. This marked discrepancy between the importance of processed foodstuffs in terms of gross value and their significance in terms of value added is due to the nature of most of the industries included in this group whose main activities consist in very simple transformations of agricultural commodities in which the actual manufacturing process plays an extremely small part. Coffee threshing, for instance, accounted for more than 52 per cent of the gross value of production for the entire group, whilst the value added in transformation was only approximately 8 per cent of the cost of the raw materials. Other sizeable industries in a similar position are the rice-polishing industry, flour mills and bakeries. Industries where the transforming process is greater, and the value added consequently represents a much higher percentage, are still relatively few; amongst these are the manufacture of chocolate and food pastes, and canning.

The beverages industry, with a considerably lower gross production value, was the most important of the industrial branches in terms of value added, having accounted for 20 per cent of the total value added in 1953. The relative importance of these activities was largely due to the noteworthy expansion of the beer industry, which includes some of the principal industrial enterprises in the country from the point of view of both capital and sales volume.

The textile industry is another important branch of the manufacturing sector, in terms of both gross value and value added. If the values added in this and the two industries previously mentioned are combined, it will be

seen that all three together contributed more than 50 per cent of the total value added in industry.

Other notable contributions were made by the footwear and clothing industries (9 per cent of the total value added), the cement, ceramics, glass and similar industries (7 per cent), the chemicals industries (7 per cent) and the group of mechanical and metallurgical industries (6 per cent). The remaining branches of industry — tobacco, wood, wooden furniture, paper, printing, leather, rubber, petroleum and coal derivatives and miscellaneous — accounted for only very small values added, the total of which added up to no more than 17 per cent of the whole of the manufacturing sector.

If the composition of industrial production is examined by type of product instead of by branch, approximately 70 per cent of the total value added is seen to have been derived from the production of consumer goods, whilst only very low percentages were registered for intermediate products and capital goods (see table 231).

TABLE 231. COLOMBIA : ESTIMATED DISTRIBUTION OF VALUE ADDED, BY TYPES OF PRODUCTION

(Thousands of pesos)

	Value	Percentage
Total value added in industry	1,551,335	100.0
Value added in production of consumer goods :		
Total	1,099,117	70.9
Non-durable consumer goods *	1,028,229	66.3
Durable consumer goods	70,888	4.6
Value added in production of intermediate goods	248,729	16.0
Value added in production of capital goods	186,758	12.0
Value added in production of fuels and lubricants	16,731	1.1

SOURCE : ECLA, on the basis of official statistics.

* Including export products.

The figures given once again emphasize the predominance of enterprises producing end consumer goods within Colombian industry, and the comparatively slow development of those manufacturing capital goods and intermediate products.

(b) *General conditions in which production is developing*

The relatively recent nature of industrial development in Colombia, and the heavy imports of machinery and equipment since the war — partly for replacement and partly to increase productive capacity — indicate that the industry as a whole is well equipped with the means of production. This may be said of most of the larger enterprises, even those in the oldest-established lines of production, and also of certain branches where medium- and small-scale industry predominates. However, there

are also many branches with a high proportion of artisan production, where neither the equipment nor the production techniques are satisfactory.

In view of this disparity, it appears advisable to give a brief description of the current situation in each of the chief branches of industry.

With very few exceptions, the foodstuffs industries constitute one of the least up-to-date branches. This is probably because of their intrinsic production characteristics, which do not appear to be dependent upon any rapid modernization of equipment; the threshing of coffee and other cereals, which is one of the outstanding activities in this line, is a typical example. In addition, the wide dispersion of production over a very large number of individual undertakings (nearly 5,000 according to the 1953 census) precludes the introduction of more efficient techniques and equipment. Some of the exceptions to this rule are sugar production, which is divided into a relatively small number of large and well-equipped enterprises, the production of vegetable oils and fats, and, to a certain extent, the manufacture of chocolate, which is carried on by several firms of an appreciable size.

In the beverages industry, the breweries and malt-houses have very modern equipment, and production is concentrated in a small number of establishments. Gaseous beverages are also produced by a few large and efficient enterprises, though an appreciable proportion still comes from a number of small plants, some of which are rudimentary and supply only a limited market in the small towns. Spirits constitute an item apart, since, with the exception of wines, which do not represent any considerable volume, they are prepared in factories that are either owned or controlled by the departmental authorities. Amongst them are some with modern equipment and others which are in process of renovation and expansions, but at least half are old plants.

There is a very marked difference between production conditions in the two main branches of the tobacco industry. Production of cigarettes is practically concentrated in the hands of a single large firm, with factories that are generally well equipped in various parts of the country. Cigars, on the other hand, are manufactured in a few plants which are relatively mechanized and which provide a very small proportion of the total output; the remainder is produced entirely by artisan labour or home industry.

The textile industry, although one of the earliest to develop, has achieved one of the highest standards of modernization and efficiency. This is manifest in the situation of cotton textiles, which are manufactured by some of the largest factories in the country. The size of their installations, as well as their equipment and administrative techniques, all help to maintain a high grade of efficiency. A similar situation prevails, although to a lesser degree, with respect to the weaving of wool and artificial fibres. However, production of these items is not concentrated in such a relatively small number of plants; in fact a fairly considerable percentage of total production still comes from a large number of

small- and medium-scale establishments, especially in the case of wool. The position is completely different for the weaving of hard fibres, for which there are only two fair-sized enterprises in the whole country, the greater part of the output deriving from artisan or home labour.

In contrast to the general situation of the textile industry, artisan production is probably greatest in the footwear and clothing sector of manufacturing. The 1953 Industrial Census registered more than 21,000 enterprises — that is, almost half the total number for industry as a whole — employing slightly over 57,000 persons. A few large enterprises have only recently begun operations, especially in the manufacture of men's clothing.

Artisan production also has a strong position in the lumber and cork and wooden furniture industries.

In the paper and paper products industry, there is one relatively large factory producing certain types of paper and board with partly out-dated equipment ; the manufacture of other types is scattered over a large number of units, although some of them are well equipped.

In the leather and leather goods industries (excluding footwear) a high proportion of the tanning and dressing of hides is effected in a small number of tanneries which in general have modern equipment ; in other manufacturing processes a large number of small concerns predominate and a certain proportion is even carried out by artisan labour.

As regards the rubber industry, the production of tyres is centralized in two relatively new plants. The older of these is of considerable size and has been continuously renewing its equipment since a few years after its foundation, so that it is now up to date and efficient. At least two large and relatively modern factories are producing other rubber manufactures, although a minor share of the output still comes from a number of smaller old-fashioned plants. The plastic industry was more recently formed and therefore as a general rule has modern installations.

In the chemicals industry, the situation varies considerably from one branch to another. In some cases, especially where enterprises that have only recently begun to develop are concerned, production is centralized in a small number of units, operating on a large scale with modern equipment ; this applies particularly to the soda plant and to the three firms producing artificial fibres. One of the latter entered operation as short a time as five years ago and has completely modern installations ; the other two began with second-hand equipment which they have been replacing until they now have almost entirely up-to-date installations.

The pharmaceutical industry, and other branches such as that of paint, do not require so much equipment, and their existing installations appear to be comparatively efficient. A very high percentage of the output of soap and candles comes from a large number of small units, usually with a low standard of mechanization. Although the production of matches is centralized in relatively few plants, the equipment in general is obsolete, mainly owing to the type of product used in Colombia.

Among the cement, ceramics, glass and similar industries, cement production is carried on in a number of plants in various parts of the country, which are of economic size and most efficiently equipped. Much the same is true of the manufacture of asbestos-cement goods, which are only recently being produced on a large scale in a number of modern plants ; there is also a big factory manufacturing fire-clay pipes, which is well equipped and designed to meet the entire country's requirements. The production of glass containers is mainly centralized in two large, modern and efficient factories, although there are also a number of small unmechanized establishments. The equipment used in the porcelain and ceramics industry is partially obsolete.

The mechanical and metallurgical industries operate in general on a very small scale, so that production is divided among a very large number of small units, with the exception of some lines in which there are several companies operating on a wider basis. In spite of the relatively limited size of the enterprises, the industry is equipped with modern means of production, and has a capacity well above its present level of utilization.

On the whole, it may be concluded that there is a very marked contrast between two types of enterprise in Colombian industry. The first consists of plants operating on a large scale with modern and efficient equipment ; amongst these are not only the industries which have been introduced fairly recently, such as soda, rayon or rubber, but also the traditional branches such as textiles and beer. The second type is made up of a very large number of small enterprises, amongst which artisan production predominates, and includes some of the old-established lines of production — cigars, candles, soap, etc. — and others which are in the early stage of development, such as the mechanical and metallurgical industries and some branches of the chemical industry.

The situation of the major industrial branches in this respect is indicated more precisely in table 232, which gives the average number of persons employed per unit, according to the preliminary results of the 1953 Industrial Census. The average for industry as a whole therefore amounts to barely six persons per unit, which shows the great extent to which artisan production prevails. The branches with the lowest figures are those of footwear and clothing, wood, and wooden furniture, which have an average of three persons per establishment. In fact, if these industries were excluded — and they are of secondary importance in the total value added by the manufacturing sector — the average for industry as a whole would rise to more than nine persons. The preponderance of artisan labour in the weaving of hard fibres considerably reduces the average for the textile industry, which has enterprises employing more than 5,000 persons, and for which the figure would be considerably higher if this type of product were omitted.

Finally it must be emphasized that the difference in productivity between industrial and artisan production is so great that, in spite of the latter's importance in numerical terms of enterprises and employees, its total contribution to the value added in the manufacturing sector is very much less.

TABLE 232. COLOMBIA : AVERAGE NUMBER OF PERSONS EMPLOYED IN ENTERPRISES, BY BRANCHES OF INDUSTRY, 1953

Industry	Number of enterprises	Number of persons employed	Number of persons per enterprise
Foodstuffs	4,986	44,893	9
Beverages	567	13,575	24
Tobacco	1,088	9,123	8
Textiles	2,220	36,594	16
Footwear and clothing	21,157	57,234	3
Wood and cork	2,314	7,191	3
Wooden furniture	3,478	9,851	3
Pulp and paper	84	2,053	24
Printing, engraving, etc.	618	8,360	13
Leather	1,139	6,122	5
Rubber	144	2,731	19
Chemicals	965	13,304	14
Petroleum and coal derivatives .	12	1,553	129
Cement, ceramics, glass, etc. ...	2,544	22,290	9
Mechanical and metallurgical industries	3,976	22,317	6
Other industries	1,451	4,480	3
TOTAL	46,743	261,671	6

SOURCE : ECLA, on the basis of official statistics.

(c) *Stock of capital and its utilization*

The ratio between the amount of capital invested and the product obtained should be one of the factors accorded an extensive analysis when an examination is made of the basic characteristics of industry. Such comparison would enable the extent to which the investment effort is yielding adequate results to be assessed ; this is of the greatest importance, in view of the fact that investment possibilities are generally a limiting factor in the achievement of a more rapid rate of development. Furthermore, with the aid of this type of ratio and sufficient grounds on which to conjecture possible future modifications, an estimate may be made of the approximate scale of investment required to achieve a given expansion of domestic production.

This would call for information by branches of industry so that gross value could be compared with value added in production, on the basis of figures for the stock of capital after depreciation and at replacement prices. These data, however, require careful statistical research which has not so far been undertaken in Colombia, and which is naturally beyond the practical possibilities of the present study. The more readily available sources of information, chiefly constituted by the balance-sheets of enterprises, give purely book values that show the purchase costs of assets at diverse periods, and in currency with a varying purchasing power. The depreciation estimates are calculated on a legal basis which is frequently at variance with the real depreciation of the equipment, or related to purchase costs which are generally much lower than current costs of replacement, etc. These few points give some idea of the varied and difficult problems which must be taken into account in

order to obtain an adequate appraisal. Moreover, the 1953 Industrial Census omitted all reference to stock of capital, confining itself to enquiries into investments made during that year. The statistics of the 1945 census also show many of the same deficiencies.

Although this is admittedly a subject that calls for detailed research and a systematic compilation of data, some very preliminary estimates are presented here, mainly for purposes of illustration.³⁸

According to these estimates, total capital (after depreciation at replacement costs, and including inventories) invested in the manufacturing sector in 1953 was almost 4,600 million pesos, which represented approximately 16 per cent of the estimated total stock of capital for the economy as a whole. If this figure is compared with the value of industrial production, it may be calculated that during the year in question 1.1 units of capital were necessary per unit of gross value of production, and 3.0 units of capital per unit of value added ; in other words, this gives a product-capital ratio of 0.91 and 0.34 for gross value and value added respectively.

These figures appear to indicate that the product-capital ratio in Colombia's manufacturing sector was unsatisfactory in comparison with that of other countries. Although the actual value of this ratio should be accepted with caution from a statistical point of view, the general conclusions appears to be correct, since it is possible to indicate a number of factors which call for unusually high investment in the case of Colombian industry. Among investments in machinery and equipment, it is frequently necessary to take into account substantial investment in capital goods which are not intended to be used directly in production, but rather to augment inadequate public services, or offset the lack of specialized industries ; outstanding examples are the installation of private power stations by industries which had otherwise no guarantee of an adequate and continuous supply of energy, as well as of their own work-shops for repairs and for the manufacture of simple spare parts.

A high proportion of the total stock of capital — approximately 24 per cent — is earmarked for the financing of large stocks of raw materials and intermediate products. This is partly due to the fact that a considerable proportion of the raw materials and intermediate products used by industry are imported, the natural supply difficulties therefore necessitating the maintenance of a reserve to guarantee continuity of production for several months. A further reason is that industry has had to finance a high proportion of domestic raw materials from agricultural sources, and even stocks of finished products which are normally financed by the commercial sector.

³⁸ The majority of these estimates were obtained from a careful analysis of capital goods imports acquired over a long period of years, valued at constant prices and based on certain assumptions of average life. An arbitrary percentage of c.i.f. values was postulated to cover the cost of installing imported equipment ready for use. Finally, as regards the value of machinery and equipment, estimates of buildings and stocks were calculated mainly on the basis of ratios similar to those utilized for the balance-sheets of stock companies.

It is estimated that industrial enterprises in 1953 held inventories worth 1,100 million pesos, representing approximately 71 per cent of the value added by industry during that year. If inventories are excluded, the ratio

between fixed capital and production will give product-capital ratios of 1.19 and 0.44, for gross value and value added respectively; these figures are still comparatively unfavourable.

TABLE 233. COLOMBIA : ESTIMATED STOCK OF CAPITAL, BY BRANCHES OF INDUSTRY
(Millions of pesos at 1953 prices)

Industry	Machinery and equipment	Buildings and installations	Total fixed capital	Stocks	Total capital
Foodstuffs	385	310	695	110	805
Beverages	263	210	473	170	643
Tobacco	50	30	80	70	150
Textiles	560	270	830	270	1,100
Footwear and clothing	160	120	280	120	400
Wood and cork	25	15	40	10	50
Wooden furniture	35	20	55	20	75
Pulp and paper	35	20	55	20	75
Printing, engraving, etc.	90	40	130	30	160
Leather	50	50	100	40	140
Rubber	40	20	60	20	80
Chemicals	110	80	190	77	267
Petroleum and coal derivatives	8	5	13	3	16
Cement, ceramics, glass, etc.	160	110	270	40	310
Mechanical and metallurgical industries	130	70	200	90	290
Other industries	10	6	16	10	26
TOTAL	2,111	1,376	3,487	1,100	4,587

SOURCE : ECLA, on the basis of official statistics.

TABLE 234. COLOMBIA : ESTIMATED PRODUCT-CAPITAL RATIO, BY BRANCHES OF INDUSTRY, 1953

(Ratios of gross value and value added by production to stock of capital)

Industry	Product-capital ratio			
	Gross value		Value added	
	To total capital	To fixed capital	To total capital	To fixed capital
Foodstuffs	2.15	2.50	0.36	0.41
Beverages	0.74	1.01	0.47	0.64
Tobacco	0.64	1.21	0.37	0.70
Textiles	0.44	0.58	0.21	0.28
Footwear and clothing	0.90	1.29	0.36	0.52
Wood and cork	0.99	1.23	0.42	0.53
Wooden furniture	0.61	0.83	0.35	0.48
Pulp and paper	0.40	0.55	0.22	0.30
Printing, engraving, etc.	0.44	0.55	0.26	0.33
Leather	0.60	0.84	0.23	0.32
Rubber	0.78	1.04	0.44	0.58
Chemicals	0.77	1.09	0.41	0.57
Petroleum and coal derivatives	5.07	6.24	1.05	1.29
Cement, ceramics, glass, etc.	0.57	0.66	0.37	0.42
Mechanical and metallurgical industries	0.60	0.87	0.33	0.48
Other industries	1.15	1.86	0.68	1.10
TOTAL	0.91	1.19	0.34	0.44

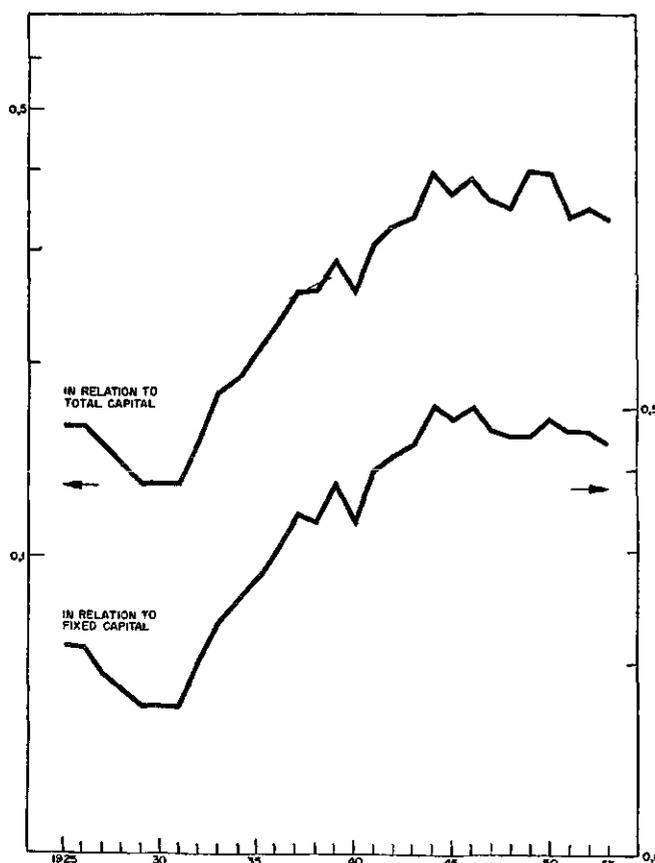
SOURCE : ECLA, on the basis of official statistics.

Detailed estimates by type of assets and by industrial branches are given in table 233, while table 234 shows the respective product-capital ratios calculated on the basis of gross value and value added, total stock of capital and fixed capital only. It is evident that there are marked differences as regards the product obtained per unit of capital in the various branches of the manufacturing sector, some of which — such as the textile industry — require a relatively high level of investment, whilst others — such as foodstuffs — need a much lower rate of investment per unit of production.

In any case, in view of the widely varying circumstances which may affect ratios of this type in any one year, it is inadvisable to attempt to draw any very precise inferences from such information, without taking into account something of the historical background. In fact, the average ratio for industry as a whole in 1953 differs very considerably from that recorded in previous periods. As may be observed from figure XX, the average product-capital ratio (measured on the basis of value added only) fluctuated widely from 1925, onwards, its movements being chiefly characterized by a sharp drop between 1925 and 1930, a steady improvement from that period up to the war years, and a fresh decline after the war (see the relevant figures in the *Statistical Appendix*, table 132).

FIGURE XX. COLOMBIA : EVOLUTION OF THE PRODUCT-CAPITAL RATIO IN INDUSTRY, 1925-53

(Ratio between value added in production and stock of capital)
(Semi-logarithmic scale)



In general, this development was more unsatisfactory as regards total capital than with respect to fixed capital, owing to the fact that inventory requirements tended to increase more rapidly than investments in machinery and equipment. Finally it should be noted that, despite the post-war decline, the ratio was much more favourable during the latter years than during the depression of the 'thirties, the average for the years 1951-53 being more than double the figure for 1925-29.

The fact that productive capacity has increased more rapidly during recent years than production itself has given rise to the existence of considerable marginal capacity in the industrial sector. A fairly accurate assessment of the degree of utilization of installed capacity in the branches of industry concerned is another important factor in deciding upon the amount of future investment required in order to achieve a given expansion in the volume of production. The estimate of the product-capital ratio mentioned previously must be supplemented by the following indications of the extent to which available productive capacity was being utilized in 1953.

The textile industries, which form one of the branches of the manufacturing sector with the highest capital per unit of production in 1953, achieved on the whole an advanced degree of utilization of installed capacity. This was due principally to the situation of the cotton textile industry, in which the majority of the larger enterprises worked three shifts at full capacity, although some small companies with marketing and competition problems constituted an exception. Utilization of capacity was almost complete in silk-weaving also. The situation of woollen textiles, on the other hand, was much less favourable; the working of three shifts was exceptional and the utilization of productive capacity generally fluctuated between 30 and 60 per cent. The position was even worse in the case of the spinning-mills, one of the most important concerns having been practically closed down.

Utilization of installed capacity was intensive in the cement, ceramics and glass industries, especially in the case of the former, with only one exception among all the existing enterprises. As regards other lines of production within this branch, two to three shifts were worked in asbestos-cement, three shifts in glass and half-capacity in chinaware.

The production of artificial fibres was the only branch of the chemical industry which achieved almost 100-per-cent utilization of installed capacity. The whole of the pharmaceutical industry worked a single shift, while the paint industry was not always able to work at full capacity during its one shift; there were also appreciable reserves of capacity in the manufacture of matches, sulphuric acid, etc.

Other large-scale industries with heavy investments were in a similar situation. With the exception of one big enterprise, the beer industry worked only one shift, while the chief producers of gaseous beverages worked a twelve-hour day. Practically none of the tobacco industries utilized more than 30 to 40 per cent of capacity. There was also a high proportion of idle capacity in the foodstuffs industries, especially in the flour mills.

Even those industries whose nature necessitated a twenty-four-hour working day registered less than 100-per-cent utilization of capacity. A typical case was the manufacture of certain types of paper and board, where three shifts were worked, but only for three days a week.

The situation was a little better in the rubber and plastics industries. Tyre production worked two to three shifts, other rubber products one to two shifts and plastic materials apparently worked at full capacity. The mechanical and metallurgical industries, on the other hand, seldom worked more than a single shift, but even then were not always able to utilize productive capacity to its fullest extent.

It may therefore be concluded, in general, that most industrial branches only partially utilized their installed capacity, which, to some extent, explains the unsatisfactory product-capital ratio. From the standpoint of future prospects, a more intensive utilization of capacity may have a favourable effect upon this ratio, and thereby reduce the amount of investment required to obtain a given increase in the volume of production.

It is hardly possible from the information available to pinpoint the general factors which may have been partly responsible for this situation. In the first place, the incentives to a full utilization of equipment differ considerably from one branch of industry to another, and principally depend upon the amount of capital required by the branch in question, and the proportion of labour expenditure within production costs. The pharmaceutical and paint industries, for example, require a relatively low investment in equipment, and therefore have less incentive to utilize it fully, while the textile industries, which demand much heavier investment in equipment, have more inducement to work at full capacity, in order to reduce the incidence of capital charges upon unit costs.

In such branches as the mechanical and metallurgical industries, where wages represent a high proportion of production costs, the legislation on extra pay for night work militates against a twenty-four-hour day, since it places the enterprise concerned at a disadvantage in its competition with others working only one shift.

It is probable that in some cases partial utilization of installed capacity is the result of too small a market, although this factor is by no means universal, since there are many enterprises which are making only partial use of their productive capacity and at the same time are preparing or carrying out expansion programmes.

Another factor which probably influences the situation is the lack of technicians, which prevents any permanent expansion of production. To this must be added the difficulty of supervising night work, and the unwillingness of many industrialists, especially in relatively small concerns, to leave the control of operations in other hands for a considerable part of the working period.

At all events this appears to be one of the problems which should be studied in greater detail with a view to diverting additional investment from industries that already have sufficient productive capacity to other branches of manufacture where it could be much more profitably used.

If the problem is re-examined as a whole, the fall in the product-capital ratio during the post-war years, and the existence of appreciable margins of idle capacity in many branches of the manufacturing industry, lead to the belief that the future development of industry may require an investment rate lower than the rate of growth to be attained by production. Other factors must also be considered, which will be liable to exert a depressive influence on future product-capital ratios. Amongst these may be mentioned the effect on capital requirements of the tendency to concentrate production in larger units and the change-over from artisan production to industry proper. These two factors signify an increase in capital not only per person employed, but also per unit of production. As an example of the influence exerted by the size of an enterprise on its unit capital requirements, it is sufficient to quote the following figures for United States industry in 1947, which show an index of the product-capital ratio, calculated on the basis of enterprises with assets of less than 100,000 dollars.³⁹

Enterprises with assets of less than 100,000 dollars	100.0
Enterprises with assets of between 100,000 and 1 million dollars	84.5
Enterprises with assets of between 1 million and 10 million dollars	63.6
Enterprises with assets of more than 10 million dollars	44.4

The effects of changes in the composition of industrial production must be added to that of the increased investment per production unit which is called for as the plants tend to increase in size. In general, the manufacture of intermediate goods, durable consumer goods and capital goods needs higher investments per unit of production, so that as Colombian industry introduces new lines of production, investment will be proportionately heavier.

The incidence of these two new factors will probably be more pronounced than the incentives to greater utilization of existing capacity, thus conducing to a subsequent deterioration of the product-capital ratio in industry. This seems even more likely if it is taken into account that industrialists are usually reluctant to divert their resources to investment in new lines of production, preferring as a rule to expand the productive capacity of existing enterprises, even though this may lead to a temporary under-utilization of installed capacity.

(d) *Supply of raw materials and intermediate products*

One of the most important characteristics of Colombia's industry appears to be its marked dependence on imported raw materials and intermediate products. This conclusion, however, does not emerge very clearly from a superficial examination of statistics for total domestic and imported raw materials consumed

³⁹ Figures taken from Daniel Creamer, "Capital and Output Trends in Manufacturing Industries, 1880-1948", *Studies in Capital Formation and Financing*, Occasional Paper 41, National Bureau of Economic Research, Inc., 1954. The ratios used in calculating the index were obtained in each case by dividing the value of output by the fixed capital concerned.

during 1953, according to the estimates presented in table 235, which is based on the preliminary results of the Industrial Census of that year.

TABLE 235. COLOMBIA : SOURCE OF RAW MATERIALS AND INTERMEDIATE PRODUCTS CONSUMED BY INDUSTRY, 1953

(Thousands of pesos)

Industry	Consumption of raw materials and intermediate products		
	Total	Domestic production	Imports
Foodstuffs	1,429,447	1,310,682	118,765
Beverages	164,900	111,800	53,100
Tobacco	40,629	34,741	5,888
Textiles	238,220	120,176	118,044
Footwear and clothing	215,208	184,718	30,490
Wood and cork	27,764	25,999	1,765
Wooden furniture	18,833	16,145	2,738
Pulp and paper	12,496	2,223	10,273
Printing, engraving, etc.	28,244	1,280	26,964
Leather	51,121	41,477	9,644
Rubber	26,536	5,544	20,992
Chemicals	93,776	39,259	54,517
Petroleum and coal derivatives	63,283	62,953	330
Cement, ceramics, glass, etc. . .	47,276	34,251	13,025
Mechanical and metallurgical industries	74,774	14,608	60,166
Other industries	11,723	6,397	5,326
TOTAL	2,544,280	2,012,253	532,027

SOURCE : ECLA, on the basis of official statistics.

In fact, these figures would appear to indicate that out of a total industrial consumption of approximately 2,540 million pesos in raw materials and intermediate products, some 2,000 million were of domestic origin, imports amounting to only a little more than 530 million. This is due to the fact that the large share of the total constituted by raw materials for the foodstuffs industries had very little significance in terms of value added, as repeatedly mentioned before. If these industries are excluded, the raw materials consumed by the remainder of the manufacturing sector are seen to have reached a value of approximately 1,115 million pesos, of which 413 million — 37 per cent — corresponded to imported raw materials and intermediate products.

As might be expected, the degree of dependency varies considerably from one branch of the manufacturing sector to another. Imported raw materials and intermediate products have little significance in some of the smaller branches of production, such as spirits, cigars, sulphuric acid, soda, and men's ready-made clothing.

In contrast, they still represent a high proportion of the total in the textile industries. This even applies to the cotton textile industry, where notable progress has been made in this respect in recent years ; and it is even more noticeable in the case of woollen textiles. The consumption value of domestic raw materials used in the production of cloth from artificial fibre is already

higher than that of imports, owing to the considerable expansion of domestic production of such fibre, in which national raw materials represent little more than 10 per cent.

The beverages industry consumed approximately 32 per cent of imported raw materials and intermediate products in 1953, although this share increases to nearly 37 per cent if wines and spirits are excluded. In the case of the tobacco industries, the proportion is somewhat less, amounting to about 15 per cent. This is mainly composed of imports of various types of paper for the cigarette industry.

Dependence on imported raw materials and intermediate products is even more marked in the case of the chemicals industries, as they constitute approximately 90 per cent in the case of the match and artificial fibre industries, about 66 per cent in the paint and pharmaceutical branches, and more than 50 per cent in the case of soap, candles, etc., so that for the group as a whole such imports represent a total of nearly 60 per cent.

As far as rubber and plastics are concerned, the production of tyres is almost entirely based on imported raw materials, and the same may be said of plastic materials ; it is therefore only in the production of other rubber articles that a higher proportion of domestic raw material is used.

The proportion of imported raw materials is also extremely high in the iron and steel transforming industry, where it was more than 80 per cent in 1953.

Even after these direct comparisons have been made, it should still be borne in mind that in several cases the figures for domestic raw materials cover various intermediate products from other branches of industry, in whose production imported raw materials were almost exclusively used. One example of this is the production of artificial fibres ; in calculations of sales of rayon yarns to the weaving mills, the yarn appears as a domestically-produced raw material, although a very high proportion of imported raw materials were needed for its manufacture. The final degree of dependence upon imported raw materials and intermediate products is therefore much greater than would appear from a direct examination of the census statistics.

A high percentage of the value of imported raw materials consumed by industry consists of commodities from the agricultural sector, which is relatively underdeveloped with respect to the increasing requirements of the manufacturing sector. In a number of items the dependence on imported raw materials appears to be increasing, two examples being rubber and cacao, which register a rise in the percentage of imports within the total supply. A similar situation exists with respect to hides and skins, which Colombia had begun to export on a fairly large scale ; industry has been gradually absorbing the hitherto exportable surpluses, and it has recently even been necessary to import skins.

The only case in which an obvious improvement can be observed is that of cotton, production of which has increased so greatly that it is possible to envisage almost complete import substitution. This has been largely brought about by an energetic government campaign

to encourage its cultivation, which has received considerable co-operation from industry.

Although dependence upon imported raw materials and intermediate products is largely caused by inadequate agricultural production, a considerable part may also be attributable to industry itself. In fact, total imports of raw materials include many manufactured intermediate products which could be produced domestically. It is possible that the future development of industry, and the limitations of the capacity to import, may necessitate the channelling of funds available for investment towards the manufacture of intermediate goods, and the provision of more adequate incentives for its development.

This would also help to give national industry greater stability, freeing it from possible difficulties in obtaining supplies from foreign markets, and from problems of foreign exchange availabilities. Due heed must also be paid to the experience of other Latin American countries, in which certain types of industry were only able to develop to any appreciable degree when they could rely on domestic supplies of basic raw materials to guarantee continuity of operations; a typical case is that of the great development of iron and steel transforming industries in Brazil, Chile and Mexico once these countries had acquired their own steel-making industries.

Another important factor is the repercussion of a high proportion of imported raw materials and intermediate products upon production costs. Apart from the expenses arising from middlemen's profits, freight, transport and insurance, the use of imported materials compels industries to earmark a large part of their capital for the maintenance of stocks to meet the requirements of several months of production, which reacts unfavourably on the product-capital ratio.

In recent years considerable progress has been made in this direction, owing to new developments such as the soda plant, and more especially the Paz del Rio iron and steel works, which will greatly relieve the country's dependence upon imports for supplies of basic products.

Industries producing intermediate goods merit special attention, not only because they are included among those branches of manufacturing where an increase in demand is most likely to occur, and constitute some of the most promising lines for the extension of the import substitution process, but also because their development is an important factor in the stabilization of existing industry.

(e) *Employment: remuneration and productivity of labour*

According to the preliminary results of the 1953 Industrial Census, the total number of persons employed in industry was slightly more than 260,000, including a number of branches of production more properly classed as handicrafts. Unfortunately it is impossible to make a direct comparison between this figure and that of the 1945 Industrial Census, since in the latter case, only enterprises with an annual production of more than 6,000 pesos, or which employed at least five persons, were taken into account, while the coverage of the 1953

census was much wider.⁴⁰ In spite of this lack of uniformity, a rapid comparison will lead to some important conclusions. In 1945 some 135,000 persons were employed which would indicate a maximum increase of approximately 95 per cent during the period 1945-53; moreover, the value added by industry — at constant prices — was more than doubled during the same period. This would indicate an increment in the value added per person employed, the proportion of which would naturally be much higher if the comparison were made on a uniform basis.

Apart from noting the increment in production per person employed during the last eight years, it will also be of interest to compare the situation of industry in Colombia with that of other Latin American countries. The many statistical difficulties, however (mainly connected with the exchange rates for the various national currencies), reduce the significance of comparisons at absolute levels; for this reason they are used here only as indications of the relative productivity of each industrial branch with respect to the whole of the manufacturing sector in each country.

The figures in table 236 — in which Colombia is compared with four other Latin American countries — show that the highest value added per person employed was achieved in the beverages industry. The productivity of this branch of industry was high not only in relation to the value added per person in the other branches of Colombian industry, being equivalent to more than four times the average for the whole manufacturing sector but also in comparison with its relative productivity in other countries. In the case of the textile industries the value added per person employed was only 10 per cent above the average for total industry, but relative productivity was considerably higher in Colombia than in Argentina, Brazil, Chile or Mexico. On the other hand the situation was completely different in such industries as footwear and clothing and wood, where artisan production was outstanding, the estimates of value added per person employed being not only less than 50 per cent of the average for the whole of Colombian industry, but also considerably lower than those of relative productivity in the same branches in other countries.

These comparison also reflect the relative underdevelopment of the chemical and mechanical and metallurgical industries in Colombia. As regards the former, although the value added per person employed was 35 per cent higher than that for industry as a whole, the respective indices in the other four countries varied between 150 and 200, so that in relative terms productivity in Colombia was still very low. The figures for value added per person employed in the mechanical and metallurgical industries were generally lower than the average for the manufacturing sector, but the situation

⁴⁰ Some indication of the extent of this discrepancy may be given by the fact that the 1945 census registered approximately 7,800 enterprises, while that of 1953 recorded over 46,000. It is possible that for the final tabulation of the 1953 census, the Statistics Department will only consider establishments with more than five workers, which would standardize the bases of comparison and enable much more precise conclusions to be drawn on the aspects discussed here.

TABLE 236. LATIN AMERICA : COMPARISONS OF THE RELATIVE PRODUCTIVITY OF LABOUR EMPLOYED IN SELECTED COUNTRIES, BY BRANCHES OF INDUSTRY

(Value added per person employed in each branch as a percentage of the average for industry as a whole)

Industry	Colombia (1953)	Argentina (1948)	Brazil (1950)	Chile (1951)	Mexico (1950)
Total	100	100	100	100	100
Foodstuffs	104	85	113	103	76
Beverages	413	155	147	216	140
Tobacco	102	334	154	838	455
Textiles	110	108	78	102	75
Footwear and clothing	44	98	75	54	51
Wood and cork	50	58	80	79	70
Wooden furniture	46	68	73	47	48
Pulp and paper	138	120	119	138	120
Printing, engraving, etc.	87	98	106	123	77
Leather	93	87	80	80	65
Rubber	287	180	266	127	230
Chemicals	135	203	166	160	152
Petroleum and coal derivatives	187	770	...	137	106
Cement, ceramics, glass, etc.	88	75	71	81	72
Basic metal industries	64	107	124	76	255
Metal products	83	95		74	88
Non-electrical machinery	66	84	106	61	62
Electrical appliances and machinery	79	109	135	76	95
Transport material	62	63	127	77	112

SOURCE : ECLA, on the basis of official statistics.

was still far more unfavourable in Colombia than in the other countries.

From the foregoing it may be concluded that the contrasts and differences in productivity between the various branches of the manufacturing industry are much more marked in Colombia than in other Latin American countries, chiefly owing to the preponderance of artisan production in many of the industries.

Given adequate means of production, the Colombian worker can easily achieve a satisfactory level of productivity. This at least has been the experience of some large industries for which specific comparisons have been made with other countries, favourable, or even exceptional, results being obtained. Moreover, the desire of industrialists to improve productivity has led them to introduce time and motion studies in a number of enterprises, and to aim at increasing the technical qualifications of their workers by in-service training courses. It is probable, however, that activities of this type are still on a small scale — being limited mainly to the big enterprises, especially in the textile industries — and that a policy of much wider scope will become necessary in future in order to attain such objectives.

Total salaries and day wages paid in the various industrial branches during 1953 amounted to a little more than 400 million pesos as against a total value added of more than 1,500 million, which gives a proportion of approximately 26 per cent.

It would have been interesting to compare similar relationships for Colombia in 1945 and 1953, in order to see how the share of remunerations in total value added by industry had varied between these two years ;

unfortunately, statistical difficulties exist which would invalidate such comparisons.⁴¹ Nevertheless, an approximate assessment can be made by comparing the relationships which existed in these two periods between salaries and day-wages and the value of raw materials consumed by industry, whence it appears that remunerations in 1945 were equivalent to 20.1 per cent of the total cost of raw materials consumed, while in 1953 they were only 16.2 per cent.⁴²

The last comparison might indicate that the wage-earning sector did not fully benefit from the post-war improvement in industrial productivity, part of the profits having been retained by the enterprises. Although a situation of this type might contribute towards a higher rate of investment, its repercussions on the demand for manufactured products should also be considered, especially as the future development of a number of

⁴¹ The difficulties arise from the different meaning given to the concept of value added in the two censuses. In 1945 it was calculated on the basis of gross value of production defined as "cost of production in the factory", while in 1953 it was based on "value of production at sale price in the factory"; as a consequence the value added in 1945 appears to be under-estimated. This explains why remuneration paid in that year represented more than 66 per cent of the total value added.

⁴² It should be noted that a comparison of this type may be affected by factors extraneous to the subject under consideration, such as, for instance, changes in industrial composition which alter the relative importance of industries that need very high or very low proportions of raw materials. If the foodstuffs industries — which absorb approximately 50 per cent of the total raw materials consumed by industry — are disregarded, the relationship between the amount of the remuneration paid and the value of raw material consumed declined from 33 to 31 per cent approximately between 1945 and 1953.

TABLE 237. COLOMBIA : NUMBER OF PERSONS EMPLOYED AND REMUNERATION PAID, BY BRANCHES OF INDUSTRY, 1953

(Thousands of pesos)

Industry	Number of persons employed	Total remuneration		
		Total	Salaries and day-wages	Social security contributions
Foodstuffs	44,893	68,846	62,232	6,523
Beverages	13,575	57,700	47,500	10,200
Tobacco	9,123	12,703	11,166	1,537
Textiles	36,594	85,745	74,640	11,105
Footwear and clothing	57,234	44,192	41,391	2,801
Wood and cork	7,190	6,830	6,402	428
Wooden furniture	9,851	10,366	9,779	587
Pulp and paper	2,053	5,148	4,629	519
Printing, engraving, etc.	8,360	21,677	19,606	2,071
Leather	6,122	11,946	11,004	942
Rubber	2,731	7,909	7,092	817
Chemicals	13,304	32,853	29,610	3,243
Petroleum and coal derivatives	1,553	9,110	8,051	1,059
Cement, ceramics, glass, etc.	22,290	35,358	31,398	3,960
Mechanical and metallurgical industries ..	22,317	39,790	36,490	3,300
Other industries	4,480	6,537	6,017	520
TOTAL	261,671	456,710	407,098	49,612

SOURCE : ECLA, on the basis of official statistics.

NOTE : The figures in this table correspond to those in the first tabulations of the Industrial Census. The apparent discrepancies in the payments computed under the heading of "Social Security contributions" are due to the fact that the inclusion of items such as length-of-service bonuses, pensions, unemployment benefits, would raise the proportions of total remuneration represented by these payments considerably higher than the estimates in the table would suggest.

branches of industry, hitherto favoured by import substitution possibilities, will tend to depend more closely on whether or not the domestic market is able to expand.⁴³

The marked disparities in productivity between the various branches of industry reflect the substantial differences in remuneration per person employed in each of these branches. In fact, as may be seen in detail from table 237, the average remuneration per person varied from less than 800 pesos per year in such industries as footwear and clothing to 3,500 pesos in beverages and 5,000 in petroleum and coal by-products.

(f) Geographical distribution of industrial production

Although the initial development of industry was chiefly centred in Antioquia, a number of other important industrial centres have been growing up in various parts of the country. This geographical decentralization of industrial production was characterized not so much by specialization in individual areas, as by the development of similar industries, which were therefore to a certain extent competitive. In many cases a situation such as this might prove disadvantageous, since it implies a dissipation of resources in installations which are not satisfactorily utilized, or in the construction of plants

⁴³ The initial chapters of this study include more detailed figures and comments on the evolution of salaries in real terms, and its incidence upon the over-all purchasing power of the population.

that are below optimum size from the point of view of unit production costs. Hence it would be useful to make a brief examination of the way in which the productive capacity of the manufacturing sector is distributed by regions, and the effect which this may have had upon industry as a whole. It would also be interesting to analyse the factors which have determined this decentralization, not only from a historical point of view, but above all for the indications which they may give of the probable trends of industrial localization.

The geographical difficulties themselves, and their impact upon transport costs, have been the means of encouraging similar industries to develop in different parts of the country, especially those branches where there is some dissipation of raw material resources, and where raw material costs have a considerable effect upon the value of the final product. A typical case is that of the cement industry and asbestos-cement products, which has plants located near each of the chief consumer centres ; fortunately, in this instance, the local markets appeared to justify installations of an economic size, so that decentralization did not adversely affect efficiency.

Apart from the natural factors referred to, artificial factors have also intervened, chiefly resulting from the preferential treatment accorded by the departmental authorities to industries operating within their own area. Thus the cigarette industry—in spite of being almost completely in the hands of one company—is

TABLE 238. COLOMBIA : GEOGRAPHICAL DISTRIBUTION OF INDUSTRIAL PRODUCTION, 1953

(Values added: thousands of pesos)

Department	Population (Thousands of inhabi- tants)	Total production	Foodstuffs	Beverages	Tobacco	Textiles	Footwear and clothing	Wood and cork	Wooden furniture	Pulp and paper	Printing, engrav- ing, etc.
Atlántico	463	130,803	18,288	23,059	3,610	20,748	12,708	2,071	2,697	1,104	2,936
Bolívar	694	43,061	7,096	19,149	3,668	527	4,251	680	1,077	4	1,029
Magdalena	479	13,162	2,005	8,360	32	46	1,004	300	392	—	209
	1,636	187,026	27,389	50,568	7,310	21,321	17,963	3,051	4,166	1,108	4,174
Antioquia	1,643	378,630	39,437	24,627	13,432	167,984	36,304	4,443	3,628	1,576	6,032
Caldas	1,127	94,548	30,957	23,213	—	9,711	12,849	1,383	1,833	7	1,738
Córdoba	340	3,077	752	406	—	—	467	60	262	—	124
Chocó	134	453	46	19	—	—	31	310	12	—	—
	3,244	476,708	71,192	48,265	13,432	177,695	49,651	6,196	5,735	1,583	7,894
Cundinamarca	1,712	397,648	55,654	99,025	12,400	20,469	31,282	5,780	7,465	2,722	19,400
Boyacá	811	16,807	2,981	8,364	—	359	2,027	663	351	1	38
Huila	308	7,937	1,350	4,241	106	2	987	93	238	—	82
Tolima	743	38,399	11,164	17,040	405	35	4,097	333	845	29	350
	3,574	460,791	71,149	128,670	12,911	20,865	38,393	6,869	8,899	2,752	19,870
Valle del Cauca	1,220	290,296	93,657	33,688	9,979	29,633	24,919	3,046	4,130	10,955	8,457
Cauca	459	9,982	1,944	5,814	68	31	974	365	36	—	13
Nariño	561	16,848	3,297	7,502	419	648	1,629	1,112	216	—	188
	2,240	317,126	98,898	47,004	10,466	30,312	27,522	4,523	4,382	10,955	8,658
Santander	771	63,654	6,778	9,168	11,646	2,934	6,956	390	1,435	25	1,217
Norte de Santander ..	394	25,784	4,516	7,273	55	174	5,090	—	1,964	—	537
	1,165	89,438	11,294	16,441	11,701	3,108	12,046	390	3,399	25	1,754
TOTAL	11,859	1,531,089	279,922	290,948	55,820	253,301	145,575	21,029	26,581	16,423	42,350

Department	Leather	Rubber	Chemicals	Petroleum and coal derivatives	Cement, ceramics, glass, etc.	Basic metal- lurgical industries	Metal products	Non-elec- trical machi- nery	Electrical appliances and machi- nery	Transport materials	Other industries
Atlántico	1,790	283	15,322	—	8,494	—	9,924	202	653	5,191	1,723
Bolívar	146	155	2,832	—	800	—	267	4	84	615	677
Magdalena	66	12	14	—	423	—	49	—	38	142	70
	2,002	450	18,168	—	9,717	—	10,240	206	775	5,948	2,470
Antioquia	10,144	3,789	13,537	361	26,087	310	16,088	2,341	1,545	3,991	2,974
Caldas	1,709	84	4,092	851	1,759	275	1,330	800	470	922	565
Córdoba	519	—	63	—	316	—	14	—	—	49	45
Chocó	—	—	—	—	8	—	—	—	—	—	27
	12,372	3,873	17,692	1,212	28,170	585	17,432	3,141	2,015	4,962	13,611
Cundinamarca	10,592	21,934	26,270	235	52,325	1,150	11,682	1,564	4,632	6,027	7,031
Boyacá	252	7	106	—	812	—	169	17	54	456	150
Huila	199	52	155	—	247	—	17	65	—	67	36
Tolima	421	14	518	229	682	—	442	211	50	894	640
	11,464	22,016	27,049	464	54,066	1,150	12,310	1,857	4,736	7,444	7,857
Valle del Cauca	3,505	8,273	22,782	—	16,226	—	6,108	1,310	3,269	7,541	2,818
Cauca	88	2	140	—	233	—	67	43	—	118	46
Nariño	738	107	190	—	514	—	154	5	3	16	110
	4,331	8,382	23,112	—	16,973	—	6,329	1,358	3,272	7,675	2,974
Santander	1,085	117	2,343	13,928	3,411	674	157	1,003	65	459	502
Norte de Santander ..	578	64	404	1,877	1,637	322	4	167	226	723	173
	1,663	181	2,747	15,166	5,048	996	161	1,170	291	1,182	675
TOTAL	31,832	34,902	88,768	16,842	113,974	2,731	46,472	7,732	11,089	27,211	17,587

SOURCE : ECLA, on the basis of official statistics.

distributed among various plants operating in different parts of the country, although in this case the incidence of transport costs is very low. Another example is that of the spirits industry—a monopoly of the departmental authorities, for whom it constitutes an appreciable source of income—whose products are not allowed to move freely from one Department to another.

In order to illustrate the geographical distribution of manufacturing production, the country may be divided, although somewhat arbitrarily, into the following five zones: the Departments of Atlántico, Bolívar and Magdalena on the north coast; those of Antioquia, Caldas, Córdoba and Chocó in the north-east; those of Cundinamarca, Boyacá, Huila and Tolima in the central region; those of Valle del Cauca, Cauca and Nariño in the south-east; and those of Santander and Norte de Santander in the east. As may be seen from table 238 each of these five zones accounted for fairly large percentages of the country's total industrial production in 1953, the proportions represented by the three largest being very similar. The zone headed by Antioquia continues to show the highest percentage in terms of value added, but if each Department is considered separately, the highest production level is attained by Cundinamarca.

It should also be noted that there is a certain relationship between the total value added in each zone and the respective population. This is highest, however, in the groups headed by Antioquia and Valle del Cauca, at an intermediate level in the Cundinamarca and Atlántico groups, and much lower in Norte de Santander and Santander. If the amount of value added *per capita* is calculated on the basis of the total population of each of these five regions, it may be seen that for the first two zones mentioned it stands at 147 and 142 pesos respectively, 130 in the areas grouped under Cundinamarca, 114 in those headed by Atlántico and less than 80 in the Santanderes. These figures give an approximate indication of the extent to which industry has developed in the various districts, primarily with a view to supplying the local markets, and ultimately to satisfying the requirements of a more highly-integrated national market.

Apart from the historical factors already mentioned, industry in Antioquia later enjoyed the advantages of being located in a growing industrial centre which offered possibilities of development financed by re-investment of profits, of the gradual formation of an industrial tradition among the workers, of an expanding market resulting from this same industrialization and of a relatively better situation as regards electric energy supplies, etc.

For its part, Cundinamarca had one of the largest population centres with one of the most rapid rates of growth; these two factors led to more intensive industrial development. Valle del Cauca, and Cali in particular, not only had a sizeable market, but were also in a favourable geographical position for the supply of raw materials and better placed for absorbing much of the agricultural production intended for manufacturing; moreover, their proximity to Buenaventura facilitated the supply of imported raw materials and goods. Barranquilla also

enjoyed a fair-sized local market, as well as certain advantages for the development of industries utilizing a high proportion of imported raw materials.

Although emphasis has been laid on the existence of similar industries in various regions, it should also be mentioned that the geographical distribution of industrial production in 1953 showed a certain degree of specialization which may be particularly important in so far as future prospects are concerned, since it is possible to foresee an intensification of this trend. The textile industries were chiefly concentrated in Antioquia—this Department produces two-thirds of the total value added in these industries—thus becoming the most highly specialized branch; Antioquia also shows, although less markedly, the highest proportion of value added in the tobacco, footwear and clothing and metal products industries. Cundinamarca registers the highest values added in the beverages, printing, rubber, chemicals and cement, ceramics, glass and similar industries, as well as in some less important branches. In Valle del Cauca the staple industries are foodstuffs and the production of paper and board, while rubber, chemicals and some branches of the mechanical and metallurgical industries are also fairly important. The Department of Atlántico is of no outstanding importance in any of the general branches into which the manufacturing sector has been grouped, but a considerable part of the production of certain groups of chemicals, foodstuffs, and mechanical and metallurgical industries takes place there. In the case of Santander, production consists almost entirely of petroleum derivatives, which supply more than 20 per cent of the value added by industry in this Department.

Although it is difficult to forecast future variations in the geographical distribution of the main industrial branches, a consideration of some of the factors whose influence is already being felt may give an indication of the most significant changes to be expected. The progressive improvement of communications⁴⁴ will, in the first place, lead to a greater integration of the national market, and will therefore improve competitive conditions for the larger and more efficient industries. This in turn will probably tend to intensify concentration in particular zones, and encourage specialization. Future conditions will probably favour the increasing importance of Antioquia in the textile field and, on a lesser scale, in clothing, as well as an increment in the relative importance of the foodstuffs industries in Valle del Cauca and of various other branches in Cundinamarca.

Another factor which will probably exercise a considerable influence on the future location of industry is the variation in the sources of supply of raw materials and intermediate products consumed by the manufacturing sector. The high proportion hitherto maintained by imported raw materials undoubtedly provided an incentive for the installation of transforming industries in regions where foreign supplies were most easily obtained.

⁴⁴ Some of the most outstanding events that have recently taken place in this connexion are the conclusion of the highway from Medellín to Barranquilla, and the progress made in the work on the Magdalena railway which will link up with the country's main railway network.

This is one of the factors that has primarily conduced to the development of Cali in recent years. Nevertheless, as national products are increasingly substituted for imported raw materials and intermediate goods — both agricultural and manufactured — this incentive will gradually lose its significance.

One of the most interesting examples of this process has already occurred with the commencement of operations at the Paz del Río iron and steel plant, whose situation is gradually changing the location of the mechanical and metallurgical industries. Up to 1953 the highest percentages of the total value added in the latter branch of the manufacturing sector still came from the industries of Antioquia, whereas the new industries which are being set up tend to be located closer to the steel plant. The altered conditions therefore appear to favour Cundinamarca — and perhaps to a lesser extent Santander and Boyacá — as centres for this type of industry.

(g) *Participation of foreign capital and technique*

Foreign capital has taken little part in the historical evolution of Colombian industry, which was basically financed by national capital. Apart from small English and Swedish investments in the match industry, and United States investments in one of the textile enterprises, there were practically no other direct contributions by foreign capital to the manufacturing sector before the end of the last war.⁴⁵

Some idea of the extent of foreign investments may be obtained from information on the assets of stock companies. In December 1951 the assets held by foreign stock companies represented approximately 14 per cent of the total for this type of company (529 million pesos compared with 3,195 million in national stock companies). On the other hand, only 14 per cent of the paid-up capital of foreign stock companies was employed in manufacturing, while the remainder was principally invested in mining and commercial activities; whereas the domestic stock companies' capital was mainly in the industrial sector, in which more than 60 per cent of their total assets was placed.⁴⁶

Foreign capital has, however, acquired a certain significance in post-war industrial development, in the form of both direct contributions and technical assistance. The most interesting examples of direct investment are to be found in the rubber and paper and board industries, asbestos-cement products and artificial fibres.

In the case of rubber, United States and Colombian capital combined to finance the chief tyre-producing company, and a foreign firm established a branch operating in the same line. The United States and Colom-

bia also participated jointly in starting production of certain types of paper and board. The recent installations for the manufacture of asbestos-cement products were set up with Swiss and Colombian capital.

Foreign participation has been of considerable assistance in these three cases, contributing both financial and technical aid to the development of new industries within the country.

The production of artificial fibres was primarily financed by Colombian capital in its early stages, but numerous technical problems arose which were aggravated by the lack of specialized Colombian personnel, and, although technical experts were engaged from abroad, there were considerable difficulties during the early stages. Agreements were later reached with large foreign firms which, as well as providing for continued technical assistance, also offered direct capital participation in national enterprises. Two of the three companies existing in 1953 operated with both United States and Colombian capital, while a foreign firm had an option on direct capital participation in the third.

Foreign capital was also recently invested on a smaller scale in some of the foodstuffs industries; the production of vegetable fats was begun with Dutch capital, and the United States acquired interests in certain fruit preserving, confectionery, biscuits and milk and milk products industries. A number of foreign contributions were also recorded in the chemicals industry, although, with the exception of the manufacture of paint, in which there is a relatively high proportion, these were on a very small scale.

One of the apparently more important contributions was the installation of a number of pharmaceutical laboratories by foreign companies. However, these usually belonged to firms which were traditional distributors of imported pharmaceutical products, and which, by undertaking the final stages of production and packing in the country, hoped to improve their competitive position, through a reduction in transport costs and a more favourable customs tariff. These laboratories had little significance in terms of imports of equipment, additional employment of local labour, and value added to the imported raw materials, nor did domestic production of some of the raw materials required develop on any appreciable scale.

Foreign investment was also effected in relatively simple industries, which did not need high technical qualifications, and for which domestic companies already had productive capacity, or sufficient possibilities of expansion to satisfy the market. Amongst these may be mentioned woollen textiles, certain types of ready-made clothing and gaseous beverages. The chief result of foreign investment in these industries has been to create excess capacity, which has mainly affected existing national enterprises. In the two last-named branches, competitive conditions for foreign investment were also aided by the prestige of well-known names or brands.

It may therefore be stated that certain branches of manufacturing received important direct foreign contributions — although not on any great scale — as well as

⁴⁵ Some mention should perhaps be made of the case of the principal enterprise in the brewing industry, which is also undoubtedly one of the most important industrial companies in the country. Up to the war most of the capital — and almost all the technicians — were Dutch and German. The original foreign contribution was, however, very small, the company's remarkable later development being entirely financed by re-investment of profits; it is now an entirely national concern.

⁴⁶ See detailed figures in the *Revista de la Superintendencia de Sociedades Anónimas*, Vol. IX, No. 23, September 1953.

benefits, from technical assistance, which were sometimes conditional upon direct capital participation in the companies concerned. But foreign investments were also effected in certain industrial branches which were in a position to supply their own capital and technical personnel, as well as in others where they produced excess capacity, and sharpened competition for the existing domestic companies.

From the standpoint of future prospects, there are obviously many opportunities for foreign capital investment to play a far more important part in the industrial development of Colombia. In view of the developments referred to, it might well be advisable to adopt legislation encouraging further foreign investment, together with a policy aimed at channelling it towards the sectors where it is most needed from the point of view of the over-all national economy.

While direct foreign investment has been acquiring some degree of importance, the contribution made by foreign capital in the form of loans for industrial investment has also reached fairly high figures. In fact, some large undertakings have been made possible by this means, outstanding among which is the Paz del Río iron and steel plant. There are also many other large scale projects, in which private enterprise is not always prepared to take part, which could be carried out with this type of assistance. Colombia's capacity for absorbing foreign loans still considerably transcends its current commitments, as is attested by the low proportion of the total balance of payments represented by remittances for amortization and interest.

(ii) *Production costs*

One of the most important characteristics of Colombian industry is the heavy cost of production, which not only necessitates a high customs barrier, but also limits the possibilities of extending consumption of a large number of products to the lower-income groups. A lengthy analysis of this subject would require much more thorough research than was possible with the resources and time available for this study. The most which can be done is to give a general explanation of some of the responsible factors.

In the first place, some general comments should be made upon the limitations imposed by production costs. The problem is often judged only from the direct or immediate point of view, by comparing the prices of national products with those of the corresponding imported items, and so deducing whether the national costs are in general low or high. But apart from these considerations, it would also be necessary to examine the social cost from the point of view of the economy as a whole. Even though the prices of national products are, in fact, usually higher than those of imports — it could hardly be otherwise in the majority of items — this does not necessarily mean that the possibilities of domestic consumption are decreasing, since a large part of the consumption capacity is precisely derived from the value added by national industry. If hypothetical estimates are made of the level that would have been reached by the *per capita* gross product without the development

achieved by the manufacturing sector, and if the level of consumption that it would permit at lower prices for manufactured products is examined, such a level would undoubtedly be far below that actually attained in spite of higher production costs.

Naturally this does not mean that every effort should not be made to reduce production costs, by improving productivity and encouraging the expansion of consumption in the lower-income groups; on the contrary, this may be one of the most efficacious means of maintaining a high rate of growth for future industrial production. It is known that much of the industrial development that took place in previous periods was encouraged by the possibilities of import substitution; whereas the very small part that imports have recently played in supplies of manufactured consumer goods tends to limit the prospects of growth to conform with the rate of increase in domestic demand.

If some of the aspects which influenced the relative costs of manufactured products in reaching their present level are considered one by one, reference should first be made to the most obvious, which were caused by the inadequacy of the market, resulting in the installation of plants that were often below optimum size, in the diversification of production, and in the impeding of specialization. The regional dispersion of industrial production — as a consequence of the geographical characteristics of the country and transport difficulties — gave rise to duplicate installations, which were seldom of optimum size from the point of view of unit costs.

The continued preponderance of handicrafts in some branches of the manufacturing sector also constituted one of the factors loading the prices of a number of industrial items. It has already been mentioned that the average productivity per person employed in these branches was very low, since they did not have the advantages of large-scale production.

Apart from this, the high proportion of imported raw materials used by domestic industry obviously increased production costs, not only on account of freight and insurance charges, but also because of the large stocks that had to be maintained and that immobilized a large part of the companies' capital. Many of the industries normally maintain sufficient reserves of imported raw materials for four to six months' requirements.

Another characteristic of Colombian enterprises was the volume of investment required for equipment and installations not directly related to production needs. Many of the industries were obliged to install their own electric power plants, since the public services could not guarantee either the amount or the uninterrupted supply required for production. The magnitude of investments of this type can best be appreciated from the fact that almost 25 per cent of the total kW installed in 1953 corresponded to private plants belonging to different industries. The lack of specialized workshops for repairs, and the manufacture of certain types of spare parts, led many enterprises to install their own, which, apart from the purchase of necessary equipment, also called for the maintenance of a staff which was not always fully occupied.

It is difficult to appreciate the extent to which the shortage of specialized labour and the inherent qualities of the Colombian worker may have affected the situation. As regards the latter factor, very few industries have carried out labour productivity studies that were in any sense comparable with those of other countries, but where this has been done the output was found to be very satisfactory, and more than one foreign industrialist was surprised by the results obtained. The need for trained and specialized manpower varies considerably from one type of industry to another, being most important in such branches as the transformation of iron and steel. The companies normally undertake the necessary training and specialization themselves, since appropriate schools do not exist and this has led a number of industries to employ instructors and to make other suitable efforts. Although this type of initiative is very limited, it must be acknowledged that at least a few industries are directly absorbing the training expenses which are naturally reflected in production costs.

The adverse influence of several of the factors mentioned will probably be moderate in the future. The increases in population and *per capita* income will lead to a greater expansion of the national market, which will become progressively more integrated as the means of transport improve. This will encourage an increase in the size of industries, thereby allowing a greater degree of efficiency and specialization, reducing the relative importance of artisan production and of small industries. The development of industries manufacturing intermediate products will reduce dependence upon imported raw materials and intermediate goods, thus proportionately doing away with the need to maintain high stocks. At the same time the creation of mechanical and metallurgical industries, and a greater stimulus to investments in public services, will tend to reduce the need for investment in equipment and installations which do not form a direct part of the productive process.

Finally, it should be noted that the relative prices of manufactured products tended to decline,⁴⁷ at least during the later years of the period under review. This seems to reveal either a tendency to transfer part of the increment in industrial productivity to the consumer, or to reduce the current gross profits from manufacturing.

IV. ALTERNATIVE PROJECTIONS OF INDUSTRIAL DEVELOPMENT

1. *General data on which hypotheses of future industrial development are based*

In the previous sections an analysis was made of the more outstanding events in the historical development of Colombian industry, its present characteristics and problems, the availability of various types of manufactured goods — both domestic and imported — and the behaviour of demand. The object of this section is to present hypotheses of the basic tendencies of future industrial development, assuming the need to attain a

⁴⁷ In fact, the prices of many domestic manufactures have become stabilized, and, in general, have increased less than those of foodstuffs.

given rate of increase in *per capita* real income for the economy as a whole.

Wherever possible, the prediction of some of these fundamental trends would help to orientate the economic policy not only of the Government but also of private business. An approximate forecast of the future composition of demand for manufactured goods, for instance, might necessitate a partial deviation of investment towards those branches whose productive capacity is likely to be insufficient, and which should be offered adequate encouragement for their development. Moreover, a calculation of the amount and composition of future supplies of manufactured consumer goods would enable requirements of raw materials and intermediate products to be predicted, as well as their repercussions on imports, agriculture, and industrial production itself. In its turn, the increased demand for consumer goods, as well as intermediate goods and raw materials, modifies the amount of capital goods needed for the expansion of productive capacity in the different sectors. Furthermore, a comparison of import requirements estimated according to the data given above, with the anticipated evolution of exports and of the capacity to import, may reveal some insufficiency in the rate of growth which would have to be offset by strengthening the import substitution policy until it was commensurate with general development targets. Finally, it is also possible to forecast the implications of a given rate of industrial growth in so far as labour requirements, power supplies, transport and so forth are concerned.

It is unnecessary to add that any value which the hypotheses may have is essentially methodological. They show the type of statistical data required for this kind of analysis, and how such data may be used so as to give a more or less satisfactory idea of the incidence of a given rate of increase in real income upon the various factors mentioned.

In spite of the essentially methodological nature of the hypotheses, the data accumulated on the characteristics of Colombian industry have been utilized to the full in this illustration. In this way, the present study will at least serve as a general guide with a certain degree of validity, although the formulation of a global development plan would require a much more careful and detailed elaboration of the basic figures and even of the prospects of growth in each specific sector.

Naturally, any attempt to postulate the extent and direction of future industrial development should take into account the possibilities and conditions of the national economy as a whole. As these are described in detail in the early chapters of this study, present comments will be confined to the aspects more directly related to the manufacturing sector.

In the first place, an analysis of circumstances governing the past rate of income growth, and of present conditions, shows that two alternative rates of future growth in *per capita* real income for the period 1953 to 1960 may be taken as reasonable working hypotheses, i.e., cumulative annual rates of 4 and 2.2 per cent respectively. On the basis of alternative estimates for the inflow of foreign capital, it may also be assumed that these incre-

ments in global income would permit *per capita* consumption to expand by 4 and 2 per cent annually in each case ; these hypotheses will be taken as a starting point for the analysis.⁴⁸

In the chapters mentioned, an analysis is also made of the possibilities of increasing both exports and the capacity to import, divided into maximum and minimum hypotheses. Although these hypotheses depend upon differing assessments of the conditions likely to prevail in foreign markets, and are therefore basically independent of the rate of growth projected for the national income, for reasons of simplicity the hypothesis of maximum exports will be examined together with that of the most rapid growth of consumption, the minimum hypothesis being compared with that of a more moderate increase in consumption.

It is important to remember that the two hypotheses on the development of the capacity to import show estimated future levels which seem highly inadequate in view of the additional requirements resulting from the rise in both population and income. When the prospects of industrial development are examined later, special attention is paid to this problem and a high rate of substitution is projected for the various types of manufactured goods. Although these hypotheses of substitution are couched in such general terms, and their practical possibilities have to be examined anew in each specific case, the order of magnitude that they postulate is, in the last analysis, barely enough to satisfy estimates of requirements in projections of income and the capacity to import.

Apart from these general data, and as a preliminary step in the preparation of hypotheses on future industrial development, it would be useful to supplement the information contained in previous sections upon the situation of those industries already operating in 1953 by a brief examination of new enterprises whose development was already well advanced by that time and of further expansion plans.

It should be mentioned in this respect that, when the year 1953 was taken as a basis for future comparisons, the iron and steel plant of Paz del Río was not taken into account, since it did not enter production until later. The inclusion of this plant in future projections therefore affects a number of aspects, among them the probable growth of the mechanical and metallurgical industries, which would give a considerable impetus to import substitution, both in intermediate and end products. Moreover, it means that not only the current productive capacity of the plant, but also plans now under consideration for its expansion, especially as regards the manufacture of flat products, are taken into account.

Apart from this, the known expansion plans of private concerns had very short-term prospects, and were therefore subject to substantial modifications during the period covered by these projections. The considerable variations in the utilization of installed capacity in the various branches made it difficult to make an over-all appraisal of the extent of expansion plans in the manu-

facturing sector in 1953, which in turn makes it necessary to refer particularly to the more important companies.

In the textile industries, the most important cotton companies were planning or had already begun a certain amount of expansion, which would probably increase productive capacity by about 25 to 30 per cent. In the woolen industry, on the other hand, there were almost no expansion plans, and many which had been projected some years ago, mainly in spinning, had been suspended. There appeared to be no special plans to increase installed capacity in silk weaving, not in the actual production of artificial fibres except that of cord for tyres, which was soon to be manufactured in the country.

The clothing industry — particularly that of men's clothing — had plans for moderate expansion, on the grounds that the big enterprises had considerable possibilities of increasing their production provided that artisan labour was largely eliminated.

Expansion plans in the foodstuffs industries were chiefly limited to some of the lesser and more recently developed branches. For instance, there was a project for increasing productive capacity in the canning of both fish and shellfish, and fruit and vegetables. Four new factories were also proposed for the production of vegetable oils and fats in various parts of the country.

In the beverages industry there were considerable plans for expansion in beer and gaseous beverages ; on the other hand, the existing productive capacity for spirits was by no means completely utilized. The tobacco industry did not envisage any expansion.

As regards rubber, a large expansion was expected shortly in the productive capacity of tyres ; of the two existing firms, one proposed a 50-per-cent increase and the other intended to double its installed capacity. In addition to this, programmes were under way for the installation of two new plants, one of which recently entered production.

Expansion programmes were much more limited in the paper, board, and paper products industries, except in so far as the production of cellophane and other packing materials was concerned.

The cement, ceramics, glass and similar industries had far-reaching expansion projects. In cement, those already studied would increase installed capacity by approximately 50 per cent within a relatively short time. The most important manufacturer of glass containers was also considering an increase of approximately 50 per cent, and the construction of a new plant in Bogotá ; apart from this, a new company recently set up its plant in the capital. In chinaware, emphasis was mainly on expanding present lines of production, including the manufacture of bathroom fittings.

The chemical industry proposed to increase capacity for the production of soda, whereas no great additional investments were being considered in the match industry. Some new lines in pharmaceutical products were being considered, including the production of antibiotics.

Finally, the leather industry projected considerable increases as well as the construction of new tanneries.

⁴⁸ In order to avoid unnecessary repetition, the two alternatives will be described as hypothesis *A* and hypothesis *B* in future.

Apart from these immediate plans on the part of the private companies, a number of new industries, planned by the *Instituto de Fomento Industrial*⁴⁹ should be taken into account.

The metal industries were considering the installation of aluminium rolling mills — relations having been established with foreign companies and studies being well advanced — mainly for the production of sheet and aluminium foil. The possibility of augmenting production of copper derivatives, especially conductor wire and electrical installations, has also been studied; copper sulphate for insecticides could also be produced with the scrap from wire-drawing and domestically-produced sulphuric acid.

The chemicals industry had a number of plans with considerable possibilities of development on the basis of domestic raw materials, especially in heavy chemicals and petro-chemicals. The projects included the forthcoming construction of a plant in Barrancabermeja to manufacture ammonia, nitric acid, ammonium nitrate and urea; the amplification of production of chloride and electrolytic caustic soda; the manufacture — with coke and lime from Paz del Río — of calcium carbide from which to obtain acetylene; the use of this, in its turn, as the basic material for a large group of chemical products; the manufacture of insecticides and fungicides, and the expansion of fertilizer manufactures based on potassium and phosphorus; the utilization of the tar from Paz del Río for the manufacture of dyes and other products; the manufacture of explosives with nitric acid from Barrancabermeja; the introduction of plastic industries, for which the supply of urea from Paz del Río would have to be complemented by the production of formaldehyde, to be obtained from natural gas, and the manufacture of lamp black for the rubber industry, also obtainable from natural gas or petroleum.

The *Instituto* was also planning the installation of a pulp and paper plant, for which studies were under way, pending a more detailed investigation of raw materials. It was also interested in encouraging private enterprise to produce sheet glass domestically. Finally, the production of slag cement was shortly to begin on the basis of blast furnace slag from Paz del Río.

These data are utilized only in a very general way in the projections that appear later, and no attempt is made to undertake a definite evaluation of any of the specific projects mentioned. On the other hand, such aggregate projections offer a general picture of the development requirements in main industrial branches, on which to form a more accurate judgement of the scope of the projects concerned.

2. Alternative projections for 1960

The formulation of the alternative projections of industrial development presented below calls for a brief review of the successive stages involved.

⁴⁹ The following paragraphs are extracted from the *Informe del Gerente*, June 1954, in which details are given of the future programme of the *Instituto*.

In the first place, estimates will be presented of the probable future demand for manufactured consumer goods. An assessment will also be made on the composition of supplies of national and imported consumer goods, taking into account the contribution of domestic production and imports to the supply of this type of goods in 1953, as well as the probabilities of substitution.

Secondly, projections on the export of manufactured goods will be summarized in the light of the analysis contained in other chapters of the present study, and of some general criteria on the possible emergence of new export lines.

The possibilities of expanding domestic industries producing capital goods will be surveyed later — although only cursorily — in addition to a specific appreciation of the prospects; an estimate will be made of the volume of production that will be compatible with total capital goods requirements and the predictable future levels of the capacity to import.

Consideration of all three stages will enable the level of final demand for domestically-manufactured products in 1960 to be determined, and it will subsequently be possible to estimate the volume of raw materials and intermediate products required to meet such demands. In the preliminary approximation, it will be assumed that the proportion between imported and domestic intermediate products will remain the same as in 1953, in order to calculate probable import requirements; the import substitution possibilities for all types of intermediate products and raw materials will also be examined, together with the raw materials requirements thereby entailed.

After requirements of domestically-produced end goods and intermediate goods have been ascertained, it will be possible to determine the total increase in production (by branches of industry) between 1953 and 1960, as well as the ensuing changes in the composition of manufacturing.

Once the new levels of production have been projected, estimates will be made of the increases required in installed capacity in each industrial branch, and the consequent investment needs.

The earlier projections can then be finally summarized in tables giving detailed requirements of the various types of manufactured goods in 1960, including estimates of the volume and composition of imports that would be compatible with the global projections.

(a) Projections of demand for manufactured consumer goods

Projections of the level and composition of demand for manufactured goods in 1960 are based partly on the two hypotheses of the growth in total *per capita* consumption (an annual cumulative rate of 4 and 2 per cent respectively), and partly on the coefficients of income-elasticity referred to in Section II. These coefficients were derived from two different sources: a comparison of the variations in total consumption with the consumption of different types of manufactured goods during the period 1937-53, and the results of the 1953 survey

TABLE 239. COLOMBIA : ESTIMATED AVERAGE COEFFICIENTS OF INCOME-ELASTICITY OF DEMAND FOR MANUFACTURED CONSUMER GOODS, 1953-60

<i>Total manufacturer consumer goods</i>	1.15
<i>Non-durable consumer goods</i>	1.06
<i>Foodstuffs</i>	0.90
<i>Non-foodstuffs</i>	1.14
Beverages	1.55
Tobacco	0.64
Textiles	1.00
Footwear and clothing	1.10
Paper	1.50
Printed and engraved matter, etc.	1.60
Rubber goods	1.30
Chemicals	0.70
Products of the mechanical and metallurgical industries	1.00
Other non-durable goods	0.63
<i>Durable consumer goods</i>	1.80
Wooden furniture	1.50
Printed and engraved matter, etc.	1.60
Leather goods	1.50
Rubber goods	1.90
Cement, ceramics, glass, etc.	1.10
Products of the mechanical and metallurgical industries	2.04
Other durable goods	1.50

SOURCE : ECLA, on the basis of official statistics.

on the income and expenditure of 1,500 families. Mention has also been made of the main reservations with regard to these two sources as a basis for future projections. The relative importance of the latter was evaluated by means of the list of coefficients given in table 239, since these are usually closer to the values of the survey than to past coefficients.

The coefficient for total manufactures was estimated at 1.15 on the grounds that demand for these products would tend to rise slightly more rapidly than total consumption, thereby increasing the relative importance of this item within the whole.⁵⁰ In fact, manufactured goods represented 39 per cent of consumer total expenditure on goods and services in 1953, and by 1960 should have increased to more than 40 per cent.

The coefficients for durable and non-durable manufactured consumer goods and the different types of products within these two categories were estimated in the same way.

Table 240 gives the estimates for 1960 according to the two hypotheses, and the respective values anticipated for the demand for manufactured products at 1953 prices. Assuming an annual increase of 4 per cent in total *per capita* consumption, the demand for manufactures in 1960 would be almost 4,400 million pesos — an increase of almost 60 per cent over its 1953 level. Apart from the over-all increment, there would also be

⁵⁰ The coefficients used for the other sectors were 0.5 for foodstuffs for direct consumption and 1.5 for services.

important changes in the composition of this demand, chiefly characterized by a sharper upward trend in the demand for durable consumer goods, whose relative importance within the total would expand from less than 13 per cent in 1953 to nearly 15 per cent in 1960. As regards non-durable goods, processed foodstuffs would diminish in importance from approximately 30 to less than 28 per cent.

TABLE 240. COLOMBIA : PROJECTIONS OF DEMAND FOR MANUFACTURED CONSUMER GOODS, 1953-60

(Millions of pesos at 1953 prices)

	Base 1953	1960	
		Hypothesis A	Hypothesis B
<i>Total manufactured consumer goods</i> .	2,767	4,392	3,781
<i>Non-durable consumer goods</i>	2,429	3,754	3,271
<i>Foodstuffs</i>	821	1,206	1,076
<i>Non-foodstuffs</i>	1,608	2,548	2,195
Beverages	452	789	649
Tobacco	102	142	134
Textiles	336	510	447
Footwear and clothing	367	572	495
Paper	14	25	20
Printed and engraved matter, etc.	66	120	97
Rubber goods	21	35	30
Chemicals	204	289	264
Products of the mechanical and metallurgical industries	9	14	12
Other non-durable goods	37	52	47
<i>Durable consumer goods</i>	338	638	510
Wooden furniture	35	62	51
Printed and engraved matter, etc.	6	11	9
Leather goods	20	35	29
Rubber goods	16	31	25
Cement, ceramics, glass, etc.	32	51	44
Products of the mechanical and metallurgical industries	199	395	308
Other durable goods	30	53	44

SOURCE : ECLA estimates.

Similar variations — although on a lesser scale — are also assumed by hypothesis *B*. In this case, the increase in demand for manufactured goods between 1953 and 1960 would be approximately 40 per cent, of which less than 35 per cent would be constituted by non-durable and more than 50 per cent by durable consumer goods respectively.

On the basis of these estimates of demand, the respective contributions of domestic production and imports have to be calculated. The results of these calculations are given in table 241, where they are compared with their respective proportions in 1953.⁵¹ In both hypotheses

⁵¹ It should be emphasized that in table 241 only manufactured consumer goods are included, so that these figures cannot be taken as indications of the total value of production. This especially affects those branches of industry where a high percentage of the production consists of intermediate products or capital goods, or of goods for export.

TABLE 241. COLOMBIA : SOURCE OF MANUFACTURED CONSUMER GOODS
TO MEET PROJECTED DEMAND, 1960

(Millions of pesos at 1953 prices)

	Base 1953		1960 Hypothesis A		1960 Hypothesis B	
	Domestic production	Imports	Domestic production	Imports	Domestic production	Imports
<i>Total manufactured consumer goods</i>	2,372	395	4,062	330	3,549	232
<i>Non-durable consumer goods</i>	2,243	186	3,702	52	3,224	47
<i>Foodstuffs</i>	798	23	1,206	—	1,076	—
<i>Non-foodstuffs</i>	1,445	163	2,496	52	2,148	47
Beverages	437	15	781	8	641	8
Tobacco	99	3	139	3	131	3
Textiles	317	19	510	—	447	—
Footwear and clothing	361	6	572	—	495	—
Paper	9	5	23	2	18	2
Printed and engraved matter, etc.	60	6	116	4	94	3
Rubber goods	16	5	35	—	30	—
Chemicals	126	78	260	29	238	26
Products of the mechanical and metallurgical industries	—	9	14	—	12	—
Other non-durable goods	20	17	46	6	42	5
<i>Durable consumer goods</i>	129	209	360	278	325	185
Wooden furniture	35	—	62	—	51	—
Printed and engraved matter, etc.	4	2	10	1	8	1
Leather goods	20	—	35	—	29	—
Rubber goods	13	3	31	—	25	—
Cement, ceramics, glass, etc.	20	12	46	5	40	4
Products of the mechanical and metallurgical industries	37	162	150	245	150	158
Other durable goods	—	30	21	27	22	22

SOURCE : ECLA estimates.

the decline in the contribution of imports would be both relative and absolute, but, as imports of manufactured consumer goods were already very small in 1953, the total amount of substitution projected is quite moderate.

The justifications for estimated substitutions may be summed up as follows : in the case of processed foodstuffs, it was estimated that the potential development of domestic industries was sufficient to reduce imports, which, in 1953, chiefly consisted of canned fish, shell fish and fruit, to a very low level. In the case of beverages, imports in the same year consisted of certain types of spirits which could not be produced in the country ; nevertheless it was estimated that the greater part of the increment in future demand could be diverted to domestic products, thus keeping imports down to a more moderate level. It was assumed that the case of the tobacco industries would be very similar and that the 1953 level of *per capita* imports would be maintained.

Complete import substitution of end goods was assumed in the case of textiles and footwear and clothing ; this would merely be the culmination of a long process of substitution, since imports had already been reduced to a relatively small level in 1953.

In paper and board, imports which represented a very considerable proportion of the total supply in 1953

are assumed to drop appreciably, in spite of the large increment projected in total consumption. Domestic production of paper is assumed to develop on a large scale, although certain special types would still have to be imported. A certain amount of newsprint would also have to be imported. On the other hand, complete import substitution is assumed for such rubber goods as were still being imported in 1953.

In the case of chemical products, there is not sufficient information to justify any expectation of substitution. In 1953 the entire demand for soap, candles and matches was met by domestic production, while imports represented more than one-third of the total demand for pharmaceutical products. Since laboratories already installed in the country are gradually introducing new lines of production imports are expected to drop considerably and by 1960 to be scarcely more than 10 per cent of the total supply of chemical products for direct consumption.

All non-durable metal consumer goods were imported in 1953, but as they were relatively simple items (razor blades, steel wool for floor-cleaning etc.) it may be assumed that domestic industry will be able to meet demand.

The problem is much more difficult in the case of durable consumer goods, almost two-thirds of which

were imported in 1953. It is assumed that domestic industry will continue to meet the entire demand for wooden furniture and leather goods ; that printed and engraved matter will continue to be imported in small quantities, and that the substitution process will be complete in rubber products. It is also assumed that the proportion of imports in the cement, ceramics and glass industries — chiefly ceramics and chinaware — would decline to only about 10 per cent of the total requirements for this type of product in 1960.

Durable consumer goods manufactured by the mechanical and metallurgical industries are more important, and a higher coefficient of income-elasticity has been assumed for them. In 1953 domestic industry chiefly produced the simpler types of metal goods — including metal furniture — while imports mainly consisted of automobiles and other means of transport, electric appliances for household use and a large variety of similar articles. The drive displayed by this branch of the manufacturing sector in recent years, its present low level, and the incentive which will be supplied by the existence of domestic sources of basic raw materials, lead to the belief that, under favourable conditions, these industries would have an exceptionally rapid growth during the coming years. For purposes of illustration, only the domestic production of this type of goods in 1960 has been estimated at 150 million (at 1953 prices), as against approximately 40 million pesos in 1953. It is important to note that, despite the magnitude of such development, the expansion in demand would continue to make heavy imports necessary ; in fact, according to hypothesis *A*, imports would surpass production by almost 60 per cent and would be 50 per cent more than in 1953.

The proportion of imports in the total supply of durable consumer goods is so high, and substitution so difficult that, in spite of the efforts made in most branches, the increase in domestic demand will only be met by continuing to import in appreciable quantities.

(b) Projections of exports of manufactured goods

In the chapters devoted to an analysis of the various aspects of foreign trade, the future prospects of exports and of the capacity to import are discussed in detail ; this section will therefore only give a summary of the projections for manufactured goods, in order to proceed to an examination of the probable incidence of such exportable production on the requirements for intermediate products and capital goods.

It should be emphasized once again that the definition of the manufacturing sector is so all-embracing that very simple processing of agricultural commodities has, of necessity, to be included ; for example, the 1953 Industrial Census included coffee threshing. (Exports of coffee, rice and other commodities therefore appear as exports from the foodstuffs industries.)

These projections are summarized in table 242.

If coffee is excluded, an increase of from 6 million pesos in 1953 to 24 million in 1960 has been assumed for exports of actual manufactured goods. Although

this would imply a relatively sharp upward trend, the result in absolute terms within over-all exports would continue to be very small.

TABLE 242. COLOMBIA : PROJECTIONS OF EXPORTS OF MANUFACTURED GOODS, 1960 ^a

(Millions of pesos at 1953 prices)

	Base 1953	1960	
		Hypothesis A	Hypothesis B
Coffee and other products of the foodstuffs industries	806	879	734
Textiles	2	5	5
Leather and leather goods	3	5	5
Rubber goods	—	4	4
Chemicals	—	3	3
Cement, ceramics, glass, etc.	1	4	4
Products of the mechanical and metallurgical industries	—	3	3
TOTAL	812	903	758

SOURCE : ECLA estimates.

^a Estimated values at manufacturers' prices.

This increment in exports of manufactured goods would be contributed to by moderate expansions in this existing volume of exports from the textile, leather and cement, ceramics and glass industries, and also by the introduction of certain exportable items in the rubber, chemical and mechanical and metallurgical industries.

As regards manufactures proper, these estimates do not in any way constitute a concrete evaluation of the real export possibilities, but rather serve as illustrative data. The promotion of a more active inter-Latin American trade, with regional specialization in certain types or products, could lead to the export of manufactured goods in much larger quantities. Nevertheless, in view of the serious difficulties that this would appear to entail, it has been thought preferable to emphasize the possibilities of import substitution rather than give an optimistic forecast of the export prospects for manufactured goods.⁵²

(c) Projections of domestic production of capital goods

The possibilities of expanding domestic industries which manufacture capital goods deserve to be given preferential attention in an examination of the country's industrial development prospects.

In the first place, this branch of the manufacturing sector has had one of the slowest rates of development, with certain notable exceptions such as the cement industry. Its relative importance within industry as a

⁵² The high production costs of Colombian industry, for example, acquire a different meaning in accordance with the alternatives — an increment in exports or import substitution under consideration. In the first case it is necessary to compete on the world market at ruling prices ; in the second, the limitations of the capacity to import may justify substitution regardless of the comparative price of the imported article.

whole was therefore still very low in 1953, in comparison with the progress achieved in other Latin American countries.

Secondly, the proportion of imports within the total availability of capital goods was very high in 1953. If this excessive dependence upon imports is considered, together with the limited prospects of the capacity to import and the considerable increment in productive capacity which will be necessary to meet the growth of population and income, it may be concluded that future resources will be totally insufficient to meet these import requirements.⁵³ The ability to achieve a given rate of growth of income may therefore be dependent to a considerable extent upon the possibility of expanding domestic productive capacity for certain types of capital goods.

Finally, it should be remembered that the situation prevailing in 1953 has already been modified by the opening of the Paz del Río iron and steel plant. The first stage of production in the latter will not only result in the substitution of imported intermediate products, but also of end goods — especially construction materials — which represented an appreciable percentage of the total supply of capital goods in 1952. Future expansion of the plant — which is already under consideration — will intensify this process, and encourage the establishment of new transforming industries.

On the basis of the foregoing comments, a very marked rate of growth is assumed for those branches of the mechanical and metallurgical industries producing capital goods, production value in 1960 being estimated at 350-450 million pesos (at 1953 prices) in comparison with 116 million pesos in 1953.⁵⁴

TABLE 243. COLOMBIA : PROJECTIONS OF THE INCREASE IN DOMESTIC PRODUCTION OF CAPITAL GOODS, 1953-60

(Millions of pesos at 1953 prices)

Producer industry	Base 1953	1960
Wood and cork	7	15
Wooden furniture	11	20
Leather	1	3
Rubber	31	100
Chemicals	11	35
Cement, ceramics, glass, etc.	140	240
Mechanical and metallurgical industries : (a) ..	116	350
(b) ..		450
Other industries	—	2
TOTAL : (a) ..	317	765
(b) ..		865

SOURCE : ECLA estimates.

Total domestic production of capital goods projected is shown in table 243.

⁵³ The extent of this insufficiency may be seen from estimates presented later in the two hypotheses projected on the future growth of total consumption.

⁵⁴ In estimating the extent of the projected growth, the value of capital goods produced by the iron and steel industry itself must be considered, since it has already considerably raised the 1953 figure.

The estimates for the majority of the other branches producing capital goods are chiefly based on possible increases in construction activities, and on the prospects of replacing goods that were imported up to 1953 by domestic products. The plans of the *Instituto de Crédito Territorial* are also taken into account ; these would raise the level of building activities in 1960 to more than 50 per cent above that of 1953.

A considerable increase is postulated for the wood industry, including domestic production of minor items that had to be imported in 1953. Chemical products included also consist of construction materials, mainly paints. The projected increase in the chemical industries is due not only to the expansion in over-all requirements, but also to import substitution in the large number of items which were still being purchased abroad in 1953. As the cement, ceramics and glass industries are closely linked to construction, the relevant projections have taken into account both the plans mentioned, complete import substitution and the prospects for public investments in highways. Imports in 1953 amounted to approximately 6 per cent of the total for this type of manufactured goods, and consisted mainly of sheet glass and bathroom fittings.

Leather goods projected are chiefly transmission belting and other machine accessories. Although this type of product was still imported to a certain extent in 1953, complete substitution is assumed to have been effected by 1960. Rubber products include tyres for public vehicles and agricultural or highway construction machinery, together with certain accessories for industrial machinery. A considerable increment in total requirements for these items is assumed, as well as a sufficient degree of development in domestic industry to enable the products that were imported prior to 1953 — and that constituted more than 15 per cent of the total availability — to be manufactured within the country.

To sum up, the projections postulate that total domestic production of capital goods will increase from 317 million pesos in 1953 to 765 and 865 million in 1960 ; furthermore, they assume complete substitution of all capital goods imports, except those produced by the mechanical and metallurgical industries. In the subsequent summary of total capital goods requirements in the various sectors, the amount of machinery and equipment to be imported in 1960 is assumed for hypothesis *A* and *B*, and compared with the available capacity to import this type of goods.

(d) *Projections of final demand for domestically-manufactured goods*

On the basis of the projections already described of manufactured consumer goods that could be produced within the country, of exports, and of the growth of domestic capital goods industries, the composition of final demand — excluding raw materials and intermediate products — for domestically manufactured goods in 1960 may be envisaged.⁵⁵ The respective assumptions hypotheses *A* and *B* are given in tables 244 and 245.

⁵⁵ Final demand is defined as all those products which have been sufficiently processed to allow of their direct utilization (whether as capital goods for consumption or for export). On the other hand all inputs acquired by enterprises for subsequent transformation constitute intermediate demand.

TABLE 244. COLOMBIA : PROJECTIONS OF FINAL DEMAND FOR DOMESTICALLY MANUFACTURED GOODS, 1960

*(Millions of pesos at 1953 prices)**Hypothesis A*

<i>Producer industry</i>	<i>Total</i>	<i>Non-durable consumer goods</i>	<i>Durable consumer goods</i>	<i>Capital goods</i>	<i>Exports</i>	
Foodstuffs	2,085	1,206	—	—	879	
Beverages	781	781	—	—	—	
Tobacco	139	139	—	—	—	
Textiles	515	510	—	—	5	
Footwear and clothing	572	572	—	—	—	
Wood and cork	15	—	—	15	—	
Wooden furniture	82	—	62	20	—	
Pulp and paper	23	23	—	—	—	
Printing, engraving, etc.	126	116	10	—	—	
Leather	43	—	35	3	5	
Rubber	171	35	32	100	4	
Chemicals	298	260	—	35	3	
Cement, ceramics, glass, etc.	290	—	46	240	4	
Mechanical and metallurgical industries : (a) .	517	14	150	350	3	
(b) .	617					
Other industries	74	46	26	2	—	
	TOTAL : (a)	5,731	3,702	361	765	903
	(b)	5,831	3,702	361	865	903

SOURCE : ECLA estimates.

TABLE 245. COLOMBIA : PROJECTIONS OF FINAL DEMAND FOR DOMESTICALLY MANUFACTURED GOODS, 1960

*(Millions of pesos at 1953 prices)**Hypothesis B*

<i>Producer industry</i>	<i>Total</i>	<i>Non-durable consumer goods</i>	<i>Durable consumer goods</i>	<i>Capital goods</i>	<i>Exports</i>	
Foodstuffs	1,810	1,076	—	—	734	
Beverages	641	641	—	—	—	
Tobacco	131	131	—	—	—	
Textiles	452	447	—	—	5	
Footwear and clothing	495	495	—	—	—	
Wood and cork	15	—	—	15	—	
Wooden furniture	71	—	51	20	—	
Pulp and paper	18	18	—	—	—	
Printing, engraving, etc.	102	94	8	—	—	
Leather	37	—	29	3	5	
Rubber	159	30	25	100	4	
Chemicals	276	238	—	35	3	
Cement, ceramics, glass, etc.	284	—	40	240	4	
Mechanical and metallurgical industries : (a) .	515	12	150	350	3	
(b) .	615					
Other industries	66	42	22	2	—	
	TOTAL : (a)	5,072	3,224	325	765	758
	(b)	5,172	3,224	325	865	758

SOURCE : ECLA estimates.

TABLE 246. COLOMBIA : COEFFICIENTS OF INPUT PER UNIT OF GROSS PRODUCTION IN INDUSTRY, 1953

(Millionths per peso of total gross production)

Producer industry	Consumer industry →																
	Non-manufacturing sectors (1)	Foodstuffs (2)	Beverages (3)	Tobacco (4)	Textiles (5)	Footwear and clothing (6)	Wood and cork (7)	Wooden furniture (8)	Pulp and paper (9)	Printing, engraving, etc. (10)	Leather (11)	Rubber (12)	Chemicals (13)	Petroleum and coal derivatives (14)	Cement, ceramics, glass, etc. (15)	Mechanical and metallurgical industries (16)	Other industries (17)
1. Non-manufacturing sectors	40,620	706,450	96,719	318,664	202,562	32,039	188,652	9,759	3,687	—	330,751	115,493	97,072	775,465	122,321	2,357	—
2. Foodstuffs	3,547	63,618	32,361	124	52	—	—	—	165	—	179	—	3,280	—	—	213	—
3. Beverages	575	8	91,774	41	21	—	101	—	329	—	119	—	7,575	—	—	—	—
4. Tobacco	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5. Textiles	2,998	6,352	4,342	879	76,102	349,874	—	19,648	19,754	2,473	15,122	125,020	3,083	—	—	859	—
6. Footwear and clothing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	144	—
7. Wood and cork	300	176	1,267	8,429	56	3,240	335,502	286,731	1,975	1,827	1,826	—	9,768	—	3,287	17,763	—
8. Wooden furniture	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9. Pulp and paper	25	4,846	295	26,508	1,466	1,900	—	1,178	235,498	247,709	1,325	—	24,599	—	29,841	10,292	—
10. Printing, engraving, etc.	—	254	2,745	27,263	2,494	102	—	—	99	323	—	—	6,517	—	—	179	—
11. Leather	—	—	—	—	21	147,110	—	12,247	—	730	109,722	1,263	101	—	—	242	—
12. Rubber	—	—	—	—	—	4,247	—	175	658	—	275	11,190	459	—	—	3,745	—
13. Chemicals	4,261	6,215	15,232	5,554	119,516	2,945	2,776	17,945	23,309	22,651	77,138	24,697	144,236	2,710	33,179	16,882	—
14. Petroleum and coal derivatives	—	—	—	—	—	—	—	—	—	—	191	927	25,386	—	—	357	—
15. Cement, ceramics, glass, etc.	—	99	18,177	—	—	—	—	7,160	—	—	418	—	26,734	—	42,398	1,314	—
16. Mechanical and metallurgical industries	905	1,404	25,211	8,739	73	4,054	15,299	25,717	7,572	7,475	10,778	4,316	9,126	—	56	260,432	—
17. Other industries	—	569	2,148	362	762	7,538	3,141	3,057	3,391	5,846	14,717	24,489	6,284	—	9,090	12,366	315,304

SOURCE : ECLA, on the basis of official statistics.

TABLE 247. COLOMBIA : COEFFICIENTS OF INPUT OF DOMESTIC PRODUCTS PER UNIT OF GROSS PRODUCTION IN INDUSTRY, 1953

(Millionths per peso of total gross production)

Producer industry	Consumer industry →																
	Non-manufacturing sectors (1)	Foodstuffs (2)	Beverages (3)	Tobacco (4)	Textiles (5)	Footwear and clothing (6)	Wood and cork (7)	Wooden furniture (8)	Pulp and paper (9)	Printing, engraving, etc. (10)	Leather (11)	Rubber (12)	Chemicals (13)	Petroleum and coal derivatives (14)	Cement, ceramics, glass, etc. (15)	Mechanical and metallurgical industries (16)	Other industries (17)
1. Non-manufacturing sectors	40,270	686,259	77,894	315,086	126,510	32,009	188,652	9,453	3,687	—	330,751	20,317	80,840	775,465	98,102	2,357	—
2. Foodstuffs	3,547	56,401	31,908	124	52	—	—	—	165	—	179	—	2,696	—	—	213	—
3. Beverages	575	8	78,889	41	21	—	101	—	329	—	119	—	7,493	—	—	—	—
4. Tobacco	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5. Textiles	2,998	6,235	4,319	879	34,842	320,260	—	9,518	9,943	1,602	13,069	51,200	957	—	—	859	—
6. Footwear and clothing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	144	—
7. Wood and cork	300	176	1,267	8,429	56	2,964	335,502	286,622	1,975	1,827	1,826	—	9,705	—	2,139	14,942	—
8. Wooden furniture	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9. Pulp and paper	25	4,514	65	6,526	1,466	1,402	—	327	41,483	10,510	1,194	—	13,396	—	27,691	8,863	—
10. Printing, engraving, etc.	—	239	2,745	27,263	2,494	102	—	—	99	—	—	—	6,372	—	—	179	—
11. Leather	—	—	—	—	21	138,750	—	12,160	—	674	107,824	1,263	101	—	—	144	—
12. Rubber	—	—	—	—	—	4,206	—	175	658	—	251	3,197	459	—	—	1,642	—
13. Chemicals	957	2,219	4,372	476	83,939	2,337	—	12,509	11,589	703	29,564	2,286	46,464	—	23,245	7,076	—
14. Petroleum and coal derivatives	—	—	—	—	—	—	—	—	—	—	191	336	2,188	—	—	357	—
15. Cement, ceramics, glass, etc.	—	65	17,121	—	—	—	—	5,916	—	—	394	—	8,657	—	32,931	—	—
16. Mechanical and metallurgical industries	—	461	14,434	124	73	2,652	2,371	14,583	2,831	1,405	6,278	—	7,000	—	—	45,673	—
17. Other industries	—	322	388	362	747	6,122	203	1,201	428	1,265	3,402	9,943	3,328	—	8,668	1,720	214,643

SOURCE : ECLA, on the basis of official statistics.

TABLE 248. COLOMBIA : COEFFICIENTS OF INPUT OF IMPORTS PER UNIT OF GROSS PRODUCTION IN INDUSTRY, 1953
(Millionths per peso of total gross production)

Producer industry	Consumer industry →	Non-manufacturing sectors																
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
		Non-manufacturing sectors (1)	Food-stuffs (2)	Beverages (3)	Tobacco (4)	Textiles (5)	Foot-wear and clothing (6)	Wood and cork (7)	Wooden furniture (8)	Pulp and paper (9)	Printing, engraving, etc. (10)	Leather (11)	Rubber (12)	Chemicals (13)	Petroleum and coal derivatives (14)	Cement, ceramics, glass, etc. (15)	Mechanical and metallurgical industries (16)	Other industries (17)
1. Non-manufacturing sectors		350	20,191	18,825	3,578	76,052	30		306				95,176	16,232		24,219		
2. Foodstuffs			7,217	455										584				
3. Beverages				12,885										82				
4. Tobacco						41,260	29,614		10,130	9,811	871	2,053	73,740	2,126				
5. Textiles			117	23			276		109					63		1,148	2,731	
6. Footwear and clothing							498		851	194,015	237,199	131		11,203		2,150	1,429	
7. Wood and cork			332	230	19,982									145				
8. Wooden furniture			15				8,360		87		56	1,898					98	
9. Pulp and paper							41				323	24	7,993				2,103	
10. Printing, engraving, etc.							608		5,436	11,720	21,948	47,574	22,411	97,772	2,710	9,934	9,756	
11. Leather			3,304	10,860	5,078	35,577		2,776					591	23,198				
12. Rubber												24		18,077				
13. Chemicals									1,244	4,741	6,070	4,500	4,316	2,126		9,467	1,314	
14. Petroleum and coal derivatives			34	1,056			1,402	12,928	11,134							36	214,739	
15. Cement, ceramics, glass, etc.		905	943	10,777	8,615		1,416	2,938	1,856	2,963	4,581	11,315	14,546	2,956		422	10,637	100,661
16. Mechanical and metallurgical industries			247	1,760		15												
17. Other industries																		

SOURCE : ECLA, on the basis of official statistics.

TABLE 249. COLOMBIA : DIRECT AND INDIRECT REQUIREMENTS OF DOMESTIC RAW MATERIALS

<i>Producer industry</i>	<i>Consumer industry</i> →	<i>Non-manufacturing sectors (1)</i>	<i>Foodstuffs (2)</i>	<i>Beverages (3)</i>	<i>Tobacco (4)</i>	<i>Textiles (5)</i>	<i>Footwear and clothing (6)</i>	<i>Wood and cork (7)</i>
1. Non-manufacturing sectors		1.045482	0.761604	0.118664	0.331752	0.145589	0.135972	0.29
2. Foodstuffs		0.003956	1.062661	0.037187	0.001390	0.000903	0.000683	0.00
3. Beverages		0.000665	0.000524	1.085767	0.000263	0.000865	0.000387	0.00
4. Tobacco		0	0	0	1.000000	0	0	0
5. Textiles		0.003276	0.009286	0.005517	0.002070	1.036685	0.334604	0.00
6. Footwear and clothing		0	0	0.000002	0	0	1.000000	0
7. Wood and cork		0.000497	0.000752	0.002719	0.012958	0.001538	0.005364	1.50
8. Wooden furniture		0	0	0	0	0	0	0
9. Pulp and paper		0.000070	0.005160	0.001100	0.007143	0.002945	0.002763	0.00
10. Printing, engraving, etc.		0.000020	0.000309	0.003045	0.027278	0.003170	0.001173	0.00
11. Leather		0	0	0.0000005	0.000020	0.000036	0.155537	0
12. Rubber		0	0.000006	0.000032	0.000004	0.000046	0.004284	0.00
13. Chemicals		0.001351	0.004192	0.006273	0.001133	0.091344	0.036963	0.00
14. Petroleum and coal derivatives		0.000004	0.000010	0.000020	0.000002	0.000200	0.000113	0.00
15. Cement, ceramics, glass, etc.		0.000025	0.000121	0.019280	0.000014	0.000836	0.000386	0.00
16. Mechanical and metallurgical industries		0.000023	0.000573	0.016500	0.000235	0.000784	0.004127	0.00
17. Other industries		0.000007	0.000472	0.000846	0.000520	0.001404	0.009081	0.00

SOURCE: ECLA, on the basis of official statistics.

This information is important mainly as a means of deducing the total amount of end goods to be produced by each industrial branch in 1960, and thereby calculating the volume of raw materials and intermediate products required to achieve such production.

(e) *Projections of the requirements for raw materials and intermediate products*

It has been seen that the basic coefficients of income-elasticity for consumer goods may be used for the projection of end goods; data on external demand for the projection of exports; and targets somewhat arbitrarily chosen, but compatible with total requirements and the prospects of the capacity to import, for projections of capital goods. On the other hand, the demand for raw materials and intermediate products is essentially derived, and depends upon the requirements for end goods.

As a first step towards their projection, the requirements of each type of intermediate goods per unit of production in the sectors under consideration should be determined. In practice, this entails a calculation of the composition of input in each industrial branch, and of the purchases to be made from each of the other sectors before a given volume of production can be attained. Since these ratios are only modified by technological changes, it is feasible to use 1953 ratios for projecting requirements in 1960.⁵⁶

These coefficients — which represent the purchases to be made by each sector from the others per peso of

total production — are given in table 246. Nevertheless, in an economy such as that of Colombia, where a high proportion of raw materials and intermediate products is imported, it is necessary to make a separate computation of the unit input of domestic and imported intermediate products. The latter coefficients are given in tables 247 and 248.

Even these coefficients do not enable the problem to be solved, since it is not possible to make a direct forecast of the total production values of each sector, on the basis of final demand only.⁵⁷ It is, in fact, necessary to supplement the latter by the production requirements of intermediate goods themselves, which, in turn, signify additional demand for raw materials and intermediate products.

The complexity of the problem may be illustrated by a simple example, such as the satisfaction of a given final demand for cement and ceramic manufactures: since the production of a single unit of these products depends upon the purchase of certain intermediate products from the same sector, the volume of total production will not only be governed by final demand, but also by derived demand; in its turn, derived demand requires more intermediate production — although considerably less than the original — to be satisfied, and so the sequence continues. It is not only the effects on the same sector which have to be considered, however; the production of one unit of cement and ceramic manufactured goods needs certain chemical products as raw

⁵⁶ See chapter IV, section II, table 213.

⁵⁷ The demand is summarized in tables 244 and 245, which were commented upon in point (d).

INTERMEDIATE PRODUCTS PER UNIT OF FINAL DEMAND FOR DOMESTICALLY-PRODUCED GOODS, 1953

Wooden urniture (8)	Pulp and paper (9)	Printing, engraving, etc. (10)	Leather (11)	Rubber (12)	Chemicals (13)	Petroleum and coal derivatives (14)	Cement, ceramics, glass, etc. (15)	Mechanical and metallurgical industries (16)	Other industries (17)
103799	0.007539	0.001127	0.394050	0.033022	0.097763	0.810735	0.109113	0.008831	0
000438	0.000273	0.000007	0.001847	0.000141	0.003663	0.003068	0.000502	0.000302	0
000234	0.000492	0.000007	0.000703	0.000075	0.008604	0.000516	0.000290	0.000077	0
	0	0.001694	0.016560	0.053441	0.001611	0.002540	0.000685	0.001214	0
010468	0.010828	0	0	0	0	0	0	0	0
000002	0	0	0.000001	0	0.000001	0	0	0.000151	0
432051	0.003224	0.002826	0.004080	0.000132	0.015692	0.000385	0.003879	0.023745	0
000000	0	0	0	0	0	0	0	0	0
000920	1.043520	0.010655	0.002066	0.000194	0.015112	0.000054	0.030249	0.009810	0
000134	0.000221	1.000009	0.000282	0.000181	0.006718	0.000016	0.000269	0.000242	0
013633	0.000002	0.000764	1.120861	0.002836	0.000123	0	0.000002	0.000197	0
000211	0.000701	0.000002	0.000313	1.003208	0.000504	0	0.000032	0.001737	0
014866	0.013674	0.000932	0.036735	0.007234	1.049491	0.001048	0.025756	0.008023	0
000040	0.000031	0.000003	0.000297	0.000353	0.002299	1.000003	0.000057	0.000391	0
006257	0.000132	0.000008	0.000804	0.000066	0.009546	0.000019	1.034286	0.000073	0
016506	0.003211	0.001507	0.007673	0.000075	0.007919	0.000018	0.000294	1.048000	0
001880	0.000659	0.001639	0.004976	0.013123	0.004610	0.000005	0.011547	0.002381	1.273306

materials, the production of which again requires certain intermediate products from the cement and ceramics industries; in this way, a new chain reaction similar to the previous one is set off. Total production in each sector is therefore governed by the extent of final demand for their products.

Once an input-output matrix such as that described in the foregoing pages has been obtained,⁵⁸ it is easy to calculate all these effects by means of coefficients of direct or indirect requirements per unit of final demand.⁵⁹ Such coefficients enable the total production value of each sector in response to a given composition of final demand to be determined. Table 249 shows the relevant coefficients for Colombian industry for 1953.⁶⁰

By means of these coefficients and the projections of final demands, it is possible to postulate the amount and composition of raw materials and intermediate products which would be required in 1960 according to hypotheses *A* and *B*. In order not to complicate the presentation of the results unnecessarily, only two of

⁵⁸ See again chapter IV, section II, table 213.

⁵⁹ Although this table of coefficients is simple to use, its preparation involves excessively burdensome calculations, which normally — for more detailed matrices — require the use of electronic computers. In the present case, an abridged method of calculation was used, which is briefly described in the note on sources and methods in annex VII.

⁶⁰ For the reasons given in note I, annex VII, on sources and methods, these coefficients correspond to direct and indirect requirements of domestic products per unit of final demand for domestically-produced goods. The same note describes how the effects of a policy of replacing imports of intermediate products by their domestic equivalents have been dealt with.

the various alternatives are considered: in one of these the hypothesis of the greatest expansion in consumption is combined with the maximum projection of exports, and with the most rapid rate of growth assumed for domestically-produced capital goods; in the other the minimum values of these three variables are combined.

The division of raw materials and intermediate products according to whether they were domestic or imported in 1953 has been taken as a starting point. In other words, it is assumed that domestic production and imports of this type of goods would increase commensurately so as to cover total requirements, and that no new import substitution would be required in this type of product.

The results of these calculations are shown in tables 250 and 251 where it will be seen that total requirements of raw materials and intermediate products are assumed to be nearly 4,000 million and more than 3,400 million pesos (at 1953 prices) in the maximum and minimum hypotheses respectively, compared to an aggregate figure of only 2,400 million in 1953. The most important aspect of these projections, however, concerns the respective shares of domestic and imported products in total requirements. The value of the requisite imports of raw materials and intermediate products would vary between 570 and 660 million pesos according to which of the two hypotheses is under consideration, as against slightly more than 300 million pesos in 1953.⁶¹

⁶¹ The whole analysis of raw materials and intermediate products is based upon estimated value at factory in country of origin, the respective c.i.f. values therefore being even higher.

TABLE 250. COLOMBIA : PROJECTION OF INTER-INDUSTRIAL TRANSACTIONS, 1960 (WITHOUT FURTHER
 (Thousands of peso

Producer industry	Consumer industry →	Non-	Foodstuffs (2)	Beverages (3)	Tobacco (4)	Textiles (5)	Foot-
		manufacturing sectors (1)					wear and clothing (6)
1. Non-manufacturing sectors	Total	205,650	1,595,862	82,643	44,291	156,284	18,
	Domestic production	203,878	1,550,251	66,558	43,794	97,607	18,
	Imports	1,772	45,611	16,085	497	58,677	
2. Foodstuffs	Total	17,958	143,712	27,651	17	40	—
	Domestic production	17,958	127,409	27,264	17	40	—
	Imports	—	16,303	387	—	—	—
3. Beverages	Total	2,911	18	78,418	6	16	—
	Domestic production	2,911	18	67,408	6	16	—
	Imports	—	—	11,010	—	—	—
4. Tobacco	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
5. Textiles	Total	15,178	14,349	3,710	122	58,715	200,
	Domestic production	15,178	14,085	3,690	122	26,882	183,
	Imports	—	264	20	—	31,833	16,
6. Footwear and clothing	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
7. Wood and cork	Total	1,519	398	1,083	1,172	43	1,
	Domestic production	1,519	398	1,083	1,172	43	1,
	Imports	—	—	—	—	—	—
8. Wooden furniture	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
9. Pulp and paper	Total	127	10,947	253	3,684	1,131	1,
	Domestic production	127	10,197	56	907	1,131	—
	Imports	—	750	197	2,777	—	—
10. Printing, engraving, etc.	Total	—	574	2,346	3,789	1,924	—
	Domestic production	—	540	2,346	3,789	1,924	—
	Imports	—	34	—	—	—	—
11. Leather	Total	—	—	—	—	16	84,
	Domestic production	—	—	—	—	16	79,
	Imports	—	—	—	—	—	4,
12. Rubber	Total	—	—	—	—	—	2,
	Domestic production	—	—	—	—	—	2,
	Imports	—	—	—	—	—	—
13. Chemicals	Total	21,572	14,040	13,016	772	92,211	1,
	Domestic production	4,845	5,013	3,736	66	64,762	1,
	Imports	16,727	9,027	9,280	706	27,449	—
14. Petroleum derivatives and coal	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
15. Cement, ceramics, glass etc.	Total	—	224	15,531	—	—	—
	Domestic production	—	147	14,629	—	—	—
	Imports	—	77	902	—	—	—
16. Mechanical and metallurgical industries	Total	4,582	3,171	21,542	1,214	56	2,
	Domestic production	—	1,041	12,333	17	56	1,
	Imports	4,582	2,130	9,209	1,197	—	—
17. Other industries	Total	—	1,285	1,836	50	588	4,
	Domestic production	—	727	332	50	576	3,
	Imports	—	558	1,504	—	12	—
TOTAL	Total	269,497	1,784,580	248,029	55,117	311,024	316,
	Domestic production	246,416	1,709,826	199,435	49,940	193,053	292,
	Imports	23,081	74,754	48,594	5,177	177,971	24,

SOURCE : ECLA estimates.

CONSTITUTION OF DOMESTIC PRODUCTION FOR IMPORTS OF RAW MATERIALS AND INTERMEDIATE GOODS)

3 prices)

is A

	Wooden furniture (8)	Pulp and paper (9)	Printing, engraving, etc. (10)	Leather (11)	Rubber (12)	Chemicals (13)	Petroleum derivatives and coal (14)	Cement, ceramics, glass, etc. (15)	Mechanical and metallurgical industries (16)	Other industries (17)	Total
942	798	223	—	46,121	20,204	40,362	221,790	39,016	1,574	—	2,490,102
942	773	223	—	46,121	3,554	33,613	221,790	31,291	1,574	—	2,336,294
	25	—	—	—	16,650	6,749	—	7,725	—	—	153,808
	—	10	—	25	—	1,364	—	—	142	—	190,919
	—	10	—	25	—	1,121	—	—	142	—	173,986
	—	—	—	—	—	243	—	—	—	—	16,933
9	—	20	—	17	—	3,150	—	—	—	—	84,565
9	—	20	—	17	—	3,116	—	—	—	—	73,521
	—	—	—	—	—	34	—	—	—	—	11,044
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—
	1,606	1,192	340	2,108	21,871	1,282	—	—	574	—	321,349
	778	600	220	1,822	8,971	398	—	—	574	—	256,668
	828	592	120	286	12,900	884	—	—	—	—	64,681
	—	—	—	—	—	—	—	—	96	—	96
	—	—	—	—	—	—	—	—	96	—	96
	—	—	—	—	—	—	—	—	—	—	—
129	23,448	119	251	255	—	4,061	—	1,048	11,803	—	77,184
129	23,439	119	251	255	—	4,035	—	682	9,979	—	74,801
	9	—	—	—	—	26	—	366	1,824	—	2,383
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—
	97	14,214	34,043	184	—	10,228	—	9,518	6,873	—	92,387
	27	2,504	1,444	166	—	5,770	—	8,832	5,919	—	37,683
	70	11,710	32,599	18	—	4,658	—	686	954	—	54,704
	—	6	—	—	—	2,709	—	—	120	—	11,526
	—	6	—	—	—	2,649	—	—	120	—	11,432
	—	—	—	—	—	60	—	—	—	—	94
	1,001	—	101	15,300	221	42	—	—	161	—	101,062
	994	—	93	15,035	221	42	—	—	96	—	95,931
	7	—	8	265	—	—	—	—	65	—	5,131
	14	40	44	38	1,957	191	—	—	2,502	—	7,217
	14	40	—	35	559	191	—	—	1,097	—	4,344
	—	—	44	3	1,398	—	—	—	1,405	—	2,873
249	1,468	1,406	3,113	10,757	4,321	59,972	775	10,583	11,242	—	247,183
	1,023	699	97	4,123	400	19,319	—	7,414	4,726	—	117,561
249	445	707	3,016	6,634	3,921	40,653	775	3,169	6,516	—	129,622
	—	—	—	27	162	10,556	—	—	238	—	10,983
	—	—	—	27	59	910	—	—	238	—	1,234
	—	—	—	—	103	9,646	—	—	—	—	9,749
	586	—	—	58	—	11,116	—	13,524	878	—	41,917
	484	—	—	55	—	3,600	—	10,504	—	—	29,419
	102	—	—	3	—	7,516	—	3,020	878	—	12,498
374	2,104	357	1,027	1,502	755	3,795	—	18	173,933	—	217,851
213	1,193	171	193	875	—	2,911	—	—	30,503	—	51,024
161	911	286	834	627	755	884	—	18	143,430	—	166,827
282	250	205	804	2,252	4,284	2,613	—	2,900	8,259	35,335	65,059
18	98	26	174	474	1,739	1,384	—	2,765	1,155	24,054	37,077
264	152	179	630	1,578	2,545	1,229	—	135	7,104	11,281	27,982
985	31,372	17,892	39,723	78,444	53,775	151,441	222,565	76,607	218,395	35,335	3,959,400
311	28,823	4,418	2,472	69,030	15,503	78,859	221,790	61,488	56,219	24,054	3,301,071
674	2,549	13,474	37,251	9,414	38,272	72,582	775	15,119	162,176	11,281	658,329

TABLE 251. COLOMBIA : PROJECTION OF INTER-INDUSTRIAL TRANSACTIONS, 1960 (WITHOUT FURTHER
(Thousands or per cent of total production)
Hy

Producer industry	Consumer industry →	Non-	Foodstuffs (2)	Beverages (3)	Tobacco (4)	Textiles (5)	Foot- on cloth- (6)
		manufacturing sectors (1)					
1. Non-manufacturing sectors	Total	186,021	1,384,951	67,890	41,745	136,673	15,000
	Domestic production	184,418	1,345,368	54,676	41,276	85,359	15,000
	Imports	1,603	39,583	13,214	469	51,314	—
2. Foodstuffs	Total	16,244	124,719	22,715	16	35	—
	Domestic production	16,244	110,571	22,397	16	35	—
	Imports	—	14,148	318	—	—	—
3. Beverages	Total	2,633	16	64,418	5	14	—
	Domestic production	2,633	16	55,374	5	14	—
	Imports	—	—	9,044	—	—	—
4. Tobacco	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
5. Textiles	Total	13,729	12,452	3,048	115	51,348	173,000
	Domestic production	13,729	12,223	3,032	115	23,509	158,000
	Imports	—	229	16	—	27,839	14,000
6. Footwear and clothing	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
7. Wood and cork	Total	1,374	345	889	1,104	38	1,000
	Domestic production	1,374	345	889	1,104	38	1,000
	Imports	—	—	—	—	—	—
8. Wooden furniture	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
9. Pulp and paper	Total	114	9,500	207	3,473	989	—
	Domestic production	114	8,849	46	855	989	—
	Imports	—	651	161	2,618	—	—
10. Printing, engraving, etc.	Total	—	498	1,927	3,571	1,683	—
	Domestic production	—	469	1,927	3,571	1,683	—
	Imports	—	29	—	—	—	—
11. Leather	Total	—	—	—	—	14	72,000
	Domestic production	—	—	—	—	14	68,000
	Imports	—	—	—	—	—	4,000
12. Rubber	Total	—	—	—	—	—	2,000
	Domestic production	—	—	—	—	—	2,000
	Imports	—	—	—	—	—	—
13. Chemicals	Total	19,514	12,184	10,692	727	80,639	1,000
	Domestic production	4,383	4,350	3,069	62	56,635	1,000
	Imports	15,131	7,834	7,623	665	24,004	—
14. Petroleum derivatives and coal	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
15. Cement, ceramics, glass, etc.	Total	—	194	12,759	—	—	—
	Domestic production	—	127	12,018	—	—	—
	Imports	—	67	741	—	—	—
16. Mechanical and metallurgical industries	Total	4,144	2,753	17,697	1,145	49	2,000
	Domestic production	—	904	10,132	16	49	1,000
	Imports	4,144	1,849	7,565	1,129	—	—
17. Other industries	Total	—	1,115	1,507	47	514	3,000
	Domestic production	—	631	272	47	504	3,000
	Imports	—	484	1,235	—	10	—
TOTAL	Total	243,773	1,548,727	203,749	51,948	271,996	273,000
	Domestic production	222,895	1,483,853	163,832	47,067	168,829	252,000
	Imports	20,878	64,874	39,917	4,881	103,167	20,000

SOURCE : ECLA estimates.

CONSTITUTION OF DOMESTIC PRODUCTION FOR IMPORTS OF RAW MATERIALS AND INTERMEDIATE GOODS)

(1953 prices)

Table B

	Wooden furniture (8)	Pulp and paper (9)	Printing, engraving, etc. (10)	Leather (11)	Rubber (12)	Chemicals (13)	Petroleum derivatives and coal (14)	Cement, ceramics, glass, etc. (15)	Mechanical and metallurgical industries (16)	Other industries (17)	Total
69	693	190	—	39,729	18,799	36,892	183,096	37,934	1,315	—	2,167,059
69	671	190	—	39,729	3,307	30,723	183,096	30,423	1,315	—	2,031,667
	22	—	—	—	15,492	6,169	—	7,511	—	—	135,392
	—	9	—	22	—	1,247	—	—	119	—	165,126
	—	9	—	22	—	1,025	—	—	119	—	150,438
	—	—	—	—	—	222	—	—	—	—	14,688
8	—	17	—	14	—	2,879	—	—	—	—	70,004
8	—	17	—	14	—	2,848	—	—	—	—	60,929
	—	—	—	—	—	31	—	—	—	—	9,075
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—
	1,395	1,020	278	1,817	20,350	1,172	—	—	479	—	280,418
	676	513	180	1,570	8,347	364	—	—	479	—	223,291
	719	507	98	247	12,003	808	—	—	—	—	57,127
	—	—	—	—	—	—	—	—	80	—	80
	—	—	—	—	—	—	—	—	80	—	80
	—	—	—	—	—	—	—	—	—	—	—
6	20,358	102	205	219	—	3,712	—	1,019	9,858	—	67,983
6	20,350	102	205	219	—	3,688	—	663	8,335	—	65,935
	8	—	—	—	—	24	—	356	1,523	—	2,048
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—
	83	12,159	27,808	159	—	9,349	—	9,254	5,741	—	79,777
	23	2,142	1,180	143	—	5,091	—	8,587	4,944	—	33,657
	60	10,017	26,628	16	—	4,258	—	667	797	—	46,120
	—	5	—	—	—	2,477	—	—	100	—	10,311
	—	5	—	—	—	2,422	—	—	100	—	10,227
	—	—	—	—	—	55	—	—	—	—	84
	869	—	82	13,180	206	38	—	—	135	—	87,355
	863	—	76	12,952	206	38	—	—	80	—	82,921
	6	—	6	228	—	—	—	—	55	—	4,434
	12	34	36	33	1,821	174	—	—	2,089	—	6,301
	12	34	—	30	520	174	—	—	916	—	3,768
	—	—	36	3	1,301	—	—	—	1,173	—	2,533
25	1,274	1,203	2,543	9,265	4,021	54,817	640	10,290	9,389	—	218,880
	888	598	79	3,551	372	17,659	—	7,209	3,947	—	103,959
25	386	605	2,464	5,714	3,648	37,158	640	3,081	5,442	—	114,921
	—	—	—	23	151	9,648	—	—	199	—	10,021
	—	—	—	23	55	832	—	—	199	—	1,109
	—	—	—	—	96	8,816	—	—	—	—	8,912
	508	—	—	50	—	10,160	—	13,148	733	—	37,552
	420	—	—	47	—	3,290	—	10,212	—	—	26,114
	88	—	—	3	—	6,870	—	2,936	733	—	11,438
88	1,826	391	839	1,295	703	3,468	—	17	145,277	—	182,849
92	1,035	146	158	754	—	2,660	—	—	25,478	—	42,837
6	791	245	681	541	703	808	—	17	119,799	—	140,012
54	217	175	656	1,768	3,986	2,388	—	8,219	6,898	31,220	57,296
16	85	22	142	409	1,618	1,265	—	2,688	964	21,253	32,947
88	132	153	514	1,359	2,368	1,123	—	131	5,934	9,967	24,349
80	27,235	15,305	32,447	67,754	50,036	138,421	183,736	74,481	182,412	31,220	3,441,012
41	25,023	3,778	2,020	59,463	14,425	72,079	183,096	59,783	46,956	21,253	2,869,879
99	2,212	11,527	30,427	8,111	35,611	66,342	640	14,699	135,456	9,967	571,133

In view of the anticipated levels of the capacity to import it is obvious that it would be very difficult to meet these import requirements. The projections, therefore, serve to emphasize the pressing necessity for a more intensive policy of import substitution in this type of product, and to give an indication of the scale on which this should be carried out.

As the impossibility of maintaining the same proportion between domestic production and imports of raw materials and intermediate products as in 1953 has thus been demonstrated, some examination — however rapid — should be made of substitution possibilities, in order to decide what repercussions these might have, if implemented, on total production requirements in each branch of industry.

The information contained in tables 250 and 251 may be used for this purpose, and a brief analysis undertaken by consumer industries, to obtain some general indication of the feasibility of substitution of the various input factors. In this respect, the almost entirely methodological character of this study should be insisted on once more, as it justifies the adoption of representative figures whose magnitude in each case would have to be deduced from a concrete and detailed analysis.

As regards the non-manufacturing sectors, imported inputs from these same sectors mainly consist of seeds and other products for which domestic substitutes would be hard to find. Those from the chemical industries, on the other hand, are chiefly fertilizers and insecticides, for which the country will probably have a much greater productive capacity than in 1953. It is safe to assume therefore that the proportion of imports within total requirements may be considerably reduced if a fair degree of substitution takes place. In the case of inputs from the mechanical and metallurgical industries, it may also be assumed that domestic production would expand sufficiently to reduce imports to a negligible figure.

In the foodstuffs industries, almost complete replacement for part of the input from the agricultural sector may be assumed (such as cacao and oleaginous raw materials), except in the case of wheat, which it will probably be necessary to continue importing on a fair scale;⁶² and of the small imports of textiles, paper and printing products, and cement, ceramics and glass manufactured goods which are assumed to cease entirely. Imported inputs from the same sector consist to a great extent of wheat flour — imports of which may be substituted by the domestic product in view of the excess capacity in the national mills — and some special types of flour used for farinaceous foods and for biscuits, whose manufacture depends on special wheat which could probably not be produced in the country. Imports of these items are therefore assumed to show no more than a moderate reduction. Partial substitution is also assumed for imports of industrial chemicals, especially for the manufacture of vegetable oils and fats, and

complete substitution for intermediate products from the metal industries.

With regard to inputs of a certain importance for the beverages industries partial substitution of agricultural commodities may be assumed (chiefly barley for beer, for which a marked increase is postulated in domestic production, although it would still be insufficient for complete substitution). On the other hand there is a possibility of complete substitution of imports from the same sector (mainly malt, which could be supplied by the domestic maltsters if the necessary raw materials were available), and from the metal industries (tin plate and crown caps), as well as of the small input from the other sectors. A large part of the imported chemical flavouring matter for gaseous beverages which would obviously be difficult to produce within the country. At the same time there are certain possibilities of domestic production (in citric acid, for example) from which it may be assumed that imports will be proportionately lower than in 1953.

It is assumed that the tobacco industry will continue to import a small quantity of special tobaccos, while imports of the remaining items are assumed to be completely replaced by domestic production, with the exception of inputs from the paper industry. In the latter case a reduction is postulated in their relative importance, always supposing that imports of certain types of paper are maintained at the same level.

The largest volume of imported inputs for the textile industries consists of agricultural commodities and goods supplied by textile industries abroad and chemical industries. As regards the former — which were still considerable in 1953 — it is assumed that the campaign to encourage cotton-growing in the country would eliminate these; on the other hand, in spite of a possible increment in domestic wool production, imports of wool in bulk are assumed to rise, on the grounds that imported yarns could be replaced by the domestic product, which would lead to a reduction of imports of intermediate goods from the industries. Imported inputs from the chemical industries are also assumed to decrease considerably because of the possibility of import substitution of certain special types of artificial fibre yarn — that used for tyre cord for instance — and of many finished products, including electrolytic caustic soda.

In the footwear and clothing industry the only appreciable imported inputs consist of certain very high quality textile products; nevertheless it is estimated that the improvement of domestic production would lead to almost complete substitution. In the wood and wooden furniture industries, imports of intermediate products were at a very low level in 1953 and complete substitution is postulated.

Imported inputs in the paper and paper products industries are also negligible, except those from the same sector, which chiefly consist of pulp for paper manufacture. If the plans for the installation of a pulp plant mature, a considerable reduction of these imports as well may be postulated.

⁶² The substitution possibility of these and other agricultural commodities' cited in the following paragraphs being produced within the country instead of being imported has been discussed in detail in chapter III.

Projected import substitution of inputs in the printing and associated industries is based on a similar supposition, since only certain types of paper will presumably be imported; domestic production is also assumed to participate more in the supply of certain chemical products, such as inks, which are consumed by these industries.

In the leather industry complete substitution is assumed for all imported inputs except chemical products (the figures for 1953 being very small, apart from imports of metal products). The chemical products consist mainly of tanning materials, for which a much larger relative participation of national production is projected, although imports would probably continue to be required in appreciable quantities.

The principal imported inputs in the rubber industry consist of raw rubber, textiles and chemical products, apart from minor imports from other sectors for which complete substitution is projected. As it seems very unlikely that any marked short-term development will take place in domestic rubber production, it may be assumed that imports will have to increase substantially. Textile products mainly consist of cord for tyres, domestic production of which was already planned in 1953, and total import substitution may therefore be postulated; finally, in the case of chemical products, a marked reduction is assumed in the proportion of imported inputs, in view of the possible domestic production of certain basic items, such as lamp black.

The possibilities of substituting domestically-produced goods for imported inputs from the chemical industries themselves are much more difficult to assess from such a brief examination. As a representative example, imports from the non-manufacturing sectors are assumed to decrease by approximately 10 per cent of total requirements; the same assumption is applied to the pulp and paper industry (on the supposition that part of the cellulose for rayon may be produced within the country) and the cement, ceramics and glass industries (with regard to glass containers in particular). The most important item consists of imports of intermediate products from the chemical industries themselves, in which a considerable degree of import substitution is also postulated. Imports being maintained would thereafter constitute about one-third of total requirements, instead of the 60 per cent which would be needed in the absence of any efforts to replace them by domestic products. Finally, complete substitution of other less significant imported inputs is assumed.

Almost all the raw materials and intermediate products utilized in the industries producing petroleum and coal derivatives are already of national origin. This is also true, although to a lesser degree, of the cement, ceramics and glass industries; in their case it is assumed that the only imports to be maintained, although at a relatively lower level than in 1953, would be commodities from the non-manufacturing sectors (part of the requirements for asbestos, for instance), and certain chemical products, imports of which are assumed to drop to approximately 20 per cent of total requirements, in comparison with a little more than 30 per cent in 1953.

In the mechanical and metallurgical industries, complete import substitution is assumed for most of the less important inputs, while imports of intermediate products from the chemical industry are assumed to be maintained although their share would be proportionally less than in 1953. One of the most difficult problems in this respect concerns imported inputs from the same sector; in spite of the very rapid development postulated for these industries, which would enable them to produce a number of intermediate products currently imported that are utilized in the industries themselves — above all primary products, including flat rolled products — there would be a considerable increment in requirements for spare parts and accessories, which would be difficult to produce domestically within a relatively short period. It is assumed that the maximum reduction which could be achieved would be approximately 50 per cent of total imports of this type of input.

From the foregoing comments it will be seen that very intensive efforts to substitute domestic products for imports are assumed as regards raw materials and intermediate products, the practical possibilities of which would naturally have to be carefully examined in each case. Once the impossibility of maintaining a similar proportion of imported inputs to that in 1953 has been proved, an attempt should be made to calculate how far these imports could be reduced, and to examine the compatibility of the new results with the prospects of the capacity to import.

An expansion in industrial production for the purpose of substituting domestic for imported intermediate products would naturally require in its turn a greater supply of intermediate products and raw materials, thereby starting a new chain reaction similar to that described in the case of final demand.⁶³ The cumulative result of all these requirements, according to hypotheses *A* and *B*, is shown in tables 252 and 253.

It is evident that total requirements for intermediate products have currently increased, owing to the greater need for input arising from the actual process of substitution. The fact most worthy of emphasis is the pressing need for an import substitution effort as great as that projected, in order to prevent imports of raw materials and intermediate products rising above their 1953 level.

According to hypothesis *A*, it is assumed that requirements would decrease from approximately 660 million pesos (at 1953 prices) to only some 270 million, if the proportion of imported inputs remains the same and the projected import substitutions are effected. These figures compare with imports of raw materials and

⁶³ When the problem of substitution of imports of intermediate products is considered, it becomes increasingly clear that a table of inter-industrial relations, in which the sectors are more concretely defined than in this first attempt, is a primary necessity. Supposing, for example, that import substitution is projected for intermediate products from the artificial fibre branch of the textile industry. If the whole of the textile industry is considered as a single sector, the calculation of the inputs derived from this substitution process would involve sectors which, in fact, have no connexion with the projected import substitution, such as burlap cotton. This would not occur if this branch of the textile industry were considered as a separate sector, in which case coefficients specifically referring to its own input factors would be available.

TABLE 252. COLOMBIA : PROJECTION OF INTER-INDUSTRIAL TRANSACTIONS, 1960 (WITH ADDITION)

(Thousands of peso

H

Producer industry	Consumer industry →	Non-manufacturing sectors (1)	Foodstuffs (2)	Beverages (3)	Tobacco (4)	Textiles (5)	Footwear and clothing (6)
1. Non-manufacturing sectors	Total	210,700	1,605,400	83,900	44,300	164,800	18,000
	Domestic production	208,900	1,585,400	74,900	43,800	142,800	18,000
	Imports	1,800	20,000	9,000	500	22,000	—
2. Foodstuffs	Total	18,400	144,600	28,100	*	*	—
	Domestic production	18,400	139,100	28,100	*	*	—
	Imports	—	5,500	—	—	—	—
3. Beverages	Total	3,000	*	79,600	*	*	—
	Domestic production	3,000	*	79,600	*	*	—
	Imports	—	—	—	—	—	—
4. Tobacco	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
5. Textiles	Total	15,500	14,400	3,800	100	61,900	200
	Domestic production	15,500	14,400	3,800	100	42,900	190
	Imports	—	—	—	—	19,000	9
6. Footwear and clothing	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
7. Wood and cork	Total	1,600	400	1,100	1,200	*	1,000
	Domestic production	1,600	400	1,100	1,200	*	1,000
	Imports	—	—	—	—	—	—
8. Wooden furniture	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
9. Pulp and paper	Total	100	11,000	300	3,700	1,200	1,000
	Domestic production	100	11,000	300	2,500	1,200	1,000
	Imports	—	—	—	1,200	—	—
10. Printing, engraving, etc.	Total	—	600	2,400	3,800	2,000	—
	Domestic production	—	600	2,400	3,800	2,000	—
	Imports	—	—	—	—	—	—
11. Leather	Total	—	—	—	—	*	84,000
	Domestic production	—	—	—	—	*	84,000
	Imports	—	—	—	—	—	—
12. Rubber	Total	—	—	—	—	—	2,000
	Domestic production	—	—	—	—	—	2,000
	Imports	—	—	—	—	—	—
13. Chemicals	Total	22,100	14,100	13,200	800	97,200	1,000
	Domestic production	16,100	9,600	10,200	800	90,200	1,000
	Imports	6,000	4,500	3,000	—	7,000	—
14. Petroleum derivatives and coal	Total	—	—	—	—	—	—
	Domestic production	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
15. Cement, ceramics, glass, etc.	Total	—	200	15,800	—	—	—
	Domestic production	—	200	15,800	—	—	—
	Imports	—	—	—	—	—	—
16. Mechanical and metallurgical industries	Total	4,700	3,200	21,900	1,200	100	2,000
	Domestic production	4,700	3,200	21,900	1,200	100	2,000
	Imports	—	—	—	—	—	—
17. Other industries	Total	—	1,300	1,900	100	600	4,000
	Domestic production	—	1,300	1,900	100	600	4,000
	Imports	—	—	—	—	—	—
TOTAL	Total	276,100	1,795,200	252,000	55,200	327,800	316,000
	Domestic production	268,300	1,765,200	240,000	53,500	279,800	307,000
	Imports	7,800	30,000	12,000	1,700	48,000	9,000

SOURCE : ECLA estimates. * Under 100,000 pesos.

TABLE 253. COLOMBIA : PROJECTION OF INTER-INDUSTRIAL TRANSACTIONS, 1960 (WITH ADDITION

(Thousands of pesos)

Producer industry	Consumer industry →	Non-manufacturing sectors					Footwear and clothing (6)
		(1)	(2)	(3)	(4)	(5)	
1. Non-manufacturing sectors	Total	191,000	1,393,100	68,900	41,700	145,000	15,000
	Domestic	184,400	1,383,100	65,900	41,200	127,000	15,000
	Imports	1,600	10,000	3,000	500	18,000	—
2. Foodstuffs	Total	16,700	125,500	23,100	*	*	—
	Domestic	16,700	120,500	23,100	*	*	—
	Imports	—	5,000	—	—	—	—
3. Beverages	Total	2,700	*	65,400	*	*	—
	Domestic	2,700	*	65,400	*	*	—
	Imports	—	—	—	—	—	—
4. Tobacco	Total	—	—	—	—	—	—
	Domestic	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
5. Textiles	Total	14,100	12,500	3,100	100	54,500	173,000
	Domestic	14,100	12,500	3,100	100	39,500	166,000
	Imports	—	—	—	—	15,000	6,000
6. Footwear and clothing	Total	—	—	—	—	—	—
	Domestic	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
7. Wood and cork	Total	1,400	300	900	1,100	*	1,000
	Domestic	1,400	300	900	1,100	*	1,000
	Imports	—	—	—	—	—	—
8. Wooden furniture	Total	—	—	—	—	—	—
	Domestic	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
9. Pulp and paper	Total	100	9,600	200	3,500	1,000	—
	Domestic	100	9,600	200	2,500	1,000	—
	Imports	—	—	—	1,000	—	—
10. Printing, engraving, etc.	Total	—	500	2,000	3,600	1,800	—
	Domestic	—	500	2,000	3,600	1,800	—
	Imports	—	—	—	—	—	—
11. Leather	Total	—	—	—	—	*	72,000
	Domestic	—	—	—	—	—	72,000
	Imports	—	—	—	—	—	—
12. Rubber	Total	—	—	—	—	—	2,000
	Domestic	—	—	—	—	—	2,000
	Imports	—	—	—	—	—	—
13. Chemicals	Total	20,000	12,300	10,900	700	85,500	1,000
	Domestic	12,000	8,300	7,900	700	81,500	1,000
	Imports	8,000	4,000	3,000	—	4,000	—
14. Petroleum derivatives and coal	Total	—	—	—	—	—	—
	Domestic	—	—	—	—	—	—
	Imports	—	—	—	—	—	—
15. Cement, ceramics, glass. etc.	Total	—	200	13,000	—	—	—
	Domestic	—	200	13,000	—	—	—
	Imports	—	—	—	—	—	—
16. Mechanical metallurgical industries	Total	4,300	2,800	18,000	1,100	100	2,000
	Domestic	4,300	2,800	18,000	1,100	100	2,000
	Imports	—	—	—	—	—	—
17. Other industries	Total	—	1,100	1,500	*	500	3,000
	Domestic	—	1,100	1,500	*	500	3,000
	Imports	—	—	—	—	—	—
TOTAL	Total	250,300	1,557,900	207,000	51,800	288,400	273,000
	Domestic	240,700	1,538,900	201,000	50,300	251,400	267,000
	Imports	9,600	19,000	6,000	1,500	37,000	6,000

SOURCE : ECLA estimates. * Under 100,000 pesos.

intermediate products to the value of nearly 300 million pesos in 1953. On hypothesis *B* import requirements are assumed to drop from 570 to a little more than 220 million pesos as a consequence of the import substitution projected.

Tables 252 and 253 show the distribution of total requirements for intermediate products — both domestic and imported — by branches of consumer and producer industries.

(f) *Projections of total production and of the composition of industrial production*

On the basis of the information in the foregoing paragraph it is possible to estimate the levels that should be reached by total production in each branch of the manufacturing sector, according to hypotheses *A* and *B*, and to the subsequent assumptions on exports and capital goods production. The respective summaries are presented in table 254.

TABLE 254. COLOMBIA : PROJECTIONS OF GROSS VALUE OF INDUSTRIAL PRODUCTION, 1960
(Millions of pesos at 1953 prices)

Producer industry	1960		
	Base 1953	Hypothesis A	Hypothesis B
Foodstuffs	1,732	2,273	1,972
Beverages	479	868	713
Tobacco	97	139	131
Textiles	480	814	716
Footwear and clothing	362	572	495
Wood and cork	49	101	88
Wooden furniture	46	82	71
Pulp and paper	30	120	107
Printing, engraving, etc.	71	138	113
Leather	84	145	125
Rubber	63	178	166
Chemicals	207	517	471
Petroleum and coal derivatives	81	299	248
Cement, ceramics, glass, etc.	178	333	323
Mechanical and metallurgical industries	174	795	650
Other industries	30	141	125
TOTAL	4,161	7,515	6,514

SOURCE : ECLA estimates.

The gross value of industrial production in 1960 is assumed to be 7,515 and 6,514 million pesos (at 1953 prices), on the two hypotheses ; these figures represent increments of 80 and 56 per cent respectively over the 1953 figures.

In order that a more adequate quantification of the extent of industrial growth envisaged by these projections may be carried out, the same information in terms of value added is repeated in table 255.⁶⁴ For the manu-

⁶⁴ In previous sections explanations have been given for the use of value added instead of gross value of production as the basis for estimating variations in the quantum of industrial production. The estimated ratios between value added and gross value by branches of industry in this table are similar to those prevailing in 1953.

facturing sector as a whole the amount of value added in 1953 is assumed to increase by 99 and 73 per cent on the respective hypotheses, which would imply cumulative annual rates of growth of approximately 10 and 8 per cent. The projections according to hypothesis *A* would signify a higher rate of industrial development for the period 1953 to 1960 than during the years 1945 to 1953 ; on the other hand, the net effect of the factors projected according to hypothesis *B* would be a slight lessening of this rate of development.

TABLE 255. COLOMBIA : PROJECTED COMPOSITION OF INDUSTRIAL PRODUCTION BY BRANCHES OF INDUSTRY, 1960

(Estimates of value added, in millions of pesos at 1953 prices)

Producer industry	Base 1953	1960	
		Hypothesis A	Hypothesis B
Foodstuffs	287	377	327
Beverages	304	551	452
Tobacco	56	80	76
Textiles	234	395	349
Footwear and clothing	146	231	199
Wood and cork	21	42	37
Wooden furniture	27	48	41
Pulp and paper	16	64	58
Printing, engraving, etc.	42	82	67
Leather	32	55	47
Rubber	35	99	92
Chemicals	108	268	246
Petroleum and coal derivatives	17	62	52
Cement, ceramics, glass, etc.	114	214	207
Mechanical and metallurgical industries	95	436	356
Other industries	18	84	74
TOTAL	1,551	3,088	2,680

SOURCE : ECLA estimates.

Comments made in previous sections are borne out in that the maintenance of the rate of growth attained by the economy in recent years is dependent upon an even greater expansion in industrial production than that achieved during the same period. Although total consumption is assumed to increase at a very much slower rate, the industrial sector would nevertheless have to expand considerably in order, at the least, to maintain the same rate of increase as between 1925 and 1953.

Apart from their estimates of over-all development, the projections also assume widely differing rates of growth for the various industrial branches, some of the more intensive relating to the mechanical and metallurgical and to the chemical industries, as well as to another smaller industry — that of pulp and paper — in which large-scale import substitution is assumed to take place. The increase is much slower in the foodstuffs industries and other branches producing non-durable consumer goods are assumed to develop much more slowly.

As a result of the discrepancies between the various rates of growth, the composition of industrial production is assumed to be very different from that of 1953 ; the

relative share of the industries chiefly connected with the production of capital goods and intermediate products would increase and thus bring them more into proportion with equivalent industries in more highly-industrialized Latin American countries.

(g) *Projections of capital requirements*

Some comments have been made in previous sections on the ratios between the stock of capital in industry and gross value and value added respectively in manufacturing. The analysis of these ratios showed that in general the product-capital ratio was unsatisfactory in Colombian industry, and pointed out some of the factors to which this might be partially attributable. Other factors were also indicated which might affect the future behaviour of this ratio, specific reference being made to the appreciable margins of idle capacity existing in 1953 in various branches of the manufacturing sector, from which it might be inferred the ratio would become more favourable during the next few years. At the same time, the probable influence of other factors was examined, expressed, for example, in the tendency to concentrate industrial production in large units, whose growth would mainly stem from the shift away from artisan production; this increased concentration would thus require more capital per unit of production. Mention was also made of the fact that, within the future prospects of industrial development, those industries producing capital goods and certain basic intermediate products, whose capital investment requirements are normally greater, would probably expand more rapidly. It is difficult to predict the evolution of the product-capital ratio for the manufacturing sector as a whole; to do so would require a separate analysis of each branch of industry.

This will be attempted primarily to enable an overall assumption to be made of capital requirements in 1960 according to the working hypotheses adopted. On the basis of the estimates, a complete picture of the requisite availability of domestically-manufactured products in 1960 for the attainment of the projected expansions may already be built up.

Table 256 shows the ratio between gross production value and fixed capital employed in 1953, and projects a similar ratio for 1960.⁶⁵

In the case of the foodstuffs industries, the 1953 ratio was affected by the considerable margins of idle capacity existing in various parts of this branch of the manufacturing sector, especially in milled and thrashed products. In view of this, a slight increase of the coefficient — from 2.50 to 2.85 — is projected for 1960. This projection has taken into account both the possibility of a fuller utilization of installed capacity and the need for additional investment, which would result in a much more unfavourable ratio for certain less-developed branches such as the canning industries.

⁶⁵ It should be noted that these ratios do not coincide with those normally used for the product-capital ratio, in which the respective value added is considered, and therefore reach very different orders of magnitude. It has been preferred to use here ratios in respect of the gross value, since these are the figures which have been directly obtained from previous projections.

TABLE 256. COLOMBIA: PROJECTIONS OF THE RATIO BETWEEN THE GROSS VALUE OF PRODUCTION AND FIXED CAPITAL EMPLOYED, 1953-1960

Producer Industry	1953	1960
Foodstuffs	2.50	2.85
Beverages	1.01	1.00
Tobacco	1.21	1.20
Textiles	0.58	0.65
Footwear and clothing	1.29	1.25
Wood and cork	1.23	1.20
Wooden furniture	0.83	0.83
Pulp and paper	0.55	0.70
Printing, engraving, etc.	0.55	0.55
Leather	0.84	0.80
Rubber	1.04	0.90
Chemicals	1.09	0.85
Petroleum and coal derivatives ...	6.24	1.25
Cement, ceramics, glass, etc.	0.66	0.60
Mechanical and metallurgical industries	0.87	0.80
Other industries	1.86	1.70
TOTAL	1.19	{ Hypothesis A : 1.07 Hypothesis B : 1.08

SOURCE: ECLA estimates.

In spite of the fact that in 1953 the beverages industry was not making full use of its installed capacity, comparative stability is assumed for the ratio, taking into account the possibility that an increase in the percentage of production would correspond to large industries with greater capital-intensity, and that the relative importance of small enterprises, which were numerous in 1953, would be reduced. The projection for the tobacco industry is somewhat similar, since the coefficient estimated for 1960 would only differ very slightly from that for 1953.

As regards textiles, the cotton industry had 100-per cent utilization of capacity in 1953, the only sector with any appreciable amount of idle capacity being the woollen industry. Although this appears to uphold the assumption of a reduction in the average ratio for 1953, it should be remembered that textiles constituted one of the industrial branches most heavily affected by investments in assets unconnected with direct production requirements — chiefly power stations. This situation may improve considerably in future if larger public investments are effected in this type of service. In view of these circumstances, a slightly more favourable ratio is assumed for 1960.

The coefficient for the footwear and clothing industry was already fairly low, in spite of the fact that this is one of the branches with the greatest possibility of effecting a changeover from artisan production to industry proper; for this reason, a minimal reduction only is projected for 1960.

Little change is estimated in the ratio for the wood and wooden furniture industries.

Two major factors are taken into account in the case of the paper industry. First, the utilization of installed

capacity was very low in 1953. On paper production itself, for instance, less than 50 per cent was utilized, which would no doubt react to a very favourable extent upon the future ratio. On the other hand, the development of a large-scale domestic pulp and paper industry would necessitate considerable investment, probably resulting in a less favourable ratio. In spite of the difficulty of defining the possible effect of these two opposing elements, a moderate increase — from 0.55 to 0.70 — is estimated over the prevailing ratio in 1953. It is assumed that the coefficients for the printing and engraving industries, as well as for the leather industry, will be very similar to that of the base year.

In the rubber industry, the more intensive development assumed for production of inner tubes and tyres in comparison with that of other rubber goods may raise investment per unit of production; hence the ratio is assumed to decrease from 1.04 to 0.90. The situation in the chemical industries is somewhat analogous; although the future development of other, more capital-intensive, branches will certainly be more accelerated there were fairly large margins of idle capacity in some branches in 1953, whereas industries that are not so heavily capitalized, such as those producing soap, candles and other consumer goods, will lose much of their relative importance.

In so far as the industries producing petroleum and coal derivatives are concerned, the estimates for 1953 are of such doubtful validity that no great importance is attached to them. For the 1960 ratio, it has been found preferable to use an independent estimate, based on other sources and taking into account the substantial expansion of refinery capacity implied by current plans.

The capital requirements of the cement, ceramics, glass and similar industries are largely determined by the first-named, which show an intensive utilization of installed capacity in 1953. At the same time, these industries had already achieved a high degree of concentration of production, so that the ratio between gross production value and fixed capital is assumed to decline slightly from 0.66 to 0.60.

It is much more difficult to project the future variations in the ratio of gross production to fixed capital in the mechanical and metallurgical industries. On the one hand, the capacity of the transformation industries existing in 1953 considerably exceeded its utilization which would favour the projection of an appreciably higher ratio, but, on the other hand, the substantial expansion of the industries producing durable consumer goods and capital goods should be borne in mind, as the capital-intensity per unit of production will undoubtedly be much higher. The iron and steel industry itself would require a much higher volume of investment, relatively speaking, than that normally effected in industries existing previously. For this reason, a reduction is projected in the ratio — from 0.87 in 1953 to 0.80 in 1960.

Subsequent calculations will thus facilitate the determination of the average ratio between gross value of production and fixed capital for the industrial sector as a whole; this would be 1.07 on hypothesis *A* and 1.08

on hypothesis *B* in comparison with an average ratio of 1.19 in 1953. The deterioration in this ratio is slightly more marked on hypothesis *A* as the result of the greater development projected on the same hypothesis for the industries producing capital goods and certain intermediate goods, which usually have less favourable ratios than consumer goods industries.

Table 257 comprises projections of fixed capital (depreciated and at replacement cost) required in 1960 in order to achieve the objectives postulated on the two hypotheses. According to hypothesis *A*, the productive capacity of Colombian industry between 1953 and 1960 would have to be practically doubled, since the total stock of capital would increase from a little less than 3,500 million pesos to some 7,000 million pesos (at 1953 prices). Hypothesis *B* assumes an increase in productive capacity of more than 70 per cent over the 1953 level. The purely illustrative nature of these estimates should be emphasized, since a reasonably precise assessment on the requisite scale of investment would need a much more detailed analysis, and an examination of a number of specific projects.

TABLE 257. COLOMBIA: PROJECTIONS OF REQUIRED INCREASES IN INDUSTRIAL PRODUCTIVE CAPACITY, 1953-1960

(Fixed capital, depreciated and at replacement cost, in millions of pesos at 1953 prices)

Producer industry	Base 1953	1960	
		Hypothesis <i>A</i>	Hypothesis <i>B</i>
Foodstuffs	695	795	690
Beverages	473	870	715
Tobacco	80	115	110
Textiles	830	1,325	1,100
Footwear and clothing	280	460	395
Wood and cork	40	80	75
Wooden furniture	55	100	85
Paper and pulp	55	170	150
Printing, engraving, etc.	130	250	205
Leather	100	180	155
Rubber	60	200	185
Chemicals	190	605	555
Petroleum and coal derivatives	13	240	200
Cement, ceramics, glass, etc.	270	550	540
Mechanical and metallurgical industries	200	995	810
Other industries	16	85	75
TOTAL	3,487	7,020	6,045

SOURCE: ECLA estimates.

In any case, the usefulness of the estimates lies in the fact that they indicate the magnitude of the capital-formation efforts called for to achieve the objectives postulated on the two hypotheses, and, at the same time, permit a general examination to be made of the possible capital goods availabilities, both domestic and imported.

The latter aspect has already been studied in detail in one of the final sections of Part One, chapter II. The conclusion to be drawn from these figures is that a considerable effort would be necessary to replace imports of end goods and intermediate products by domestic production and thus free the limited resources of the capacity to import for the external purchase of machinery and equipment that are required by the Colombian economy in order to attain the rates of growth postulated by hypotheses *A* and *B*.

(h) *Projections of availability of manufactured goods*

By means of previous projections it is possible to estimate the total availability of manufactured goods in 1960, distinguishing between consumption requirements, and the capital goods and intermediate products needed for the actual process of production. The relevant projections, according to hypotheses *A* and *B*, are given in the *Statistical Appendix*, tables 133 and 134.

The most outstanding findings resulting from the projections on hypothesis *A* are as follows: (i) a marked increase of more than 60 per cent in the availability of manufactured goods between 1953 and 1960; and (ii) appreciable changes in the composition of total availabilities. The participation of durable consumer goods is assumed to increase from 6.8 to almost 8 per cent during the same period, that of capital goods from less than 18 to approximately 24 per cent and that of intermediate products from approximately 19 to more than 20 per cent. The joint effect of these increments would be to reduce the participation of non-durable consumer goods.

Hypothesis *B* also assumes that such increases would take place, although on a lesser scale. An increment of approximately 40 per cent over its 1953 level is assumed for total availabilities.

In the *Statistical Appendix*, tables 135 and 136 include separate projections of supplies of domestic and imported manufactured goods according to hypothesis *A*; corresponding projections on hypothesis *B* are presented in the same way in tables 137 and 138.

Some of the most important modifications brought about by the different conditions projected are demonstrated here. In the case of hypothesis *A*, the relative participation of imports within available manufactured goods is assumed to decline from approximately 32 per cent to a little more than 19 per cent between 1953 and 1960. At the same time, the proportion of imported goods within the supply of non-durable consumer goods is assumed to be insignificant, that of durable consumer goods to be reduced from more than 60 to approximately 43 per cent, that of intermediate products from 40 to only 12 per cent and that of capital goods from 67 to 58 per cent.

According to hypothesis *B*, the reduction in the relative share of imports within the total availability of manufactured goods would be at least as marked as in the case of hypothesis *A*, owing to the relative inflexibility of certain projections of the growth of domestic production, and the smaller volume of total requirements.

Apart from providing a source of reference, the six tables mentioned also enable a more specific comparison to be made of given branches of the manufacturing sector, although the degree of approximation would necessarily be less accurate.

Finally, by means of the foregoing projections, it is possible to make general estimates of import requirements in 1960 according to hypotheses *A* and *B*. From these estimates, which have already been presented in Part One, chapter II (see tables 45 and 48), some indication may be obtained of the possible changes in import composition. It will be remembered that, in chapter II, it was estimated that slightly more than two-thirds of total imports in 1960 would consist of capital goods, which would constitute a notable increase over their share in 1953. According to the hypotheses in question, the above-mentioned increment would not necessarily be accompanied by a contraction in the total availabilities of consumer goods and intermediate products. In fact, a high coefficient of income-elasticity has been used for durable consumer goods as well, a marked expansion being assumed in the consumption of this type of product.

3. *Some hypothetical projections of industrial development for 1965*

Similar methods to those used in formulating alternative hypotheses for industrial development from 1953 to 1960 were applied to ascertaining prospects for the succeeding five-year period. The starting point consisted of two basic hypotheses on the future growth of *per capita* consumption, at annual cumulative rates of 4 and 3 per cent respectively.⁶⁷

Since the present study is essentially methodological, it seems hardly necessary to make detailed break-downs of the calculations corresponding to the different stages of the projections, as in the case of those for 1960. Moreover, the practical significance of many assumptions — especially those relating to specific branches of particular sectors — is naturally diminished when applied over long-drawn-out periods.

Nevertheless, the magnitude of certain problems — such as those arising from a possible disparity in the rates of growth of the gross product and the capacity to import — can only be properly assessed against a sufficiently comprehensive historical background. For this reason, at least a few of the more important conclusions to be drawn from projections up to 1965 will be briefly reviewed in the following paragraphs, in a similar sequence to that of the projections for 1953-60.

(a) On the basis of hypotheses *A* and *B* on the growth of *per capita* consumption and of the income-elasticity of demand for manufactured consumer goods, as well as on the predictable population increase, requirements of this type of product in 1965 are assumed to attain the amounts of 6,200 and 5,000 million pesos respectively (at 1953 prices), compared with less than 2,800 million pesos in 1953.

⁶⁷ See the opening chapters of the present study for a detailed justification of these assumptions.

Owing to the variations in the behaviour of demand in response to the rise in *per capita* income, the proportion of durable consumer goods in total consumption of manufactured goods in 1965 is estimated to expand from a little over 12 per cent in 1953 to more than 16 and approximately 15 per cent respectively in the cases of hypotheses *A* and *B*.

The differing contributions of domestic production and imports to the supply of durable consumer goods are also worth studying. If the similar import substitution criteria to those adopted for the 1960 projections are employed, imports of manufactured non-durable consumer goods may be assumed to be insignificant — less than a quarter of the already very low 1953 figures. The high income-elasticity coefficient of durable consumer goods may, however — in spite of the assumption of a still more rapid expansion of domestic production — enable imports to surpass their 1953 level by a wide margin, i.e., over 80 per cent according to hypothesis *A* or a total of more than 360 million pesos at 1953 prices.

(b) Export requirements should be added to the intensified industrial production necessary to satisfy domestic demand for consumer goods. As regards exports of manufactured goods proper,⁶⁸ it is assumed, for purposes of illustration only, that a figure of some 60 million pesos would be attained in 1965 in comparison with the sum of slightly more than 24 million postulated for 1960 and the actual export figure of only 9 million in 1953.

(c) Another important class of manufactured products consists of capital goods. It will be remembered that, in earlier projections, it was assumed that a very accelerated development would take place in capital goods industries from 1953 to 1960, and that their contribution would thereby increase from 330 million pesos in 1953 to 865 and 765 million in 1960 according to hypotheses *A* and *B* respectively. The possibility of achieving such a pronounced expansion is largely dependent on the supplementary contribution made by the initial production and development of the domestic iron and steel industry. It cannot therefore be assumed with impunity that any such rapid rate of growth would be maintained between 1960 and 1965, merely on the basis of an expansion in the iron and steel transforming industries and other branches producing capital goods, mainly building materials such as cement, etc. Nevertheless, it is assumed, again for illustrative purposes, that there would be a fairly intensive development in capital goods industries, which would raise the value of domestic production to 1,330 and 1,180 million pesos by 1965 on hypotheses *A* and *B* respectively, i.e., an increment of over 50 per cent between 1960 and 1965.

(d) After the projections of final demand for manufactured goods — consumer goods, manufactures for export and capital goods — have thus been determined, it is possible, by means of coefficients similar to those used in the projections for 1960, to estimate the amount

of raw materials and intermediate products required for the productive process itself. The first conclusion that may be drawn from these calculations is that if the same proportion of raw materials and intermediate products were to be maintained as in 1953, import requirements of these items would amount to approximately 1,000 million pesos on hypothesis *A*, as against less than 350 million in 1953.

As regards the projections for 1960, similar calculations gave rise to the conclusions that, in view of the prospective limitations of the capacity to import, maintenance of the same proportion of imported raw materials would have results incompatible with the respective rate of development. It was therefore assumed that imports of many of the commodities in question could be replaced to a large extent by domestic production.

Despite the intensive import substitution projected, it is assumed that the process of replacing imports by domestic production would continue up to 1965 on a scale sufficient not only to prevent an increment in such imports but also to bring about a slight reduction. On the basis of this assumption, it was estimated that imports of raw materials and intermediate products in 1965 would amount to about 260 and 210 million pesos in hypotheses *A* and *B* respectively, in comparison with the previous estimates of 280 and 250 million for 1953. In the case of hypothesis *A*, manufactured intermediate goods would total some 170 million pesos and raw materials from other sectors — chiefly agricultural commodities — a little over 90 million pesos.

(e) The significance of the earlier projections of the value and composition of industrial production in 1965 also warrants some examination. According to these projections, the gross value of manufacturing production in that year should amount to about 10,700 and 9,000 million pesos (at 1953 prices) on hypotheses *A* and *B* respectively, in comparison with the totals of slightly more than 7,500 and 6,500 million projected for 1960 and the actual figure of some 4,160 million attained in 1953.

In terms of value added, the respective figures would be about 4,850 and 3,820 million pesos in 1965, as against 3,100 and 2,680 million in 1960 and a little less than 1,550 million in 1953. In other words, under the conditions postulated by hypothesis *A*, over-all industrial production is estimated to develop at an accumulated annual rate of almost 10 per cent between 1953 and 1960, thereafter declining to a little over 8 per cent between the latter year and 1965; in the case of hypothesis *B*, the equivalent rates would be about 8 and 7.4 per cent.

In addition, the case of the mechanical and metallurgical industries may be cited as representative of the changes which such development would bring about in the composition of industrial production. These industries would increase their relative importance within the manufacturing sector (in terms of value added) from 6.1 in 1953 to more than 13 per cent in 1960 and to about 17 per cent in 1965.

⁶⁸ Excluding coffee, which, as stated before, is also considered to belong to the manufacturing sector.

Chapter IV

ENERGY PROBLEMS

INTRODUCTION

The purpose of this chapter is to examine the most significant aspects of the energy sector, since it is one which, while making only a fairly modest contribution to the gross national product, may indirectly constitute a decisive obstacle to the attainment of a satisfactory rate of economic development. No attempt is made, however, to present a thorough and comprehensive analysis of the topic; the aim pursued has rather been to point out basic aspects of past trends and of the present situation. Some indication will also be given of the future prospects that are consistent with the hypothetical projections formulated in other chapters as to the possible rate of growth of the Colombian economy as a whole and of its principal sectors. The subject is dealt with more fully in other studies, which may be consulted for further details on several of the points which will be discussed here only in broad outline.¹

Attention must once more be drawn to the essentially methodological nature of the present study and the consequent need to refrain from interpreting the figures given — especially those relating to future requirements — as the outcome of exhaustive research or as fairly accurate forecasts. Rather is an endeavour made to suggest an angle of approach to the problem which is compatible with available data on other sectors of the economy, and thus to acquire such increasing experience in the field of methodology as may in the future enable problems of this kind to be more satisfactorily tackled. It is therefore of interest to mention certain general aspects which seem to deserve consideration, although the present position with respect to basic statistical data precludes for the time being their complete application in practice.

Like many other Latin American countries, Colombia has undergone protracted shortages of electric energy, which have seriously retarded development in certain parts of the country. Moreover, the lack of a satisfactory public service has stimulated private investment in this sector with a view to supplying the energy required for internal use in a number of industries, a circumstance which has had adverse repercussions on production costs.

In the ECLA study cited it is pointed out that when investment in the energy sector lags behind requirements,

the result may be idle capacity in other sectors, so that the existence of an adequate reserve is a prerequisite if development is to progress with the minimum waste of capital in the various sectors of production. Furthermore, by their very nature, the projects upon which the improvement of energy supplies depends, and which usually take a considerable time to complete, call for the adoption of a far-sighted policy, allowing the extent of future requirements to be properly forecast and the necessary investment opportunely effected.

In the evaluation of prospective needs, it seems important to bear in mind the twofold function of energy, as a consumer service and as a factor of production. In fact, the magnitude of energy requirements for final and for intermediate uses may be determined by very different characteristics, and may therefore lessen the significance of projections based on global indices.

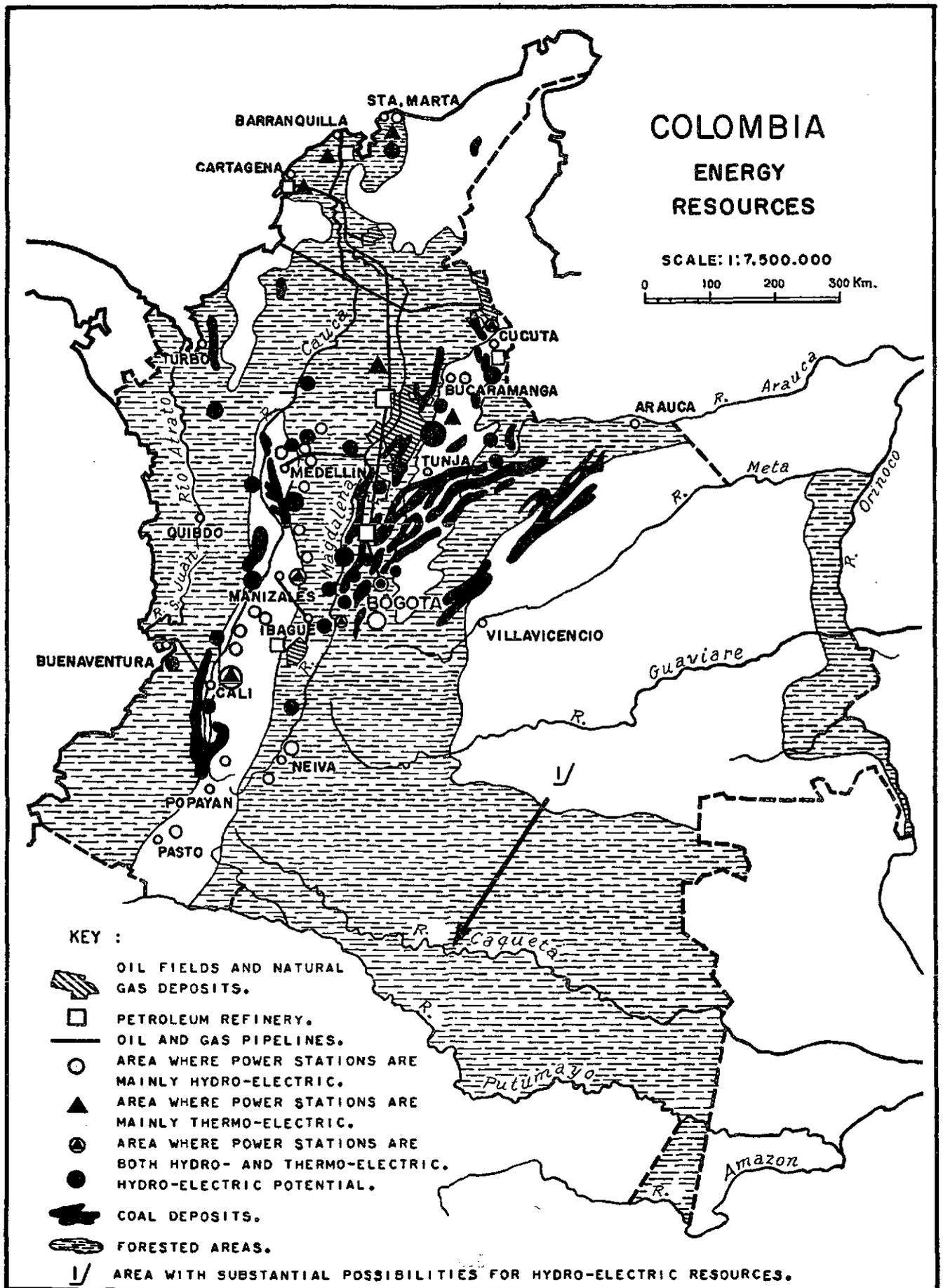
For example, in the ECLA study mentioned, it is noted that consumption of energy as a factor of production tends to increase more rapidly during the intermediate phases of development, a situation to which several causes contribute. Among these are mentioned (a) the superseding of animate forms of energy, especially in the agriculture and transport sectors, and (b) the progress of industrialization, which entails heavier consumption of inanimate energy per unit of production.

Again, a characteristic of the process of development is a relative contraction in consumption of non-commercial fuels and a consequent expansion of demand for commercial energy.

As regards demand for energy as a consumer service, it depends not only on the level of income — showing as a rule a high income-elasticity — but also on trends in the distribution of the population between the urban and rural sectors, since in the former *per capita* consumption is several times greater than in rural areas.

Hence it may be inferred that a satisfactory policy for the development of the energy sector is hardly conceivable except as part of an over-all economic development policy. Thus a necessary point of departure is a reasonable hypothesis on the over-all growth of the economy, in addition to information on the demand for energy as a factor of production and as a consumer service, and hypotheses as to the changes in such demand likely to be determined by development itself. Due account must also be taken of the probable geographic location of productive activity, of the population and its distribution between the urban and rural sectors, of the location of alternative sources of energy and the

¹ See in particular ECLA, *The development of energy production and utilization in Latin America. Possibilities and problems* (E/CN.12/384); and *El Plan Nacional de Electrificación*, prepared by a technical mission composed of French and United States experts, in collaboration with the *Instituto Nacional de Aprovechamiento de Aguas y Fomento Eléctrico*.



degree to which one of these different alternatives can be substituted for another, etc.²

An additional difficulty in formulating projections of this kind lies in the evaluation of possible deficits in current energy supplies, the pressure of which combines with the increase in requirements and may ultimately mean that productive capacity has to be expanded much more rapidly than these requirements themselves. In this connexion it is of interest to draw attention to some of the findings of the research carried out in the field of electric energy by the Technical Mission to which allusion has already been made. One of the conclusions reached is that a capacity from 30 to 47 per cent higher than that available would have been needed to satisfy the whole of the potential demand existing in 1954.

It is such considerations as these which are analysed in the following sections, and applied, as far as possible, to the analysis of the energy sector in Colombia. The first section will describe the chief characteristics displayed by the evolution of energy consumption in earlier periods and some of the most important problems arising at the present time. On this basis, in a subsequent section, hypothetical projections of future development will be presented, not only in conformity with the over-all projections recorded in other chapters, but also on lines more consistent with past experience in this field.³

² See the summarized version of the study cited above (E/CN.12/373).

³ Annex X of the present study contains a brief description of the most important concepts and sources of information utilized in the following sections.

I. TRENDS IN THE DEMAND FOR ENERGY ; LEVEL AND COMPOSITION OF CONSUMPTION

1. Trends in aggregate consumption

Gross consumption of energy *per capita* in Colombia is relatively low, having amounted to only 415 kilogrammes of petroleum equivalent in 1955. Nevertheless, this modest level of consumption seems consistent with *per capita* income figures and with the country's economic structure. Indeed, in 1955 1.81 kilogrammes of petroleum equivalent per unit of production (assessed in thousands of dollars at 1950 prices) was registered in Colombia, as compared with corresponding relationships of 1.30 kilogrammes in Argentina and 1.89 in Brazil. This was largely due, however, to the rapid improvement witnessed in recent years, since a similar comparison some few years before would have shown relationships much less favourable for the Colombian economy.

On the other hand, Colombia is one of the most privileged of the Latin American countries from the standpoint of the primary energy resources it possesses, as regards both traditional commercial fuels — petroleum and coal — and hydraulic power. The problem, therefore, does not consist for Colombia, as for other countries, in the search for domestic resources which are scarce at the present time but which in the future may relieve the heavy and sometimes intolerable pressure exerted on the balance of payments by large import requirements. It can better be expressed in terms of the need for careful programming, with due regard to demand prospects and local factors, of the most rational utilization of the

TABLE 258. COLOMBIA : EVOLUTION OF ENERGY CONSUMPTION

	1934	1940	1945	1950	1955
Total consumption in thousands of tons of petroleum equivalent :					
Gross	2,159	2,668	2,884	3,551	5,443
Net	1,786	2,156	2,270	2,713	4,033
Ratio net consumption/gross consumption	0.83	0.81	0.79	0.76	0.74
Net consumption of fuels as such, in thousands of tons of petroleum equivalent	1,773	2,127	2,225	2,634	3,880
Total electricity production, in millions of kWh	187	412	644	1,147	2,230
Electrification coefficient/kWh/kilogrammes of petroleum	0.094	0.172	0.252	0.374	0.472
Ratio net consumption/gross product/tons/millions of pesos at 1950 prices	526	502	462	429	474
Ratio total electricity production/gross product/kWh/thousands of pesos at 1950 prices	55	96	131	181	235
<i>Per capita</i> gross consumption/kilogrammes of petroleum equivalent	269	293	284	313	415
<i>Per capita</i> electricity production/kWh	23	45	63	101	166

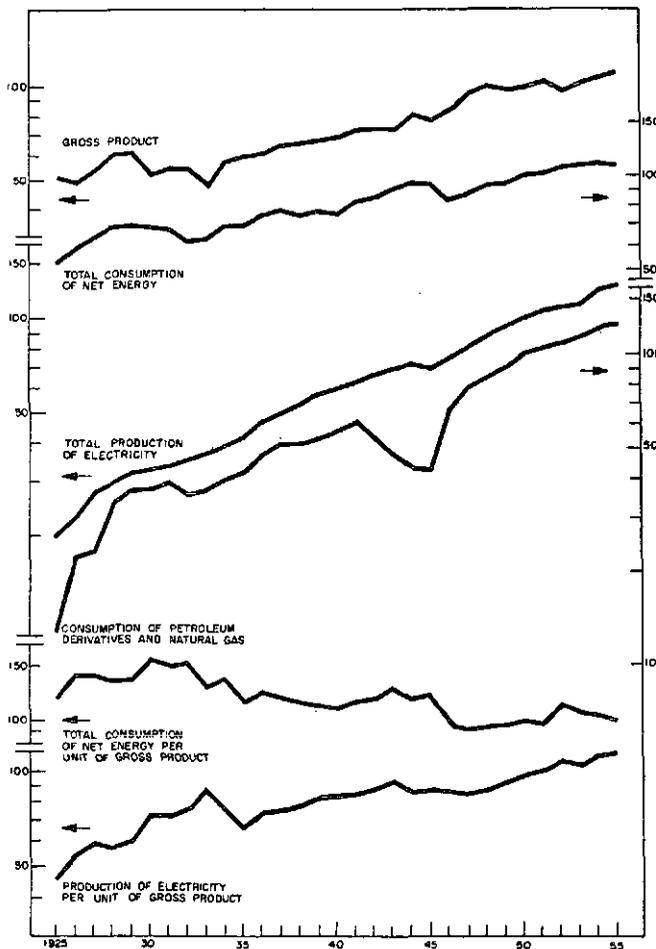
SOURCE : See *Statistical Appendix*, table 139.

country's resources in such a way as to keep investment at the lowest possible level and avoid anti-economic emergency measures, which involve unnecessary imports, or slow up industrial development, because essential energy supplies cannot be relied upon in advance.

But it must also be acknowledged that even if the level of total energy consumption cannot be considered very satisfactory, it represents a substantial improvement upon the figures for earlier periods. An analysis of the evolution of gross energy consumption between 1934, from which year onward the necessary data are available, and 1955, would reveal an uninterrupted process of growth, which, moreover, considerably increased in intensity after 1945. The figures in table 258 shed some light on the outstanding features of this evolution.

FIGURE XXI. COLOMBIA : FLUCTUATIONS IN THE GROSS PRODUCT, NET ENERGY CONSUMPTION, PRODUCTION OF ELECTRICITY AND DERIVED RELATIONSHIPS

(Semi-logarithmic scale)



As can be seen, gross energy consumption increased relatively slowly during the first twelve years of the period under review, but much more intensively during the following decade. The increment in net consumption was less marked, so that a moderate but steady decline

was registered in the ratio between net consumption and gross consumption⁴ (see figure XXI).

Since the rate of growth of gross consumption outstripped that of the population, *per capita* figures rose significantly, from 269 kilogrammes of petroleum equivalent *per capita* in 1934 to 415 in 1955. On the other hand, the expansion of total energy consumption did not keep pace with that of the national gross product, so that the ratio between net energy consumption and the gross product showed a downward trend over the long term. Although from this point of view Colombia is no exception to the general rule for the Latin American countries, the decline in question was less sharp in its case than in that of Argentina, Brazil, Chile and Mexico. This disparity between the growth of energy consumption and that of the gross product seems worth investigating, especially with a view to possible indications of future energy requirements. It has been noted in other studies⁵ that in the early stages of development in countries where the level of the gross product is low and the preponderance of agricultural production high, energy consumption tends on the whole to increase less intensively than the gross product, and unit consumption therefore declines. In contrast, during the intermediate phases of development, when marked changes take place in the structure of the economy, mainly in the shape of a greater expansion of industry and other activities where energy inputs are proportionally larger, requirements are liable to grow at least as rapidly as the gross product. Finally, once an advanced stage of development has been attained and the structure of the various sectors of production has become more stable, unit consumption again follows a downward trend, because energy can then be more efficiently utilized.

As the first chapters of the present study showed, during the quarter of a century which ended in 1953 the level of income rose substantially in Colombia, while at the same time the structure of the economy radically altered. Industrial development was very rapid, although the installation and expansion of those manufacturing activities which, like the metal-working and metallurgical industries, need to utilize more energy, did not quite keep pace with that of other industrial production lines, such as foodstuffs, beverages, tobacco, etc. Hence a decline in the ratio between energy consumption and the gross product would hardly seem very logical. It must be borne in mind, however, that whereas the propensity of industrialization was towards higher unit consumption, in the domestic sector, which carried a great deal of weight within total consumption, unit consumption increased less intensively than the gross product. Furthermore, during the period under consideration, various factors combined to place a check on demand for energy, especially as a consumer good. This

⁴ The concept of gross energy used here includes that utilized within the country in operations relating to the extraction, transport and transformation of energy itself. Net energy, on the other hand, represents a measure of the energy potential contained in fuels and electricity under the form and in the places in which they are utilized. For a fuller explanation of these concepts, see the above-mentioned ECLA study (E/CN.12/384).

⁵ See, for example, the ECLA study previously cited.

conclusion is confirmed by events in more recent years. By 1950, indeed, the ratio in question had fallen to its lowest level (some 400 tons of petroleum equivalent per million pesos — at 1950 prices — of gross product) ; but thereafter the trend was reversed, and the relationship had improved considerably by 1955, when it reached 470 tons of petroleum equivalent per million pesos of gross product. In this connexion, mention may be made of the abrupt rise in energy consumption during recent years (1952-55),⁶ when the rate became abnormally high. A number of different causes combined to promote this increase, including the substantial increment in the number of self-propelling vehicles, the expansion of domestic petroleum refining, the development of the heavy iron and steel industry, etc. Some general influence was also exerted by the disappearance of those factors which had restricted the use of energy as a consumer good.⁷

It would seem, then, that trends similar to those observed during 1934-54 and 1952-55 are unlikely to continue. This fact will be taken into account when the hypothetical projections of energy requirements for 1965 are formulated. Of course, the considerations discussed refer to total consumption of energy, as the situation may be very different with respect to some of its principal components. Consumption of electricity, which tends to increase much faster than total consumption, probably constitutes the most extreme case in point. According to the statistics given above, production of electricity increased from less than 190 million kWh in 1934 to over 2,200 million in 1955 ; this permitted an expansion of *per capita* production ranging from 23 to 166 kWh between the years mentioned. At the same time, the relationship between electricity production and the total gross product was more than quadrupled, rising from 55 kWh per thousand pesos (at 1950 prices) of gross product in 1934, to 235 in 1955. Probably, however, this is one of the forms of energy supply which, relatively

⁶ During this three-year period gross consumption of total energy increased by 43 per cent ; net consumption by 41 per cent ; petroleum derivatives by 73 per cent (fuel oil, 62 per cent ; diesel and gas oil, 102 per cent ; kerosene, 95 per cent ; petrol 71 per cent ; kerosene for household use, 136 per cent) ; coal by 86 per cent ; and hydro-electricity by 67 per cent.

⁷ While consumption of total energy is considered in relation to the gross product, energy as a consumer good is related to income, which, during the period under review, grew more rapidly than the product owing to the favourable movement of the terms of trade.

speaking, is lagging farthest behind, and where the volume of unsatisfied demand is greatest. Apart from these general considerations, the following paragraphs contain an analysis of the evolution and characteristics of energy consumption by types of energy, its distribution by economic sectors and some over-all aspects of its distribution by areas.

2. Consumption by types of energy

One of the first conclusions which would be drawn from a cursory study of the evolution of the composition of gross energy consumption during the period under review relates to the progressively greater importance gradually acquired by commercial types of energy (petroleum derivatives, mineral coal and hydro-electricity) as against the non-commercial forms (vegetable fuels). Even if it were assumed that total consumption of the latter had remained approximately constant in absolute terms, this would mean that its relative significance had dropped from over 80 per cent in 1934 to a little under 30 per cent in 1955. Among the types described as commercial, an increase was registered for all forms of energy, although varying proportions. The relative importance of petroleum derivatives and hydroelectric power in total consumption became five times greater during the interval in question, while the share of coal doubled. In absolute terms, consumption of petroleum derivatives, hydroelectricity and coal reached levels respectively 12, 13, and 6 times higher than before. The figures for certain selected years (see table 259) illustrate the magnitude of these changes.

From a different point of view, the evolution of net consumption of fuels as such, that is, excluding those utilized in the production of thermo-electric power, was very similar to that of total energy consumption. This is attributable to the fact that the relative importance of electric energy from thermic sources remained virtually stationary throughout the period under consideration.

Consumption of each of the commercial types of energy, that is, petroleum derivatives, electricity and coal, will now be discussed in greater detail.

(a) The figures given in table 260 summarize several of the most important aspects of the trends, composition and nature of consumer supplies of petroleum derivatives. One of the first conclusions to be inferred from this analysis relates to the disparity in the growth of con-

TABLE 259. COLOMBIA: GROSS ENERGY CONSUMPTION

(Thousands of tons of petroleum equivalent)

	1934	1940	1945	1950	1955
Petroleum derivatives and natural gas	170	415	520	930	2,077
Coal and coke	193	397	445	616	1,098
Hydro-electricity	46	106	169	305	618
Vegetable fuels	1,750	1,750	1,750	1,700	1,650
Total energy	2,159	2,668	2,884	3,551	5,443

SOURCE : See *Statistical Appendix*, table 140.

TABLE 260. COLOMBIA : PRODUCTION AND CONSUMPTION OF PETROLEUM AND DERIVATIVES

	1925	1930	1940	1950	1955
<i>Crude petroleum</i> (Thousands of cubic metres) :					
Production ^a	160	3,172	4,022	5,402	6,312
For refining	93	136	449	1,392	2,238
For export	—	3,038	3,565	4,494	3,860
<i>Gross consumption of derivatives</i> (Thousands of tons of petroleum equivalent) :					
Total consumption ^b	82	133	415	930	2,077
Fuel oil and natural gas	62	78	231	378	676
Diesel and gas oil	2	5	19	87	272
Kerosene and tractorine	6	7	18	59	209
Petrol	12	43	147	403	909
<i>Composition of consumption</i> (Percentages) :					
Heavy derivatives and natural gas ..	78.0	62.4	60.2	50.0	45.7
Light derivatives	22.0	37.6	39.8	50.0	54.3
<i>Percentage relationship between imports and gross consumption</i> :					
Total for energy .....	...	...	1.6	5.8	13.2 ^c
Total for petroleum derivatives .....	...	...	11.0	22.0	25.0
Fuel oil .....	...	...	10.0	—	2.0
Diesel and gas oil .....	...	...	5.0	47.0	27.0
Kerosene .....	...	...	...	33.0 ^d	31.0
Petrol .....	...	...	14.0	41.0	33.0

SOURCE : See *Statistical Appendix*, tables 141, 142 and 143.

^a The sum of the figures for refining and export does not exactly coincide with production, owing to the omission of figures for products added to crude, consumption and losses in refining and variations in distances.

^b Including small quantities of propane.

^c 1954.

^d 1951.

sumption as between fuel oil and the other derivatives (diesel and gas oil, kerosene and petrol), the process being much less intensive in the former case than in the latter. Consequently, the relative importance of fuel consumption, which in 1925 had represented four-fifths of total consumption of petroleum derivatives, had decreased to less than one-third.

These changes in the composition of consumption of petroleum derivatives, together with the noteworthy expansion of total consumption, led to an increase in import requirements during this period. Total imports of derivatives, in fact, rose from less than 20,000 tons of petroleum equivalent annually during the period 1936-38 to 630,000 in 1954 ; most of the latter consisted of petrol. The proportion of total consumption of each type of product covered by imports in 1954 was 35 per cent for the aggregate, 37 per cent for diesel and gas oil, 56 per cent for kerosene and 58 per cent for petrol, while fuel oil was the only commodity obtained almost entirely from domestic production.

Although the increase in the volume of crude petroleum refined in Colombia exceeded that registered in total

consumption of derivatives, the explanation of the larger proportion represented by imports lies in the fact that the output of light derivatives obtained from domestic refining failed to expand commensurately with consumption of such products. Whereas 121,000 tons of crude petroleum were refined annually, on an average, during the three-year period 1925-27, the corresponding figures were 343,000 tons for 1937-39 and 1,556,000 tons in 1952-54. Thus increases of 183 and 353 per cent were registered between those periods, in comparison with increments of 240 and 280 per cent respectively in total consumption of derivatives.

On the other hand, a radical change took place in the break-down of consumption by heavy and light derivatives. The share of the former in total consumption decreased from 78 per cent in 1925-27 to about 67 per cent in 1937-39 and to 46 per cent in 1952-55.

Of the heavy derivatives themselves, diesel oil, gas oil and similar products registered much higher growth rates, especially in the post-war years. Thus, medium derivatives, which represented negligible amounts at the beginning of the period, came to account for over 40 per

cent of fuel oil consumption. As regards this trend towards widespread use of diesel oil, the situation in Colombia is much the same as in almost all the other countries, although it should be noted that in some cases (for thermo-electricity, for example) medium derivatives were used to replace fuel oil, with the consequent rise in production costs.

The marked expansion in consumption of light derivatives, which by 1950 had reached the same level as that of heavy derivatives and subsequently rose even higher, was the decisive factor which determined the increase in import requirements, since domestic refining was unable to satisfy demand, especially for petrol. Only recently did the expansion of the Barrancabermeja refinery by the installation of a cracking unit enlarge the output of light derivatives, with the result that imports significantly decreased, from 690,000 cubic metres in 1954 to 500,000 cubic metres in 1955. Imports of petrol were reduced by 34 per cent, and by 1955 represented only 33 per cent of consumption. In 1951-53 25 per cent of the total fuel output of the Barrancabermeja refinery consisted of light derivatives; this proportion rose to about 50 per cent in 1955 and is expected to increase in due course to 65 per cent. Even so, the projected total production of light derivatives was not sufficient to cover the consumption registered in 1954 (much less that of 1955), which shows that Colombia will have to continue importing even larger quantities of such products until there are prospects of a further expansion of refining capacity. This end will of course be served by the new refinery which is now under construction at Mamonal, near Cartagena, and which will have a daily capacity of 28,000 barrels.

As regards hydrocarbons, attention should be called to the intensive increase in their use for household consumption, which is one of the contributory factors in the superseding of vegetable fuels. The amount of kerosene utilized for this purpose rose by 240 per cent after 1951, reaching 220,000 cubic metres by 1955.

Consumption of liquid gas, which began in 1948, has

expanded steadily, but without attaining any very considerable proportions. The same is true for natural gas, most of which is reinjected after the natural petrol has been extracted and is used for fuel only at the oilfields and at refineries themselves. As the country has no pipelines for urban distribution, prospects for gas seem to be confined to the consumption of such industries as are located near to the deposits. There is also a project for the utilization of natural gas, especially that obtained from the oilfields of the De Mares and Yondó concessions, as raw material in the production of fertilizers.

The foregoing statistics also indicate how total petroleum production has been distributed between exports and home requirements for refining purposes. The amount absorbed by these latter rose from barely 7 per cent of the total output before the depression of the 'thirties, to almost 55 per cent in 1955. Up to 1951, this did not prevent exports too from expanding in absolute terms; but from the peak of 5.1 million cubic metres attained in that year, they gradually declined in subsequent years, until by 1955 they stood at less than 3.9 million cubic metres.

Until 1939 the development of petroleum in Colombia was dependent on the production of the De Mares concession, exploited by the Tropical Oil Company, which accounted for almost the whole of the country's output. As early as 1930, this deposit was yielding more than 3 million cubic metres a year, almost entirely earmarked for export. Despite the gradual incorporation of new fields, total production did not greatly exceed the figure mentioned until after 1948. This arresting of growth was the result of a falling-off in the concession referred to, the productive capacity of which apparently began to decline, so that the expansion of other sources was thus offset. In 1954 the output of the De Mares oilfields represented only 1.8 million cubic metres, and a further slight contraction took place in 1955. Thus, the increment in Colombian petroleum production since the war has been almost entirely determined by the growing yields of new deposits (see table 261).

TABLE 261. COLOMBIA : PRODUCTION OF CRUDE PETROLEUM, BY CONCESSIONS

(Thousands of barrels)

Year in which production began	Name of concession	1930	1940	1944	1948	1951	1954	1955
1921	De Mares	20,346	21,421	18,068	9,152	13,846	11,599	11,254
1939	Barco	—	4,144	4,580	8,003	10,104	9,990	9,788
1941	Yondó	—	—	57	5,672	12,833	15,107	12,825
1943	El Difícil	—	—	25	542	725	393	516
1943	Cantagallo	—	—	40	390	429	840	855
1946	Guaguaquí	—	—	—	49	461	1,502	3,525
1953	Tetuán	—	—	—	—	—	373	398
1953	Aguachica	—	—	—	—	—	133	35
1953	Totumal and San Pablo	—	—	—	—	—	39	514
	TOTAL	20,346	25,565	22,770	23,808	38,398	39,977	39,711

SOURCE : Official statistics.

TABLE 262. COLOMBIA : PRODUCTION AND CONSUMPTION OF ELECTRIC ENERGY

	1934	1940	1945	1950	1955
<i>Production (Millions of kWh)</i>					
Total	186	412	644	1,147	2,100
Public	157	362	575	1,035	1,800
Private	30	50	69	112	300
Hydraulic	110	253	402	725	1,250
Thermic	77	159	242	422	850
<i>Consumption</i>					
Consumption of electricity (Millions of kWh)	136	316	492	873	1,450
Total <i>per capita</i> consumption (kWh)	21	40	55	87	142
Percentage distribution of total consumption :					
Industry .....	...	...	36	...	37*
Other sectors .....	...	...	64	...	63*

SOURCE : See *Statistical Appendix*, tables 144 and 145.

* 1953.

The new concessions were established in three stages, corresponding to the boom periods in foreign investment in petroleum. During the first of these, immediately before the war, the Barco and Yondó concessions were established. These two deposits currently provide over 60 per cent of the petroleum produced in Colombia. Although the output of the Yondó oilfield has increased at a much faster rate, and it is at the present time the most important of the petroleum concessions, here too the areas where the proven deposits exist seem to have entered upon a phase of decline. The high-quality crude petroleum produced by the Barco concession is particularly important, since it supplies the country's refineries with the raw material from which the largest proportion of light derivatives can be obtained. The second stage covered the last years of the war and the first of the post-war period, and was characterized by the opening-up of three new oilfields (El Difícil, Cantagallo and Guaguaquí). Lastly, from 1950 onwards, the Government of Colombia approved a series of reforms in the petroleum legislation, designed to stimulate further investment of foreign capital. The rate of production is only now beginning to feel the repercussions of the investment effected since 1952. The Tetuán concession, for example, is in full process of exploitation, while the Aguachica and Totumal deposits are at the experimental stage. From the last of these very satisfactory results have recently been obtained. Prospecting is being expedited not only in the areas where petrol reserves have already been proven, but also in other sectors, as, for instance, in the province of Chocó. However, nothing is known as yet of the prospects offered.

To sum up, the output of the new deposits has sufficed only to offset the decline in those previously existing since total production has remained stabilized since 1951 at a level slightly higher than 6 million cubic metres, despite the incentive provided by the increase in domestic demand and the importance of exportable purpluses for the country's balance of payments.

(b) Table 262 shows certain structural characteristics of the production and consumption of electric energy,

and some of the variations registered. The figures given confirm the observation made in earlier paragraphs to the effect that consumption of electric energy has risen at a very rapid rate, so that not only are *per capita* consumption levels higher, but also the ratio between electricity consumption and the gross national product has substantially improved.

On the other hand, no significant changes have taken place in the composition of electricity production by private or public and thermic or hydroelectric sources. Save in exceptional years, the proportion of electricity produced by the private sector (taking into account only that for industrial use) fluctuated between 10 and 14 per cent throughout the whole period under consideration, while hydroelectric power represented from 60 to 64 per cent of the total.

In consequence of the rapid growth of electricity production, the electrification coefficient also increased considerably,⁸ rising from 0.094 in 1934 to 0.252 in 1945 and 0.427 in 1955.

If the electricity consumption figures for public installations are taken into account, it can be seen that in 1939, out of a *per capita* total of 34 kWh, 8 corresponded to energy for industrial purposes and the remaining 26 to household consumption and that of other activities. By 1952 total *per capita* consumption had reached 105 kWh, of which 38 — that is, over 36 per cent — were used by industry, as against only 23.5 per cent in 1939. Between the two years mentioned, total *per capita* consumption of electric energy increased until a cumulative annual rate of 9.6 per cent was attained ; 12.7 per cent was used for industrial purposes and 7.6 per cent by other activities. If in addition the electricity generated privately by industrial establishments them-

⁸ The electrification coefficient can be defined as a quotient of electricity consumption in terms of kWh, and net consumption of fuels as such, in terms of kilogrammes of petroleum equivalent. It therefore reflects the relative position of a country's use of electricity within the use of energy in general. (For a more detailed explanation of this concept, see the ECLA document to which reference has already been made.)

selves is taken into consideration, the conclusion is reached, on the basis of the data supplied by industrial censuses, that the proportion of total electricity consumed by industry rose only slightly between 1945 and 1953, although in absolute values it increased considerably from 202 to 539 million kWh.

(c) Lastly, with respect to coal, Colombia is the only Latin American country where consumption has expanded considerably during the last few years. According to estimates, the output in 1955 was 1.8 million tons, which represented an improvement of 20 per cent over the preceding year's. In 1954 the increment had been greater still, amounting to 22 per cent, and the average cumulative annual rate over the period 1950-53 can be estimated at over 7 per cent.

This special feature in Colombia's case is attributable to its possession of coal deposits which are among the richest in Latin America. Their large-scale exploitation has barely begun, however, and is not yet carried out along technically progressive lines. The outlook for the future seems promising, both as regards much larger supplies for the domestic market and as far as export possibilities are concerned.

Production is concentrated in four Departments, more of half of it in Cundinamarca and Boyacá, and the rest distributed between Valle del Cauca and Antioquia. Hitherto, projects for the exploitation of the Carrejón mines in the Department of Magdalena seem to have been held up by financing difficulties.

The iron and steel industry at Paz del Río has signified a further increment in consumption, and has encouraged the opening-up of new mines with a daily production capacity of 1,600 tons, to be expanded to 2,000 tons. By 1955 an output of metallurgical coke amounting to 130,000 tons had already been attained.

3. Distribution of consumption by sectors

In the preceding paragraphs the problem was approached from the standpoint of the sources of supply whence energy requirements could be met. It seems of

interest, especially with a view to the assembling of data for the study of future prospects, to supplement this aspect with a cursory examination of the distribution of energy consumption among the various sectors of the economy.

It should be pointed out that the want of statistics is particularly marked in this field and that it is therefore impossible for precise and reliable estimates to be presented. An attempt will nevertheless be made to give some general indications based on partial data or on estimates calculated by the use of over-all coefficients which may not be strictly consonant with the real state of affairs in Colombia.

(a) Consideration may first be given to the consumption of energy in the manufacturing sector. On the basis of industrial census figures⁹ or of the data provided by a sample of enterprises, net consumption of total energy in industry (that is, consumption of fuels as such plus consumption of electricity at 860 calories) can be estimated to have reached some 355,000 tons of petroleum equivalent in 1945. If this figure is related to the value added by industrial production, the result will be 553 tons of petroleum equivalent per million pesos (at 1950 prices) of value added, which represents a unit consumption 20 per cent higher than the country's total for net unit energy.

The interpretation of this result is in itself a somewhat complex matter, since the factors affecting its magnitude are numerous. The figure mentioned may be compared, for example, with the following similar data

⁹ The reference is to the 1945 and 1953 censuses. In the case of the latter, up to the time of carrying out this study only the tabulation of some global statistics was available, without the necessary details. This prevented a more exhaustive appraisal of developments between the years in question, whereby several interesting aspects might have been assessed. Among other factors which combined to make comparison difficult must be emphasized the differing definitions of the value of production adopted in the two censuses. In the 1945 census, the "factory cost of production" was tabulated, not the "sales value of production". For the purposes of the present study, therefore, the value added by industry in 1945 was estimated on the basis of the figure for value added in 1953 and the quantum index of industrial production as calculated by ECLA (see Part Two of this study, chapter III).

TABLE 263. COLOMBIA : ENERGY CONSUMPTION ON THE PART OF MANUFACTURING INDUSTRY

Year	Heavy liquid fuels	Coal	Vegetable fuels	Total	Total electricity (Millions of kWh)
	(Thousands of tons of petroleum equivalent)				
1945	48	231	96	375	202
1953	270	420	220	910	539

SOURCE : ECLA, on the basis of official statistics.

NOTE : For 1945, the statistics presented correspond to the data in that year's industrial census. For 1953, industrial consumption of heavy liquid fuels was obtained by deduction of the consumption figures for railways, navigation and thermo-electricity from total consumption of these fuels in the country as a whole. For coal consumption, a direct estimate obtained by ECLA in Colombia is given. Total consumption of fuels was estimated on the basis of an average price per ton of petroleum equivalent and the value of fuels consumed by industry in 1953 (39,105 million pesos). Consumption of vegetable fuels was obtained by subtraction ; the increase is accounted for by the considerable expansion of the foodstuffs, beverages and tobacco industries, which in 1945 consumed a volume of vegetable fuels, representing 54,000 tons of petroleum equivalent. The figure for electricity is that recorded in the 1953 census.

TABLE 264. COLOMBIA : FUEL CONSUMPTION ON THE PART OF RAILWAYS

Year	Coal (Tons)	Fuel oil Petrol Diesel oil			Total (Tons of petroleum equivalent)
		(Cubic metres)			
1945	—	—	—	—	170,000
1952	168,599	83,759	16.9	109.8	180,440
1953	161,850	88,966	30.3	96.6	181,140
1954	162,699	84,739	10.7	144.4	177,771

SOURCE : ECLA, on the basis of official statistics.

NOTE : For 1945 consumption was estimated in proportion to the ton/kilometres transported (551 million ton/kilometres of freight in 1952 and 509 million in 1945).

for other countries : 95 per cent for Argentina in 1948 ; 6 per cent for Brazil in 1940 ; 26 per cent for Mexico in 1945 ; 10 per cent for the United States in 1947 ; and 20 per cent for the United Kingdom in 1950.

The change which took place in the ratio under discussion between 1945 and 1953 is of greater significance. In the latter year, net consumption of total energy in industry amounted to 839,000 tons of petroleum equivalent, which represented a unit consumption of 637 tons of petroleum equivalent per million pesos (at 1950 prices) of value added in this sector. When unit consumption of fuels only is taken into account, the figure for 1953 works out at 693 tons of petroleum equivalent per million pesos of value added by industry — higher, again, that is, than the 596 tons registered in 1945. This implies not only an increment in industry's unit consumption, but also a greater disproportion in relation to other sectors of economic activity, since the relationship in question rose from 20 per cent in 1945 to 50 per cent in 1953.

On the other hand, the same was not true of electric energy. While unit consumption of electricity on the part of industry increased from 315 kWh per million pesos (at 1950 prices) of value added by this sector in 1945 to 410 kWh in 1953, the ratio between industry's unit consumption of electricity and that of the economy as a whole fell from 2.8 to 2.2 between the same years.

Table 263 gives estimates of energy consumption in manufacturing industry during the two years analysed.¹⁰

(b) Another important sector from the standpoint of the volume of energy it consumes is that of transport, within which separate consideration should be given to consumption on the part of railways, shipping and road vehicles and aircraft.

In table 264 an estimate of the volume and composition of consumption of energy by the railways is presented.

As regards shipping (both ocean-going vessels and river boats), estimates indicate¹¹ that in 1948 consumption of fuel oil represented some 80,000 tons of petroleum equivalent, of which 42,300 were used for transport on

¹⁰ For more detailed estimates of the distribution of energy consumption in 1945 and 1953 by principal branches of industry, see *Statistical Appendix*, tables 146 and 147.

¹¹ See a study by the McGraw-Hill International Corporation, on *Petroleum Consumption in Colombia*.

inland waterways, 14,100 by tankers, 5,300 by coasters and 19,400 for maritime transport. There are no available estimates of the approximate amounts of diesel oil, A.C.P.M., and — in a smaller proportion — petrol, which are undoubtedly also consumed in this activity. For purposes of comparison alone, it has been roughly estimated that total consumption of petroleum derivatives in this sector rose from 70,000 tons of petroleum equivalent in 1945, to 110,000 in 1953.

Consideration must now be given to the volume of energy consumed by motor vehicles, which can be fairly accurately estimated on the basis of the number of vehicles in existence and the corresponding unit consumption. Table 265 gives details of the motor vehicle park during recent years ; registered vehicles only are taken into account, those belonging to the armed forces and to the large petroleum companies, and some others, being excluded.

TABLE 265. COLOMBIA : PARK OF SELF-PROPELLING VEHICLES

(Thousands of units)

Year	Automobiles	Lorries	Buses	Total
1948	31.9	20.4	6.7	59.0
1951	42.8	28.6	8.8	80.2
1952	42.4	33.5	10.0	85.9
1953	51.3	36.5	9.9	97.7
1954	67.6	47.8	12.6	126.5

SOURCE : ECLA, on the basis of official statistics.

Only for 1951 are data on the volume of unit consumption of ordinary petrol available for the various types of motor vehicle.¹² According to the estimates to hand, by that year unit consumption had attained two gallons daily per automobile, 6.33 per lorry and 11.6 per bus. If it is assumed that these vehicles are utilized on all the 365 days of the year, the conclusion reached will be that total consumption of ordinary petrol by motor vehicles accounted for 94.5 per cent of the country's total consumption of petrol. This is

¹² The figures utilized here are those appearing in a study carried out by the Colombian branch of ESSO. See Marco J. Angarita Niño, *Economía e Industria del Petróleo en Colombia*.

probably a satisfactory estimate, as it seems reasonable that consumption on the part of river craft and unregistered motor vehicles should cover the remaining 5.5 per cent.

If the unit consumption figures mentioned were assumed to have remained constant in subsequent years, the inference would be that the proportion of total petrol consumption in Colombia corresponding to motor vehicles considerably decreased, an assumption which does not seem to be in line with the facts. This may be regarded as an indirect indication that unit consumption of petrol per motor vehicle increased from 1951 onwards, at a rate which would seem to reach 4 per cent annually if the proportional distribution of total petrol consumption is taken as having remained constant except in the case of motor vehicles. Hence it seems justifiable that at a later stage, when the foregoing estimates are combined with those for other sectors, the total figure for ordinary petrol and aviation spirit is included under consumption by motor vehicles, since the proportion absorbed by other activities is probably offset by the small amount of diesel and gas oil which the vehicles in question consume.

(c) Lastly, the energy sector itself inevitably absorbed a certain proportion of total energy consumption in the production and transforming process. In default of adequate statistical data, it was necessary in this case too to work out approximate estimates, mainly based on the aggregate coefficients adopted by ECLA for the Latin American countries¹³ (see table 266).

TABLE 266. COLOMBIA : ENERGY CONSUMPTION IN THE ENERGY SECTOR ITSELF

(Thousands of tons of petroleum equivalent)

	1945	1953
Electricity	35	92
Petroleum*	50	80
Coal	45	75
Vegetable fuels	260	250
TOTAL	390	497

SOURCE : ECLA, on the basis of official statistics.

* With respect to petroleum extraction, only that intended for domestic consumption is taken into account, since energy used in the production of petroleum for export has been considered as an input in the mining sector.

(d) Gross consumption of total energy, by economic sectors, in 1945 and 1953, as computed on the foregoing bases, is shown in table 267 below. The amount consumed by the residential sector and other activities was obtained by deduction of the aggregate consumption of other sectors from the total for the country in the year concerned.

¹³ For example, as regards consumption of energy in the extraction and refining of petroleum, relevant data was supplied by the *Empresa Colombiana de Petróleo*. For further details on the other aggregate coefficients utilized, see the notes to the appropriate tables in the *Statistical Appendix*.

TABLE 267. COLOMBIA : GROSS CONSUMPTION OF TOTAL ENERGY, BY ECONOMIC SECTORS

(Thousands of tons of petroleum equivalent)

	1945	Percentage	1953	Percentage
Industry	430	14.9	1,050	24.3
Transport	437	15.2	942	21.8
(a) Motor vehicles and aircraft	167	38.2	652	69.2
(b) Railways	200	45.8	180	18.1
(c) Shipping	70	16.0	110	11.7
Energy sector	390	13.5	500	11.6
Residential sector and other activities	1,627	56.4	1,828	42.3
TOTAL	2,884	100.0	4,320	100.0

SOURCE : See the preceding tables, and relevant tables in the *Statistical Appendix*.

A comparison between the composition of consumption in 1945 and in 1953 throws into relief the substantial percentage increase registered in the cases of industry and transport. The relevant importance of the energy sector slightly decreases, while that of the group called "Residential sector and other activities" is reduced in a much greater proportion, and approaches the percentages recorded in more highly developed countries. Stress should once again be laid, however, on the approximate nature of these estimates and the consequent impossibility of using them as a basis for precise conclusions. Thus, for example, the increment in absolute terms observable in household consumption between 1945 and 1953 (12 per cent in eight years) seems unduly small, as it would imply a decline in *per capita* consumption.

4. Distribution of consumption by areas

In Colombia, the characteristics of demand and supply in the case of energy, and especially electricity, should be studied in terms of the various large areas into which the country can be divided, since each possesses a specific combination of resources, possibilities, transport, demand, price structure, etc., which gives rise to marked differences.

In the mountainous part of the country where most of the population is concentrated, the ranges running from north to south form the boundaries of deep valleys, river basins and plateaux, thus rendering transport relatively difficult and necessitating the fullest possible utilization of local energy resources. In this area hydraulic potential, which is plentiful and favourably distributed, is the principal source of electric energy. Coal is also used in the several basins in which it is produced, for household purposes, for the railways and for certain industries. As the country is a major oil producer, petroleum derivatives are widely used, although here again the topography of the country presents difficulties, since only one large refinery exists, and this means heavy freight costs for a number of consumer centres.

TABLE 268. COLOMBIA : URBAN *per capita* ENERGY CONSUMPTION
IN THE DIFFERENT AREAS, 1954

	Unit	North ^a	Centre ^b	North-east ^c	West ^d	South ^e	Total
Electricity ^f	kWh	200	338	185	589	292	346
Petroleum :							
Petrol	litres	105	274	206	165	202	188
Tractorine and kerosene	"	48	14	51	41	41	35
Diesel oil	"	49	37	104	40	65	51
Fuel oil	"	145	55	261	108	61	107
TOTAL	"	373	407	638	370	386	404
Coal ^g	kg	—	1,008	136	215	378	390

SOURCE : ECLA, on the basis of official statistics.

^a Atlántico, Bolívar, Magdalena and Córdoba.

^b Cundinamarca, Boyacá, Huila and Tolima.

^c Santander del Norte and Santander del Sur.

^d Antioquia, Caldas and Chocó.

^e Valle del Cauca, Cauca and Nariño.

^f 1953.

^g Production in 1955.

It is no easy matter to analyse these aspects of the question, because the political divisions on which statistical data by areas are based do not always permit of homogeneous grouping from the point of view of available energy resources. Some Departments are split up by the mountain ranges, which means that different parts of the same Department have to draw upon entirely different sources of supply. Nevertheless, some idea of the area pattern can be obtained by the demarcation of large zones, usually centering around the biggest towns, *viz.*, Bogotá in the centre, Medellín and Manizales in the west, Cali towards the south, Bucaramanga in the north-east, and Barranquilla and Cartagena in the north (see table 268).

What is attempted here is nothing more ambitious than a passing reference to some of the most significant features differentiating one area from another, especially those which might affect future projections of demand and of the type of consumption.

As has already been stated, hydroelectric resources exist in almost all the densely populated parts of the country, except on the northern plains. Considerable differences are to be found, however, among the various resources of this type. Medellín, for example, has large waterfalls relatively close at hand in the small valleys debouching on the low plateau where the town is located. By means of economic projects, a regular and substantial flow can be obtained, affording more or less unrestricted supplies of water for multiple uses. In the case of Cali, on the other hand, utilization of the copious flow of the River Cauca entails costly works, while priority must also be given to irrigation and flood control requirements.

Thus, the percentage of total installed capacity represented by hydroelectric power stations is almost twice as large in Medellín as in Cali, and *per capita* urban

consumption of electricity is also twice as great, whereas industrial production per active worker is only 25 per cent higher.¹⁴

Again, the northern zone, where the power stations are in almost every case thermic, registers one of the lowest figures for unit consumption of electricity, despite its considerable industrial output.

These differing positions with respect to resources for the production of electricity are naturally reflected in its price levels. The cost per kWh of electricity for household use is more than three times as high in Barranquilla and Cartagena as in Medellín, and double the Bogotá rate. So marked a discrepancy may, of course, be also partly due to the tariff policy pursued in each case.

As regards total consumption of liquid fuels, it is of interest to point out how small are the differences in *per capita* urban consumption from one area to another. Only in the north-east is consumption distinctly higher, but the explanation is not far to seek, since this is the district where most of the oilfields are found and the country's only large refinery is located.

A similar uniformity results from the use of coal instead of fuel oil in the areas where the former is produced, which, broadly speaking, are identical with those where consumption of light derivatives is highest. In fact, consumption of petrol — for which there is no substitute — ranges from 105 litres per town-dweller in cities like Barranquilla to 274 litres in Bogotá, owing to extraneous factors and not, in any major degree, to the difficulties of transporting this fuel. Such difficulties,

¹⁴ While the proportion of total installed capacity represented by hydroelectricity is 68 per cent for the country as a whole, the corresponding figures for the different areas are as follows : North, 1 per cent ; Centre, 70 per cent ; North-east, 69 per cent ; West, 78 per cent ; South, 42 per cent.

on the other hand, do seriously restrict the use of fuel oil, and lead to its being superseded by coal when this is produced locally, as in the Cali and Bogotá districts. The favourable competitive position of coal in the coal-mining areas is based on lower prices for the same calorie content.

Disparities in petrol consumption are closely linked to the number of vehicles existing in the various areas. In fact, if consumption of petrol and diesel oil is related to the number of automobiles, buses and lorries on the register, similar unit consumption figures are to be noted, except in the central zone (where the larger *per capita* stock of automobiles reduces unit consumption) and in the Medellín district, where journeys from one town to another and a higher degree of industrial development have led to a more intensive utilization of vehicles.¹⁵

Gradual progress has been made towards the partial solution of petroleum transport problems by means of the building of oil pipelines, two of which are used for transporting crude petroleum for export. At the present time, the main centre for the production of derivatives is the Barrancabermeja refinery, on the banks of the river Magdalena. Thence supplies are carried by river to the northern part of the country, and the small volume exported is obtained. On the other hand, for petroleum to reach such large centres as Bogotá and Medellín, oil pipelines have had to be constructed between widely differing levels. Cali and a large part of the valley of the River Cauca are almost inaccessible by direct routes; supplies reach them by sea from Buenaventura, and consist partly of imports and partly of domestic products brought from Barranquilla or Mamonal through the Panama Canal. Even though in the future more inland pipelines will be built and road and rail transport of fuels will improve, costs will still be unduly heavy for centres like those enumerated. Thus, for example, the next sizeable refinery which is being constructed in the country is at Mamonal, close to Cartagena. This refinery, besides improving the supply situation for the northern area, will also serve the Pacific coast, but still through the Panama Canal. Such considerations indirectly imply better prospects for domestic coal, consumption of which is at present restricted to the districts in which it is produced. The value of this commodity does not allow of long-distance freightage in face of the competition from liquid fuels or hydraulic energy, because the Colombian mines are under-mechanized and their output is small, so that extraction costs are high. However, the position of this fuel may also be strengthened by a possible future expansion of local consumption — through thermo-electric power stations, for instance — and production could then be more fully mechanized.

The most important areas currently producing coal are Boyacá, Cundinamarca, the Department of Valle

del Cauca and Antioquia. In the first of these, where the highest *per capita* rate of urban consumption is registered and where good deposits are to be found, the demand of the iron and steel and metallurgical industries is concentrated. In the Valle del Cauca a large washing plant has been completed and some mines are being modernized. Although the coal formations in this area are less favourable, their location opens up greater export prospects, which are at present being studied. The development of these deposits would undoubtedly encourage domestic consumption in the area.

The coal produced in Antioquia is of a poorer quality. It has a high damp and ash content and the mines are small and scattered, so that consumption is less significant than in the other cases cited.

II. ENERGY DEMAND AND SUPPLY PROSPECTS

In the preceding section the principal characteristics of the evolution of energy consumption during the last twenty years were discussed, together with the existing supply situation. With due regard to the objective data thus assembled, an attempt will now be made to examine energy demand and supply prospects, in consonance with the over-all hypotheses as to Colombia's future rate of economic growth formulated in other chapters of this study.¹⁶

As will be recalled, two alternative assumptions, designated hypotheses *A* and *B*, were postulated with respect to the future rate of development. In the conditions envisaged by hypothesis *A*, the *per capita* gross product would increase between 1954 and 1960 at an average cumulative annual rate of 4.2 per cent, which would rise to 4.6 per cent during the period 1960-65. According to hypothesis *B*, the corresponding rates would be 2.2 and 3.6 per cent respectively. The estimates presented in this section will therefore be adjusted to these over-all hypotheses and their implications.

Although the aggregate projections refer to the years 1960-65 and 1970, for the sake of simplicity the projections for the energy sector will be analysed here only in relation to 1965. The ten years covered by these projections seem to constitute a suitable period for this type of analysis, since it is long enough to permit the programming of investment of a kind which sometimes takes a considerable time to mature, and at the same time may be regarded as reasonable from the standpoint of the influence that may be exerted by factors which it is difficult to assess, such as the emergence of new energy sources of development processes.

In the ECLA study to which reference has been made on several occasions,¹⁷ the methodology utilized in projections of this type is described in considerable detail. Nevertheless, it may be of interest to sum up certain of its most important aspects here, as a general guide to the comments formulated below.

¹⁶ See particularly Part One, chapter II.

¹⁷ Document E/CN.12/384.

¹⁵

	North	Centre	North-east	West	South
Number of motor vehicles per 1,000 urban inhabitants ...	11	35	21	9	18
Consumption in 1954 :					
1,000 litres of petrol and diesel per vehicle	14	9	15	23	15

The usual aim of an analysis of this kind is to seek a simplified solution of the problem, which consists in merely projecting the historic trends registered during a given period. This involves considerable risk, however, since projections thus prepared may result in substantial under- and over-estimating of future requirements. The former might be the case, for example, if the period under consideration were to coincide with a very slow rate of economic development or an inadequate expansion of energy supplies while an acceleration of future growth, or a change in its characteristics, might mean that energy requirements greatly exceeded the estimates reached in the way described. Conversely, a very rapid increase in energy consumption during a specific period might reflect the gradual relief of a shortage and, consequently, once a more normal level of supply had been attained, future needs might expand less intensively. An opportunity will later arise of checking the projections formulated against other criteria—i.e., those which would have been obtained by the extrapolation of historic trends—and of examining the wide margins of difference that may result.

From an examination of the figures for the gross product (expressed in terms of a common monetary unit) and energy consumption in a group of countries whose income levels and economic structures vary as widely as possible, it can be inferred that the ratio between these two variables undergoes fairly regular modification. Much the same is true of the variations in this ratio within one and the same country, if the period of time considered is long enough. Hence it was felt preferable in this case to take as points of departure first a projection of aggregate energy consumption based on the over-all projections of the gross product and on developments in Colombia, rather than the ratio between the country's energy consumption and gross product during the last twenty years; and, secondly, Colombia's relative position, from the standpoint of this ratio, in comparison with a group of countries in which income levels vary.

A first aggregate projection having thus been prepared, the validity of the total consumption arrived at, and its possible distribution among the various types of energy, were next examined. This part of the work is based mainly on available data as to the distribution of consumption by economic sectors and on future prospects for each of the sectors in question. Consequently, more specific consideration can be given to the influence of predictable changes in the country's economic structure, such as, for example, an increase in the relative importance of manufacturing activities, and to the exceptionally high consumption of certain industries (iron and steel making, petroleum, thermic generation of electricity). This analysis is supplemented, in so far as the very limited data available permit, by a general survey of consumption prospects in the different areas, which enables a study to be made of problems relating to the composition of energy supplies, from the standpoint, for instance, of thermic and hydroelectric energy possibilities, or the alternative use of fuel oil or coal.

Projections are of course formulated on the basis of net energy, whence it is then possible to deduce gross

energy, an essential concept for assessing total production and import requirements. The necessary degree of expansion does not differ greatly from one to the other, but tends to be higher in the case of gross energy, because, on the one hand, the share of domestic production in total supplies is assumed to be larger and, on the other, the relative importance of electric energy is increasing; in both instances the consumption of the energy sector concerned rises.

In the case of electric energy, the production instead of the consumption figure is utilized. The difference between these two—constituted by the consumption of the plants themselves and losses in transmission and distribution—is estimated globally as an average percentage, although it must be recognized that this may vary according to the features characterizing the design and operation of the different systems and the length of the transmission lines.

One of the greatest difficulties in formulating projections of this kind lies in the evaluation of possible existing deficits, the pressure of which is added to the growth of normal requirements. Under the methodology adopted here, this element is not taken into account specifically, but only indirectly, because of the nature of the criteria utilized. Thus the hypothetical projections prepared for 1965 may be regarded as covering—in the conditions postulated—the full satisfaction of total energy requirements.

It is hardly necessary to call attention yet once more to the hypothetical nature of the estimates included in the following sections, which should on no account be taken as forecasts, but only as approximate magnitudes used to illustrate a method whereby more accurate computations could be made in line with the hypotheses adopted as to the rate of growth of the Colombian economy as a whole and of its principal sectors.

This warning must be particularly stressed in connexion with the distribution of consumption among the various types of fuel, which may in many cases be the result of measures of economic policy. Thus, for example, in the estimates given below it will be seen that a very marked increase in coal consumption has been assumed, in face of the uncertain prospects of a substantial increment in petroleum production; this development might not take place if it were felt preferable to reduce exportable surpluses of oil.

1. *Projections of aggregate net consumption*

The application of the method described in general terms to the specific case under review must now be considered. As will be recalled, consumption of total net energy per unit of gross product showed a downward trend in Colombia over the long term, except in the more recent years of the period under consideration, when a marked recovery was registered. The first problem to arise is consequently that of indicating, in the light of available data, possible future changes in this ratio.

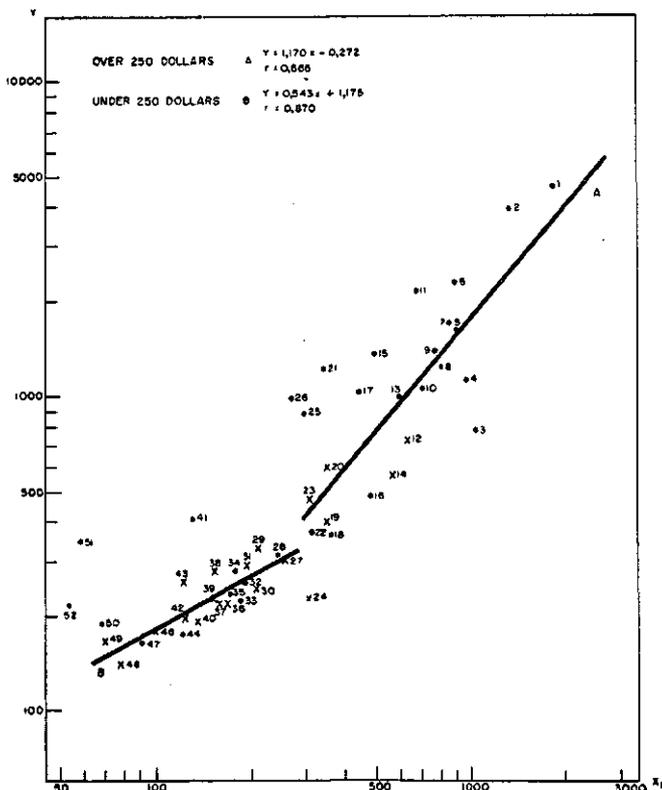
Clearly, in the first place, it would not be very reasonable to assume that the downward trend in unit consumption of energy in relation to the gross product

is likely to continue. This assertion is grounded on the fact that the ratio in question has already reached levels which are, comparatively speaking, very low, as well as on the characteristics of the phase of development upon which the country seems to have entered. The question is no longer, as in the past, merely one of achieving a rapid rate of industrialization; a further problem arises in that, within industry itself, the branches with the best prospects of expansion are precisely those requiring higher inputs of energy per unit of production, a circumstance which will offset the decrease in unit consumption brought about through the more efficient utilization of energy. The gradual attainment of a higher degree of economic integration will imply, moreover, the growth of trade among the different areas of the country, and this will raise the relative importance of the transport sector and, consequently, its requirements of fuels and so forth. Conversely, it would also be unreasonable to assume the prolongation of so marked an increment in the ratio under discussion as was registered, thanks to the conjunction of several exceptional factors, during the period 1952-55.

FIGURE XXII. COLOMBIA : CORRELATION OF NET CONSUMPTION OF ENERGY WITH *per capita* GROSS PRODUCT

(Average 1949-51)
(Logarithmic scale)

Y = Net consumption of total energy *per capita* (kilogrammes of petroleum equivalent).
X₁ = *Per capita* gross product (Dollars at 1950 prices).



X = Latin American countries.

• = Non-Latin American countries.

NOTE : For order of countries see list at beginning of study.

The considerations involved, however, are based not only on a study of Colombia's internal situation but also on this country's relative position as compared with that of others where income stands at various levels. As has already been pointed out, valuable data whereby the situation can be appraised in truer perspective may be obtained from an analysis of the ratios between energy consumption and gross product in countries where *per capita* income and the structural characteristics of the economy differ.

In figure XXII a comparison relating to a large group of countries is carried out on these lines. As can be seen, the degree of correlation shown is fairly satisfactory. But what is most interesting is the ratio between energy consumption and the *per capita* gross product. In the case of countries where *per capita* income levels fall below 250 dollars (at 1950 prices) annually, the growth of energy consumption tends to lag behind that of the gross product, but from that level upwards energy requirements first expand in absolute terms and later show a tendency to increase at least as intensively as the gross product. An examination of Colombia's relative position will reveal that its situation is not very easy from the standpoint of the current level of consumption as compared with that of the gross product, and, moreover, closely approaches the substantial modification of the ratio between net energy consumption and the gross product which has just been noted.

Hence there would seem to be grounds for concluding that during the next few years consumption of energy per unit of product — a ratio which over the long term has followed a declining trend — may most reasonably be expected to remain approximately constant. This will be the hypothesis adopted in the present study, therefore, as a point of departure for subsequent projections. It should be recalled that unit consumption of energy amounted to 430 tons of petroleum equivalent per million pesos (at 1950 prices) of gross product in 1954, and to 470 tons in 1955; thus, for 1965 a figure of 450 tons is adopted.¹⁸ When these figures are related to the projected increments in the total gross product in the conditions postulated by hypotheses A and B for 1965 (16,914 and 14,115 million pesos at 1950 prices, respectively), the conclusion is reached that total energy requirements in 1965 would range from 6.35 million tons of petroleum equivalent on hypothesis B to 7.61 million on hypothesis A. It is interesting to note that mere extrapolation of the trend for 1934-54 would have resulted in the considerably lower estimate of only 4.5 million tons of petroleum equivalent.

The projections thus formulated do not seem excessive if it is borne in mind that, in accordance with the new income level, Colombia's consumption would still be 28 per cent below the theoretical figure given by the average ratio between energy consumption and the gross product as estimated for the other countries under consideration (see figure XXIII).

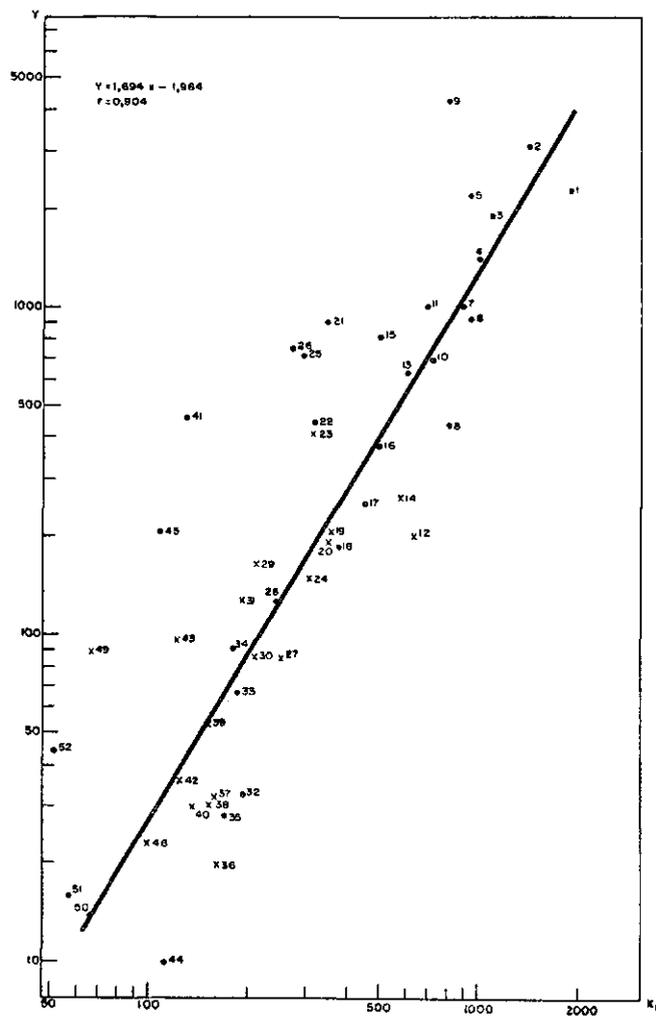
¹⁸ The adoption of this average figure is warrantable because unit consumption in 1955 may be regarded as fortuitously expanded, the figure having been largely due to the slower rate of growth of the gross product during that year.

FIGURE XXIII. COLOMBIA : CORRELATION OF ELECTRICITY CONSUMPTION WITH *per capita* GROSS PRODUCT

(Average 1949-51)
(Logarithmic scale)

Y = *Per capita* electricity consumption (kWh).

X_1 = *Per capita* gross national product (Dollars at 1950 prices).



X = Latin American countries.

. = Non-Latin American countries.

NOTE : For order of countries see list at beginning of study.

2. Projections of consumption of electric energy

The prospects of an expansion of net consumption of total energy having been reviewed, an analysis must now be made of the contribution to its satisfaction which might be made by the different types of energy. Demand for each of these types of course displays its own special features, and it should therefore be noted in advance that the relative importance of each within total consumption will alter considerably as demand reaches progressively higher levels.

With respect to electric energy, there has already been an opportunity of showing that demand tends to grow much more rapidly than the gross product. In Colombia's

case, production of electric energy increased during 1934-54 at an average cumulative annual rate of 10.8 per cent, which rose to 13.5 per cent between 1948 and 1954. This also implied so substantial an improvement in the output of electric energy per unit of gross product that the ratio concerned steadily increased at an annual rate of over 7 per cent between 1934 and 1954. Such a marked growth of electric energy consumption largely represented only a recovery from extremely modest consumption figures, as well as from an electricity-gross product ratio and a level of industrial consumption of electric energy per worker employed in industry which were among the lowest in Latin America.

It seems of interest to resort once more to international comparisons, whereby the problem can be viewed in truer perspective. An examination of figure XXIII, in which the ratios between consumption of electric energy and the *per capita* gross product in several countries are compared, will show that the ratio between the two variables tends to increase more intensively as the level of the gross product rises, in contrast with the findings of the similar comparison relating to total net energy. As regards Colombia's special position, its consumption during the period referred to (1949-51) can be seen to have stood 2.3 per cent below the figure which would theoretically be consistent with its level of income, if the average ratio registered for the other countries is taken into account.

Several of the foregoing aspects, supplemented with other important special research, were taken into consideration in the studies of the Technical Mission which formed the basis for the National Electrification Programme (*Plan Nacional de Electrificación*) completed in March 1955. As this Programme contains detailed recommendations for the expansion of electric energy supplies up to 1970, it seems preferable to begin by summing up its main conclusions, with a view to considering its adaptability to the over-all hypotheses which are taken here as a basic point of reference.

In the preparation of the Programme, various alternative methods were adopted for the projection of future electric energy requirements. These were based mainly on an extrapolation of historic trends during the period 1948-54 ; on the ratio registered in earlier periods between the increment in electric energy and the growth of national income ; and on a more direct procedure taking into account the different conditions prevailing in the various parts of the country and the possible magnitude of the deficits in current supplies. The findings are not very dissimilar in the three cases, and those obtained by the third method, which represented the highest relative figures, ultimately, were adopted.

Apart from various modifications and adjustments designed to take into consideration the wide variety of local situations, the point of departure in this last case was the calculation of a theoretical consumption which would fully satisfy demand, and which proved to be 40 per cent higher than that actually registered in 1954. The next step consisted in estimating a population growth rate and the proportion of the population that would

utilize electric energy, for which purpose it was assumed that in 1970 electric energy would be used by the whole of the urban and only 50 per cent of the rural population. Lastly, it was projected that *per capita* electric energy consumption would increase at an annual rate of 7 per cent, starting from the hypothetical value calculated for 1954 as representing total satisfaction of demand.

On the basis of these criteria, it was ultimately possible to estimate that total electric energy production should expand at an annual rate of 13.1 per cent, which would imply an output of 7,053 million kWh in 1965.

This estimate must now be compared with those that might be obtained by the adoption of other criteria. Extrapolation of past production trends would give a total output of approximately 6,315 million kWh in 1965, so that the estimate in question implies future development at a higher rate than that registered in previous periods. The adoption of a criterion based on the ratio between electricity production and the level of the gross product as deduced from Colombian statistics for earlier years, would mean that future estimates of electric energy consumption had to be related to the aggregate projections of the gross product; the conclusion would thus be reached that electric energy production requirements for 1965 would range from 6,680 million kWh in the conditions postulated by hypothesis *B* to over 12,000 million in those of hypothesis *A*. Finally, if the historic trend of electric energy production per unit of gross product were taken into account and the corresponding figures applied to the new levels of the latter, production requirements would be estimated at approximately 6,800 million kWh for hypothesis *B* and more than 8,100 for hypothesis *A*.

As can be seen, the adoption of different criteria in the formulation of the projections, once these have been related to the various possible alternatives for the growth of the gross product, gives rise to estimates of electric energy requirements which lie within fairly wide limits. Thus the margins of variation allowed for in these projections are much greater than when aggregate net energy requirements are estimated.

Although indirectly, a specific future rate of growth of the Colombian economy, falling between hypotheses *A* and *B* of the present study, was implicitly taken into account in the projections prepared for the National Electrification Programme. Hence the estimates of electric energy needs for 1965 finally adopted here will be 6,600 million kWh for hypothesis *B* and 9,000 million on the assumptions contained in hypothesis *A*.

It must be recognized that both the projections of the Technical Mission and those formulated here seem relatively high, especially if they are judged in the light of the international comparisons to which reference has been made. Indeed, their acceptance would mean that in Colombia's case the ratio between electric energy consumption and gross product would be considerably above the average ratio registered in the other countries. Nevertheless, they cannot be said to exceed what may reasonably be considered attainable limits. In the case of hypothesis *B*, *per capita* production would amount

to some 420 kWh (as compared with only 166 in 1965), a figure similar to that recorded in 1950 for Italy and Denmark, but much higher than the corresponding figure for Uruguay, where the current level of *per capita* income is similar to that projected for Colombia in 1965 on the terms of this hypothesis. On hypothesis *A*, *per capita* production would be 570 kWh, or much the same as in France and Holland in 1950.

Another indication of the relatively high level of these projections is constituted by the electrification coefficient they imply. In 1965 this coefficient would be 0.949 according to hypothesis *B* and 1.094 in the case of hypothesis *A* (in comparison with only 0.460 in 1954). These levels are higher than any that the Latin American countries might be expected to record if their product were to grow at similar rates, and approach those registered in 1950 for the most highly electrified countries in the world, where hydroelectric energy abounds.

In this connexion, the local programme drawn up by the Valle del Cauca Corporation (*Plan Regional de la Corporación del Valle del Cauca*) deserves special mention. While the initial stages of the basic studies carried out by this Corporation were taken into account in the preparation of the Electrification Programme, subsequent research, of which only the preliminary findings are available, might lead to important advances upon the electrification targets comprised in the Programme, especially as regards those established for 1960. Furthermore, as a result of the new studies, in which irrigation and flood control requirements have been fully considered, the recommendations as to the proportion of thermic plants might also be modified.

To sum up, therefore, and with a few important reservations, the projections formulated here may up to a point be considered as indicative of maximum levels, and will have to be adjusted compatibly with more exhaustive investigation of the possibilities for investment and its distribution among those fields where it can be turned to best account at the present stage of Colombia's economic development. In this context, special allusion must again be made to the programme of the Valle del Cauca Corporation. This Corporation has undertaken an integrated study of the problem, covering not only the utilization of hydraulic potential for irrigation and energy, but also the need for flood control. Although these objectives had already been borne in mind in the preparation of the National Electrification Programme, the Corporation's subsequent studies, carried out in the light of the prospective programme for its own area, and with fuller knowledge of the technical characteristics of the various projects, entailed significant alterations in the growth rates forecast. As a rule, the new estimates are higher than those of the National Programme, while at the same time they suggest that in the future the proportion of hydro to thermo-electric plants may alter in accordance with the possibilities of putting into operation the various projects for water utilization and development of coal mines. Thus, while the Corporation estimates that by 1970 the Valle del Cauca area ought to possess an installed potential of 783,000 kWh, 73 per cent of which would be on the basis

of hydroelectric plants, for a more or less identical area, the National Programme envisages only 624,000 kWh, with 77 per cent from hydraulic sources.

Total production of electric energy having been projected, the proportions to be supplied by hydraulic energy and by thermic power stations respectively must be determined. As has already been seen, Colombia possesses natural resources for both types of generation, which, although they are not evenly distributed throughout the various areas, would allow a very favourable balance to be preserved in the country as a whole. In fact, as demand is highest in those areas where hydraulic resources are available and the kWh cost of this type of energy is generally cheaper, the majority of the power stations would have to be hydroelectric; but, on the other hand, to supply deficit areas and to strengthen the hydroelectric service by supplementing it at peak hours or at times when the water supply is low, a certain margin of thermic power stations would be necessary. There would be no great difficulty in operating these on the basis of domestic coal in some areas and petroleum derivatives in others.

A study by areas which allowed for these circumstances might well bear out the conclusion that the hydroelectric power stations would have to satisfy approximately three-quarters of the country's demand and the thermic power stations the remainder. Such proportions are consistent with the assessments of the National Electrification Programme.

The Technical Mission studied the energy resources of the various areas, but from the data collected it could deduce no final conclusions as to their optimum utilization. On the basis of the programmes under way and the projects which have been described here, the distribution of hydro- and thermo-electric power stations is calculated up to 1960. From that year onward, it is simply suggested that a study be made of other power stations, existing information on which does not as yet allow estimates to be formulated. The estimate of the number of power stations of each type up to 1965 is therefore approximate, and is based both on local conditions and on the general technical principles that would ensure the provision of a reliable and economic service.

In areas where there is plenty of coal and mining is carried on (the Boyacá and Cali districts, for example), fairly large power stations to be run on coal are envisaged. In the north and north-west, as also in most of the isolated centres of consumption, thermic power stations would be operated on the basis of petroleum. The programme estimates that by 1965 24 per cent of total installed capacity will be of the thermo-electric type.

For the hypotheses used in the present study, this same figure of 24 per cent is adopted in the case where a more moderate rate of growth is assumed, as it approximates more closely to the conditions envisaged in the Programme. In the other instance it is raised to 30 per cent, because greater demand for electric energy would probably be conducive to slightly more intensive development of the contribution of fuels, in preference to the less accessible hydraulic resources which would have to be utilized.

The output of the power stations is estimated on the basis of their capacity, a hypothetical degree of utilization in the course of the year being assigned to each. In the case of combined systems where hydraulic energy is preponderant, the annual utilization of power stations of this type might exceed that of the thermic plants. On the other hand, there would be large areas served entirely by thermic systems with a high rate of utilization, and also exclusively hydraulic systems where certain units would work only at peak hours, with a low average annual utilization rate. It is therefore assumed that the degree of annual utilization would be the same for both the thermo- and the hydro-electric power stations. Hence the output of kWh of both types would be distributed in the same proportion as the installed capacity, that is, on the hypothesis postulating a higher rate of development 30 per cent of total production would be thermo-electric, and on the other only 24 per cent.

In conformity with the general principles of the National Electrification Programme, and on the basis of its recommendations as to the proportion of thermic power stations in the various parts of the country, an outline analysis of the type of thermo-electric power station which might be found in each case, in view of local fuel resources, is presented in table 269.

TABLE 269. COLOMBIA : ESTIMATES OF DISTRIBUTION OF CAPACITY FOR GENERATING ELECTRIC ENERGY

Area	Total capacity in 1965* (Thousands of kW)	Thermic capacity in 1965			
		Percentage	Total	Based on petroleum	Based on coal
(Thousands of kW)					
Centre	499	20	100	10	90
South and west	836	10	85	5	80
North	232	60	140	140	—
North-east	78	20	15	15	—
Isolated areas	147	60	90	80	10
TOTAL	1,792	24	430	250	180

SOURCE : ECLA estimates.

* Recommendations of the *Plan Nacional de Electrificación*.

In accordance with the statistics in this table, 40 per cent of the thermic power station could use coal, the remainder being dependent on petroleum. This was the proportion adopted for hypothesis *B*, while it was raised to 50 per cent in the case of hypothesis *A*, as fuller development of the coal mines was assumed.

Table 270 gives a break-down of estimated electricity production for 1965.

TABLE 270. COLOMBIA : PROJECTIONS OF THE PRODUCTION OF ELECTRICITY, 1965

(Millions of kWh)

	1954	1965	
		Hypothesis A	Hypothesis B
Total	1,950	9,000	6,600
Hydroelectric energy	1,315	6,300	5,000
Thermo-electric energy	635	2,700	1,600
Based on coal	200*	1,350	640
Based on petroleum derivatives	435*	1,350	960

SOURCE : ECLA estimates.

* Estimates.

3. Projections of consumption of vegetable fuels

It has already been pointed out that estimates of total consumption of vegetable fuels in Colombia were made on very unreliable bases. Detailed projections for 1965 cannot therefore be attempted, for which reason a decline of 20 per cent in relation to the 1954 figure is assumed for purely illustrative purposes. This decrease is larger than is envisaged in other Latin American countries,¹⁹ and is established with due regard to the country's greater mineral fuel resources, which will enable it to replace firewood in some local industries and even for household purposes.

4. Projections of consumption of mineral coal

Colombia's abundant coal resources offer scope for substantial future development. Furthermore, the country's natural energy resources are such as to make it desirable that coal be utilized to the greatest possible extent for the satisfaction of domestic consumer requirements. As much of the coal available is of good quality and easily accessible, coal consumption prospects depend entirely upon the absorption possibilities of the domestic market. Consequently, only a few very broad hypotheses are presented here, assuming fairly considerable future consumption. Prospects of attaining this expansion are mainly contingent upon technical improvements in extraction, processing and transport, which would permit of competitive prices. Even if the predicted market should prove large enough for production to be undertaken on a scale that would justify the necessary investment, the achievement of a sizeable export margin would also indirectly help to foster the growth of domestic consumption.

The relevant estimates can be seen in table 271.

TABLE 271. COLOMBIA : ESTIMATES OF NET COAL CONSUMPTION, 1956

(Thousands of tons)

	1954*	1965	
		Hypothesis A	Hypothesis B
Iron and steel industry	150	500	500
Thermo-electric energy	150	900	400
Railways	170	400	300
Industry	550	1,450	1,200
Household use	480	750	600
TOTAL	1,500	4,000	3,000

SOURCE : ECLA estimates.

* ECLA estimates.

Demand on the part of the iron and steel industry was estimated on the basis of existing programmes and on the assumption that 400,000 tons of raw steel will be produced annually, for which 500,000 tons of high-quality coal would be required in 1965. Consumption of mineral coal for the generation of thermo-electric energy estimated in line with the hypotheses previously formulated for production on the basis of this fuel and a thermic yield of 4,500 calories/kWh, which was considered probable for power stations of this type. In order to determine possible coal consumption on the part of the railways, prior knowledge of the probable development of rail traffic and the distribution of the fuels used between coal and liquid derivatives is required.

The prospects of closer economic integration, which will be facilitated by the construction of the Magdalena railway and the junctions with the railway systems on both sides of the river, justify the assumption that the rates of increase of railway activities will be considerably higher than those adopted as averages for the economy as a whole. This fact, in combination with the better yields obtained from diesel traction and the decrease which is sure to be registered in the ratio between gross cargo and net cargo, makes it reasonable to assume that in 1965 the Colombian railways will consume twice as much fuel as in 1954, if the total product grows in accordance with the postulates of hypothesis *B*. This assumption that fuel consumption is likely to be doubled in 1965 is consistent — within the degree of approximation characterizing the estimates in the present document — with traffic forecasts in the study carried out by the Madigan-Hyland South American Corporation, which predicts that by 1963 the freight transported by the national railways will amount to 1,114 million tons/kilometre ; if this figure is added to those for private and departmental railways, the 618 million tons/kilometre registered for 1954 will be doubled by 1963.

On hypothesis *A*, assuming maximum growth of the gross product, railway traffic is taken to be one-third as much again as on hypothesis *B*.

¹⁹ See document E/CN.12/384 (op. cit.).

TABLE 272. COLOMBIA : PROJECTIONS OF CONSUMPTION OF PETROLEUM DERIVATIVES ACCORDING TO HISTORIC TRENDS

(Thousands of tons of petroleum equivalent)

	1954		Average rate of growth in 1944-1954	1965		
	Gross consumption	Basic relationships		Gross consumption	Basic relationships Hypothesis A	Hypothesis B
Petrol	794	16.4 ^a	17.0	4,163	37 ^a	45.6 ^a
Light derivatives	977	53.3 ^b	18.9	5,800	87.2 ^b	87.2 ^b
Heavy derivatives	823	90 ^c	9.4	2,002	70 ^c	91 ^c
Total derivatives	1,800	37 ^a	13.7	6,655	59 ^a	73 ^a

SOURCE : ECLA estimates.

- ^a Petrol as a percentage of total gross energy.
- ^b Light derivatives as a percentage of total derivatives.
- ^c Heavy derivatives as a percentage of coal.
- ^d Total derivatives as a percentage of total gross energy.

Hence it can be inferred that total consumption on the part of the railways might be estimated for 1965 at some 360,000 tons of petroleum equivalent according to hypothesis *B*, and 480,000 on hypothesis *A*.

In 1954, mineral coal accounted for 55 per cent of the railways' total calorie consumption. It is assumed that by 1965 consumption will be equally distributed between mineral coal on the one hand and liquid fuels — almost all heavy — on the other. Although a tendency to substitute diesel for steam engines is observable, this trend may be offset by the availability of coal and its favourable prices.

Industrial consumption of coal is estimated to grow at the same rate as industry itself, that is, by 9.4 and 7.5 per cent annually according to hypotheses *A* and *B*, respectively. It is thought that, owing to the area distribution of coal resources, this fuel may not be superseded by residual petroleum.

Lastly, mention must be made of household consumption. In this sector contradictory factors exist. The replacement of vegetable fuels raises the rate of coal consumption, whereas the increase in the use of refinery gas lowers it. It is therefore estimated that these factors will necessarily cancel each other out and that, ultimately, household consumption of mineral coal will tend to register a growth rate similar to that of national income.

According to the foregoing estimates, total consumption of mineral coal would expand in 1955-65 at annual rates of 7.2 per cent if the conditions of hypothesis *B* were fulfilled, and 10.1 per cent in those of hypothesis *A*. A greater degree of intensity might be considered high but not excessive ; a more precise assessment, however, would have to be based on detailed studies.

5. Projections of consumption of petroleum derivatives

In accordance with the methodology utilized here, projections of net consumption of petroleum derivatives are obtained by deduction, as independent estimates have been formulated for total net energy consumption, for production and consumption of electric energy and

for consumption of vegetable fuels and mineral coal. Thus, figures for petroleum derivatives in 1965 would stand at 4,205,000 and 3,360,000 tons of petroleum equivalent, on hypotheses *A* and *B*, respectively.

As in other cases, the validity of these estimates might be tested by comparing them with the result of an extrapolation of the historic consumption trends noted for the fuels in question. If effective gross consumption in 1954 (1.8 million tons of petroleum equivalent) is taken as a base, the assumption that it will continue to grow at a cumulative rate similar to that registered during the period 1944-54 (13.7 per cent annually) implies that by 1965 gross consumption will absorb more than 6.6 million tons of petroleum equivalent.

For purposes of the following discussion, it is of interest to note the findings of a projection of this kind in greater detail (see table 272).

Clearly, there is a considerable disparity between the estimates obtained by deduction and those based on consumption trends over the last ten years. It is difficult, however, to account for so substantial a difference by means of an analysis of total consumption of petroleum derivatives ; the problem will therefore now be studied from the angle of each of the various types of derivatives.

(a) In the first place the situation with respect to consumption of petrol and light derivatives will be considered. According to the statistics in the foregoing table, a projection of petrol consumption based on historic trends would give an exceptionally high estimate for 1965, *viz.*, 4,163,000 tons of petroleum equivalent, as compared with less than 800,000 tons in 1954. It must be acknowledged, however, that this figure does not greatly differ from the result that would be obtained by projecting the park of motor vehicles in 1965 — on the basis of its growth during recent years at average rates of 13.2 per cent for automobiles, 14.9 per cent for lorries and 10.2 per cent for buses over the period 1948-54 — and assuming that the expansion of unit consumption of petrol will continue at the annual rate of 4 per cent recorded between 1951 and 1954. But in neither case does it seem very practical to base future

estimates on the trends registered in recent years, as is demonstrated by an examination of other significant data. Thus, for example, if the situation of Colombia is compared with that of other countries as regards the ratio between petrol consumption and the *per capita* gross product, it will be seen that the consumption figure attained in 1949-51 was relatively high (see figure XXIV). The discrepancy became still more marked in 1954, when the consumption registered in Colombia was 112 per cent above the level which it should theoretically have reached in consonance with the average ratio recorded for the other countries considered. If, in addition, growth were to continue at as rapid a rate as in recent years, by 1965 consumption would be totally out of proportion to the projection for the gross product, even on the more favourable hypothesis.

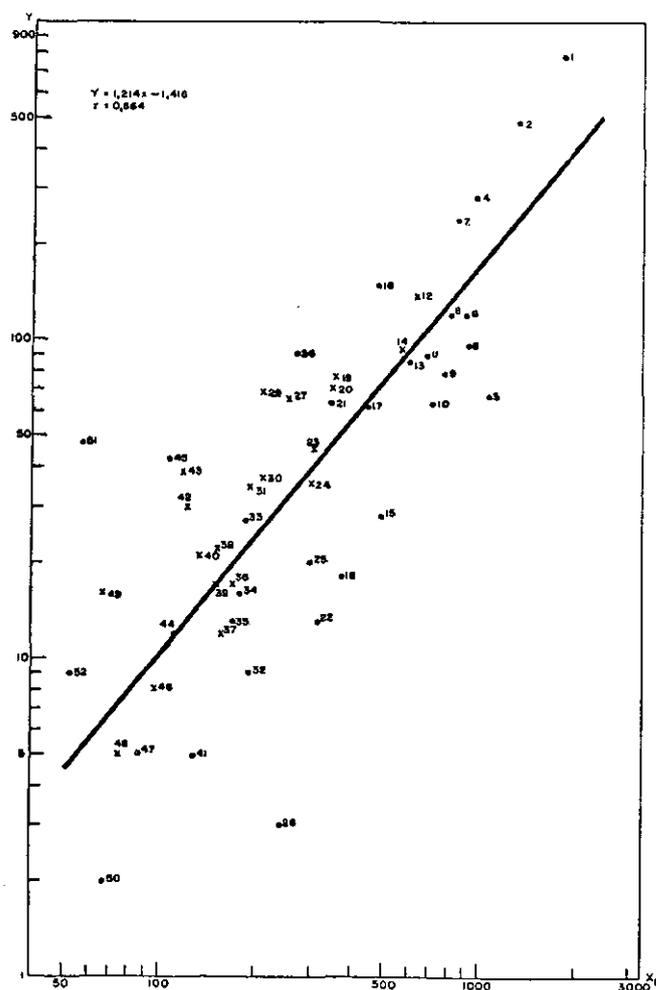
FIGURE XXIV. COLOMBIA: CORRELATION BETWEEN PETROL CONSUMPTION AND *per capita* GROSS PRODUCT

(Average 1949-51)

(Logarithmic scale)

Y = *Per capita* petrol consumption (kilogrammes of petroleum equivalent).

X_1 = *Per capita* gross product (Dollars at 1950 prices).



X = Latin American countries.

o = Non-Latin American countries.

NOTE: For order of countries see list at beginning of study.

Similar conclusions can be deduced from the percentage relationship of petrol consumption to total energy consumption, which fluctuated around 5 per cent in recent years in the countries of western Europe and reached as much as 18 per cent in the United States. In Colombia, the corresponding proportion stood at over 16 per cent as early as 1954, and by 1965 might rise to figures which would range from 37 to 46 per cent (on hypotheses *A* and *B*, respectively).

Hence it seems evident that the trends noted during recent years will be bound to alter considerably, and that it would therefore be unreasonable to take them as a basis for estimates of future petrol consumption. Consequently, the relevant projections will be based on more moderate estimates as to the possible increase in the number of motor vehicles, as well as on a smaller increment in unit consumption of petrol per vehicle. The results of the projections concerned are summed up in table 273.

Although these projections of the number of motor vehicles are much lower than the estimates deduced from recent trends, they imply an expansion of the park which would exceed the growth of the gross product, and may be regarded as consistent with the over-all characteristics of future development postulated in the course of the present study. It should be noted that a relatively more moderate increase in the number of lorries and buses has been assumed, in the light of the ratio between the stock of these vehicles and the number of automobiles registered in other countries.

Consumption of petrol per motor vehicle is also assumed to have risen less than between 1951 and 1954, the annual increment being taken as only 2 per cent.

While the improvement of the motor vehicle park and of the road system encourages the more intensive use of vehicles and therefore tends to raise unit consumption of petrol, such an expansion cannot be maintained indefinitely, and is even apt to give way to a downward movement in countries where the level of development of motor vehicles is advanced. Again, the unit consumption calculated for 1965 (6,608 litres per year for petrol-driven motor vehicles in the aggregate, according to hypothesis *A*, and 6,784 on hypothesis *B*) is already high as compared with figures for other countries where *per capita* income is larger.

In the case of automobiles, the unit consumption estimated for 1965 on the hypothetical bases described above was reduced by 5 per cent, in view of the fact that some of the vehicles imported in the future may be of types that do not consume so much. Furthermore, it is assumed that 30 per cent of the increment in the number of lorries and buses would be run on gas oil. To sum up, total consumption of ordinary petrol by motor vehicles in 1965 is estimated at 1.76 million tons of petroleum equivalent on hypothesis *A* and 1.49 million tons on hypothesis *B*. The amount of diesel oil consumed by motor vehicles — if a diesel engine is taken to consume approximately 75 per cent as much as a petrol-driven engine with the same horse-power — would be 220,000 and 150,000 tons of petroleum equivalent on the respective hypotheses.

TABLE 273 COLOMBIA : PROJECTIONS OF THE NUMBER OF SELF-PROPELLING VEHICLES AND CONSUMPTION OF PETROL, 1965

	Self-propelling vehicles	Lorries	Buses	Total
Number of vehicles :				
Hypothesis A	200,000	113,000 ^a	29,000 ^b	324,000
Hypothesis B	165,000	94,000 ^c	24,000 ^d	283,000
Unit consumption of petrol (Litres/year) :				
Hypothesis A	3,450	11,490	21,000	6,608
Hypothesis B				6,784
Total consumption (Thousands of cubic metres/year) :				
Hypothesis A	690	1,070	500	2,260
Hypothesis B	570	920	430	1,920

SOURCE : ECLA estimates.

- ^a Including 20,000 lorries running on gas oil.
- ^b Including 5,000 buses running on gas oil.
- ^c Including 14,000 lorries running on gas oil.
- ^d Including 3,500 buses running on gas oil.

Total consumption of ordinary petrol was computed by assuming that the consumption of motor vehicles, as in 1951, would be equivalent to 95 per cent of the whole, which would give 1.85 million tons of petroleum equivalent according to hypothesis A and 1.57 million tons on hypothesis B.

No detailed calculation was made for aviation spirit. Consumption represented 13 per cent of the figure for ordinary petrol in 1950 and 8.5 per cent in 1954, so that for purely illustrative purposes a proportion of 10 per cent is assumed for 1965.

Even on these more moderate hypotheses, by 1965 Colombia would register one of the highest relative consumption levels in the world. Petrol would account for between 18 and 19 per cent (on hypotheses A and B, respectively) of gross consumption of total energy, while *per capita* consumption would vary between 130 and 110 kilogrammes of petroleum equivalent. This latter figure would be much higher than would be consistent with the new income levels and the average ratio between energy consumption and the gross product registered for the countries under review in the aggregate. With respect to kerosene and tractorine, it is assumed, purely for the sake of illustration, that increments of 100 and 150 per cent over their 1954 consumption levels would be recorded on hypotheses A and B, respectively.

On the basis of the preceding assumptions, total consumption of light derivatives would amount by 1965 to 2.46 million tons of petroleum equivalent in the conditions postulated by hypothesis A, and 2.07 million tons in the case of hypothesis B, representing respective proportions of 51.7 and 55.8 per cent in relation to total liquid derivatives (with the exclusion of 300,000 tons of natural gas).

Before it was enlarged, the Barrancabermeja refinery was producing light derivatives in the proportion of 25 per cent of the total volume of liquid derivatives ;

in 1955 this share rose to 56 per cent. According to the foregoing estimates, the additional refining capacity to be installed between 1954 and 1965 (including the refinery near Cartagena) should enable 58 per cent of light derivatives to be obtained on hypothesis A and 71 per cent under the terms of hypothesis B.

(b) Heavy derivatives (fuel oil, diesel oil, gas oil and similar products) will now be discussed.²⁰ The direct calculation of possible consumption in 1965, on the basis of the over-all assumptions postulated here, would give the results shown in table 274.

TABLE 274. COLOMBIA : PROJECTIONS OF GROSS CONSUMPTION OF HEAVY DERIVATIVES, 1965

(Thousands of tons of petroleum equivalent)

	Hypothesis A	Hypothesis B
Thermo-electric energy	400	280
Railways	240	180
Navigation	200	170
Industry	1,250	920
Self-propelling vehicles	220	150
Extraction and refining for motors	480	390
	TOTAL	TOTAL
	2,790	2,090

SOURCE : ECLA estimates.

These statistics too are largely residual. It was, for example, in this way that total production of thermo-electricity, and the proportion that would be generated with coal, previously determined for both hypotheses. According to the estimate resulting from the deduction

²⁰ Natural gas, consumption of which is estimated at 350 million cubic metres on hypotheses A and B, is included among heavy derivatives because it will be used mainly as a substitute for fuel oil.

process, 1,350 million and 940 million kWh on hypotheses *A* and *B*, respectively, would have to be produced with heavy derivatives; this, at a rate of 3,200 calories per kWh, would imply a consumption of heavy derivatives amounting to 400,000 tons of petroleum equivalent in the first and 280,000 tons in the second case.

Consumption on the part of railways and road vehicles was determined in the same way. For petroleum extraction and refining the calculation was based on the assumption that these operations absorb 10 per cent of total gross consumption of derivatives.

For shipping, no data exact enough to allow of a fairly accurate computation are available. If the consumption of overseas shipping, which is not reckoned as part of the country's domestic consumption, is excluded, only that of river craft and coastal traffic need be taken into account. A substantial increase is sure to be registered under these heads, although it will probably be less intensive than in the case of motor vehicles and railways. While no attempt will therefore be made at a direct calculation, it is estimated, for purely illustrative purposes, that the consumption in question will rise between 1953 and 1965 by 80 per cent on hypothesis *A* and 50 per cent on hypothesis *B*.

Lastly, the consumption of the industrial sector must be considered, that of other activities being disregarded because it is on a smaller scale and is included within the margins of error of these estimates. To compute industry's possible consumption of liquid fuels — almost all heavy — total consumption of these and other fuels must first be determined. It will be recalled that in 1953 unit consumption of fuels amounted to 693 tons of petroleum equivalent per million pesos (at 1950 prices) of the value of industrial production. In order to project total fuel consumption in 1965, this unit consumption is taken as remaining constant, since the decrease brought about by the more efficient utilization of energy will presumably be offset by the greater activity on the part of basic industries whose energy consumption is high, as in the case of the steel works at Paz del Río. When the unit consumption is related to the value of the gross product as projected for the manufacturing sector on hypotheses *A* and *B*,²¹ estimates of the sector's total consumption in 1965 are obtained; on hypothesis *A* 2.6 million tons of petroleum equivalent would be consumed, and 2.1 million tons on hypothesis *B*.

Consumption of mineral coal has already been discussed in detail. That of vegetable fuels is assumed to undergo a decline in relation to 1953 similar to the postulated decrease in their total consumption. Lastly, consumption of heavy liquid fuels was obtained by deducting the figure for coal and vegetable fuels from the total. The resulting estimates work out at 1.25 million tons of petroleum equivalent in the case of hypothesis *A* and 920,000 tons in that of hypothesis *B*.

It should be noted that in the present study, except where motor vehicles are concerned, no separate consideration is given to consumption of the various medium derivatives (diesel and gas oil and similar products). This

does not, however, imply any disregard of the importance they may acquire; on the contrary, in conformity with the trend noted in all the countries considered and already registered in Colombia at an earlier date, consumption of medium derivatives is likely to increase more rapidly than that of fuel oil, and by 1965 will probably represent a proportion of total heavy derivatives consumption 29 per cent larger than in 1955.

On the basis of these estimates of the increase in consumption of light and heavy derivatives, calculated in accordance with the direct criteria described, total consumption of petroleum and its derivatives is projected at 5.03 million tons of petroleum equivalent on hypothesis *A* and 3.96 million tons in the case of hypothesis *B*. Attention must be called to the very slight differences between these figures — which were finally adopted — and the global calculations mentioned at the beginning of this section.²² According to the estimates in question, total consumption of heavy derivatives and natural gas would reach 2.74 million tons of petroleum equivalent in 1965 according to hypothesis *A*, and 2.05 million tons on hypothesis *B*. This implies annual rates of growth of 8.1 and 11.0 per cent (in 1944-54 the corresponding rate was 9.4 per cent). It is important to stress that the figures for consumption of heavy derivatives and natural gas are conditional upon the fulfilment of the hypotheses envisaged for other fuels. Less extensive use of these latter would cause a greater demand for hydrocarbons, and this would have a direct incidence on exportable surpluses and, possibly, repercussions on the over-all rate of economic development, since, as has been pointed out, the prospects for the capacity to import do not seem commensurate with the requirements likely to derive from the growth of income. Heavier consumption of petrol and other light derivatives would have a similar effect, and so would delay in the construction of hydroelectric plants.

6. *Over-all projections of consumption, available resources and export possibilities*

Table 275 sums up the projections examined in detail in the foregoing paragraphs, taking into account not only the level and composition of the resultant net consumption but also its significance in terms of gross consumption.

From these observations an estimate of the distribution of gross consumption among the main economic sectors can also be deduced (see table 276).

The energy requirements which can be inferred from the preceding projections should now be compared with the country's energy resources and the degree of utilization of such resources which might be attained by 1965, so that the best ways of satisfying demand can be considered and possible exportable surpluses determined. As has been pointed out, the country has ample energy resources in the shape of both hydraulic power and fuels.

²² The figures given there (4.405 and 3.5 million tons of petroleum equivalent) relate to net consumption. In terms of gross consumption — comparable with the new figures examined here — they are equivalent to 5.35 and 4.01 million tons, respectively.

²¹ See Part Two, chapter III.

TABLE 275. COLOMBIA : PROJECTIONS OF NET AND GROSS ENERGY CONSUMPTION, 1965

(Thousands of tons of petroleum equivalent)

	Net consumption			Gross consumption		
	1954	1965		1954	1965	
		Hypothesis A	Hypothesis B		Hypothesis A	Hypothesis B
Petroleum derivatives and natural gas	1,630	4,405	3,500	1,800	5,050	4,010
Light	885	2,010	1,710	977	2,460	2,070
Heavy	745	2,395	1,790	823	2,590	1,940
Coal and coke	787	2,480	1,880	915	2,880	2,190
Vegetable fuels	1,360	1,120	1,120	1,600	1,320	1,320
Fuel for thermo-electricity	-265	-1,010	-600			
Consumption of fuels as such	3,512	6,995	5,900			
Hydro-electricity	88	430	340	553	2,350	1,870
Thermo-electricity	43	185	110			
(Electrification coefficient)	(0.454)	(1.094)	(0.950)			
Total for energy	3,643	7,610	6,350	4,868	11,600	9,390

SOURCE : ECLA estimates.

NOTE : An average of 4,500 calories to generate 1 kWh is calculated for 1954, and 4,000 calories for 1965. For hydro-and thermo-electricity, losses in 1965 are estimated at 15 per cent.

TABLE 276. COLOMBIA : PROJECTIONS OF THE DISTRIBUTION OF GROSS ENERGY CONSUMPTION BY ECONOMIC SECTORS, 1965

(Thousands of tons of petroleum equivalent)

	Hypothesis A		Hypothesis B	
	Consumption	Percentage	Consumption	Percentage
Industry	3,040	26.2	2,460	26.2
Transport	2,850	24.6	2,330	24.8
(a) Self-propelling vehicles and aviation ..	2,170	76.1	1,800	77.3
(b) Railways	480	16.9	360	15.5
(c) Navigation	200	7.0	170	7.2
Energy	1,430	12.3	1,150	12.3
Household and other uses	4,280	36.9	3,450	36.7
TOTAL	11,600	100.0	9,390	100.0

SOURCE : ECLA estimates.

Although the hydroelectric potential has been only very roughly evaluated, it may be asserted that the margin currently utilized represents barely a minimum proportion of total availabilities, and, in view of the relatively favourable geographical location of the resources, the projections formulated here with respect to production of hydroelectric energy over the next ten years might easily be implemented on a basis of waterfalls for primary harnessing.

As regards petroleum, on the other hand, the outlook is at present much more uncertain. Allusion has already been made to the falling-off in the two largest concessions, which together contributed 60 per cent to the total volume of crude petroleum extracted in 1955; some danger exists that their deterioration may shortly reduce the country's output. Hitherto the development of new concessions, still at the drilling stage, has sufficed only to offset this decline. On the other hand, the country

possesses vast areas which are geographically favourable, mining traditions and propitious legislation, so that the prospecting at present under way may well lead to the opening-up of important new oilfields. For example, the *Empresa Colombiana de Petróleo* — the fiscal body which mines the largest concession — has carried out intensive surface prospecting, although drilling on a significant scale began only in 1955.

At all events, in existing conditions, it seems preferable to formulate only very moderate projections of future productions. Domestic demand as estimated for 1965 would absorb between 4.3 and 5.6 million cubic metres of original crude petroleum,²³ and the current rate of

²³ According to the estimates given in table 274, a volume of natural gas amounting to 300,000 tons of petroleum equivalent was subtracted from gross consumption of energy derived from hydrocarbons, and a density of 0.90 and 5 per cent of products other than fuels was assumed.

extraction is 6.3 million cubic metres. Thus, even if the trend towards stabilization registered during the last three years were to continue, there would be no difficulty in supplying the country's demand for crude. The problem consists, however, in ascertaining whether the activities under way, in both the public and private sectors, will enable the exportable surpluses which the country has produced in the past to be maintained and increased. Somewhat arbitrarily, but with due allowance for the immediate situation, two assumptions will be formulated here as to the probable crude petroleum figure for 1965, i.e. : (a) the maintenance of the present export margin of 4 million cubic metres, in addition to the satisfaction of domestic demand, which would require an output of 9.6 million cubic metres on the maximum and 8.3 million on the minimum hypothesis ; and (b) the maintenance, at worst, of the current rate of extraction (6.3 million cubic metres) on both hypotheses, which would mean a drastic reduction of current export figures.

Lastly, the country's total reserves of coal of various types, from lignite to anthracite, are plentiful. Estimates as to their magnitude vary between very wide limits, ranging from 12,000 million tons²⁴ to 200,000 million tons (National Electrification Programme). Extraction at the present time, on the other hand, does not exceed 1.5 million tons, and is confined to the serving of a market restricted to specific areas, as the lack of mechanization in the mines is reflected in costs which preclude long-distance freightage.

The country's increasing degree of industrialization — especially the future development of the domestic iron and steel industry — the expansion of transport services, the establishment of new thermo-electric plants, etc., suggest that domestic consumption in 1965 should be estimated at 3-4 million tons of coal. If to this figure are added export possibilities, which might represent an additional 600,000-1 million tons yearly,²⁵ a probable output of 3.6-5 million tons is obtained for 1965. Such a volume of demand would already be sufficient to finance the necessary investment in mechanization, although it would still be very low in proportion to the reserves mentioned. The explanation lies partly in the known limitations to which the use of coal is subject, and which are due to competition from other sources of energy, especially liquid fuels.

7. Projections of investment requirements in the energy sector

The projections for the production and consumption of energy in its various forms having been formulated, and both domestic supply requirements and export possibilities taken into account, the time has now come to consider the volume of investment which would have to be effected in mining operations, processing plants, electric power stations, transport and distribution systems, etc.

In this connexion, it is also important to stress the illustrative nature of the figures utilized in this study. Clearly, without an exhaustive examination of specific projects and detailed research, nothing can be given here but estimates very broadly indicative of the approximate magnitude of the investment concerned. For this purpose use will be made of certain over-all coefficients obtained from a variety of specific examples, not only in Colombia but also in several other Latin American countries.²⁶

The estimates set forth below represent the net investment requirements which would derive from the working hypotheses. Consequently, such needs as might arise from the replacement of worn-out equipment during the period covered by the projections are not taken into account ; these would have to be met out of normal reserves under the head of amortization.

(a) Consideration may be given in the first instance to the case of electric energy. As has already been shown, by 1965 total electric energy production requirements would reach 9,000 and 6,600 million kWh on hypotheses A and B, respectively, of which hydraulic energy would account for 70 and 76 per cent. If an average domestic load factor of 0.55 is assumed for the year in question, and a margin of reserve equipment representing 20 per cent, installed capacity requirements would range from 2.25 million kW (hypothesis A) to 1.65 million kW (hypothesis B).²⁷

From the preceding totals the utilizable installed capacity existing at the present time would have to be deducted. As will be recalled, towards the end of 1954 total installed capacity amounted to some 362,000 kW for the public services and 92,000 kW provided by installations in various industries ; but of the former only about 338,000 kW could be regarded as effective — that is, susceptible of economic utilization — as the remainder represented obsolete equipment or installations which for various reasons could not really be taken into account. Thus the additional capacity to be installed would be 1.82 million kWh in the conditions postulated

²⁶ See the ECLA study previously cited (E/CN.12/384) for further information on these coefficients.

²⁷ Total installed capacity (C) may be expressed in terms of annual production (P) by means of the following formula :

$$C = \frac{P}{8,760 \times \text{l.f.}} \left(1 + \frac{R}{100} \right)$$

in which R stands for the percentage of reserve equipment (on the basis of the minimum capacity required and l.f. for the load factor (ratio between average and peak hour demands in the country as a whole (see E/CN.12/384, Part One)).

It should be noted that in the over-all plans of the National Electrification Programme an average domestic load factor of approximately 50 per cent is adopted for 1965 and a figure for reserve equipment which declines from 12 per cent of maximum demand in 1960 to 6 per cent in 1970. The possibility that these reserve percentages might seem relatively low for a satisfactory service in a country like Colombia is partly offset by the fact that the estimated load factor is also relatively low. In the upshot, average domestic utilization of equipment in the country (quotient of annual production and installed capacity, both expressed in terms of kWh, is taken to be 4,000 hours, a figure which is identical with the over-all estimates in this study.

²⁴ See E/CN.12/384/Add.1.

²⁵ See Part One, chapter II, for the relevant projection.

by hypothesis *A* and 1.22 million kWh in those of hypothesis *B*.²⁸

As the approximate magnitude of these projections is comparable to the figures envisaged in the National Electrification Programme, and as the break-down of plants by hydroelectric and thermo-electric power stations is also assumed to be similar, the average unit costs adopted for purposes of the programme might also be utilized here. The average cost per kW for the complete National Programme drops from 560 dollars for the period 1954-65 to 467 dollars for 1954-70. The reason is that in the case of a number of projects, by 1965 only certain phases will have been executed, in which overheads and the cost of particular basic works heavily influence the total cost of the first units installed. Moreover, it is estimated that about 60 per cent of such expenditure would have to be effected in foreign currency. If the many promising hydroelectric projects which may be developed, especially in the neighbourhood of large centres like Medellín and Bogotá, are borne in mind, these costs may seem rather high. It should be recalled, however, that the total number of installations projected is so great that during the final stages of the programme less accessible and more costly resources will have to be utilized, and that this will tend to raise average investment during the period.²⁹ It should also be noted that the average mentioned includes the over-all expenditure inherent in a national programme, in which allowance must be made for a certain proportion of important interconnexions, prospecting for resources, standardization of types of installation, preparation for the phases that will have to follow the period under consideration, etc.

The estimate finally adopted represented an average investment of 500 dollars per kilowatt, a figure which is assumed to include the costs of generation, transmission and distribution of energy. This estimate is utilized for both the hypothesis *A* and the hypothesis *B* projections, although in the former case, where the programme concerned would be of more far-reaching scope and the capacity whose gradual installation is projected would be provided more rapidly, the average cost might be rather lower, on account of the more advantageous distribution of initial and overhead expenditure. More optimistic estimates are also adopted as to foreign exchange investment, which it is assumed would cover 50 per cent in the case of hypothesis *B* and 45 per cent in that of hypothesis *A*, due allowance being made for the possibility

²⁸ The new installed capacity established as a target for the period 1955-65 under the National Electrification Programme amounts to 1,454,000 kW, a figure which, as can be seen, approaches more closely to the moderate hypothesis adopted in the present study. In the formulation of the Programme, however, only the 338,000 kW corresponding to public services were reckoned as installed capacity existing in 1954, since provision for future requirements is aimed at eliminating the need for self-supplying installations.

²⁹ As is to be expected, individual cases vary widely. For example, according to estimates prepared by a Colombo-United States firm of consultant engineers, the development of a hydroelectric project in Caldas ("La Esmeralda San Francisco", of 110,000 kW) would cost a little over 300 dollars per kW, distribution included. In reality, this is a case where the hydroelectric resources are very favourable, and there are a good many like it in the country.

that a larger proportion of some of the necessary elements might be domestically produced.

Apart from total costs, it may also be of interest to study the relative importance of generation and distribution, since the sources of financing for these two phases of the project may be different. In the case of the National Electrification Programme, from 18 to 20 per cent of total costs is assigned to distribution; this proportion might be regarded as low, but it is probably attributable to the fact that certain installations, such as distribution centres and urban transmission lines, which in the Programme are classified under the head of energy transport facilities, are in other instances included in distribution. Hence it would seem preferable to break down the cost of 500 dollars per installed kilowatt by 35 per cent for distribution and the remainder for generating plants and transmission lines proper.

(b) In the case of petroleum, both hypotheses postulate an output of crude for the satisfaction of domestic demand in 1965 which falls below the current rate of extraction. If, as is assumed, this latter rate is at least maintained, future supplies would be ensured by the existing installations, so that no new net investment would be required, but only that necessary for the gradual replacement of existing productive capacity, with the inclusion of reserves to cover depletion.

On the other hand, the definitive maintenance of the exportable margin would necessitate additional net investment in the production of crude, estimated at 3,000 dollars for an extraction capacity of 1 barrel/day (with 70 per cent of the expenditure in foreign exchange). Obviously, this figure is subject to very marked fluctuations, in relation to the many different conditions characterizing the petroleum deposits. It was adopted on a basis of comparison with other countries, but an attempt was made to modify it by taking general local conditions into account.³⁰ Estimated consumption of natural gas in 1965 would not imply any very substantial additional investment, since current production greatly exceeds local utilization possibilities, even for the year envisaged. Such investment as was entailed would be confined to transport and distribution facilities which are not taken into consideration.

In either of the hypothetical cases, the refining of crude petroleum would call for heavy investment, as instead of the daily capacity of 43,300 barrels registered by existing plants, 85,000 barrels would have to be produced daily on the hypothesis envisaging slower development and 105,000 on the other.³¹

It may be estimated that the cost of the petroleum refineries which would be built in the country would amount to some 1,000 dollars per barrel/day, in terms of capacity for treatment of crude. In view of the high proportion of light derivatives which would have to be produced, and the consequent need for additional

³⁰ See document E/CN.12/384 for the grounds on which these figures are based.

³¹ At Mamonal, near Cartagena, a foreign company has begun the construction of a refinery of 28,000 BPD at a cost of 30 million dollars, which would ease the investment budget envisaged here in the same proportion.

installations to transform the yield from simple distillation processes, the value adopted is somewhat higher than this average, ranging from 1,100 to 1,200 dollars per barrel/day. When in addition investment requirements for the long-distance transport of refined products are taken into account, the aggregate unit works out at 1,600 dollars per barrel/day, 70 per cent of which would represent the purchase of foreign exchange for imports.

Lastly, the marketing of finished products would also require investment estimated at 1,100 dollars per barrel/day consumed, 50 per cent of which might represent expenditure abroad.

(c) As regards coal, existing productive capacity (1.5 million tons yearly) would have to be rather more than doubled by 1965 in accordance with the more moderate hypothesis, and in the alternative case would need to reach 5 million tons, merely in order to satisfy the domestic demand estimated in the case of both hypotheses. Furthermore, minimum exports of 600,000

tons *per annum* are envisaged, or as much as 1 million tons on the maximum hypothesis.

The expansion of this sector would also involve considerable capital requirements. To judge from the experience of other Latin American countries, about 20 dollars may be considered a reasonable estimate of the investment needed in order to extract 1 ton net yearly, if due consideration is given to the many different factors affecting coal-mining activities.³² Here again, about 50 per cent of this total cost might represent foreign exchange expenditure.

³² At Cerrejón, for example, it was estimated in 1954 that a foreign exchange investment of about 10 dollars, plus 18 pesos spent in the country, would be required to establish an annual production capacity of 1 ton at mines with an approximate capacity of 350,000 tons yearly. (See S. A. Mewhirter, report on *Minas de Carbón de Cerrejón*.) This refers to an entirely new mine in practically unincorporated areas. On the other hand, for mines in the Cauca district where the deposits are relatively near the surface and more readily accessible, it is estimated that investment requirements would amount only to about 10-12 dollars per ton *per annum* (see report by F. W. Petri).

TABLE 277. COLOMBIA : PROJECTIONS OF INVESTMENT IN ENERGY, 1954-65

(Dollars at 1954 prices)

	Unit (Thousands)	Installed capacity				Cost of investment			
		Total				Per unit (Dollars)	Total		
		1954	1965	Increase	For export in 1965		Total	Foreign exchange	Total	Foreign exchange
<i>Hypothesis A</i>									
Electricity	kW	430	2,250	1,820	—	500	225	910	410
Petroleum	BPD ^a								
Production of crude ^b	"	110	165	55	70	3,000	2,100	165	106
Refining	"	43	105	62	—	1,600 ^c	1,120 ^c	99	69
Marketing	"	31	85	54	—	1,100	550	59	30
Coal	ton/year	1,500	5,000	3,500	1,000	20	10	70	35
Total investment								1,303	650
Investment for export								185	116
Investment for domestic supplies								1,118	534
<i>Hypothesis B</i>									
Electricity	kW	430	1,650	1,220	—	500	250	610	305
Petroleum	BPD								
Production of crude ^d	"	110	110	—	35	—	—	—	—
Refining	"	43	85	42	—	1,600	1,120	67	47
Marketing	"	31	65	34	—	1,100	550	37	19
Coal	ton/year	1,500	3,600	2,100	600	20	10	42	21
Total investment								756	392
Investment for export								12	6
Investment for domestic supplies								744	386

SOURCE : ECLA estimates.

^a For a gross consumption of petroleum fuels of 1 million tons *per annum*, a daily production capacity of 20,200 barrels of crude (BPD) was assumed, and a corresponding figure of 19,000 barrels/day as the installed capacity (BPD) for marketing 1 million tons *per annum* net. Where refining is concerned, a gross fuel consumption of 1 million tons *per annum* requires a daily capacity of 22,400 BPD, because it is assumed that only 330 days are worked in the year and that products other than fuels represent 5 per cent of total crude.

^b On the assumption that the current exportable surplus of 70,000 BPD is maintained.

^c Including transport of derivatives to the distribution centres.

^d On the assumption that the current output of 110,000 BPD is maintained.

If the aggregate result of all the estimates listed above is now examined on the basis of the statistics given in table 277, it will be seen that a considerable effort is needed in order to finance an expansion of the productive capacity of the energy sector commensurate with the two hypotheses as to the country's over-all economic development with which the relevant projections have been brought into line. In so far as these considerable investment requirements were consistent with a co-ordinated distribution of the country's total resources, it would not be impossible for such an effort to be made, within reasonable limits. What the hypothetical

calculations do clearly show is that during the next few years the energy sector will probably tend to absorb a much larger proportion of Colombia's total available investment resources than at any time during the last thirty years.³³ The effort in question, together with the high social cost which it implies, would enable the relative backwardness of this sector to be remedied and would ensure energy supplies compatible with the over-all economic development targets established by hypotheses *A* and *B*.

³³ See Part One, chapter II, of this study for the estimates concerned.

Chapter V

THE TRANSPORT SYSTEM IN COLOMBIA

INTRODUCTION

The object of the present chapter is to make a general survey of the most outstanding features of the transport system in Colombia and of this sector's contribution to the country's economic development, as well as of the part it may play in economic growth during the next few years.

The heavy investment placed in the transport sector during the period analysed in the present study — especially that effected during the late 'twenties (mainly in railways) and the whole of the 'thirties (chiefly in roads) — represented a high social cost for Colombia. But at the same time, it played an important part in the achievement of greater economic integration and the formation of markets large enough to allow many commodities to be produced on an economic scale. It may therefore be affirmed in this connexion that Colombia's rate of economic development must have been closely bound up with the expansion and improvement of transport facilities. Moreover, an examination of the country's geographical features suffices to give a clear idea of the exceptional proportions which the problem must attain in such conditions.

One of the main conclusions to be derived from the analysis contained in the following sections is that thanks to all the efforts made in previous periods the problem nowadays presents itself in much more favourable terms. With a body of basic works — in the fields of both rail and road transport facilities — already completed or under way, the main requirements for the near future seem to consist not so much in a considerable expansion of these basic means of communication as in the integration and satisfactory maintenance of the system, together with its more efficient utilization by means of increased availabilities of road vehicles and rolling-stock. Although for this purpose fairly substantial investment will still be necessary, the proportion of the country's total investment which it will represent will probably be lower than in the past. A clear idea of its former relative importance is given by the fact that such investment was higher than that effected in the whole of the manufacturing sector in each of the years between 1925 and 1944.

The importance of transport for the development of the Colombian economy has been reflected in the carrying-out of a number of special studies, as well as in the formulation of various national and local programmes. In a sense, the discussion which follows will do no more than bring their content up to date and show transport problems in relation to those of the rest of the national economy and, consequently, to development prospects.

The first section will describe the general features of the evolution and present situation of the transport system as a whole and of its main components, viz., railways, roads and motor transport, inland waterway and maritime transport, air transport and oil pipelines. The relationship of the transport sector to the national economy as a whole will next be discussed, with particular reference to its contribution to the total gross product and its share in investment and the stock of capital. Lastly, some indications will be given as to transport prospects, in accordance with the over-all hypotheses adopted throughout the study, mainly for purposes of estimating the approximate volume of the investment required, and comparing it with the projections of the total investment resources which the country will have at its disposal.

I. GENERAL CHARACTERISTICS OF THE EVOLUTION AND PRESENT SITUATION OF THE TRANSPORT SYSTEM

1. *General characteristics of the system as a whole*

Mention has already been made of the large sums invested by Colombia in the creation and expansion of the transport system. Unfortunately, until not long ago most of this investment was effected without proper co-ordination under over-all programmes, and this led to the dissipation of funds and therefore to a relatively low yield from the capital utilized. Moreover, the fact that such investments were largely determined by the requirements of given areas or purely local and circumstantial needs, rather than by an order of priorities established at national level, gave rise to one of the principal defects of Colombia's transport system, namely, its lack of integration.

The population nuclei, which at the same time constitute the most important economic centres of production and consumption, are to be found on lofty plateaux or in valleys divided by the high mountains of the three ranges into which, in Colombia, the Andean Cordillera splits up. This characteristic has combined with the lack of integration and high costs of the internal transport system, of which mention has already been made, to minimize commercial dealings between one area and another, trade being largely confined to the transactions conducted within any given zone. Traffic among different areas, as well as part of that connected with the country's foreign trade, is rendered possible in many cases only by the use of two or more means of transport, involving costly trans-shipments and the consequent delays.

The main technical problem in overland transport is the mountainous topography of the Colombian territory, which necessitates lay-outs with steep gradients, curves of small radius, narrow roads and tracks, etc., entailing high construction costs. Where such drawbacks exist, the transport capacity of the means of communication concerned is considerably reduced by the limitations thus imposed on the speed and weight of the trains or other vehicles using them. Defects of the kind described are inevitably reflected in heavy maintenance costs, which in their turn result in high tariffs; the position is also seriously aggravated by the extra costs deriving from the unavoidable trans-shipments, as well as from the low density of the traffic flows and the lack of balance between them.

To all these factors must be added the substantial percentage of goods lost in trans-shipment through either damage or theft, and the consequent high insurance rates, which lay a heavier financial burden on the user of the transport services. Clearly, then, although the transport system in Colombia has helped the country to reach the present stage of economic development, it has not yet ceased to constitute an obstacle to more rapid growth and more complete economic integration.

The unfavourable influence exerted by the deficient means of communication on the cost of raw materials and manufactured goods is patent in its bearing on Colombia's foreign and internal trade alike. Thus the

solution of the transport problem is an essential prerequisite for the continued development of the Colombia economy.

Furthermore, an appreciable improvement in the transport system, especially where overland transport is concerned, might possibly contribute to the expansion of the tourist industry, a by no means negligible source of foreign exchange.

The peculiar conditions affecting transport in Colombia have led to an unusual distribution of freight and passenger traffic among the various means of transport, high percentages being absorbed by road traffic and airlines (see table 278).

Motorized and air transport have made striking progress with respect to medium-distance and long-distance goods traffic, in both absolute and relative terms. By 1946, in fact, according to approximate estimates, the former absorbed 36 per cent of the total tonnage transported and 21 per cent of the tonnage per kilometre, while during the pre-war period — that is, in 1938 — the proportions for which it accounted were only 29 and 17 per cent, respectively. In 1954, the corresponding figures attained 63 and 40 per cent, thus demonstrating the considerable importance of road traffic.

The relative position of air freight in total traffic gained in importance to a similar extent, although its significance as a component of the transport system

TABLE 278. COLOMBIA : FREIGHT AND PASSENGER TRAFFIC, BY TYPES OF TRANSPORT

	1938		1946		1954	
	Tons (Thousands)	Tons/kilometre (Millions)	Tons (Thousands)	Tons/kilometre (Millions)	Tons (Thousands)	Tons/kilometre (Millions)
A. Freight :						
Rail	3,144	301	4,543	558	4,744	618
Motorized ^a	1,760	176	3,370	337	11,720	1,172
Air	6	2.8 ^b	35	17	134	64
Inland waterway	917	413 ^b	1,242	555	1,775	897
Coastal	188	150 ^c	162	130 ^c	180	153
Overhead cable	76	3.5	45	2.5	38	2.4
TOTAL	6,091	1,046.3	9,397	1,599.5	18,591	2,906.4
B. Passenger : ^d						
Rail	12,326	480	18,480	838	11,963	674
Air	63	22 ^e	312	108	979	426
Inland waterway	152	41 ^f	218	67	283	80
Overhead cable	64	1	1	0	—	—
TOTAL	12,605	544	19,011	1,013	13,225	1,180

SOURCE : *Anuario General de Estadística (Yearbook of foreign trade)*.

^a Estimate based on the number and capacity of the vehicles registered and on the average length of run. (See footnote 8 to the present chapter for the method of calculation.) ^b Estimate based on an average freight run of 500 kilometres. ^c Estimate based on an average freight run of 450 kilometres. ^d Estimate based on an average freight run of 800 kilometres. ^e Excluding motorized transport. ^f Estimate based on an average freight run of 350 kilometres. ^g Estimate based on an average freight run of 270 kilometres.

decreased substantially in absolute terms. The proportion of the aggregate tonnage absorbed by air transport increased from 0.1 per cent in 1938 to 0.4 in 1946 and 0.7 in 1954, while its share in the tonnage per kilometre rose from 0.3 to 1.1 and 2.2 per cent, respectively. Despite the high tariffs for this means of transport, the volume of goods carried by air is relatively large on account of the country's topography and the shortcomings of the other means of communication. Very heavy or bulky goods and those of low unit value, which ought normally to be conveyed by rail, road or inland waterways, are fairly often flown to their destination. A typical case, among the many that might be cited, is that of the cattle taken by plane from the stock-breeding area round about Villavicencio to the consumer centre constituted by Bogotá and its environs.

As has already been pointed out, motorized transport deals with a substantial proportion of goods traffic; the consequent increase in its relative importance was secured at the expense of the railways. In the pre-war period, these latter had carried somewhat more than half the tonnage transported, whereas in 1954 they handled only one-quarter. A somewhat smaller reduction can also be noted in the tons/kilometre transported.

Although on a much more limited scale, the relative importance of transport by inland waterways within total goods traffic also declined. In absolute terms, however, a fairly considerable increase in the volume of cargo carried by this means is observable. Transport by overhead cable perceptibly declined in both absolute and relative terms, while as regards coastal traffic, its volume remained the same, but its relative position deteriorated. The oil pipeline network is a highly important component of the goods transport system in Colombia. Nevertheless, owing to its highly specialized nature, it was not included in the relevant table. In 1950, the oil pipelines carried approximately half the total tons/kilometre of freight.¹ The addition of further oil pipelines to the system already in existence at that date gives grounds for the assumption that their relative importance has since been maintained.

The noteworthy development of motorized and air transport is even more marked where passenger than where goods traffic is concerned. The total absence of statistical data on passenger transport by road makes a precise assessment of the expansion impossible; study of table 278, however, suggests that on a conservative estimate it attained over 6 million passengers. In fact, if it is taken into account that demand for this kind of transport is, as will be seen later, extremely high in Colombia, it seems permissible to assume that the total number of passengers carried in 1954 must have been not only as great as in 1946 but considerably in excess of the earlier figure. Even on the extreme hypothesis that passenger traffic had not increased at all, the decline recorded by the railways, on which 6.5 million fewer passengers travelled, must have corresponded to the larger quota absorbed by motorized transport. The longer average run per passenger on the railways confirms

this assumption, as it is a well-known fact that road transport competes advantageously with rail traffic over relatively short distances.

The increase in the number of passengers utilizing the country's internal airlines was also considerable. In 1953, it amounted to over a million, though a slight decline was to be noted in 1954. From the point of view of traffic per kilometre, the significance of the figures registered for air transport is approaching that of transport by rail.

At the present time various programmes are under way for the improvement of roads, railways, airports and port facilities, the completion of which will represent solid progress towards a better integration of the transport system. In subsequent years, the full implementation of these programmes and the growing need for capital in other sectors of the economy are likely to reduce the relative importance of investment in this branch of development. Nevertheless, basic investment in the transport sector, both in construction and in road vehicles and rolling-stock, will be considerable during the next twelve years.² It is considered that such investment should be primarily directed towards improving the quality of the existing facilities and securing a higher degree of efficiency in their utilization. Some new mining enterprises (Valle del Cauca, Cerrejón) might require the construction of interconnecting roads or railways; on the other hand, prospects for the expansion of agricultural production seem to lie in the development of areas already incorporated into the economy and possessing basic transport networks, so that further programmes of far-reaching scope would probably be unnecessary, although some interconnexions might be needed. Thus the current structure of the transport system, together with the programme for its improvement now in course of execution, may be estimated to be capable of meeting traffic requirements at least in the near future. It must be pointed out, however, that at the present time the transport system covers little over 40 per cent of Colombia's total area, while the remainder, where the population density is extremely low and development is barely beginning, is served by only a few inland waterways — tributaries of the Amazon — and infrequent airline communications with the rest of the country.

2. Railways

From 1946 onwards, the importance of rail traffic in relation to the other means of transport underwent a marked decline. In the pre-war period half the freight tonnage was carried by rail. The enforced restriction of imports of motor vehicles, spare parts and accessories kept the railways in the ascendant, but in the post-war years it was already possible to note that the substantial traffic increment was absorbed largely by motorized transport and in a lesser degree by river and airlines. Revenue-earning goods traffic on the railways remained relatively stable, showing only slight fluctuations; during the interval between 1946 and 1954, the tonnage transported increased by 4.4 per cent and the corresponding

¹ See the report of the International Bank Mission, *The basis of a development program for Colombia* (Bogotá, 1950).

² See section III of the present chapter.

TABLE 279. COLOMBIA : REVENUE-PRODUCING RAIL TRANSPORT ^a

	Freight traffic			Passenger traffic		
	Tons (Thousands)	Tons/ kilometre (Millions)	Average length of run	Passengers (Thousands)	Passengers/ kilometre (Millions)	Average length of run
1938	3,144	301	95.7	12,326	480	38.9
1946	4,543	558	122.8	18,480	838	45.3
1948	4,481	576	128.5	17,609	816	46.3
1950	4,626	558	120.6	15,202	743	48.9
1952	4,579	551	120.3	13,616	694	51.0
1954	4,744	618	130.3	11,963	674	56.3

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.

^a Tariff-paying freight and passengers.

tonnage per kilometre by 10.8 per cent, figures which at the same time indicate that the average run was longer (see table 279).

The small percentage increases recorded are in marked contrast with those registered for motorized, air and inland waterway transport. Passenger traffic reveals more clearly still the decline undergone by the railways, as it decreased not only in relative but also in absolute terms ; indeed, the number of passengers and passengers/kilometre transported in 1954 amounted to barely 64.7 per cent and 80.4 per cent, respectively, of the corresponding figures for 1946. It must be noted that these changes relate, in the case of both goods and passenger traffic, to the Colombian railways taken as a whole ; as will be seen later, an analysis of the situation of the various companies reveals wide divergences.

The construction of the various lines making up the Colombian railway network was dictated mainly by the desire to link the Caribbean and Pacific ports, as well as those on the River Magdalena, with the inland centres of population and production. The unco-ordinated fashion in which these lines were built on account of the economic and topographical factors already described, gave rise to a railway system of which the main characteristic is its lack of integration. Within it, in fact, can be distinguished two entirely unconnected networks, and four isolated lines.

The western network is the most important as regards traffic density ; it consists of the *Ferrocarril del Pacífico*, including the Caldas line, operated by the *Ferrocarriles Nacionales*, and the *Ferrocarril de Antioquia*, run by the Department of the same name. In 1954, these railways comprised in all 1,226 kilometres of main and 54 kilometres of branch lines. The system they form links up the towns of Cali, Medellín and Manizales, as well as others of lesser importance, with the port of Buenaventura, on the Pacific, and with Puerto Berrío, on the River Magdalena ; on it about 60 per cent of goods and 50 per cent of passenger traffic are carried.

The eastern network is composed of four railways connecting Bogotá with the towns of Barbosa, Sogamoso, Puerto Salgar — on the River Magdalena — and Neiva, and another two lines linking Puerto Salgar with Ambalema and Ibagué. In 1954, it totalled 1,210 kilometres of main and 52 kilometres of branch lines, which absorbed

rather more than one-fourth of goods and a little over one-third of passenger traffic.

Of the four isolated lines, the most important, owing to the nature of the traffic it carries, is that connecting the port of Santa Marta, on the Caribbean, with the town of Fundación ; the company concerned possesses 95 kilometres of main and 58 kilometres of branch lines which traverse the banana-growing area and collect up the bananas that are exported via Santa Marta and constitute the bulk of the freight carried by this railway. Next in importance comes the *Ferrocarril del Norte Sección 1ª*, which joins up Bucaramanga with Puerto Wilches, on the Magdalena, and covers a distance of 117 kilometres. The 63-kilometre *Ferrocarril de Cúcuta*, on the Venezuelan frontier, is of scant importance within the Colombian railway system. Lastly, the *Ferrocarril de Nariño*, which links the port of Tumaco, on the Pacific, with El Diviso, in the south of Colombia, near the frontier of Ecuador, carries very little either goods or passenger traffic. It comprises 106 kilometres of main and 5 kilometres of branch line. Because of its low traffic density, a decision has been reached to pull up the track and turn the permanent way into a road.

From this description the lack of integration characterizing Colombia's railway network is clearly evident ; nevertheless, it should be noted that the *Ferrocarril del Atlántico*, which is at present under construction and to which detailed reference will be made later, starts from Puerto Salgar — where it joins up the Cundinamarca and La Dorada railways — continues northward to make a junction at Puerto Berrío with the *Ferrocarril de Antioquia* — thus linking up the eastern and western networks — and then connects at Puerto Wilches with the *Ferrocarril Norte Sección 1ª* and at Fundación with the Santa Marta line, thus considerably improving the degree of integration of the railway network.

Apart from the actual physical gaps between the various networks, the gauge on the majority of the tracks is one yard, while on others it is one metre, a feature which of course aggravates the lack of unity of the railway system. With a view to the elimination of this negative factor, the International Bank Mission which visited Colombia in 1950 recommended that the gauge of the two 1-metre networks serving Bogotá (*Norte 2ª-Sur* and *Noreste*) should be changed. This

work was largely carried out in February 1952, and was completed in 1953. There are still two isolated lines with 1-metre gauges, namely, the *Ferrocarriles de Cúcuta* and *Norte Sección 1ª*. The latter, when incorporated with the rest of the railway network by means of the Magdalena railway, will also necessarily have to adopt the one-yard gauge.

The relative decline noted in railway traffic is mainly due to the development and increasingly keen competition of other means of transport, especially motor vehicles and aircraft. The intervention of various adverse factors in the exploitation and operation of the railways has allowed motorized and air transport to encroach upon a field where normally rail transport is more economic. Geographical, topographical and weather conditions are among the main sources of difficulty. Most of the large inland towns are located at altitudes ranging from 1,000 to 2,800 metres, and between them lie deep valleys. Consequently, the railways generally include sectors where steep gradients, in some cases reaching 4.6 per cent, have to be climbed.³ Moreover, the country has as yet few trading centres where a great deal of traffic is concentrated, so that the density is low on some lines. This circumstance is often aggravated by the existence of roads running parallel to the permanent way.

The International Bank Mission and a Technical Assistance Administration expert⁴ pointed out that some organizational defects also constituted negative factors; although the *Ferrocarriles Nacionales* had an administrative council, each enterprise acted under the jurisdiction of a General Manager and was run as an independent body, a situation which was the very reverse of the co-ordination that should characterize a railway system.

Other drawbacks derive from the method of remuneration and the pensions system, which enables an employee to retire at any age, after a period of service varying from 15 to 20 years, and receive until the end of his life a pension equivalent to 80 per cent of the last salary he was paid. This system induces personnel to retire unduly early, precisely at the time when their technical knowledge, age and physical condition would give the maximum yield.

The engines and rolling-stock in use are not sufficiently standardized. A case in point is that of locomotives. The 23 engines in service on the Cundinamarca railway in 1953 included 12 different types. This factor, combined with the lack of inter-connexion between the networks, is of importance from the standpoint of economic exploitation; the absence of uniformity in the equipment utilized renders maintenance costs excessively high, and the want of cohesion in the railway system necessitates costly trans-shipments which often give rise to loss or damage of goods, as well as to delays.

The existing traction equipment and rolling-stock have in most cases been in use for too long a time. The traction power of the engines is very moderate and the capacity of the rolling-stock, for both goods and passengers,

relatively low. Table 280 shows stocks of railway equipment in 1938, 1946 and 1954.

It can be seen that while some companies considerably increased their equipment, others reduced it or barely maintained it at the same level. If the railways are considered as a whole, a perceptible expansion of freight equipment may be noted, as regards both the number of wagons and their average capacity, while passenger equipment, on the other hand, can be seen to have decreased. This is consistent with the variations registered in these two types of traffic during the period analysed.

The rotation period of the goods wagons — that is, the interval between two successive loads — is unduly long, apparently because of the frequent delays involved in unloading. The remedying of this defect, together with an increase in the speed of the trains and more efficient time-table arrangements, might at least notably mitigate the present shortage of material. Similarly, passenger equipment might be utilized to better advantage if certain unsatisfactory operational practices were altered, as, for instance, the distribution of the coaches in passenger trains, which is such as to render uncoupling and recoupling necessary every time a change of direction occurs.

The shortage of rolling-stock is further aggravated by the high proportion of such material which is invariably under repair. According to official statistics, in 1949 the percentage of locomotives out of service ranged from 13 to 44 per cent, according to the networks concerned, the average being 21 per cent. The cause of this anomaly lies essentially in the low output of the machine-shops, which in turn derives from failure to organize the work scientifically, from widely-scattered locations and from lack of specialization.

The unsatisfactory upkeep of the permanent way is a factor of particular importance, in view of the characteristics of the lay-out and of the ground traversed, which is largely made up of unstable elements. The frequent tropical rains readily account for the difficulty of keeping means of communication open all the year round; landslides and floods are common occurrences. Hence railway maintenance costs are excessively high. Even without a system of signals, the upkeep of the permanent way absorbs from 18 to 38 per cent of total operational costs on the principal networks.

The various negative factors described are reflected in the low quality of the services offered to the public and to the economy as a whole. The commercial speed of the trains is very low; for passengers it seldom exceeds 30 kilometres an hour, and if it is recalled that the distances between the large towns vary from 200 to 500 kilometres, the growing preference for air or motorized transport will easily be understood.

As a general rule, traffic density is decidedly low, although there are wide disparities among the various lines in this respect. As regards goods traffic, the highest density is recorded on the *Ferrocarril de Antioquia*, where the figure registered in 1954 was 404,000 tons/kilometre per kilometre of track. Next came the *Ferrocarril del Pacífico* with 291,000. It was on the Nariño line that goods traffic density was lowest, amounting to only 15,000 tons/kilometre per kilometre of permanent way;

³ The Facatativa-Girardot sector on the Girardot-Tolima-Huila railway.

⁴ See *Contabilidad, precios de costo y tarifas de los ferrocarriles en Colombia* (ST/TAA/J/COLOMBIA/R.4), 1953.

TABLE 280. COLOMBIA : RAILWAY EQUIPMENT

	Locomotives			Goods wagons					
				1938		1946		1954	
	1938	1946	1954	Number	Capacity	Number	Capacity	Number	Capacity
Central *	100	123	98	1,045	23,445	1,294	30,458	1,460	38,800
Nariño	4	5	9	32	600	46	1,135	77	1,920
Norte Seccion Ia.	10	10	16	96	2,113	89	1,907	141	3,440
Pacífico-Caldas	89	89	101	777	18,971	933	32,788	1,462	36,718
Santa Marta	15	12 ^b	19	572	9,152	149 ^b	2,547 ^b	635	12,852
Ambalema-Ibagué	7	7	9	32	780	57	1,295	57	1,270
Antioquia	45	46	54	396	8,180	542	13,684	751	19,826
Cartagena	9	10	—	142	2,240	96	1,794	—	—
Cúcuta	13	20	11	102	1,210	92	1,283	71	956
La Dorada	13	12	12	130	2,435	141	2,846	151	3,182
TOTAL	316*	334	329	3,592	73,405	3,439	89,737	4,805	118,964

	Passenger coaches and restaurant cars						Railcars, trailers, ambulance coaches					
	1948		1946		1954		1938		1946		1954	
	Number	Capacity (Passengers)	Number	Capacity (Passengers)	Number	Capacity (Passengers)	Number	Capacity (Passengers)	Number	Capacity (Passengers)	Number	Capacity (Passengers)
Central *	300	15,999	279	14,427	267	13,293	12	227	39	1,296	28	990
Nariño	12	720	7	360	7	316	5	17	—	—	—	—
Norte Seccion Ia.	14	744	14	744	10	508	6	92	3	70	1	18
Pacífico-Caldas	149	6,949	147	6,891	155	7,146	57	230	23	702	21	1,034
Santa Marta	31	1,550	31 ^b	1,729 ^b	36	1,800	42	126	—	—	—	—
Ambalema-Ibagué	8	385	11	510	9	465	3	39	3	25	2	20
Antioquia	86	3,857	76	3,410	91	4,072	14	82	17	83	28	177
Cartagena	10	529	6	300	—	—	5	80	4	84	—	—
Cúcuta	14	600	17	848	19	950	3	20	5	99	3	14
La Dorada	16	470	16	792	16	792	3	18	—	—	2	37
TOTAL	656*	32,703*	604	30,011	610	29,342	153	984	94	2,359	85	2,290

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.

* Including the following lines : Girardot-Tolima-Huila, Nordeste and Norte 2° Sur.

^b 1945.

° A few small railways not listed in detail are included in the total.

this figure alone suffices to explain the decision to pull up the track in question and turn it into a road. With respect to passenger traffic, the highest density was to be observed on the central lines serving Bogotá (254,000 passengers/kilometre per kilometre of track) and on the *Ferrocarril del Pacífico* (278,000). Here again it was the Nariño line that showed the lowest density (40,000 passengers/kilometre per kilometre of track). The respective figures per kilometre of permanent way registered for the railway system as a whole in 1954 were 206,000 tons/kilometre and 226,000 passengers kilometre. Table 281 presents, for purposes of comparison, the traffic density registered in other countries, the statistics given being those for the United States, for European countries with high and low traffic densities and for two other Latin American countries.

Table 281. RAIL TRAFFIC DENSITY IN SELECTED COUNTRIES, 1954

	Passengers/ kilometre per kilometre (Thousands)	Tons/ kilometre per kilometre (Thousands)	Total traffic units per kilometre (Thousands)
Belgium	1,508	1,171	2,679
Brazil *	290	229	519
Colombia	226	207	433
Chile	332	393	725
Spain	599	538	1,137
United States ...	123	2,095	2,218
Norway	356	238	594
United Kingdom	1,082	1,172	2,254

SOURCE : Official statistics.

* 1953.

It has already been pointed out that the evolution of traffic during the period under consideration differed widely from one company to another. The increase in

goods traffic on western network, particularly the *Ferrocarril de Antioquia*, was considerably above the average. The diversion of Cundinamarca's imports to the port of Buenaventura, on account of the difficulties presented by navigation on the upper reaches of the Magdalena, was the decisive factor in the expansion of traffic on the *Ferrocarril del Pacífico*. Furthermore, it should be noted that this railway notably improved its organization, and brought its material up to date by the introduction of diesel equipment. The Santa Marta railway also registered a substantial increment in goods traffic, deriving from the progressive growth of banana exports. On the contrary, the railways composing the eastern network witnessed decreases of about 25 per cent in their goods and approximately 40 per cent in their passenger traffic between 1946 and the end of the period under review. These, incidentally, are the railways which are faced with the keenest competition from road and air transport.

Productivity on the Colombian railways is comparatively low, although a distinct improvement is to be noted, especially in relation to the pre-war period (see table 282).

The peculiar topographical and climatic conditions prevailing in Colombia have an adverse effect on productivity. The table shows the statistics for Chilean railways, where the northern network (*Red Norte*) displays lay-out and traffic density characteristics similar to those of some of the Colombian lines. From these figures an idea can be formed of the relatively low productivity of the latter. Tariffs have not been raised in conformity with the increment in costs and the overall rise in prices (see table 283).

The tariff structure is distinctly complicated. Varying tariffs are in force on the various networks, and there are even some lines which charge differential rates for the upward and downward journeys. Neither are goods classified under a uniform system, so that there are certain commodities which on some lines pay the rates for one specific category and on others are placed in

TABLE 282. COLOMBIA AND CHILE : PRODUCTIVITY PER RAILWAY EMPLOYEE

	Colombia			Chile 1954 *
	1938	1946	1954	
Average number of personnel	14,615 ^b	17,670 ^c	14,708 ^c	23,956
Length of track (kilometres)	2,673 ^d	3,066	2,986	4,894
Total number of trains/kilometre (thousands)	6,409 ^d	8,532	10,107	...
Total number of units of revenue- producing traffic (thousands)	693,271 ^d	1,396,410	1,291,943	3,546,850
Employees per kilometre of track ..	5.47	5.76	4.92	4.89
Trains/kilometre per employee	438.5	482.8	687.2	...
Units of revenue-producing traffic per employee	47,435	79,027	87,839	148,057

SOURCE : For Colombia : statistical yearbooks. For Chile : data supplied by the *Empresa de Ferrocarriles del Estado*.

* Northern and southern networks of the *Empresa de Ferrocarriles del Estado*.

^b Personnel on 31 December 1938 (excluding some railways which supplied no data).

^c Average based on the number of day-wages and days paid.

^d Excluding the railways referred to in b.

TABLE 283. COLOMBIA : CHANGES IN AVERAGE
RAILWAY TARIFFS
(Colombian cents)

	Income per ton/kilometre		Income per passenger/ kilometre	
	Nominal	Cents at 1938 prices ^a	Nominal	Cents at 1938 prices ^a
1938	1.03	1.03	5.62	5.62
1946	1.39	0.76	5.93	3.26
1954	2.14	0.46	10.01	2.17

SOURCE : ECLA, on the basis of official statistics.

^a Deflated on the basis of the Bogotá provision market price index.

different category altogether. Again, special tariffs are fixed for a number of products. In table 284 an attempt is made to show the limits between which tariffs range on the principal lines of the railway network.

All these adverse factors in conjunction are reflected in high operational costs which the tariffs have not been sufficient to absorb completely. Furthermore, it is chiefly of the freight paying the highest tariffs that the railways have been deprived by competition from other means of transport. Thus the financial results of their operation have been increasingly unsatisfactory, until actual deficits have been registered, although the balance-sheets include no reserve for amortization to cover the wearing-out and depreciation of the rolling-stock and fixed installations.

TABLE 284. COLOMBIA : FREIGHT CHARGES FOR SELECTED PRODUCTS ON THE LINES AND FOR THE DISTANCES SHOWN
(Colombian pesos per ton)

	Pacífico		Cundinamarca		Noreste		Antioquia	
	100 kilometres	200 kilometres	100 kilometres	200 kilometres	100 kilometres	200 kilometres	100 kilometres	200 kilometres
	Fertilizers	5.00	8.00	4.50	7.50	4.30	7.30	9.90 ^a	16.90^{a}
Sugar	7.50	13.00	10.80	19.80	5.30	9.30	6.90 ^b	12.90 ^b
Coal (full loads)	8.50	16.50	8.50	15.50	5.50	10.50	7.80 ^a	13.80 ^a
Cement	8.50	15.50	8.50	15.50	6.50	11.50	5.20 ^b	9.20 ^b
Heavy fuels (A.C.P.M., fuel oil)	180 ^c	360 ^c	200 ^c	400 ^c	150 ^c	300 ^c	8.10 ^a	15.60 ^a
Oats	8.50	15.50	8.50	15.50	7.30 ^d	13.30 ^d	5.60 ^b	10.60 ^b
Barley	10.80	19.30	10.80	19.80	6.10 ^a	10.90 ^a	9.90 ^a	16.90 ^a
Cotton textiles	13.25	23.75	17.00	32.00	8.50 ^d	15.50 ^d	6.90 ^b	12.90 ^b
Wine	14.75	26.75	19.30	36.30	7.10 ^a	12.70 ^a	9.70 ^b	17.70 ^b
					9.80 ^d	17.80 ^d	17.30 ^a	31.30 ^a
					8.20 ^a	14.60 ^a	10.70 ^b	19.70 ^b
					8.20 ^a	14.60 ^a	26.30 ^a	49.30 ^a
							11.70 ^b	21.70 ^b

SOURCE : Freight schedules of the *Ferrocarriles Nacionales* (June 1953) and the *Ferrocarril de Antioquia* (September 1952).

- ^a Upward journey
- ^b Downward journey.
- ^c Freight by rail tank car.
- ^d From south to north.
- ^e From north to south.

In 1953 and 1954, the Colombian railways as a whole registered profits of 4.3 and 2.4 million pesos, respectively. These profits, however, were attributable only to the departmental and private railways, as the *Ferrocarriles Nacionales* continued to show a deficit, which amounted to one million pesos in 1954 (see table 285).

During the pre-war period and the early post-war years 70 per cent of railway income came from goods traffic and 23 to 25 per cent from passenger transport.⁵ The growing competition from motorized and air transport, which was especially apparent in the case of

passenger traffic, considerably altered the proportions in question. In 1954, 78 per cent of income derived from conveyance of goods and livestock, and only 18.6 per cent from passenger traffic.

The lack of integration of the railway system is one of the basic factors responsible for the ever-increasing competition from other means of transport. To link up the eastern and western networks and thus ensure direct rail communication between Bogotá and Buenaventura, a line from Armenia to Ibagué was studied and projected several years ago, and the tracks were actually laid for a distance of 34 kilometres. The sector that remained to be built, however, was a stretch of 100 kilometres over high mountainous country, the cost of which was

⁵ The remainder corresponded to special services, miscellaneous activities and the product from other sources.

TABLE 285. COLOMBIA : FINANCIAL IMPLICATIONS OF OPERATION OF RAILWAYS, 1954

(Thousands of Colombian pesos)

	Products	Expenditure	Operation coefficient	Net income	Net loss
<i>Ferrocarriles nacionales</i>	58,109	59,109	101.7		1,000
(a) Lines registering a profit ^a	33,481	29,777	88.9	3,704	
(b) Lines registering a loss ^b	24,628	29,332	119.1		4,704
<i>Departmental railways</i>					
Ambalema-Ibagué	775	781	100.8		6
Antioquia	17,525	14,800	84.6	2,725	
<i>Private railways</i>					
Cúcuta	1,269	953	75.0	316	
La Dorada	1,819	1,475	81.0	344	
TOTAL	79,497	77,118	97.0	2,379	

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.^a Pacifico/Caldas and Santa Marta.^b Centrales/Cundinamarca, Nariño and Norte Sección 1^a.

estimated at approximately 80 million Colombian pesos in 1953. As the project represented so heavy a financial burden, its completion was postponed indefinitely.

Communication with the Caribbean ports by river is also very precarious, particularly when weather conditions are unfavourable ; there are times when navigation difficulties on the upper reaches of the Magdalena give rise to delay lasting for weeks and sometimes for over a month.

So that the hazards of river transport might be eliminated and the various railway networks, at present entirely unconnected, might at the same time be linked up, the International Bank Mission proposed the construction of the *Ferrocarril del Valle del Magdalena*. The original proposal was to join Puerto Salgar, the terminus of the Bogotá line on the upper reaches of the river, with Gamarra, the farthest point upstream to which the Magdalena is navigable throughout the year, approximately 370 kilometres from Puerto Salgar. At Camarra, freight in transit would have to be transferred from the river boats to the goods wagons. It was subsequently decided to extend the railway for another 320 kilometres, as far as Fundación, where it will make a junction with the line from there to Santa Marta, on the Caribbean.

The construction of the Puerto Salgar-Fundación stretch of the *Ferrocarril del Atlántico* — as it was afterwards called — was to cost, according to preliminary estimates, under 150 million pesos, implying a cost per kilometre of less than 220,000 pesos.⁶

The railway referred to makes a junction at Puerto Salgar with that of Cundinamarca — connecting with Bogotá — and thence with the Girardot line and the *Norte Sección 2^a* and *Noreste* networks. Crossing the river, it links up in La Dorada with the railway of the

same name running to Ibagué. It then follows the western bank of the Magdalena as far as Puerto Berrio, where it joins the *Ferrocarril de Antioquia*, connecting with Medellín and the *Ferrocarril del Pacífico*. Once again it crosses the river to continue along the eastern bank towards Puerto Wilches ; there a junction with the *Ferrocarril del Norte Sección 1^a* links it with Bucaramanga. Then it proceeds northward via Gamarra, La Mata, Rincón Hondo, Las Pavas and Fundación, and at the last named makes a junction with the Santa Marta railway. It was also decided to build a road which, taking advantage of the ferry across the River Magdalena, will provide a means of communication between Ciénaga, located on the Fundación-Santa Marta railway, and Barranquilla, the main Colombian port on the Caribbean. Thus the eastern and western networks will be linked up and the isolated railways of Santa Marta and *Norte Sección 1^a* will be incorporated into the system. The only lines still remaining outside the unified network will be those of Cúcuta, the importance of which is very slight, and Nariño, which is in course of being replaced by a road.

On some routes, however, the inter-connexions would be achieved at the cost of a considerably longer run. It is highly likely that in specific cases, for example, on the Bogotá-Cali-Buenaventura itinerary, transport will still be effected by the shortest route, that is, by means of the *Ferrocarril del Pacífico* and the Girardot railway in combination with the Ibagué-Armenia road, even though two trans-shipments are involved. The connexion of the two sections of the *Ferrocarril del Norte* by means of the *Ferrocarril del Atlántico* also implies the covering of a much longer distance. For this reason, a large proportion of the products of the steel works at Paz del Río destined for Barranquilla and Medellín will probably be distributed by means of the road-rail combination rather than the *Ferrocarril del Noreste*.

⁶ This figure should be compared with the cost of 800,000 pesos per kilometre estimated for the Ibagué-Armenia line.

Another favourable consequence of the unification of the railway system will be the possibility of interchange of rolling-stock between the eastern and western networks, which will mean that equipment will be more efficiently utilized, the distance that has to be covered by non-revenue-earning freight will be reduced and a considerable part of the expenditure deriving from coupling and shunting manoeuvres will be eliminated. As a result of greater operational flexibility, fewer units of rolling-stock will be required, and where necessary the whole of the railway network equipment will be available.

From the technical standpoint, the lay-out of the *Ferrocarril del Atlántico* is greatly superior to the rest of the network. The gradients never exceed 0.5 per cent and the curves have a minimum radius of 500 metres, except in a few difficult sections where the radius of the curves is 300 metres; whereas on some of the networks in operation there are gradients of 4.3 per cent (*Ferrocarril del Pacífico*) and 4.6 per cent (Girardot), and the radius of the curves is often no wider than 75 metres. The favourable characteristics of the track — which, according to estimates, will enable trains of as many as 60 wagons to be set up — and the long average distance over which goods will be carried on this railway might help to place its operation on very satisfactory economic bases.

The total cost of the *Ferrocarril del Atlántico* and the related works is estimated at 85.3 million dollars, out of which the Government will finance expenditure in national currency and the building of the road from Barranquilla to Ciénaga, as well as the expansion of port facilities at Santa Marta, to an aggregate value estimated at the equivalent of 44.4 million dollars. The remaining 40.9 million have been provided by the International Bank for Reconstruction and Development, in the shape of two loans. The first of these, for 25 million dollars, was granted to the Colombian Government in August 1952, for a term of 25 years, amortization to begin in 1957. A clause in the agreement stipulated that the Government should appoint an autonomous, apolitical body to manage the state-owned railways. This agency *Ferrocarriles Nacionales de Colombia*, was set up in December 1954. The second loan, for 15.9 million dollars, was extended directly to *Ferrocarriles Nacionales de Colombia*, in June 1955, with a government guarantee. This loan was intended to defray the cost of the imports of equipment and services required for the construction of the stretch between Gamarra and Fundación, the improvements on the Fundación-Santa Marta line, the building of railway terminus facilities at Santa Marta and at Ciénaga — where the railway joins up with the road to Barranquilla — the acquisition of rolling-stock, the installation of runways for rafts on both banks of the Magdalena and the purchase of rafts and tugs. The new loan is also for a term of 25 years, and amortization is to begin in November 1958.

Significant changes are to be expected in railway transport once the *Ferrocarril del Atlántico* enters operation. Its traffic will derive from the following sources: (a) a substantial proportion of the existing river transport; (b) foreign trade traffic from Cundinamarca, Antioquia and Caldas, which is at present moved through Buenaven-

tura, and part of which will be diverted to the new railway; (c) some part of the freight at present carried by road between the river ports and the Bogotá area; and (d) the new local traffic which will develop within the railway's sphere of influence.

On the *Ferrocarril del Pacífico*, especially on the Buenaventura-Cali-Zarzal-Armenia sector, traffic will decline owing to the diversion of freight to the Magdalena railway, and the same will happen in the case of the Girardot line. Moreover, new oil pipelines now exist to carry petroleum derivatives for consumption in Bogotá and Medellín, which were formerly transported on the Cundinamarca and Antioquia railways, respectively. Furthermore, the unification of the railway system will lead to an over-all expansion of the country's internal trade. Consideration of all these factors, together with the estimates prepared by the Madigan-Hyland Corporation,⁷ seems to suggest that within 8 to 10 years rail traffic may possibly be doubled.

3. Roads and motor transport

Motorized transport developed to a notable extent in the period under review. Predominant factors in the expansion of road traffic included local conditions, the shortcomings and lack of flexibility of other means of overland transport, the dispersion of traffic — of which, moreover, a high proportion consists of small loads — the marked improvement in the capacity to import and the correlative increase in imports of motor vehicles. In addition, there are vast areas which are not served at all by the other means of transport. Motor traffic is also important in sectors where the railways cannot carry the whole volume of freight — between Buenaventura and Cali, for example — and is used when the recipient of the load prefers to pay higher freight charges for the sake of greater speed or better service, and where transshipments can be avoided and risks of loss or damage thus reduced.

To assess the expansion in question in precise figures is difficult owing to the lack of adequate statistics. Estimates based on the number of vehicles registered, their transport capacity and the average length of run suggest that motorized goods traffic increased from 176 million tons/kilometre in 1938 to 337 in 1946 and to 1,172 in 1954.⁸ The growth of passenger traffic would seem to have been even more striking; the historic trend recorded and the high income-elasticity of demand⁹ warrant the assumption that the total number of passengers carried by the various means of transport rose substantially from 1946 onwards. If it were nevertheless assumed, as

⁷ Firm of consultants contracted by the Colombian Government to study the construction of the *Ferrocarril del Atlántico*.

⁸ In each case goods traffic was estimated by calculating the approximate number of lorries, according to transport capacity, used for inter-urban and for medium-distance and long-distance traffic; average capacity worked out at approximately 3.7 tons. A utilization coefficient of 0.6 was assumed and the average distance covered annually was taken as 22,000 kilometres. This latter figure, which may seem low, is warranted by the bad state of repair of most roads, which affects the speed of vehicles and means they are often out of service while undergoing repair (see also table 278).

⁹ See section II of the present chapter.

noted above, that the figure in question remained unchanged, the increment — mainly achieved at the expense of rail traffic — in the number of passengers utilizing motor transport in 1954 would amount to approximately 6 million, in relation to 1946.

The development of motorized transport is still more surprising if it is borne in mind that the building and upkeep of roads has not kept pace with the growth of traffic. The broken topography and frequent landslides make all road works difficult and costly; hence, in view of the limited resources available, the Colombian roads are generally characterized by distinctly poor specifications. Built, for the sake of economy, with inadequate machinery and unsatisfactory lay-outs, they seriously limit traffic possibilities. Most of the roads are laid over mountainous country, with steep gradients,¹⁰ curves of very limited radius¹¹ and narrow road surfaces. The severe weather conditions (rainfall and floods) prevailing in many parts of the country considerably aggravate the road situation.

Unsatisfactory maintenance is the main defect of the road system; it sometimes becomes necessary to rebuild roads which have been virtually destroyed for want of timely repairs. The bad state of the roads in consequence of such neglect has a marked incidence on the country's economy, since it unduly raises transport costs and shortens the useful life of wheeled vehicles. Factors contributing to this situation include, among others of lesser importance, lack of adequate machinery, inefficient utilization of the existing equipment, want of properly-trained personnel and dissipation of funds among innumerable small-scale projects, owing to pressure from local interests. However, an Act passed in May 1949 (No. 356) allocated special funds for the upkeep, expansion and improvement of the road network, and steps are gradually being taken to remedy or mitigate the defects described.

TABLE 286. COLOMBIA : EXTENT OF THE ROAD NETWORK
(Kilometres)

	1938	1945	1954
National	7,507	10,600	13,898
Departmental	4,833	7,900	8,362
Municipal .....	...	...	1,035
Private .....	...	...	1,451
TOTAL .....	...	...	24,746

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.

Table 286 shows the evolution of the road system. Although for 1938 and 1945 the only data known are those relating to national and departmental highways, they are reasonably representative of the road network situation. In 1945, of the total extent of the national and departmental highways, only 904 kilometres (4.9 per

¹⁰ On some roads there are sectors with gradients of 8 to 10 per cent over distances of several kilometres.

¹¹ Often from 30 to 50 metres.

cent of the whole network) were metalled, 13,141 were macadamized and 4,455 were not surfaced at all. In 1954, on the other hand, of total national highways alone, 1,350 kilometres (9.7 per cent) were metalled, 9,777 were macadamized and the remainder had a dirt surface. Although data for the rest of the network are not available, the statistics given justify the assertion that the extent and quality of the road system have perceptibly improved. Nevertheless, the percentage of metalled roads is still low and the number of kilometres of un-surfaced roadways very large.

The Colombian road system comprises two trunk roads running lengthwise from north to south, parallel with the ridges of the Cordillera of the Andes, and two that cross the country laterally from east to west. From these trunk roads branch off others which combine with them to form the whole road network. However, there are stretches which are quite impassable, or practicable for traffic only in dry weather, and, furthermore, several points of the network still remain to be linked up. The lengthwise trunk roads connect the Caribbean ports of Cartagena, Barranquilla and Santa Marta with the large inland towns. The one to the west joins Barranquilla and Cartagena to Medellín, Manizales, Cali, Pasto and Ipiales, on the Ecuadorian frontier; the more easterly of the two starts from Santa Marta and passes through Fundación, Cúcuta, Pamplona, Bucaramanga, Barbosa and Bogotá, continuing southward to a point beyond Florencia.

Bogotá is linked with the port of Buenaventura by the southern lateral trunk road, which runs through Girardot, Ibagué, Armenia, Buga and Cali. The other crosswise trunk road runs from Bogotá to Turbo, on the Gulf of Darien, via Honda, La Dorada, Sonsón and Medellín. A branch of this road joins up Bogotá with the towns of Manizales and Cartago.

On various sectors of the road network substantial volumes of traffic are concentrated. The highest traffic density is registered on the roads connecting Bogotá with the towns of Tunja, Barbosa, Honda and Girardot, especially in the neighbourhood of the capital. Another important centre of concentration is the Armenia-Ibagué road, which serves to fill up the gap in the railway system. The Buenaventura-Cali-Palmira-Cartago-Medellín, Manizales-Pereira-Cartago and Cartagena-Barranquilla highways also carry intensive traffic. Closely related to this phenomenon is that fact that the number of vehicles registered is also concentrated in some few Departments. Cundinamarca alone accounts for more than one-third of the total park, while Atlántico, Antioquia, Caldas and Valle del Cauca possess in the aggregate over 40 per cent of the country's motor vehicles. In short, three-fourths of the road transport facilities are congregated in only five Departments.

The adverse conditions attending the development of motorized transport are reflected in high operational costs, which in turn give rise to heavy freight tariffs. In addition, the disequilibrium in foreign trade traffic substantially raises import freight charges, since the volume of goods transported is appreciably smaller on the export side (see table 287). A case in point is the

disequilibrium on the Buenaventura-Cali line, where the amount of freight carried in the direction of Buenaventura is so small that lorry owners generally have to make their trips to this port with empty vehicles.

TABLE 287. COLOMBIA : AVERAGE TARIFFS FOR
MOTORIZED FREIGHT TRANSPORT

(Colombian pesos)			
	<i>Distance (kilometres)</i>	<i>Tariff per ton</i>	<i>Tariff per ton/kilometre</i>
Buenaventura-Bogotá	675	90.00	0.133
Bogotá-Buenaventura		45.00	0.067
Buenaventura-Cali	142	25.00	0.176
Cali-Buenaventura		12.50	0.088
Buenaventura-Medellín	615	85.00	0.138
Medellín-Buenaventura		42.50	0.069
Cartagena-Medellín	720	100.00	0.139
Medellín-Cartagena		50.00	0.069
Medellín-Bogotá	570	65.00	0.114
Bogotá-La Dorada	200	16.50	0.083
La Dorada-Bogotá		33.50	0.167

SOURCE : Data from various official and private sources.

The marked expansion observable in motorized traffic was made possible, despite the unfavourable road conditions, by the marked increase in the park of motor vehicles. The number of buses registered in 1954 was more than four times higher than in 1938 and almost double the figure for 1950. The increment in capacity, moreover, was still greater (see table 288).

The statistics given in the table confirm the foregoing remarks as to the expansion of road passenger traffic. The increase in the number of lorries was still more striking, an almost sevenfold increment being recorded between 1938 and 1954, together with a perceptible rise in average capacity. Nevertheless, the capacity represented by the motorized equipment in use for both goods and passenger transport is still small. The characteristics of the road network — steep gradients, narrow curves and bridges and other engineering works with low resistance — limit the size of vehicles. If the standard of efficiency of motorized transport is to be raised, the transport capacity of the lorry park must be increased by means of the more extensive use of heavier vehicles and trailers, but this will not be possible until road specifications are basically improved.

TABLE 288. COLOMBIA : VEHICLES REGISTERED

	<i>Automobiles</i>		<i>Buses</i>		<i>Lorries</i>	
	<i>Number</i>	<i>Capacity^a</i>	<i>Number</i>	<i>Capacity^a</i>	<i>Number</i>	<i>Capacity^b</i>
1938	13,678	69,000 ^c	2,867	57,100 ^c	7,013	13,160 ^c
1946	19,056	95,225	4,345	103,212	13,769	34,289
1950	32,164	189,392	6,857	166,440	22,258	64,419
1954	67,560	329,663	12,144	358,811	47,798	130,775

SOURCE : *Anuario General de Estadístico (Yearbooks of foreign trade)*.

^a Number of seats.

^b Tons.

^c In default of data for two Departments, total capacity was estimated on the basis of the average capacity registered in the rest of the country.

Colombia's broken topography, which severely limits rail transport possibilities, emphasizes the economic significance of a good road network. It is true that the difficulties of the mountainous terrain also appreciably raise road-building costs ; these, however, largely depend of the width and surface of the roads, as well as on types and sizes of bridges, tunnels, etc. Thus they can, up to a point, be adjusted to the economic importance of the stretch it is proposed to build. Furthermore, on roads, gradients and minimum curve radii are admissible which are impracticable for a railway, however slight its importance. Another advantage of roads lies in the possibility of creating a much denser network, which is therefore more readily adaptable to the nature of the traffic.

In 1950, as a result of the recommendations of the International Bank Mission and the Economic Development Committee, the Government launched a road programme which included the rebuilding of trunk and transversal roads. Its most important consequence was that funds were no longer dissipated among a number

of unco-ordinated small-scale projects.¹² With the aid of the International Bank's contribution, a project comprising the reconstruction of 2,906 kilometres and the building of 155 kilometres of new road was put into execution. The aim of this project, on which work began in 1951, was to provide permanent means of transit on the eastern and western trunk roads and the branches between Bogotá and Gamarra ; between Cali and Barranquilla ; on the transversal trunk roads Bogotá-Buenaventura and Bogotá-Manizales ; and between Manizales, Cauya and Cerritos.¹³ Approximately 15 per cent of the roads covered by the project were to be metalled. In April 1951, the International Bank granted the Government of Colombia a loan of 16.5 million dollars, for a term of 10 years, intended to defray the foreign exchange expenditure required for the implementation of the project.

¹² In 1949, allocations for roads covered 101 different projects.

¹³ See loan agreement 43 CO between the International Bank for Reconstruction and Development and the Republic of Colombia, dated 10 April 1951.

The construction difficulties deriving from the mountainous nature of the Colombian territory, frequent landslides and delays in the delivery of heavy equipment necessitated a revision of cost estimates and an extension of the building period. Furthermore, as the execution of the project proceeded, experience showed that the specifications would have to be improved and additional stretches would have to be metalled in order to meet the claims of increasing traffic and the prevailing weather conditions; ¹⁴ consequently, it was decided that 82 per cent of the roads envisaged in the project should be metalled, instead of the 15 per cent originally planned for. To this end, in September 1953 the International Bank granted a further loan of 14.3 million dollars for a term of 10 years, amortization to begin in May 1956.

Again, the Ministry of Public Works resolved that road maintenance should be given priority over the building of new roads; funds for other road projects were to be allocated only after the sums needed for the upkeep programme had been provided. To ensure the success of the road maintenance programme, the appropriate section of the Ministry of Public Works was reorganized, and a body under the direction of foreign experts was set up; in 1955 there were plans for the purchase of additional road repair machinery to a value of 2 to 4 million pesos. The contractors to whom the works included in the road programme were assigned undertook responsibility for the upkeep of the roads concerned.

The total cost of the revised project and of the initial stages of the maintenance programme was estimated at 274.56 million pesos (about 110 million dollars), of which the equivalent of 77.125 million pesos in foreign currency was covered by the two loans from the International Bank.

In addition to the projects comprised in this programme, the Government began work on a programme of branch roads, aimed at incorporating new crop and livestock areas and supplementing the main highways with a system of approach roads.

These efforts to extend and improve Colombia's road network are reflected in the statistics given in table 289, which traces the growth of the budgets concerned.

In view of the vigorous impetus thus given to programmes for the improvement and upkeep of the road system, it seems reasonable to expect that during the next few years motor vehicles will retain their position as the principal component of the Colombian transport system, although the *Ferrocarril del Atlántico* will undoubtedly give rise to some changes in existing traffic flows. Some of the traffic at present carried on the Buenaventura-Cali-Bogotá highway may possibly be diverted to the new railroad, and the same will apply to the roads linking up Bogotá with the river ports. On the other hand, vegetative growth, improvements in the road network whereby transport costs can be reduced,

¹⁴ On the Medellín-Cartagena highway, traffic on which had originally been estimated at 250 vehicles daily, as many as 750 were registered in December 1954. Traffic on the Cali-Palmira road was computed at 1,500 vehicles daily, whereas the density actually recorded was 3,140.

and the incorporation into production of new agricultural and livestock areas, will offset this decline. It therefore seems certain that motorized transport will continue to expand, although probably at a slower rate than hitherto.

TABLE 289. COLOMBIA : ROAD BUDGETS

(Thousands of Colombian pesos)

Year	Maintenance	Building, rebuilding and studies	Bridges	Total
1949	10,900	25,178	1,239	37,137
1950	18,050	22,952	2,446	43,448
1951	21,000	33,650	5,000	59,650
1952	23,000	40,961	4,300	68,261
1953	21,214	47,250	4,300	72,764
1954	23,000	110,286	4,657	137,943
1955	40,000	147,677	7,142	194,819

SOURCE : Statement by the Ministry of Public Works on activities carried out from June 1954 to June 1955.

4. Transport by inland waterways

Since time immemorial the River Magdalena and its chief tributary, the Cauca, have played a very important part in Colombia's economic life, and especially in its communications with the outer world. There is also a little traffic on the Rivers Sinú and Atrato, which flow into the Caribbean, and on the Arauca and the Meta, tributaries of the Orinoco. Some of the Amazon tributaries, on which a very little traffic plies, combine with the infrequent and sporadic air services to form the only means of transport available in the llanos. The present analysis, however, deals only with the River Magdalena, which absorbs about 95 per cent of the inland waterway traffic.

The River Magdalena connects the inland economic centres — Medellín, Bogotá and Bucaramanga — with the most important ports on the Caribbean, namely, Barranquilla and Cartagena. Barranquilla is located on the river 19 kilometres from its mouth. Cartagena is connected with the Magdalena river system by means of the Dique Canal, which is 142 kilometres long; until 1951 the Cartagena-Calamar railway was also in existence, but the track was pulled up in accordance with the recommendations of the International Bank Mission, since traffic was slight on account of the unavoidable and costly trans-shipments.

The importance of the Magdalena as a navigable route is still great, in spite of unfavourable natural factors; in its upper reaches the stream tends to divide into small shallow channels and the silt deposited after the flood season is apt to form shoals. Above Gamarra, a port mid-way along the river, navigation conditions are difficult and unreliable during half the year. The *Canal del Dique*, linking Cartagena with the river port of Calamar, 124 kilometres from the debouchment, was improved on the lines recommended by the International Bank Mission, and is dredged at regular intervals; nevertheless, the silt from the river is continually being

TABLE 290. COLOMBIA : INLAND WATERWAY TRANSPORT (RIVER MAGDALENA)

Year	Freight traffic			Passenger traffic		
	Tons (Thousands)	Tons/ kilometre (Millions)	Average length of run (Kilometres)	Passengers (Thousands)	Passengers/ kilometre (Millions)	Average length of run (Kilometres)
1938	917	...	...	152	...	...
1946	1,242	554	446	218	65	307
1948	1,114	500	450	215	52	256
1950	1,593	686	432	204	43	225
1952	1,602	706	442	222	52	243
1954	1,775	895	505	283	78	283

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.

TABLE 291. COLOMBIA : FREIGHT MOVEMENT THROUGH PORTS ON THE RIVER MAGDALENA

(Thousands of tons)

	1938		1946		1954	
	Received	Despatched	Received	Despatched	Received	Despatched
Barranquilla	350.7	192.7	331.2	235.8	275.2	627.1
Cartagena	45.2	40.7	24.9	25.7	40.8	143.9
Ciénaga	12.0	25.2	15.5	25.7	48.3	18.9
Calamar	49.6	37.2	34.8	38.1	4.9	3.2
Magangué	36.8	12.6	49.6	19.2	61.2	29.0
El Banco	4.8	3.3	21.1	11.0	24.9	17.5
Gamarra	7.1	8.1	10.1	13.6	35.3	16.9
Puerto Wilches	39.6	15.7	72.6	32.9	76.8	17.4
Barrancabermeja	31.3	377.4	33.7	436.1	81.0	407.9
Puerto Berrío	135.8	59.3	231.1	65.8	446.2	40.4
Puerto Salgar	52.3	24.4	109.7	46.1	101.2	25.8
La Dorada	96.0	89.2	176.1	79.7	247.5	67.0
Honda	4.0	10.1	13.8	20.4	0.0	9.2
Intervening ports .....	...	...	117.8	191.8	331.3	350.4

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.

deposited, so that more or less permanent maintenance operations are required to preserve the depth necessary for navigation.

Between 1946 and 1954 river freight traffic increased by 42 per cent and the corresponding tonnage per kilometre by 62 per cent, which show that the goods were carried for a longer average distance. The volume of traffic contracted in 1948, but subsequently recovered, and was stabilized at about 1.6 million tons between 1950 and 1953 ; in 1954 a further increment was recorded. As has already been pointed out, however, the relative importance of river freight transport underwent a marked decline, in consequence of the pronounced expansion of motorized transport (see table 290, the figures in which should be compared with those given in table 278).

In the years immediately following the war, passenger traffic reached a level almost 50 per cent higher than in 1938 ; subsequently some fluctuations were registered within an over-all picture of relative stability, up to 1954, in which year a sudden increase of almost 30 per cent took place.

Barranquilla, Puerto Berrío, Barrancabermeja, La Dorada, Cartagena and Puerto Salgar are the ports where the most active freight movement is recorded (see table 291).

One of the main transit ports for Colombia's foreign trade is Barranquilla. The increase in the cargo shipped by river is an index of the growth of imports and of economic activity at this port. The same is true of Cartagena. Imported goods for Medellín are disembarked at Puerto Berrío and sent on by the *Ferrocarril de Antioquia*, and from Puerto Salgar the cargo brought by river is despatched to Bogotá via the Cundinamarca railway. Almost 90 per cent of the tonnage shipped from Barrancabermeja consists of petroleum products from the nearby oilfields. Of the cargo received at La Dorada, more than one-fourth is made up of hydrocarbons, which are sent on from this point.

The difficulties arising from the erratic navigation conditions on the middle and upper reaches of the river are aggravated by the defective nature of the river fleet, still largely composed of old-fashioned paddleboats.

TABLE 292. COLOMBIA : RIVER MAGDALENA FLEET ^a

	Number of craft	Method of propulsion	Horsepower		Capacity (Tons)	
			Total	Average	Total	Average
Ships	34	Steam	16,069	473	25,886	761
Tugs	59	Diesel and petrol	15,997	271	35,187	596
Launches	159	Diesel and petrol	9,402	59	9,701	61
Small boats	502		—	—	81,095	162

SOURCE : National Department of Statistics, *Boletín Informativo* (June 1952).

^a To 31 May 1952.

whose capacity is small while their operational costs are high. In recent years, however, improvement has been achieved by the addition of new equipment. Table 292 shows the number of craft existing in 1952.

The inferior transport capacity, heavier consumption of fuels, deeper draught and employment of larger crews, which differentiate vessels of this obsolete type from diesel tugboats, have a direct incidence on the high operational costs and, consequently, on the heavy freight tariffs. The practice of allocating the cargo to the boats according to order of arrival, without taking into account the suitability of the craft for the particular goods concerned or their capacity for navigating the river in prevailing conditions, results in lengthy delays which often lead to the choice of other means of transport. Again, there is no difference in the tariffs for the various commodities, types of boat or standards of service. The savings that might accrue from the use of more modern equipment are largely cancelled out by the fact that certain of the agreements in force stipulate the employment of larger crews than are strictly necessary. The excessively heavy charges for loading and unloading operations imposed by the stevedores' trade unions, and the inefficient utilization of the existing mechanical equipment, complete the set of factors which combine to raise the cost of river transport. As commonly happens where traffic disequilibrium exists, tariffs are much higher in the direction in which the flow is more intensive, but here an additional reason exists, as operational costs are also much higher on the upstream journey.¹⁵ With a minimum freight charge of 7 pesos per ton, the average tariffs work out at 4 Colombian cents per ton/kilometre on the upstream and 2 cents on the downstream trip ; as has already been stated, the unduly heavy rates for loading and unloading — 8.50 to 9.00 pesos per ton — represent an excessive addition to the cost of transport by inland waterways.

The project for the building of the *Ferrocarril del Atlántico* caused serious concern among entrepreneurs engaged in river transport, as its implementation would considerably reduce inland waterway traffic. *Adenavi*, as the association concerned is called, obtained government support for its modernization and improvement programmes, which primarily pursued the following

two aims : (a) the modernization and mechanization of port facilities, with a view to cutting down loading and unloading costs and shortening the time taken up in such operations ; and (b) the purchase of the river-dredgers required to control and keep open the navigable channel between Puerto Wilches and La Dorada.

With respect to the first point, the work of modernization and mechanization was completed at Barranquilla, Puerto Berrio, La Dorada and Puerto Salgar, and similar projects were prepared for Barrancabermeja, Puerto Wilches, Caracolí and Gamarra. In order to solve the problem of erosion which is affecting the towns on the river bank and the ports of Magangué and La Dorada, the services of the principal French laboratory of hydraulics research were contracted for the purpose of carrying out studies on the basis of models and recommending the measures that ought to be adopted.

With a view to the maintenance of normal navigation conditions on the upper reaches of the river, *Adenavi*, on the advice of Colombian and foreign experts, obtained a loan from United States banking institutions for the purchase of two dredging-shovels, one of which is being constructed in the United States. There are no available data on the amount of capital which has been or is to be invested in port improvements or the size of the loans obtained.

The desirability of carrying out programmes for the improvement of navigation on inland waterways is indisputable, in view of the economic advantages which this type of transport offers. Nevertheless, the fact that the *Ferrocarril del Atlántico* project has not only been approved but is in full process of execution bears eloquent witness to the priority accorded to this programme over plans for providing better river transport.¹⁶

Clearly, the *Ferrocarril del Atlántico* will absorb a considerable proportion of river traffic. Much of the cargo brought from the Caribbean ports to Bogotá, Medellín and other inland towns, which constitutes the bulk of the tonnage transported by river, will undoubtedly be sent by rail, since trans-shipments and lengthy delays will thus be eliminated. There will consequently be a substantial decline in transport by river when the *Ferrocarril del Atlántico* enters operation. If, however, *Adenavi*'s programmes succeed in improving the system, the magnitude of this decline will be reduced commensurately with the

¹⁵ In 1954 the cargo carried downstream corresponded to approximately 45 per cent of the volume transported in the opposite direction.

¹⁶ See the report ST/TAA/J/COLOMBIA/R.4, *op. cit.*

TABLE 293. COLOMBIA : FOREIGN SERVICE FLEET ^a

(Vessels owned)

Name of unit	Tonnage			Year built	Speed (Knots)
	Deadweight	Gross	Net		
<i>Flota Mercante Grancolombiana</i>					
República de Colombia	5,087	3,805	2,123	1945	11.0
Ciudad de Bogotá	5,087	3,805	2,123	1945	11.0
Ciudad de Manizales	5,940	3,947	2,102	1951	14.5
Ciudad de Medellín	6,382	4,219	2,352	1951	14.5
Ciudad de Cali	5,885	4,327	2,023	1953	14.8
Ciudad de Ibagué	5,885	4,327	2,023	1953	15.0
Rio Magdalena	5,087	3,805	2,123	1945	11.0
Ciudad de Bucaramanga	5,084	3,695	2,153	1952	13.0
Ciudad de Cúcuta	5,034	3,694	2,151	1952	13.0
<i>Compañía Colombiana de Navegación Marítima Ltda. (Coldemar)</i>					
Colombia	1,500	1,764	1,272	1946	14.6
Cali	2,320	1,923	1,015	1953	13.0
Bolívar	2,520	2,080	1,009	1953	12.5
<i>Compañía Nacional de Navegación S.A. (Navenal)</i>					
Tolima	2,400	1,444	766	1946	12.0

SOURCE : Ministry of War, Navy Department.

^a May 1954.

extent to which costs are cut down. Entrepreneurs shipping those commodities which are transported in bulk and would benefit most by lower tariffs would be particularly inclined to continue utilizing the river route.

5. Maritime transport

Thanks to Colombia's highly favourable geographical situation and its proximity to the Panama Canal, its sea communications with other countries are well served by direct lines. In addition to the foreign craft belonging to the large number of shipping companies operating at Colombian ports, the country has a fleet of its own which increased surprisingly in the course of a few years. In March 1954, the Colombian overseas fleet ¹⁷ comprised 13 vessels with 58,211 tons of cargo; all the boats were relatively new (under 10 years old), speedy (12-15 knots) and diesel-driven (see table 293).

In addition to its own boats, the *Flota Mercante Grancolombiana* — which is the most important shipping enterprise — permanently operates chartered motor ships, thus approximately doubling its transport capacity. In 1954, the *Compañía Colombiana de Navegación Coldemar* was also running a boat with a cargo capacity of 2,520 tons and a speed of 12 knots, chartered on a time basis. The boats belonging to the *Flota Mercante Grancolombiana* served eight overseas routes, linking the Colombian ports with those of the United States, Canada, Mexico, Central America, the West Indies, Ecuador and Europe. The other two companies — *Coldemar* and *Navenal* — run services to the United States. In 1955, the *Gran-*

¹⁷ Excluding those boats belonging to the *Flota Mercante Grancolombiana* which sail under the Ecuadorian flag.

colombiana acquired four additional units, each with a cargo capacity of approximately 5,000 tons and a speed of 14 knots, as well as a special cattle boat. It also invited tenders for the building of four other motor ships of 12,000 tons and 17 knots.

With respect to coastal traffic, a different situation prevails. These routes are served by a heterogeneous fleet including units that range from ships of high tonnage belonging to the *Flota Grancolombiana* ¹⁸ to small motor boats plying only between neighbouring ports when weather conditions are favourable.

TABLE 294. COLOMBIA : COASTAL TRAFFIC

	Tons (Thousands)	Index	Tons/ kilometre (Millions)	Average length of run (Kilometres)
1938	188	116.1	...	...
1946	162	100.0	...	...
1948	185	114.2	...	...
1950	174	107.7	143	822
1952	188	116.1	138	734
1954	180	111.4	153	850

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.

The figures shown in table 294 give a clear indication of the stagnation of coastal traffic. In 1946, the tonnage

¹⁸ In 1954 the *Flota Mercante Grancolombiana* possessed, in addition to its ocean-going vessels, two steam units, each with a freight capacity of 2,830 tons and a speed of 11.5 knots, used exclusively for coastal traffic.

transported was appreciably less than in 1938; subsequently a recovery took place, although only in 1952 was the pre-war level regained. In face of the expansion registered by other means of transport, the relative importance of coastal traffic has considerably declined.

From table 295, which presents the coastal traffic movement recorded at the principal ports, some interesting conclusions can be drawn. The remarkable falling-off in the amount of cargo shipped from Barranquilla seems to be partly due to the deflection of such freight to Cartagena. Again, the increase in the relative importance of Buenaventura is manifest in contrast with the decline in that of Barranquilla. The freight received at the latter port is largely made up of coal, salt and fuel oil, and the cargo shipped from it consists of beer and

manufactured goods. Buenaventura receives large quantities of salt, beer and fuel oil. In Cartagena, agricultural commodities and timber are disembarked and petroleum products, coal and cement are shipped, while from Manaure — traffic through which has substantially increased — large quantities of brine are despatched. Approximately half the total tonnage is transported between ports on the Pacific and on the Caribbean, via the Panama Canal, which accounts for the length of the average distance covered.

The difficulties of overland transport warrant the assumption that coastal traffic might be considerably expanded if its shortcomings were remedied; the main cause of these would seem to lie in the nature of the fleet concerned.

TABLE 295. COLOMBIA : MOVEMENT OF COASTAL TRAFFIC, BY PORTS

(Thousands of tons)

	1938 *		1946		1954	
	Despatched	Received	Despatched	Received	Despatched	Received
Barranquilla	19.3	157.7	73.9	19.1	58.6	20.6
Buenaventura	34.3	6.3	37.2	10.4	62.4	29.4
Cartagena	76.5	3.3	13.4	73.6	11.8	72.0
Manaure	0.2	0.7	1.5	26.0	1.1	37.1
Santa Marta	6.5	6.5	10.6	17.6	12.6	2.8
Other ports	10.0	14.0	25.1	15.0	33.7	18.3

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.

* The disparity between the figures for total cargo received and despatched is due to the lack of registration in those ports which in 1938 had no port authority.

6. Principal ports

The construction and administration of the Colombian ports is in the hands of government agencies. The two aspects of port administration — the actual physical handling of cargo entering and leaving the port and the inspection of customs duties — are dealt with respectively by the Ministry of Public Works, through the port authority, who is responsible to the Department of Navigation and Ports, and by the Ministry of Finance, through the chief customs officer. This dual control, and the inevitable clash or duplication of faculties, militate against the efficient utilization of port facilities, as was pointed out in the report of the International Bank Mission. The customs house, for example, is in charge of shipments to inland destinations. The Mission in question recommended the establishment of a National Port Authority, which would have under its control all matters connected with port administration.

The port of Buenaventura is subject to a special régime. Here port administration used to be in the hands of the *Ferrocarriles Nacionales*; since August 1953 a new administrative system has been in force, under which the general superintendent of the port, who is employed by the Ministries of Public Works and Finance, supervises and co-ordinates administrative and customs control.

An analysis will next be made of the characteristics of the chief Colombian ports, which are, in order of

importance according to the volume of freight handled, Buenaventura, Barranquilla, Cartagena, Santa Marta and Tumaco (see table 296). These five ports together deal with over 95 per cent of maritime foreign trade — excluding liquid fuels in bulk which are exported from Mamonal and Coveñas, ports under the customs jurisdiction of Cartagena — and approximately 85 per cent of the coastal traffic.

(a) Buenaventura

This port, located on Colombia's Pacific seaboard, serves a large area in the middle west, the nearest and most important town being Cali. The volume of freight handled through Buenaventura makes it the foremost port in the country. The main export commodity is coffee, which in 1951-54 averaged more than 92 per cent of the tonnage shipped; the preponderance of this commodity has increased in recent years, and at the present time about 70 per cent of Colombia's total coffee exports is shipped from Buenaventura. The explanation lies in the fact that for the Departments of Caldas, Valle del Cauca and Tolima, which together represent the country's largest coffee-growing area, the natural outlet is Buenaventura; moreover, much of the coffee from Cundinamarca is shipped from this port, because of navigation difficulties on the River Magdalena. The imports disembarked are, of course, much more diversified, although a considerable proportion is constituted

TABLE 296. COLOMBIA : FREIGHT MOVEMENT THROUGH THE PRINCIPAL PORTS

(Tons)

	Year	Imports	Exports	Coastal traffic	Total
Barranquilla	1950	473,888	109,660	82,576	666,124
	1954	731,529	91,301	79,186	902,016
Cartagena	1950	128,842	13,523	83,088	225,453
	1954	248,507	36,385	83,756	368,648
Santa Marta	1950	14,149	130,573	16,667	161,389
	1954	25,275	173,996	15,387	214,658
Buenaventura	1950	414,124	230,538	87,951	732,613
	1954	746,868	256,869	91,744	1,095,481
Tumaco	1950	5,921	2,941	12,213	21,075
	1954	3,337	12,818	12,764	28,919

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.

by liquid fuels (over 270,000 tons in 1954) and cereals (more than 30,000 tons).

Natural conditions at Buenaventura are favourable. Its greatest drawback lies in the frequent heavy rains which often interrupt the work of loading and unloading. It has wharves totalling 1,350 metres in length that can be used for berthing, with a minimum depth of 32 feet at low water.

For the shifting of cargo, use is made of the resources both of the boat itself and of the port, which possesses the necessary floating and shore equipment.

Current monthly capacity for the handling of freight may be estimated at about 95,000 tons (in 1954 the average tonnage handled monthly slightly exceeded 91,000 tons), 30,600 square metres of warehouse and 14,000 square metres of yard space being available. If the paving of all docks, yards and warehouses were levelled up so as to permit the efficient utilization of the modern mechanized equipment and port rolling-stock, capacity could be considerably increased. Transport of the cargo from dockside and warehouses is at present partly effected in wheelbarrows, for want of proper rolling-stock and motorized equipment. The building of suitable protection against rain is another factor whereby the capacity of the port could be raised and its output improved.

Work was recently completed on an oil dock built to receive the substantial volume of petroleum derivatives consumed in the Department of Valle del Cauca, especially at Cali. In this connexion an oil pipeline from Buenaventura to Cali is under construction. There are plans to install, at one end of the wharf for general cargo, an automatic coal-loading plant, for shipping the coal from Valle del Cauca ; the projected equipment will have a maximum hourly capacity of 1,000 tons, although it will operate at a rate of 300 tons to begin with.

The cargo handled at this port is transported to and from the interior by the transversal highway which joins the western trunk road at Cali, and by the *Ferrocarril del Pacífico* ; improvements in this latter have greatly eased congestion in the Buenaventura warehouses, especially since the introduction of diesel engines.

(b) *Barranquilla*

This port is situated on the left bank of the River Magdalena, 19 kilometres from its mouth. As in the case of Buenaventura, large quantities of coffee are shipped from Barranquilla, and in 1951-54 averaged over 70 per cent of the exports leaving from this port.¹⁹ The cement that Colombia sells abroad is also shipped almost in its entirety from Barranquilla. Foremost among the commodities imported are petroleum derivatives, of which over 300,000 tons were delivered in 1954 ; cereals and associated products, various manufactured goods, fertilizers, etc., also play an important part. Apart from maritime foreign trade and coastal transport activities, Barranquilla registers a highly intensive river traffic movement, which in 1954 accounted for 900,000 tons of the cargo handled.

The incoming and outgoing of ocean liners are seriously hampered by the shoals in the River Magdalena, especially in its estuary, which is called Bocas de Ceniza. Artificial channels have been built, constituted mainly by two breakwaters eight kilometres long, as well as works designed to narrow the mouth of the river, or, in other words, the gap between the breakwaters ; the results have not proved satisfactory, however, for although the silting-up of the river has been prevented, the water tends to remain low at the point of debouchment. This problem is aggravated by the rapid changes in the seabed at Bocas de Ceniza, which cause frequent accidents, despite the fact that sounding are taken every two or three days. No further projects have been put into execution, pending the result of the studies which the French laboratory previously mentioned is carrying out on a reduced-scale model.

Barranquilla has docks 700 metres long at the service of maritime shipping, besides two repair docks where 2,500 metres of wharves are available for the berthing of river boats. At the dock for ocean-going vessels the minimum depth is 28 feet ; but the shallows at Bocas de Ceniza make it very difficult for ships with a draught

¹⁹ Over 100,000 tons of coffee were exported from Barranquilla in 1953 and nearly 69,000 in 1954.

of more than 20 feet to enter Barranquilla. A project for the expansion of the maritime terminal envisages the extension of this dock, of which the total length would ultimately be 1,230 metres. Consideration is being given at the same time to the provision of additional berths for river craft and the enlargement of the area assigned to yards and warehouses.²⁰

It is estimated that once the extensions are completed and the equipment fully made up, Barranquilla's monthly capacity for handling ocean freight will amount to 90,000 tons. At the present time about 50,000 tons of maritime traffic pass through the port each month, and this figure seems to represent the limit of its capacity, owing to the lack of facilities and equipment. Under the expansion programme, the 31,500 square metres of warehouse and 20,000 square metres of yard space available should be increased to 65,600 and 39,000 square metres, respectively. The project in question will imply the investment of 4.5 million Colombian pesos (approximately 1.8 million dollars).

Insufficient equipment (cranes, tractors, elevators, etc.) is available for the shifting of cargo, and the boats mainly use their own resources. The principal means of approach to the port and of relieving congestion therein is constituted by the River Magdalena; overland connexions with the interior are provided by the western and eastern trunk roads through Cartagena and Fundación, respectively.

(c) Cartagena

This is a maritime port with excellent natural conditions, situated on the bay of the same name on the Caribbean sea, about 100 kilometres from Barranquilla. Owing to the proximity of the latter port, where the commercial and industrial interests of the area are concentrated, a smaller volume of cargo is transported via Cartagena; its coastal traffic, however, exceeds that of Buenaventura and Barranquilla. There is a certain tendency towards an expansion of imports, as shipments destined for Barranquilla are often diverted to Cartagena because of the silting-up of Bocas de Ceniza. Over 70 per cent of the export tonnage shipped from Cartagena consists of coffee. Liquid fuels account for about one-fourth of imports, and among the remainder, which are widely diversified, fertilizers, rice, wheat and wheat flour and iron bars, wire, sheet and tubes are predominant.

The part of the harbour where ships can berth comprises two jetties 40 metres wide and 184 metres long, between which lie approximately 200 metres of wharves, providing altogether about 1,000 metres utilizable for vessels of any type. The natural entrance to the bay was improved by the dredging of a channel 150 metres wide and 12 metres deep, whereby deep-draught ships were enabled to enter the harbour. Spring and neap tides attain 0.11 metres in relation to the average low water level.

In existing conditions, Cartagena could handle about 50,000 tons monthly if its equipment were expanded. Available warehouse and yard space, to a large extent

unpaved, covers 18,600 and 83,000 square metres respectively. A project exists for the construction of four parallel jetties similar to those now in existence, a step which would almost treble the capacity of the port.

Until 1951, Cartagena was connected with the River Magdalena by the Cartagena-Calamar railway. This was subsequently pulled up and the *Canal del Dique* was improved, to the great benefit of Cartagena's river traffic, since the need for trans-shipments was averted. The western trunk road, although much less important, also serves to link this port with the interior of the country.

(d) Santa Marta

This port stands on the bay that bears its name, some 70 kilometres from Barranquilla. It owes its importance to the fact that it is the outlet for practically the whole of Colombia's banana exports. The exclusion of this commodity leaves only from 10,000 to 20,000 tons of exports yearly, composed mainly of cattle for the Dutch West Indies and vegetable produce other than bananas.²¹ Imports are very limited, although in recent years they have shown a decided upward trend, exceeding 25,000 tons in 1954. For the berthing of vessels a dock 200 metres long is at present available, the depth of water being sufficient for boats with a draught of up to 28 feet. The monthly capacity of the port is some 30,000 tons; and 1,750 square metres of warehouse space are available.

Banana-loading operations are so highly mechanized that up to 2,500 tons can be handled daily; on such occasions, Santa Marta's rail terminal facilities have to deal with an exceptionally intensive movement, and consequently are utilized up to the maximum. This is why, although only one ocean-going vessel can be berthed at a time, it has been possible for shipments amounting to 240,000 tons annually to be handled.

This port will become very important from 1958 onwards, as it will be the terminus of the *Ferrocarril del Atlántico*, and also because it is the centre of an area in full process of development, thanks to national projects and a departmental programme in course of execution.

The expansion of port facilities envisaged in the *Ferrocarril del Atlántico* project is currently being put into effect. The initial stage comprises 566 metres of wharves, of which 436.50 are utilizable for deep-draught sea-going vessels and 128.50 for coasters. This first phase, with all its accessory works (sheds, administrative buildings, warehouses, etc.), will cost 10 million pesos, and should be completed by the end of 1955. Once the two phases into which the project is divided are terminated, Santa Marta will possess a dockside 650 metres long, 30,750 square metres of warehouse space and storage yards covering an area of 22,000 square metres.

Santa Marta is at present connected by rail with the large banana-growing area in the Magdalena Department, and by the eastern trunk road with the interior of the country. Once the *Ferrocarril del Atlántico* is completed it will be directly linked by rail with all Colombia's main population centres.

²⁰ In 1955 a project for a silt sluice 1,300 metres long for the river terminal was being completed, at a cost of 3.5 million pesos.

²¹ These last exports have declined almost to nil in recent years.

(e) *Tumaco*

Tumaco lies on the Pacific, on the island of El Morro in the inlet from which the port takes its name. The volume of cargo currently handled is very small, because the accessory port facilities are in process of construction and the equipment for shifting cargo is not yet available.

At the present time a dock 310 metres long exists, suitable for the berthing of vessels with a draught of 28 feet. There is also a provisional warehouse. When the works are completed and the necessary equipment has been allocated to this port it will have a monthly capacity of 30,000 tons, and will be of great importance for the Department of Nariño.

TABLE 297. COLOMBIA : COMPARISON OF PORT EFFICIENCY WITH THAT REGISTERED IN OTHER COUNTRIES

	Port utilization ^a (Percentage)	Rate at which cargo is shifted ^b	
		Per hour of stay in port	Per hour worked
Antofagasta	51.1	20.8	40.8
Barranquilla	56.5	17.1	30.2
Buenaventura ^c	65.7	25.2	38.3
Buenos Aires	36.9	19.7	53.3
Cartagena ^d	64.0	20.4	31.9
Guayaquil	29.0	11.8	40.5
La Guaira ^e	43.3	15.4	35.4
Maracaibo ^f	47.3	11.6	24.6
Montevideo ^g	39.0	11.2	28.8
Puerto Cabello ^h	37.8	12.7	33.6
San Antonio	48.5	28.6	59.1
Santos ⁱ	54.1	13.8	25.5
Valparaiso	40.8	15.3	37.6

SOURCE : ECLA, E/CN.12/369/Add.3.

^a Quotient of hours worked and duration of stay in port.

^b Tons per hour.

^c March 1954.

^d January-March 1953.

^e March-May 1953.

^f January-July 1952.

^g 1952.

Tumaco used to be linked with the interior by the railway to El Diviso, which is being pulled up and

turned into a road that will join the western trunk highway at Pasto.

The operational characteristics of Colombia's three main seaports are relatively satisfactory, as can be seen from the figures given in table 297, where they are compared with those of other South American ports. The degree of utilization of the port of Buenaventura (65.7 per cent) is remarkable if the frequent interruptions caused by heavy rain are taken into account.

The most salient feature of the port situation in Colombia is the increase in capacity which has been registered, and which has made it possible for a considerable expansion of maritime traffic to be coped with ; the latter increased by approximately 50 per cent between 1950 and 1954, apparently without any serious consequences in the shape of port problems. The projected enlargements, especially at the three chief ports on the Caribbean — Barranquilla, Cartagena and Santa Marta — will still further raise the already considerable capacity of Colombia's ports, enabling them to absorb a substantial increment in maritime traffic.

The projects for improvements at Santa Marta and Cartagena, as well as the excellent natural conditions at these ports, have compelled the shipping and business interests located in Barranquilla to effect considerable investment with a view to preventing a diversion of traffic towards the two ports mentioned. In consequence of this competition, Colombia will possess three Caribbean ports, situated within a sector of less than 200 kilometres and with a joint capacity that may easily reach some 2.5 million tons of maritime freight per annum.

7. Air transport

The drawbacks and costliness of overland transport, the topography of the country and the great distance from one large population centre to another account for the early development of commercial aviation in Colombia, which has the oldest airline in Latin America, dating back to 1919. The same factors stipulated the growth of air transport, which expanded with exceptional intensity during the post-war years. From 1950 onwards a relative stabilization is observable, although passenger traffic continued to display a slightly upward trend (see table 298). By 1954 goods traffic was almost four and 24 times heavier than in 1946 and 1938 respectively.

TABLE 298. COLOMBIA : INTERNAL AIR TRANSPORT

Year	Freight traffic			Passenger traffic		
	Tons (Thousands)	Tons/ kilometre (Millions)	Average length of flight	Passengers (Thousands)	Passengers/ kilometre (Millions)	Average length of flight (Kilometres)
1938	5.6	...	...	63	...	...
1946	34.7	17.4	501	312	108	346
1948	70.1	43.4	619	686	210	306
1950	136.3	56.0	411	874	298	341
1952	123.4	61.7	500	967	372	385
1954	134.2	64.5	481	979	426	435

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.

The increase in the number of passengers transported was not quite so large. The figure for 1954 was treble that registered for 1946 and 15 times higher than in 1938. In terms of passengers/kilometre, however, the expansion was greater, because of the longer average distance covered per passenger.

The share of Colombian enterprises in international civil aviation also increased considerably, reaching significant proportions (see table 299). The number of Colombian aeroplanes serving foreign routes in 1954 constituted about 36 per cent of the total ; approximately 44 per cent of passenger traffic to points outside the country was handled by Colombian aeroplanes, and, lastly, 37 per cent of the air freight tonnage deriving from foreign trade was carried in Colombian aircraft. The country's principal airline, Avianca,²² currently deals with passenger traffic between Colombia and New York, via Jamaica, and also maintains a regular passenger and goods service between Colombia and Ecuador, Venezuela, Panama, Bermuda, Lisbon, Paris, Madrid and Frankfurt. The relative importance of the Barranquilla airport in international air traffic is outstanding. In 1954, 40 per cent of the passengers, 35 per cent of the freight and 62 per cent of the air mail carried passed through this airport, and it was the point of arrival or departure for 50 per cent of the aircraft. Bogotá, Cali and Medellín came next in order of importance. These four airports absorb almost the whole of the international air movement, except in the case of freight, where Cartagena and Pereira must be added, since together they handle almost 10 per cent.

TABLE 299. COLOMBIA : INTERNATIONAL AIR TRAFFIC
1954

	Colombian aircraft	Foreign aircraft	Total
Number of aircraft : Arrivals	2,045	3,676	5,721
Departures ..	2,046	3,661	5,707
Number of passengers : Arrivals ..	19,181	23,652	42,833
Departures	19,633	26,393	46,026
Load (Tons) : Imports	1,731	3,223	4,954
Exports	273	214	487
Mail (Tons) : Received	15	90	105
Despatched	22	34	56

SOURCE : *Anuario General de Estadística (Yearbooks of foreign trade)*.

The development of air transport in Colombia was almost entirely attributable to private capital. It is true that the Government gave assistance in the shape of donations of land to the companies for airports ; building of airports by the public sector ; and, in particular, the subsidy granted to Avianca²³ for the transport of air mail. Nevertheless, the major burden of the development of commercial aviation — including the building, upkeep

²² Avianca (*Aerovías Nacionales de Colombia*) is a perpetuation of the first Colombian airline, Scadta (*Sociedad Colombo-Alemana de Transporte Aéreo*).

²³ The air mail service is entirely in the hands of Avianca, including the sale of stamps and the collection and delivery of mail.

and operation of many airports and the provision of navigation facilities for aircraft — fell upon the private enterprises. This somewhat retarded the growth of air transport, the benefits of which were confined to those localities where demand was strongest.

Up to the beginning of the Second World War, Scadta virtually held a monopoly in commercial aviation in Colombia, which afterwards passed into the hands of Avianca, until the post-war period. The foreign exchange accumulated during the war, in conjunction with the ease with which aeroplanes and other flying equipment could be obtained because of war surpluses, permitted the establishment of 16 new companies which began to compete with Avianca. The newly-founded lines made striking tariff cuts with a view to pushing their way into the market, and compelled Avianca to reduce its own charges so much that there came a point at which the journey between certain towns could actually be made more cheaply by air than overland. However, lack of financial backing prevented the new companies from absorbing their increasing costs without raising their tariffs, and little by little they disappeared. At last only Lansa²⁴ — the enterprise which came second in importance — was left as Avianca's sole competitor ; even so, its heavy operational losses compelled it to merge with Avianca early in 1954. Thus the latter company once again appeared as the only one of any importance in the field of commercial aviation in Colombia. But in the meantime the spell of competition had redounded to the undoubted benefit of air transport, which expanded to a remarkable extent ; tariffs were reduced, the equipment was improved and new routes were opened up.

TABLE 300. COLOMBIA : MAIN AIR ROUTES FOR INTERNAL PASSENGER TRAFFIC, 1954

Route to and from:	Passengers transported	Percentage of total
Bogotá-Cali	93,428	9.5
Bogotá-Medellín	83,880	8.6
Bogotá-Barranquilla	57,568	5.9
Barranquilla-Santa Marta	34,383	3.5
Cali-Medellín	31,394	3.2
Bogotá-Ibagué	25,505	2.6
Bogotá-Pereira	25,423	2.6
Medellín-Barranquilla	22,189	2.3
Bogotá-Bucaramanga	21,413	2.2
Bogotá-Cartagena	20,914	2.1
Bogotá-Cúcuta	19,094	2.0
Medellín-Pereira	17,639	1.8
Bogotá-Armenia	15,908	1.6
Bucaramanga-Barrancabermeja	15,898	1.6
Bogotá-Manizales	15,573	1.6
TOTAL	500,209	51.1

SOURCE : *Boletín Mensual de Estadística (March 1955)*.

Internal air traffic is, relatively speaking, heaviest on a certain number of routes in the case of both passengers and goods ; however, this phenomenon is less marked than might be expected in view of the concentration of

²⁴ *Líneas Aéreas Nacionales S.A.*

the population and economic activities. Furthermore, this situation is tending to improve, as a result of the competition mentioned. Table 300 shows the most important air routes for passenger traffic. As can be seen, 51.1 per cent of total passenger traffic is absorbed by the 15 principal routes, operating between only 13 towns; if no more than the 10 most important routes, which serve nine towns, are taken into consideration, it will be noted that they account for 42.5 per cent of the traffic. Nevertheless, air traffic is slightly less concentrated than in 1949; in July of that year, 50 per cent of the passengers/kilometre were carried on the main routes.²⁵ Although these figures are not strictly comparable, they give some idea of the progress achieved.

The concentration of air freight is greater than that of passenger transport (see table 301). The 10 routes on which traffic is most intensive, and which cover only seven towns, absorb in the aggregate 60 per cent of the total tonnage, and the two most important of all, 26.3 per cent. In 1949, the corresponding percentages were 62.2 and 34.2, respectively, which again indicates that traffic was becoming less concentrated.

TABLE 301. MAIN AIR ROUTES FOR INTERNAL FREIGHT TRAFFIC, 1954

Route to and from:	Tons transported	Percentage of total
Bogotá-Barranquilla	23,532	17.5
Medellín-Barranquilla	11,866	8.8
Bogotá-Medellín	9,880	7.4
Bogotá-Cartagena	8,992	6.7
Medellín-Cartagena	6,836	5.1
Bogotá-Cali	5,808	4.3
Medellín-Cali	3,853	2.9
Barranquilla-Cali	3,874	2.9
Medellín-Montería	3,121	2.3
Bucaramanga-Medellín	2,631	2.0
TOTAL	80,393	59.9

SOURCE: *Boletín Mensual de Estadística* (March 1955).

The development of the present structure of the air routes was determined by various economic and political factors. Nowadays, it meets the requirement of those centres where the demand for transport is strongest — and the lines can consequently be run at a reasonable profit — linking them up, in addition, with other small urban nuclei. On the other hand, routes which would incorporate vast areas into the national economy have not been developed on account of the heavy losses which would be suffered in the early stages of their operation. Quite the contrary; during the phase of competition, the enterprises concentrated their attention on the most lucrative routes, which were very well served. The minor part played by the Government in the development of air transport prevented it from effectively intervening in this problem.

Commercial aviation in Colombia is subject to the provisions of Act 89, passed in 1938, which laid down

²⁵ See the report of the International Bank Mission, *op. cit.*

regulations for the over-all aspects of the supervision and organization of flying, and set up the Department of Civil Aviation (*Dirección General de Aeronáutica Civil*), a government body responsible for the inspection and control of air transport. This agency, reorganized in 1947, meets with certain difficulties in the performance of its functions. In this context, the report of the International Bank Mission points out that as it is a dependency of the Ministry of War it is guided by points of view which do not always coincide with those of commercial undertakings; that budget restrictions greatly limit its possibilities; and, lastly, that it has not always had sufficient properly-trained personnel to put its projects into effect.

Act 89 (1938) also empowered the Government to invest in airlines or to establish its own transport services — dependent in that case on the Department of Civil Aviation — should private capital prove unable to meet requirements.

However, the Department of Civil Aviation has not undertaken the direct creation of new airlines. Military aircraft have sometimes operated in zones where commercial services are infrequent, particularly in the llanos and the area to the south of Bogotá.

Air communications, air traffic control and airports constitute another sector in which private capital has enacted a very important role. In the early stages of commercial aviation in Colombia, the airports and other flying facilities maintained by the Government were unsatisfactory and insufficient, so that first Scadta and afterwards Avianca had to invest heavily to secure these services for themselves. With the creation of new airlines after the war another problem arose, as these latter were dependent upon the services of the principal line, and it was precisely in the market served by the company concerned that they wished to obtain a footing. In some cases this induced them to effect huge investments, which doubled existing flying facilities, and undoubtedly largely contributed to the financial disaster which later overtook such enterprises and compelled them to withdraw from the market.

The present system of air communications and traffic control is unsatisfactory, and does not constitute a sufficient guarantee of safety. In this connexion, the report of the International Bank Mission stated that existing arrangements were more in the nature of an advisory and information service than a system of air traffic control. In 1954 the only installation of this type existing in Colombia was that of the Techo airport at Bogotá.²⁶ The expansion of air traffic, especially at the principal airports,²⁷ calls for the introduction of proper services.

In 1952 most of the airports used for commercial aviation²⁸ were the property of the airlines (see table 302).

²⁶ See *Industria Colombiana* (September 1954).

²⁷ At Medellín, during 52 per cent of the time aeroplanes land and take off at intervals of less than 5 minutes; the corresponding percentage for Barranquilla is 45 per cent and for Bogotá 60 per cent. (See *Industria Colombiana*, September 1954.)

²⁸ According to statistics cited by the Ministry of Public Works in a lecture given in March 1955, Colombia currently possesses 62 aerodromes with daily flights, and others of secondary importance (194 airports in all).

It should be pointed out that out of the 53 aerodromes belonging to the airlines 40 were owned by Avianca and 10 by Lansa, companies which have now been merged. The Government recently created an Aerodrome Corporation (*Corporación de Aeródromos*) to be responsible for the service in question. To this end, the Corporation conducted negotiations with Avianca with a view to taking over the airports owned by the enterprise; the Government was to pay Avianca's debt of about 12 million pesos to the Bank of America for the purchase of three aeroplanes of the Constellation L-10494 type. This deal would be highly profitable for the company, increasing the liquidity of its assets and enabling it to expand the facilities it can offer, while at the same time the nationalization of the airports might provide fresh incentives for the creation of other air companies and services.

TABLE 302. COLOMBIA : AIRPORT SYSTEM, AUGUST 1952

	Number	Percentage
Airline companies	53	38.7
Central Government	29	21.2
Municipal	21	15.3
Military	7	5.1
Private	27	19.7
TOTAL	137	100.0

SOURCE : *Industria Colombiana* (September 1954).

Up to 1945 the flying equipment used was very heterogeneous. The substantial availabilities of United States war material surpluses largely contributed to its standardization. In 1949, the commercial airlines possessed in the aggregate 70 aeroplanes, of which 64 were Douglasses,²⁹ 4 Curtisses and 2 Consolidateds. In 1954 the companies³⁰ had in service 54 Douglasses, 20 Curtisses, 20 Cessnas, 7 Beavers, 3 Super-Constellations, 3 Catalinas, 2 Stinsons, 1 Constellation and 1 Norsewan — 111 aircraft in all. The improvement in flying equipment was, as can be seen, considerable.

Again up to 1945, air transport tariffs for both passengers and freight were largely determined by what the traffic could sustain, allowance being made for the slowness and other defects of overland transport. Thus the rates charged soon became very high. During the phase of competition after the war, tariffs dropped sharply, in some cases to about half their 1945 level. They afterwards increased again, but still remained lower than the rates in force in the latter year. As has already been stated, air freight is not confined to commodities whose value is high and whose weight or volume is limited (see table 303).

Approximately 25 per cent of the cargo carried consists of fruit, vegetables, meat, fish, etc. Where a traffic disequilibrium exists, many of these commodities are subject to compensatory tariffs, covering only direct operational costs.

²⁹ Fifty-six D.C.3's and 8 D.C.4's.

³⁰ Including, in addition to Avianca-Lansa, 25 small commercial enterprises, among which are air taxis and fumigation squads.

TABLE 303. COLOMBIA : AIR FREIGHT TRAFFIC BY GROUPS OF PRODUCTS, JULY 1949

Commodity	Percentage of total
Manufactured goods	30
Perishable foodstuffs	25
Textiles	20
Newspapers and magazines	10
Drugs and pharmaceutical products	7
Tobacco	5
Leather	3
TOTAL	100

SOURCE : International Bank Mission, *The basis of a development program for Colombia* (1950).

From table 304 it can be seen that on certain routes where such a disequilibrium is registered, the tariff in the direction in which traffic is heavier is approximately double the rate charged in the opposite direction.

TABLE 304. COLOMBIA : AVERAGE TARIFFS ON MAIN AIR ROUTES

(Colombian pesos)^a

Route	Distance (Kilometres)	Tariff per ton	Tariff per ton/kilometre
Barranquilla or Cartagena-Bogotá	700 ^b	315.00	0.45
Bogotá-Barranquilla or Cartagena		150.00	0.21
Barranquilla or Cartagena-Medellín	540 ^b	270.00	0.50
Medellín-Barranquilla or Cartagena		150.00	0.28
Bogotá-Cúcuta	400	220.00	0.55
Bogotá-Bucaramanga	300	180.00	0.60
Bogotá-Medellín	240	100.00	0.42
Medellín-Bogotá		120.00	0.50
Bogotá-Cali	300	120.00	0.40
Cali-Bogotá		108.00	0.36

SOURCE : Data supplied by Avianca.

^a For consignments of 3 tons a month, or over.

^b Distance from or to Barranquilla.

Apparently the future development of air transport will not be affected by the *Ferrocarril del Atlántico* to the same extent as that of overland transport, because of the topography of the country. Nevertheless, the figures recorded during recent years suggest that air traffic has tended to grow more slowly than in the post-war years, up to 1950. Indeed, from that year onwards a relative stabilization of goods and passenger transport by air is to be observed.

At the same time, the fact that there are various potential air routes not yet opened up, for reasons mainly of a financial order, indicates that excellent prospects still exist for a further expansion of air transport, and that it has yet to play an important part in Colombia's economic development.

8. Oil pipelines

Within the over-all picture of transport in Colombia, an increasingly important position is occupied by the network of oil pipelines. Owing to their very specialized nature—they are utilized only for the transport of petroleum and its derivatives—the immense volumes they convey and the long distances they cover, it is preferable to discuss the system they form separately from the other means of transport; otherwise the latter's percentage share in the total volume of freight carried and the corresponding tonnage per kilometre would be distorted by the oil pipeline figures.

The growth of this system of transport has been rapid. Before the war, in 1938, there were more than 500 kilometres of oil pipelines for crude, which carried over 2.5 million tons of petroleum to Mamonal for export. In 1946 almost 1,000 kilometres of pipeline were available, all for crude and fuel oil. At the present time there are almost 2,000 kilometres of oil pipeline in existence, of which 572 are used for the transport of refined products and the rest for crude petroleum to be refined or exported (see table 305).

In 1950 the oil pipeline system transported approximately half the tons/kilometre of freight handled in Colombia, according to the estimates of the International Bank Mission. If consideration is given, on the one hand, to the considerable increase in the number of kilometres of oil pipeline in operation, as well as to the increment in petroleum production and exports, and, on the other,

to the striking expansion of motorized and air transport, the network of oil pipelines may be regarded as maintaining its relative importance within the over-all panorama of transport in Colombia.

From 1952 onwards the network of oil pipelines was extended at a rapid rate. As from that date 325 kilometres of pipelines for crude petroleum and 566.8 kilometres for refined products were brought into service. In 1955, the oil pipeline from Buenaventura to Cali, for the transport of derivatives brought into the country via the port in question, was also under construction, and was expected to be completed by the beginning of 1956.

Hence it can be inferred that considerable changes have taken place in the structure of oil pipeline transport in Colombia. During the pre-war period, the petroleum refined in the country represented only about 17 per cent of the volume earmarked for export, while the derivatives purchased abroad totalled only a little over 20,000 tons; the role of the oil pipelines was therefore to carry the crude petroleum to the ports whence it was to be shipped abroad. Subsequently, domestic consumption increased at a surprising rate. In 1954, the petroleum refined within the country amounted to almost 38 per cent of the volume exported; furthermore, imports of derivatives in the same year exceeded 670,000 tons. Thus the problem of the internal distribution of products arose, to be solved by the construction of nearly 670 kilometres of oil pipelines for this purpose (see again table 305).

TABLE 305. COLOMBIA : OIL PIPELINE NETWORK, 31 OCTOBER 1955

Stations		Length (Kilometres)	Diameter (Inches)	Pumping station	Capacity (Barrels/day)	Tariff (Pesos/barrel)
Point of departure	Terminus					
<i>Crude Petroleum</i>						
El Centro	Mamonal	538	10 & 12	18	78,000	0.90
Petrólea	Coveñas	421	12	3	27,000	3.00 ^a
Anisales	Guamo	34	4	1	3,400	0.49
El Dificil	Plato	85.5	6 & 10	1	13,200	0.22
Puerto Miño	La Dorada	74	4 & 6	1	4,000	..
Cantagallo	Puerto Wilches	2.5	4	1	1,000	0.05
Casabe	Galán	10	10.5	1	60,000	0.05
Velásquez	Galán	181	12	1	30,299	0.36
Aguachica	Puerto Mosquito	17	4	1	5,000	0.25
Totumal	Puerto Mosquito	19	4	1	5,500	0.25
<i>Derivatives</i>						
Galán	Cantimplora	96.5	8	1	24,000	0.0135 ^b
Cantimplora	Puerto Berrío	5.5	2 & 6	1	15,400	0.10
Cantimplora	Puerto Salgar	146.5	8	1	19,000	0.025 ^b
Puerto Salgar	Bogotá	143	6	3	9,060	0.05 ^b
Cantimplora	Medellín	180.8	6	3	8,300	0.11 ^b
Buenaventura ^c	Cali	98	8 & 6	2	28,000	

SOURCE : Ministry of Mines and Petroleum, *Boletín de Petróleos* (October 1955).

^a Dollar per ton.

^b Pesos per gallon.

^c Under construction.

II. SHARE OF TRANSPORT IN NATIONAL GROSS PRODUCT AND INVESTMENT

The foregoing paragraphs contained a description of the general characteristics of the existing transport system, as well as of some of the main trends displayed by the principal types of transport. In this section an attempt will be made to express these data in terms comparable with the other sectors of the Colombian economy, so that a brief examination may be made of the contribution of transport to the aggregate gross product, the available investment resources absorbed by the transport sector, capital formation and the way in which such capital has been utilized, personnel employed and the productivity of labour, etc.

Table 306 sums up the estimates relating to these aspects of the transport question.³¹

It has already been shown that during the past thirty years transport activities increased at an exceptionally rapid rate, as might be more precisely assessed through the estimates of the gross product (at constant 1950 prices) generated in this sector. It would thus be seen that in the interval between 1925-29 and 1950-53 the *per capita* gross product in question increased at an annual rate of 6 per cent, far in excess of the growth registered by the *per capita* gross product in the economy as a whole (only 2 per cent annually between the same periods). The rate of increase of the *per capita* gross product deriving from transport was even more intensive in 1945-53, when it attained 11.2 per cent, and was thus much higher than the corresponding figure recorded in any other important sector of economic activity.

Consequently, the gross product of this sector represented a growing proportion of the aggregate gross

product, its contribution rising from 2.6 per cent in the periods 1925-29 and 1930-38, to 3.7 per cent in 1939-45, 6.2 per cent in 1946-53 and 7.4 per cent in the year 1953. In other words, the relative importance of this activity within the economy as a whole was trebled between 1925 and 1953.

This expansion and the amount of investment placed in the transport sector were closely bound up with economic development and the structural changes that took place in the Colombian economy. In this connexion, several main phases can be distinguished.

The first of these comprises the basic investment in railways and port facilities effected during the 'twenties, and largely financed by means of substantial loans from abroad. During the quinquennium 1925-29 alone, such investment amounted to over 1,000 million pesos (at 1950 prices), a sum which represented about 32 per cent of total fixed gross investment in that period. Furthermore, it may be estimated that approximately 50 per cent of the additional external public debt incurred between 1920 and 1929 was allocated to the financing of construction of roads, railways and port facilities. Of total investment in transport, nearly 75 per cent came from official sources, and the activity in question absorbed over 80 per cent of the total investment of the public sector. The investment coefficient³² attained the high figure of 321 as an average for the years 1925-29, that is, the value of investment in transport was more than three times as great as the gross product generated in the sector. This constitutes the clearest indication of the high social cost represented by such investment.

The periods 1930-38 and 1939-45 might be regarded as forming a second phase. During this stage average

³² Percentage of investment in relation to the gross product generated in the sector.

³¹ See *Statistical Appendix*, table 149.

TABLE 306. COLOMBIA : SELECTED ASPECTS OF TRANSPORT DEVELOPMENT, 1925-53

(Annual averages: pesos at 1950 prices)

	1925-29	1930-38	1939-45	1946-53	1953
Gross product (Millions of pesos)	68	87	166	394	574
Percentage of total gross product	2.6	2.6	3.7	6.2	7.4
Active population (Thousands of persons) ^a . . . . .	..	..	81	108	132
Gross product per active person (Pesos) . . . . .	..	..	2,050	3,650	4,350
Fixed gross investment (Millions of pesos)	217	95	132	232	306
Public investment (Millions of pesos)	159	73	105	112	133
Investment coefficient ^b	321	114	81	61	53
Percentage of total gross investment	31.9	19.9	17.4	18.2	17.2
Stock of capital (Millions of pesos)	829	1,242	1,630	2,250	2,723
Capital per active person (Pesos) . . . . .	..	..	20,120	20,830	20,630
Product-capital ratio	0.08	0.07	0.10	0.17	0.21
Percentage of total stock of capital	7.3	9.5	10.4	11.4	12.2

SOURCES : See *Statistical Appendix*, tables 1, 5, 6, 7 and 149, and the relevant tables in Part One of this study.

^a Including a relatively small number of persons employed in the energy sector.

^b Ratio between investment and gross product in the sector.

annual investment dropped to only 50 per cent of the figure registered in the five-year period preceding the world depression, a fact which, in view of the increase in the gross product, implied a greater decrease in the investment coefficient. The absolute volume of such investment, however, remained significant, and represented about one-fourth of the total gross investment registered in the economy as a whole. This period was also characterized by a transport shift from railways to roads, and the replacement of foreign capital by an expansion of the internal public debt as a method of financing public investment in this sector.

It seems of interest to make a somewhat more thorough examination of the composition of gross investment in transport, mainly from the standpoint of its distribution among basic works and rolling-stock or other vehicles. During the period 1925-29, rolling-stock, road vehicles and other types of machinery and equipment accounted for 26 per cent of fixed gross investment in transport; the remaining 74 per cent corresponded to the construction and improvement of basic means of communication. Subsequently, restrictions on imports of rolling-stock and other vehicles helped to reduce the share of these and other equipment, which fell to 22 and 21 per cent, respectively, in 1930-38 and 1939-45; this same factor, in combination with the compensatory policy pursued by the public sector, also had a marked influence on the shift towards roads of the importance formerly attaching to railways. The magnitude of these changes is summed up in the figures contained in table 307.

TABLE 307. COLOMBIA: COMPOSITION OF INVESTMENT AND STOCK OF CAPITAL IN THE TRANSPORT SECTOR

(Percentages)

	1925-29	1930-38	1939-45	1946-53
<i>Gross investment:</i>				
Total	100	100	100	100
Rolling-stock and vehicles	26	22	21	52
Construction and improvements.	74	78	79	48
	1925-29	1930-38	1939-45	1946-53
<i>Stock of capital:</i>				
Total	100	100	100	100
Rolling-stock and vehicles	20	31	24	40
Construction and improvements	80	69	76	60

SOURCE: See *Statistical Appendix*, tables 20, 22, 24 and 25.

Lastly, the third of the stages mentioned — the post-war phase — was characterized by a still more marked alteration in the nature of investment in transport. The intensive growth of the capacity to import and the rapid increase in domestic transport requirements rendered it at once possible and necessary to allocate a substantially larger proportion of total investment in the sector to rolling-stock and other transport media, mainly through heavy imports of various types of motor vehicles. Such investment for the first time exceeded that effected in

the field of basic works. The consequent decline in the relative importance of these latter was also influenced by the new stage of development which the Colombian economy and the transport sector itself had attained; particularly decisive factors were the existence of a basic road network and a substantial increase in its rate of utilization, thanks to the considerable imports of lorries, buses and other transport media and equipment.

Similarly, during this period, private imports of rolling-stock and road vehicles entailed a reduction of public investment in transport, which for the first time represented less than half of total investment.

Although the absolute level of investment was higher than that registered in previous periods, the investment coefficient continued to decline, until in 1953 it reached the lowest figure in the whole of the period under review. To a large extent, however, this merely reflected the transition of investment in transport from the primary stage of development to the phase of improved utilization of the basic works already constructed.

Such investment trends as these were bound to entail similar modifications in the figures for the sector's total stock of capital. This more than trebled between 1925-29 and 1953, its growth greatly exceeding that of the aggregate stock of capital in the Colombian economy as a whole, so that in addition its relative importance almost doubled between the same two periods, rising from 7.3 per cent of the total in 1925-29 to 12.2 per cent in 1953. The composition of the stock of capital used in this sector also underwent a radical change during the period in question. The proportion represented by rolling-stock, road vehicles and other equipment stood at only 20 per cent in 1925, while by 1953 it had reached 40 per cent³³ (see again tables 306 and 307).

Perhaps one of the most significant pointers to the importance of the trends and changes described is the evolution of the product-capital ratio. The gross product per unit of capital registered in this sector during the five-year period 1925-29 amounted barely to 0.08; that is, the gross product generated was equivalent to less than one-tenth of the value of the capital invested in basic works and transport material. However, this ratio rose rapidly during subsequent periods, reaching averages of 0.10 in 1939-45, 0.17 in 1946-53 and 0.21 in 1953. So substantial an improvement gradually brought about a considerable reduction in the real social cost of transport activities, and constituted one of the factors which over the long term raised the ratio in question for the economy as a whole. Indeed, while transport is an activity in which capital density is high, and which therefore has a product-capital ratio considerably lower than that recorded for the over-all economy, the marked improvement referred to significantly influenced the level of the product-capital ratio for the economy as a whole.

The active population employed in transport also increased during the period under consideration, faster, indeed, than the total active population, so that its

³³ It should be noted that between 1930 and 1945 this proportion dropped from 30 to 24 per cent, in consequence of the limitations imposed upon the capacity to import by the world depression of the 'thirties and the Second World War.

TABLE 308. COLOMBIA : COMPOSITION OF GROSS PRODUCT GENERATED IN THE TRANSPORT SECTOR

(Annual averages: millions of pesos at 1950 prices)

	1925-29	1930-38	1939-45	1946-53	1953
<i>Total</i>	68	87	166	394	574
<i>Passenger transport</i>	25	34	69	164	238
Buses	4	10	26	58	88
Taxis	10	12	25	61	90
Railways and overhead cables ...	7	7	10	12	12
Inland waterways	4	4	5	5	5
Airlines	—	1	3	28	43
<i>Freight transport</i>	43	53	97	230	336
Lorries	5	11	34	134	223
Railways and overhead cables ...	18	17	31	44	46
Inland waterways	10	11	20	27	35
Airlines	—	—	—	5	6
Oil pipelines	10	14	12	20	26

SOURCE : See *Statistical Appendix*, table 149.

relative importance within this latter passed from 2.5 to 3.2 per cent between 1945 and 1953. But still more significant was the improvement in productivity in this sector, where the gross product per worker rose from 2,050 pesos (at 1950 prices) in 1939-45 to 4,350 in 1953. In the first of these periods, the productivity in question was almost double that registered for the economy as a whole and, in consequence of the greater subsequent expansion, this proportion was exceeded in 1953. So increasingly high a level of productivity was obviously related to the considerable amount of capital per worker employed in the transport sector, which in 1953 was three times greater than the average for the economy.

When the contribution made by this sector is considered in terms of the gross product originated (see table 308), it is easier to compare the relative importance of the various types of transport, to which reference was made in the preceding section, from the standpoint of the volume transported.

In the first place it should be noted that, from this point of view, there has been no long-term change in the relative importance of passenger and freight transport. The gross product generated by the former was 38 per cent in 1925, 41 per cent in 1929, 45 per cent in 1938, 40 per cent in 1945 and 41 per cent in 1953. In both passenger and goods traffic, on the other hand, the relative importance of the various types of transport substantially altered.

The most spectacular growth was that of the product generated by road freight transport, of which the relative importance rose from 7 per cent in 1925-29 to 39 per cent in 1953. Much the same was true of public motor vehicles. The expansion of air transport was also striking, its relative importance increasing from 2 per cent in 1938 to 3 per cent in 1945 and 8 per cent in 1953. The proportional contribution of river transport underwent almost as marked a decline as rail and overhead cable transport. Lastly, the growth of transport by oil pipelines

in relative terms was rapid between 1925 and 1929, but afterwards fell off because production of petroleum expanded less than other activities.³⁴

Long-term changes in types of transport were characterized, briefly speaking, by a marked shift from rail and river transport to road traffic. Not unconnected with this phenomenon, of course, were the fluctuations in the capacity to import and the proportion and coefficients of imports of machinery and equipment in relation to total investment to which reference was made at an earlier stage.

As far as rail transport was concerned, it was not merely a decrease in its relative importance that took place—a very drastic one, since from 44 per cent of the total gross product generated by passenger and freight transport in 1925 its share dropped to barely 10 per cent in 1953—but also, particularly in recent years, a stagnation of its activities in absolute terms. Apart from the world trend towards the displacement of rail by road transport, the deterioration of the tracks and the virtual suspension of imports of rolling-stock and other railway equipment after 1930 aggravated this stagnation. It must be remembered, however, that not all the railways in the country were equally affected by this situation, and that in Colombia's case there has been up to now no integration of the railway system. The completion of the *Ferrocarril del Atlántico*, alluded

³⁴ It should be recalled that these observations relate to the importance of the several types of transport, judged from the standpoint of the gross product generated thereby. The trends displayed in each case coincide with the fluctuations in the volume of traffic, since it was precisely this criterion that was adopted in preparing the relevant estimates of changes in the gross product at constant prices. The same does not apply to the level of the gross product, which may differ considerably from the volume carried by one type of transport or another, and which is based on the tariff and cost conditions prevailing in 1950. This last consideration must also be borne in mind when the gross product generated in the entire transport sector is compared with that of the economy as a whole.

to in the preceding section, and the consequent integration of the network, will in the future constitute factors that are sure to determine an intensification of rail traffic; on the other hand, they may have unfavourable repercussions on transport by inland waterways, for which the River Magdalena is still, up to the present time, the main artery.

III. SOME SUGGESTIONS AS TO TRANSPORT PROSPECTS IN COLOMBIA

In the two preceding sections the general characteristics of the evolution and present status of the transport system were discussed, together with this sector's share in the national gross product and investment. In this last section an attempt will be made to make some general suggestions as to its future prospects, chiefly from the point of view of transport expansion requirements and the investment that may be needed to extend existing basic works and equipment. As in the case of other sectorial analyses, these prospects will be considered in the light of the two over-all hypotheses as to the rate and characteristics of the future growth of the Colombian economy as a whole, discussed in detail in other chapters of the present study.³⁵

Special reference will be made to two aspects, namely, the prospects of demand for passenger and goods transport services, and the consequent investment requirements. In neither case, however, will any attempt be made at a thorough analysis, taking into detailed account such important considerations as those relating to area requirements or to the distribution of future demand by types of transport. Rather will these remarks be confined to an examination of the way in which the other aggregate projections formulated might affect transport—due allowance being made for the most important indications of a general kind—and to the definition of the part which this sector may possibly be called upon to play in the future development of the Colombian economy. Finally, an endeavour will be made to provide a general background against which specific problems could be viewed in truer perspective, and in a manner consistent with the hypotheses for the other sectors. For these problems special research would be required in every case, such as is not, of course, within the scope of the present study.

Hence future prospects for an expansion of transport activities will be presented in terms of the gross product which would be originated in the sector, without exact quantification of the volume of traffic likely to correspond to each type of transport. The question of investment requirements will be similarly approached; they will be estimated on the basis of possible changes in the product-capital ratio, without direct evaluation of the investment contemplated or implicit in existing programmes or in projects that might have to be developed in the future. The only aim pursued will be, therefore, to present an over-all picture, together with an estimate of the possible approximate magnitude of such investment and a comparison of the sum concerned with the total investment resources that it is assumed will be available.

³⁵ See particularly Part One, chapter II.

1. Prospects of demand for transport

Transport activities are linked both to final consumer demand and to intermediate goods traffic requirements. Since the behaviour of the factors influencing demand is different in each of these two cases, it seems preferable to give separate consideration to the prospects for passenger and for freight transport.

(a) As regards the former, an estimate of future requirements might be based on over-all income projections and an average ratio, derived from previous experience, between the growth of income and the expansion of demand for transport. As has been pointed out in other chapters of the present study, in Colombia's case income-elasticity coefficients of this kind can be obtained on the basis of various types of data, relating both to the distribution of consumer expenditure in 1953 and to the growth of total expenditure and expenditure on transport in earlier periods.

FIGURE XXV. COLOMBIA: RATIO BETWEEN *per capita* INCOME AND EXPENDITURE ON TRANSPORT SERVICES, ACCORDING TO THE SAMPLE OF URBAN FAMILIES, 1953

(Logarithmic scale)

Y = Expenditure on transport services.

X = Average monthly *per capita* income.

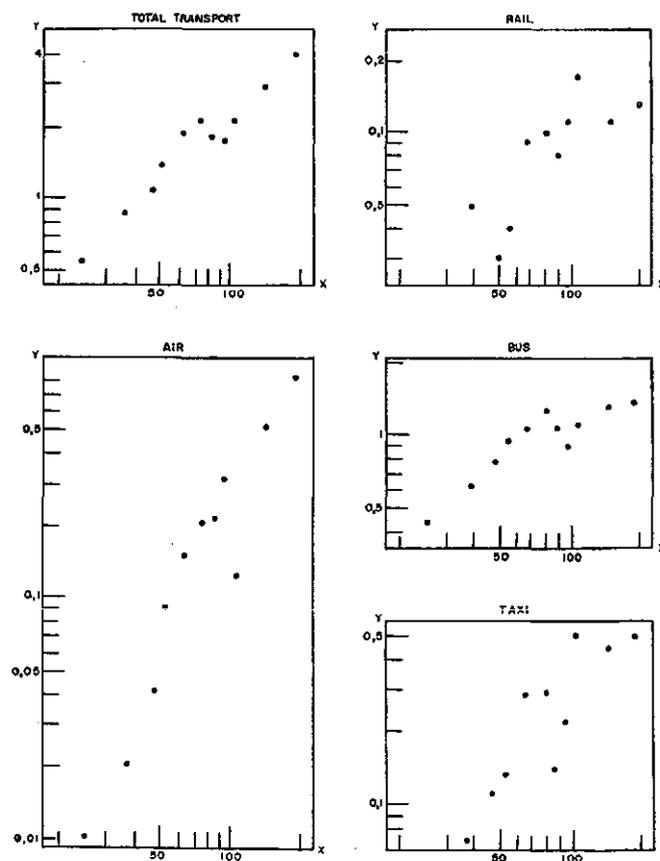


Figure XXV shows the results of a comparison between *per capita* expenditure on transport services—total and by main types—and average *per capita* income, basen on data from the survey of income and expenditure in

a group of urban families in 1953, to which detailed reference was made in previous chapters. As can be seen, there is a certain uniformity in the growth of expenditure on transport services (total and by main types) and that of total income. Nevertheless, the upward trend of expenditure on transport differs in intensity in each case. While for total transport expenditure tends to rise in a proportion closely resembling the growth of income — showing, that is, an income-elasticity coefficient very close to unity — the situation differs when the volumes of demand for air and for rail transport are compared.

Even in the case of total expenditure on transport, certain additional factors must still be taken into account. The limited transport facilities that may possibly be available deserve special mention, as they may prevent greater potential demand from being actually reflected in heavier expenditure. For example, to a greater or lesser degree, most of the urban areas in Colombia suffered from a transport deficit, but for which the income-elasticity coefficient resulting from the comparison under consideration might probably have proved higher.

This possibility is strengthened by the experience of previous periods. Even if the comparison is confined to more recent years (for example, to the five-year period 1948-53), by which time it may reasonably be assumed that the arrears accumulated during the depression and the war had been partly eliminated, the growth of the product generated by passenger transport will be seen to have greatly exceeded that of total *per capita* consumption. The income-elasticity coefficient of demand for transport thus obtained would reach the high figure of 1.9. In this case, too, some influence is exerted by the limitations of available transport facilities, although in the opposite direction from that indicated in the survey of the income and expenditure of urban families in 1953. In fact, a major share of the increment in the gross product generated in this sector during the five-year period mentioned, rather than directly corresponding to an expansion of demand, represents precisely a trend towards recovery of part of the ground lost in earlier periods.

With due regard to the foregoing observations, and allowance for some inevitable degree of arbitrariness, an income-elasticity coefficient of 1.3 is adopted as a basis for the projection of the gross product which will be generated by passenger transport. This figure lies between the two that would be obtained by the methods described, although it is nearer to the lower. Such a coefficient might appear rather small, but its adoption implies acceptance of the fact that the limitations referred to will continue to constitute an important factor throughout the next decade, mainly because of the inadequacy of the predictable growth in the capacity to import and the consequent repercussions on the proportion of the required imports of transport equipment that it will be possible to obtain.

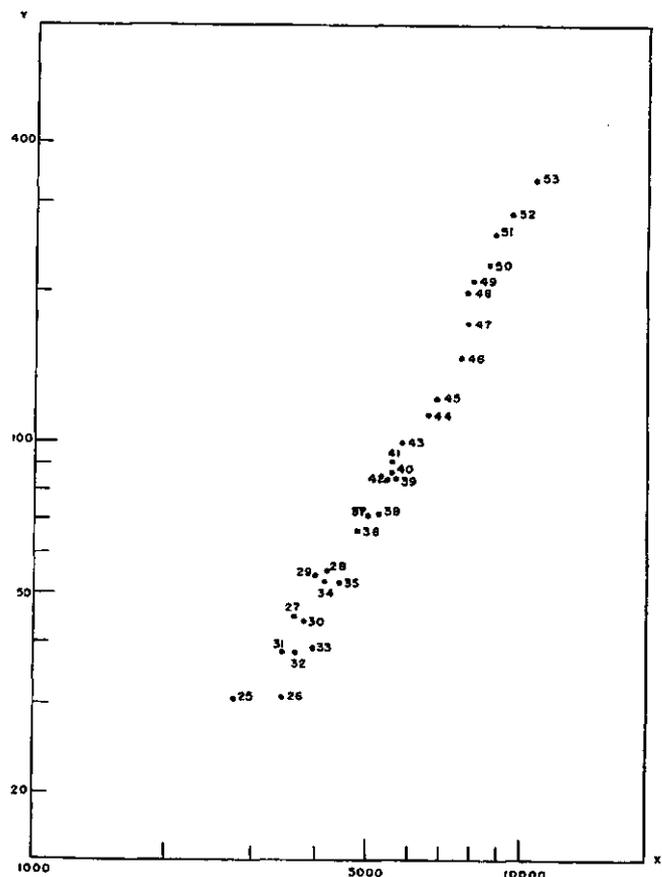
(b) The prospects of demand for transport as an intermediate service, or, in other words, goods traffic, must now be analysed. As a first step attention should be called to the close relationship between the gross product generated by freight, on the one hand, and,

on the other, the aggregate variations in the quantum of agricultural, industrial and mining production, of building activities and of imports and exports of goods. Figure XXVI, comparing the levels of these two variables in each year of the period 1925-53, is sufficiently explicit in this connexion.³⁶ As well as for total goods traffic, similar ratios can be studied with respect to the various individual types of transport (see figure XXVII).

FIGURE XXVI. COLOMBIA: RATIO BETWEEN THE PRODUCT GENERATED BY FREIGHT TRANSPORT AND THE GROSS VALUE OF PRODUCTION AND TRADE GOODS, 1925-53

(Millions of pesos at 1950 prices)
(Logarithmic scale)

Y = Gross product generated by freight transport.
X = Production, construction, trade in goods.



Although this type of over-all relationship does not constitute a precise enough instrument for the calculation of very elaborate projections of possible future traffic, the close degree of association apparent at least justified its utilization for purposes of forming a general impression and an approximate estimate of the expansion that will be necessary in transport of cargo.

From this comparison it can be deduced that throughout the period 1925-53 every 1-per-cent increment in the value (at constant prices) of production, building activities

³⁶ See *Statistical Appendix*, table 150.

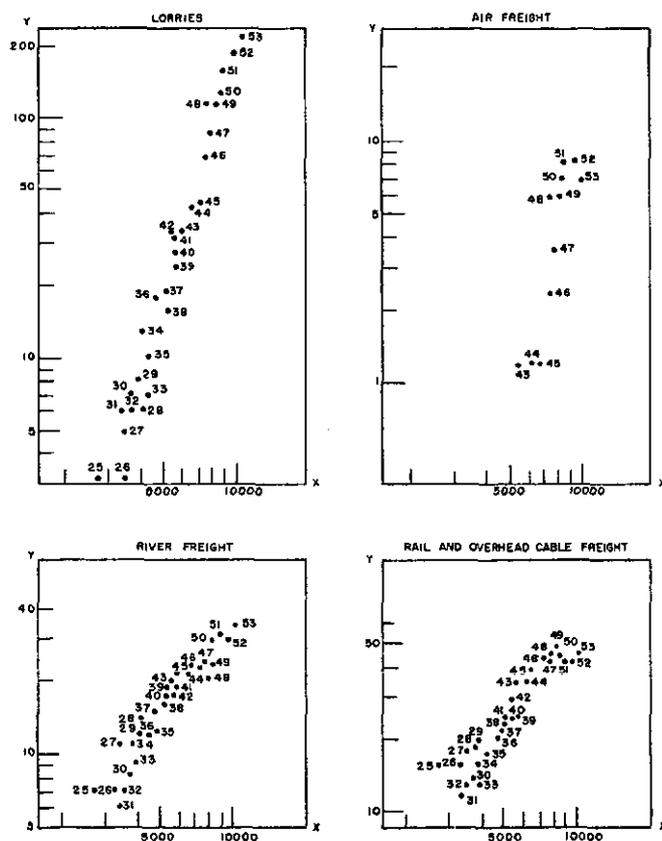
and foreign trade in goods was linked to a 1.7-per-cent increment in the gross product generated by freight. A relationship of this kind — which, for convenience's sake, will also be designated an elasticity coefficient — can thus be utilized as a criterion on which to base estimates of the future growth of the gross product deriving from this type of transport. Its magnitude must also have been influenced, however, by the gradual improvement in transport facilities, as in the case of passenger traffic, so that it would seem reasonable to expect a somewhat more moderate ratio in the future. Mainly for illustrative purposes, it will be assumed here that during the next decade the coefficient concerned would be only 1.4.

FIGURE XXVII. COLOMBIA : RATIO BETWEEN THE GROSS PRODUCT GENERATED BY FREIGHT TRANSPORT, BY TYPE OF TRANSPORT, AND GROSS VALUE OF PRODUCTION AND TRADE (GOODS), 1925-53

(Millions of pesos at 1950 prices)
(Logarithmic scale)

Y = Gross product.

X = Production and trade (goods).



Such aggregate projection criteria thus formulated should now be related to the over-all prospects for the development of the Colombian economy as a whole and in its main sectors, already discussed in other chapters of this study.³⁷ As will be recalled, two different hypo-

³⁷ See, in particular, Part One, chapter II, and Part Two, chapters II and III.

theses were formulated, one of which (hypothesis A) postulated a relatively rapid rate of future development, while the other (hypothesis B) assumed a moderate growth. The result of the pertinent calculations for 1965 is given in table 309.

TABLE 309. COLOMBIA : PROJECTIONS OF GROSS PRODUCT GENERATED IN THE TRANSPORT SECTOR, 1953-65

	1953	1965	
		Hypothesis A	Hypothesis B
<i>Passenger transport</i>			
Annual rate of growth of consumption ^a	—	4.0	2.5
Elasticity-coefficient of transport	1.0-1.9	1.3	1.3
Rate of growth of gross product from transport ^a	—	5.2	3.2
Per capita gross product from transport ^b	20	30	25
Total gross product ^b	238	479	398
<i>Freight transport</i>			
Rate of growth of production, construction and trade	—	6.5	4.9
Elasticity-coefficient of transport	1.7	1.4	1.4
Rate of growth of gross product from transport	—	9.0	7.0
Gross product ^b	336	960	755
<i>Total transport</i>			
Gross product ^b	574	1,439	1,153

SOURCE : See the foregoing tables and those in Part One of this study.

^a Per capita.

^b Millions of pesos at 1950 prices.

In so far as the gross product constitutes a satisfactory indication of the activity displayed in this sector, the conclusion can be reached that transport services would have to be practically doubled between 1953 and 1965 in the conditions assumed by hypothesis B, and that the corresponding increment would be about 150 per cent in the case of hypothesis A. This would mean a rate of growth higher than that assumed for the gross product of the economy as a whole, so that the relative share of the transport sector would rise from 7.4 per cent in 1953 to 8.2 and 8.5 per cent in 1965 on hypotheses A and B, respectively.

Such a conclusion seems reasonable — and in any event its findings might be considered rather on the conservative side — if consideration is given to the great possibilities still existing for the country's closer economic integration, and to the prospects of increased co-ordination and trade between the different areas to which reference has been made elsewhere.

2. Investment requirements

Transport demand prospects having thus been surveyed in very broad outline, consideration should now be given to the investment requirements entailed by the projected growth. It has already been pointed out that in this context too all that will be done is to analyse a few over-all magnitudes, with a view to an approximate assessment of the scope of the problem, without discussion of specific programmes or projects.

A study of the present characteristics of Colombia's transport system and an analysis of its evolution in the past provide important background data which, taken in conjunction with the demand projections just discussed, might allow possible future needs for investment in basic works and transport material to be viewed in truer perspective. The most significant of the conclusions reached must therefore be examined.

The country by now has at its disposal a fairly extensive set of basic networks of which the integration and the characteristics will be notably improved with the completion, in the near future, of current road, rail, airport, oil pipeline and port facilities programmes. The short-term possibilities for an expansion of agricultural production seem to lie rather in the development of areas already incorporated in the economy, and possessing basic transport networks, so that they probably will not necessitate further programmes of any very far-reaching scope, although perhaps interconnexions may be needed. The present road programme mainly envisages improvements in roads already existing and short cuts to be achieved by the laying of alternative routes. The works so far executed have already substantially improved the connexions between the most important production and consumption centres (Bogotá, Medellín, Cali, Barranquilla, Bucaramanga, etc.). Thus the foregoing considerations, and others of a similar nature, seem to lead to the conclusion that the main task in the transport sector during the next ten years will be that of improving the quality of existing means of transport and in intensifying their utilization rather than the achievement of any substantial expansion of basic works.³⁸

Hence, too, the persistent improvement in the product-capital ratio shown by this sector in earlier periods may reasonably be expected to continue in the future, mainly as a result of the increasing utilization of existing equipment and means of communication. It is precisely this conclusion that will be taken here as a point of departure for an approximate quantification of the future investment which would be required for the gross product growth rates discussed in the two alternative hypotheses. Given the mainly illustrative nature of these estimates, they will be applied in the following paragraphs only to hypothesis A.

As was previously shown, the product-capital ratio more than doubled between 1939-45 and 1953. At least

³⁸ See in this context "Exposición del señor Ministro de Obras Públicas, Contralmirante Rubén Piedrahita, sobre las actividades de su Despacho Ejecutivo en el año comprendido entre junio de 1954 y junio de 1955", *Revista del Banco de la República* (Bogotá, June 1955), pp. 696-707.

during the latter part of this period, however, the higher figures in question coincided with an increase in imports of rolling-stock, road vehicles, etc., which could hardly be maintained during the next few years. Hence, although many of the background data available hold out hopeful prospects of the future continuance of the improvement in this ratio, it seems scarcely reasonable to assume that the intensity registered in the later years of the period will be maintained. It will thus be assumed that, in accordance with hypothesis A, which postulates a relatively rapid rate of growth of income, of production and of trade in goods, the required expansion of the gross product generated in the transport sector (that is, aggregate demand for this service) would exceed the increase in the capital utilized in this sector. As will be recalled, the increment in the gross product from transport between 1953 and 1965 is estimated at 150 per cent, and the assumption will now be adopted that this improvement could be achieved through more efficient utilization not only of the new equipment and works incorporated into the sector during that period, but also of those currently in existence, with an expansion of 75 per cent in the capital utilized. This is only another way of saying that a rise in the product-capital ratio from 0.21 in 1953 to 0.30 in 1965 would be postulated. This does not seem an exaggerated figure if it is compared with the increases registered in immediately preceding periods, and with the long-term trend shown by the ratio in question. Table 310 gives the relevant figures, including both those relating to the stock of capital and those referring to investment requirements.

TABLE 310. COLOMBIA : PROJECTIONS OF CAPITAL AND INVESTMENT REQUIREMENTS IN THE TRANSPORT SECTOR, 1953-65

(Values in millions of pesos at 1950 prices)

	Hypothesis A	
	1953	1965
Stock of capital	2,723	4,800
Gross product	574	1,439
Product-capital ratio	0.21	0.30
Capital as a percentage of the total ...	13	11
Net investment in 1953-65		2,077
Net annual investment	176	173
Gross investment	306	413
Gross investment as a percentage of the total	17	10
Investment coefficient	53	29

SOURCE : See the foregoing tables and those in Part One of this study.

It should be noted that although, in accordance with these hypothetical projections, the relative importance of the transport sector in the economy as a whole would increase from the standpoint of the product generated therein, the reverse would be true if the figures for its stock of capital were considered, since these would fall from 13 to 11 per cent of the total between 1953 and 1965. Nevertheless, the absolute amount of the net

investment that would have to be effected in this sector would be considerable, since over the whole period 1953-65 it would exceed 2,000 million pesos (at 1950 prices).

So great an effort does not seem to be beyond the country's potentialities, at least on the conditions postulated by the hypothesis under consideration. The average annual volume of net investment would be practically the same as in 1953, but gross investment in 1965 would be higher than in the former year by over 30 per cent, in view of the increment in the stock of capital and the consequent increase in depreciation costs. But even this latter figure would represent a much lower proportion of total gross investment (10 per cent in 1965, as against 17 per cent in 1953).

It is also of interest to note what would happen in such conditions to the investment coefficient, which would drop from over 50 to under 30 per cent between the two years that are being compared. Although the latter figure would still be higher than the coefficient

for the economy as a whole, it would imply a substantial reduction of the social cost formerly represented by investment in transport, while at the same time it would allow a much larger proportion of total resources to be diverted towards investment in other activities.

Clearly, the projection of such a decrease in the real social cost of transport is an essential aspect of the set of projections collected under the terms of hypothesis *A* for 1953-65. Failure to achieve this reduction would constitute a serious threat to the possibilities of attaining the high rate of growth postulated by hypothesis *A*.

Lastly, it is needless to point out that the foregoing observations relate to some of the most important existing conditions and the relatively short-term prospects they seem to offer. As regards longer-term possibilities, conditions would undoubtedly be very different and might, for example, necessitate the building of new basic trunk roads intended to facilitate the more active incorporation of large areas of the country into the production of goods and trading activities.

ANNEXES

Annex I

EXPORT PROSPECTS FOR PRINCIPAL COMMODITIES

In Part One, chapter II of this study, prospects for exports and the capacity to import were discussed in broad outline. This annex gives in fuller detail the background data on which the relevant projections were based, both in order that the latter may be more thoroughly understood, and so as to facilitate any correction that may be necessitated by more recent events or additional information on the subject.

In the following sections reference is made to each of Colombia's staple export commodities.

1. COFFEE

During the last fifteen years, the share of coffee in total Colombian exports has tended to increase, rising from about 65 per cent during the period 1935-39 to over 80 per cent from 1952 onwards. As has already been seen, this increase resulted from the expansion of both the quantum and the unit value of coffee exports, stimulated for the most part by abnormal factors which distorted the world coffee supply and demand situation and which are not expected to persist in the future. Before the analysis of coffee export projections is begun, it would be useful at this point to summarize recent trends in the Colombian coffee trade, with the purpose of emphasizing the fortuitous and transitory character of the sudden boom in the country's capacity to import during the last few years. Otherwise, the projections appearing in this study would seem unduly pessimistic.

In the first place, the Second World War almost eliminated the European market, although the expansion of exports to the United States, facilitated as it was by Colombia's advantageous geographical position as compared with that of Brazil, more than offset the drop in exports to Europe. The increase in Colombian coffee's share in the United States market undoubtedly helped to create a taste preference for the mild Manizales type, which enabled Colombia to retain much the same position after the war, despite renewed Brazilian competition.¹

During the war, United States price controls prevented coffee prices from rising, and afterwards a similar restraint was exercised by the existence of large Brazilian stocks. As a result, during 1945-49, average retail prices for coffee in the United States were below the 1925-29 level, although the general level of prices and *per capita* real income was considerably higher. This discrepancy caused a remarkable expansion of United States coffee imports; between 1935-39 and 1945-49, *per capita* consumption rose from 14.2 to 18.1 pounds, and total imports by 50 per cent, or almost 7 million bags annually. Such an increment in demand, together with a substantial increase in imports by other countries outside Europe, more than offset the effect of the abnormally low level of European purchases. Thus, the dollar value of Colombia's coffee exports more than doubled between 1945 and 1949.

Between the first half of 1949 and the end of 1950, world coffee prices rose by 100 per cent, as a result of heavy purchases to

accumulate stocks in anticipation of the supply difficulties likely to arise from hostilities in Korea and the liquidation of the large Brazilian surpluses. As a matter of fact, world coffee production had failed to satisfy world consumption in every post-war year except 1947, so that by 1950 it became apparent that available stocks could not continue to make up the difference at current prices. In 1950, the rise in prices led to an abrupt contraction of the volume of United States coffee imports, which by 1955 had not yet regained their 1949 level. European purchases continued to grow, however, stimulated by the gradual easing of import restrictions and the improvement in the balance-of-payments position of the countries concerned. The net decline in the volume of world coffee demand was thus limited to about 10 per cent, and was amply offset by the greater rise in prices, to the benefit of coffee exporters.

In spite of a considerable falling-off in the volume of both production and exports of Colombian coffee in 1950-51, the dollar value of sales rose significantly. In 1953, coffee exports amounted to 500 million dollars (as against about 270 million in 1949), owing to a combination of favourable factors which permitted Colombia to export a much larger volume than was produced in that year. On the supply side, the country's competitive position was fortified by the relatively low level of Brazilian production, which resulted from a decade and a half of chronic surpluses that had discouraged the replacement of worn-out trees. Moreover, the 1949-50 rise in coffee prices considerably narrowed both the absolute and the relative price margins between the Santos and Manizales types, to the benefit of Colombian and Central American producers of the latter grade.² Thus, in 1953, Colombia was in an excellent position to absorb most of the year's increase in world coffee demand, since United States consumers became accustomed to the high level of prices, and European imports reached a post-war peak of 10.2 million bags (as compared with an average of 6 million bags during 1945-49). Colombian coffee sales to Europe were stimulated not only by low Brazilian export availabilities, but also by a drop in African production in 1953.

In 1954 Colombia was again favoured by the turn of events, when the forests in Brazil provoked another 40-per cent rise in coffee prices. During the first half of the year, despite the contraction in the volume of United States total imports, Colombia marketed coffee at the same high rate as in 1953, as a result of the Brazilian policy of withholding coffee from the market when prices began to decline. Thus, Colombia accounted for almost 29 per cent of United States purchases in 1954 (only 37 per cent being absorbed by Brazil in the same year), while exports to Europe fell only slightly and the total value of Colombian coffee shipments rose to 550 million dollars.

The growth in the value of coffee sales from 1949 onward (except in 1953) was thus based almost solely on the increase in prices, since the average volume of exports during 1950-54 was some 100,000 bags below the average for 1945-49. By June 1955, the New York spot price for coffee was about the same as in 1953.

¹ During the period 1935-39, Colombia supplied 22 per cent of total United States coffee imports, as compared with an average of 24.2 per cent during 1946-50. Brazil's share declined from 59.6 to 55.0 per cent over the same interval.

² Before the price rise, spot prices for Colombian Manizales were 5-6 cents per pound higher than those quoted for Santos 4, which represented a difference of nearly 15 per cent. As from 1950, the margin was reduced to 3 or 4 cents per pound, or about 7 per cent.

while quotations for futures had declined to the 1950 level;³ this implied that the coffee terms of trade had already deteriorated to approximately what they had been in 1950, with the possibility of dropping still lower in the future. On the supply side, there is every indication that world production is now expanding rapidly, owing to the encouragement of intensive planting by the 1949-50 improvement in prices. The effect of the increase in the rate of production on world coffee supplies was deferred by the Brazilian frosts, but by 1950 world exportable production should considerably exceed 40 million bags, unless harvests are affected by another unforeseen catastrophe of unusual proportions. Within the price range projected in the present study, it is not likely that such a volume can be marketed in 1960. This prospect implies serious problems for the future growth of Colombia's capacity to import.

(a) *Demand for coffee in the United States*

Since the United States absorbs 60 per cent of world coffee exports and over 85 per cent of Colombia's exports of this product, it is essential to form a clear idea of United States coffee consumption prospects, in order to project Colombia's coffee sales for 1960 and 1965. Any estimate of future trends is naturally open to wide margins of error, and should of course be interpreted as a mere approximation. Nevertheless, the method which consists in estimating maximum and minimum estimates is reasonably adequate for the purposes of this study, since in the absence of new factors which might enter into the picture at a later stage, and which have not been taken into consideration, the actual values are much more likely to fall within the projected range than outside it. Obviously, too, the relevant analyses appearing elsewhere in this study would not enable import substitution and the rate of domestic capital formation — to cite only two examples — to be quantified without some idea of the possible order of magnitude of the future capacity to import, which will depend principally on the evolution of the coffee situation. Studies of demand for coffee in the United States reveal the existence of three determining factors. These are the growth of the population, *per capita* income levels and changes in the relative prices of coffee. Projections of United States coffee imports will therefore be formulated on the basis of these factors,

³ The pre-1950 margin of 6 cents per pound between Santos and Manizales quotations had also been re-established, although the relative difference had risen only by about 10 per cent.

use being made of the available estimates of the income-elasticity and price-elasticity of demand as deduced from past experience. As will be seen later, there are other factors which may possibly affect demand and which will not be taken into account in the projections because it is difficult to assess their impact with precision. In any case, for simplicity's sake it may be assumed that the incidence of these factors is cancelled out, since they operate in opposite directions.⁴ The elasticity coefficients which will be utilized in these projections were taken from a study published by FAO;⁵ as can be deduced therefrom, the coefficients in question account fairly satisfactorily for former trends in United States consumption, although there is evidence that the elasticity of demand varies considerably in the very high or very low price ranges.⁶ For the

⁴ In all likelihood the net effect of these additional factors will determine a level of future consumption rather lower than would seem to be justified by the income-elasticity and price-elasticity coefficients of demand. The only favourable factor which is not taken into account is a possible change in consumer preferences which might foster an expansion of consumption as the result of more effective advertising, of the long-term trend towards the stabilization or reduction of coffee prices, etc. Among the factors which might operate in the opposite direction may be mentioned the increasing use of soluble coffee and "stretchers", the replacement of coffee by other beverages, and the attainment of a saturation point beyond which the public may simply not wish to consume more coffee even if income levels are higher.

⁵ A. Szarf and F. Pignalosa, "Factors which influence coffee consumption in the United States", *Monthly Bulletin of Agricultural Economics and Statistics*, FAO (October 1954). The coffee projections included in this article, however, are based on the population and income estimates in the Paley Report, which has recently been revised, the conclusions reached indicating higher values. The projections in the present chapter take this revision into account, with the result that the annual rate of growth of demand for coffee in the United States is estimated as fluctuating between 2.2 and 2.4 per cent, instead of the 2 per cent envisaged in the article cited.

⁶ See, for example, E. W. Gilbey, "Time Series and the Derivation of Demand and Supply Curves: Study of Coffee and Tea, 1850-1930", *The Quarterly Journal of Economics*, Vol. 48 (1934), and Tea, 1850-1930", *The Quarterly Journal of Economics*, Vol. 48 (1934), pp. 685 *et. seq.* (quoted in *Production, Consumption and Price Trends of Coffee*, Foreign Agricultural Report No. 33, December 1948); and also *Economic Report of Coffee Prices*, submitted to the Senate Committee on Banking and Currency by the Federal Trade Commission (1954).

TABLE 311. UNITED STATES : COFFEE DEMAND

	Total population (Millions)	Per capita income (Dollars)	Percentage of per capita income spent on coffee	Coffee prices		United States price indices		Per capita coffee consumption (Pounds)	Total United States coffee demand (Millions of bags)
				New York spot price Manizales (Cents per pound)	Average United States retail price	Coffee (1925-29 = 100)	Foodstuffs		
1925-29	118.9	651	0.75		48.8	100	100	11.9	10.7
1930-34	124.8	410	0.80	13.7	31.0	64	74	12.6	12.0
1935-39	129.0	507	0.57	11.1	24.2	50	73	14.2	13.9
1940-44	135.1	896	0.38	14.2	26.6	55	90	14.8	16.4
1945-49	144.2	1,334	0.49	27.5	43.7	90	136	18.1	20.6
1950-53	155.7	1,601	0.75	57.2	85.3	176	167	16.8	19.8
1954	161.3	1,511	0.88	72.0	110.8	227	171	14.5	17.7
(Export prices)									
Projections									
1960	175	1,837	0.80	60.0	92.5	190	171	17.8	23.5
{ B }			0.72	50.0	80.0	164	171	18.4	24.3
1965	190	1,997	0.76	60.0	92.5	190	171	18.7	26.4
{ B }			0.68	50.0	80.0	164	171	19.3	27.3

SOURCE : ECLA, on the basis of official statistics.

average range of coffee prices, the income and medium range of coffee prices, the income and price-elasticities of demand used in this study with a view to determining future United States consumption are 0.55 and 0.25 respectively. The implications of these elasticities are extremely significant; in the first place, given the estimated rate of growth of population and *per capita* real income in the United States, coffee consumption cannot be expected to increase at more than 2.4 per cent *per annum* unless prices drop considerably. This is lower than the rate for the period following the First World War, since consumption was then stimulated by the fall in the relative price of coffee. The low price-elasticity signifies that coffee prices must decline by 4 per cent to raise the volume of consumption by 1 per cent. Thus, in the projections of Colombia's coffee exports, it will be found that the largest volume of exports is associated with the minimum export values, and *vice versa* (see table 311).

Before the specific projections are analysed, it would be opportune to discuss briefly the possible determinants of demand, other than price and income-elasticities. One of these is the percentage of *per capita* income spent on coffee in the United States. Historically, this proportion has fluctuated considerably, remaining at the low average level of 0.38 per cent during the war and rising to a maximum of 0.88 in 1954 (see again table 311). Broadly speaking, such variations corresponded to those registered in the price of coffee. A number of determinants not necessarily related to income and price fluctuations can also be listed, such as changes in consumer habits, the substitution of other beverages for coffee, the growing tendency to use inferior mixtures or "stretchers" and the increasingly wide spread consumption of soluble coffee. Of these influences, only the first is likely to bring about an expansion of coffee consumption and it is considered that this factor may in fact have contributed to the growth of post-war demand, as an increasing percentage of the population acquired the habit of drinking coffee during military service. Other beverages cannot feasibly be substituted for coffee on any large scale, owing to the relatively small consumption of competing products, such as tea and cocoa. If consumption of these beverages were to replace coffee-drinking to a fairly large extent, quotations for the former commodities would rise rapidly, and in fact tea and cacao prices have been increasing in recent years almost as fast as those of coffee. So far as the use of "stretchers" and inferior mixtures are concerned, it is generally believed that inveterate coffee-drinkers will insist on better-quality coffees provided that prices do not rise exorbitantly; and, as has been noted, there is little prospect of such a development in anticipated world market conditions.

The most serious danger to increased coffee consumption is perhaps the growing popularity of soluble coffee. It has been estimated that to make one cup of soluble coffee about 20 per cent less green coffee is needed than for the ordinary roasted variety.⁷ Studies in the United States show that sales of soluble coffee have risen rapidly since 1949 and have recently represented from 10 to 14 per cent of total consumption. Whether the switch to soluble coffee has been motivated mainly by convenience or taste, or solely by economy, has not been determined. But the general impression is that if a means could be found of giving it the same aroma as ordinary coffee, it would probably almost entirely supersede this latter in the United States market. In the present study the adverse implications of the use of soluble coffee are not taken into account in the projections on the grounds that the future effect on green coffee consumption is indeterminable. It may very well be, for example, that the greater use of soluble coffee will come to supplement, as well as replace, consumption of ordinary coffee, and that the net consequences with respect to total demand will be insignificant. In any event, the effects of the various determinants mentioned may cancel one another out, or be offset by under-estimates of the future growth of United States income and

population, which after all are the most important factors influencing demand.⁸

Finally, a range of future coffee prices must be established so that the demand-elasticities can be applied. In the coffee supply and demand conditions projected for 1960, it would not be unrealistic to assume that the upper limit would be the mid-1955 price level, or about 60 cents per pound for the Manizales type. This does not imply that the price in question would remain stable in any circumstances, but that the coffee terms of trade would be maintained, or in other words, that the price of coffee would hold its own in relation to over-all world price levels. The problem of fixing the lower limit is somewhat more difficult, given the prospects of an over-all supply of coffee by 1960. However, as has already been pointed out, other things being equal, any drop in coffee prices means a reduction of coffee income; in the case of Colombia, if 6.5 million bags were to be exported annually by 1960, each drop of 1 cent in the price of coffee would represent a loss of almost 7 million dollars, even with due allowance for the resulting small increase in the volume of sales. In such circumstances, the principal exporter countries might have to take measures to prevent competitive price-cutting from forcing prices down to very low levels, and to regulate the marketing of the product.⁹

Attention has already been called to the fact that, according to the projections of United States coffee demand which, together with some historical series for the purposes of comparison, are summarized in table 311, the maximum volumes of *per capita* and total consumption are associated with the minimum projections, and *vice versa*, since a larger volume of imports would coincide with a smaller import value, as a result of the low price-elasticity of demand. The projected expansion of *per capita* consumption will depend mainly on the growth of population and *per capita* income in the United States, owing to the relatively small margin assumed between maximum and minimum prices. Thus, from 1960 onwards the rate of increase in total demand varies only between 2.0 and 2.4 per cent *per annum*. Since the income-elasticity of demand is substantially below unity, the proportion of United States *per capita* income spent on coffee may be expected to decline steadily, so that by 1965 it would fluctuate only between 0.68 and 0.76 per cent; this share, however, would still be above the average for the years immediately preceding the war.

⁸ Moreover, the possibility cannot be discounted that Latin American countries might in the future manufacture their own soluble coffee for export, although there are numerous obstacles involved, such as the popularity of traditional brand names in consumer countries and the difficulty of manufacturing appropriate blends of different types of coffees in a country such as Colombia, which produced a single type.

⁹ The margins of price fluctuation adopted in the present study are, of course, purely hypothetical, and in no way constitute a forecast of future trends. However, as regards the minimum price of 50 cents per pound, it should be noted that any price below this figure would entail great difficulties for the coffee-exporting countries, giving rise to such a situation as might prove incompatible with even a moderate rate of economic growth. Consequently, for purposes of the external sector projections, it was felt preferable to discount the possibility of a future coffee crisis, to cope with which direct measures, either unilateral or multilateral, would probably have to be applied. In this context mention may conveniently be made of the agreement reached at the meeting of the members of the Pan American Coffee Bureau held at New York in June 1955, under the terms of which measures were to be adopted to stabilize coffee prices between upper and lower limits of 60 and 50 cents per pound, through the fixing of export quotas and the withholding of production surpluses from the market. Similar coffee price limits are adopted by Henry G. Aubrey, of the New York Federal Reserve Bank, in his recent projections of long-term trends in United States imports.

⁷ See Federal Trade Commission, *op. cit.*

TABLE 312. WORLD DEMAND FOR COFFEE IMPORTS

	Europe			United States	Rest of the world	World total
	Population (Millions)	Per capita consumption (Pounds)	Total imports (Millions of bags)			
1920-24	252	4.5	8.6	9.9	1.5	19.9
1925-29	261	5.2	10.2	10.7	1.8	22.7
1930-34	269	5.6	11.3	12.0	1.8	25.1
1935-39	278	5.5	11.5	13.9	2.2	27.6
1940-44	287	1.2	2.6	16.4	2.7	21.7
1945-49	300	2.6	6.0	20.6	3.1	29.7
1950-53	310	4.1	9.5	19.8	2.7	32.0
1954				17.1		(29.5)
<i>Projections</i>						
1960 { A }	322	5.5	13.4	24.3	3.4	41.1
{ B }		5.0	12.2	23.5		39.1
1965 { A }	327	5.7	14.1	27.3	4.0	45.4
{ B }		5.5	13.6	26.4		44.0

SOURCE : ECLA, on the basis of official statistics.

In spite of the decline projected in United States *per capita* expenditure on coffee, imports, according to the model, would rise very considerably over the course of the next ten or fifteen years. In fact, the projected increase intentionally exceeds estimates made by a number of other authorities, the aim having been to associate the maximum coffee export projection for Colombia with the highest feasible level of United States demand. Thus, in 1954, an expert belonging to the *Federación Nacional de Cafeteros de Colombia* calculated that the United States would import 22 million bags by 1959, while the Federal Trade Commission of the United States has estimated that imports would still be below 20 million bags by 1965. On the other hand, the Foreign Agriculture Service of the United States Department of Agriculture has projected that coffee imports will rise to only 28.7 million bags by 1975, or not much above the maximum figure given for 1965 in the present study.¹⁰

(b) *Demand for coffee in the rest of the world*

Projections of total world demand for coffee imports in 1965 are shown in table 312 in which separate estimates are given for Europe and the rest of the world, excluding the United States. It can be seen that post-war European *per capita* consumption continued to lag considerably behind pre-war figures, reaching only 4.3 pounds in 1953. Owing to the dollar shortage and general balance-of-payments difficulties suffered by most European countries after the war, coffee consumption was kept down artificially by import restrictions and heavy taxation. As late as 1952, import duty rates and internal taxes on green coffee exceeded the untaxed price per pound in France, Germany, Italy and Spain, and such taxation was also substantial in a number of other European countries. Furthermore, in some countries taxes on retail sales of roasted coffee are even higher than those charged on green coffee.

The gradual relaxation of those controls and taxes was the main factor responsible for the steady increase in European coffee

consumption as from the end of the war.¹¹ Indeed, the rise in prices during 1949-50 did not check this growth, as was the case in almost all the other countries of the world. Future *per capita* consumption is therefore projected independently of coffee prices. On the maximum hypothesis, it is postulated that the pre-war level of 5.5 pounds *per capita* would be regained by 1960, while the minimum hypothesis assumes that it would not be reached again until 1965. Both projections anticipate that the expansion of consumption after the attainment of the pre-war rate will be gradual. Nevertheless, by 1965 European coffee imports may amount to over 14 million bags per year, or about 50 per cent more than in 1950-53, which is an increment considerably greater than is likely to be registered in United States consumption. As in the case of future United States imports, the estimates of European coffee demand compare quite favourably with projections prepared by other authorities on the subject.

The rate of increase of coffee demand in the rest of the world will also probably be higher than in the United States. The coffee habit is not so well developed in many other parts of the world, and if over a considerable period of time prices can be expected to remain stable or decline, it is quite possible that new groups of consumers may be attracted to the beverage. Again, coffee exports to eastern Europe might be resumed. For these reasons, it is assumed that imports effected by the rest of the world in 1965 would probably reach 4.4 million bags, or 50 per cent above the 1950-53 level.¹² No attempt is made to establish two growth hypotheses for coffee demand in the rest of the world, owing to the multiplicity of the possible variants which exist.

From the total figures for world coffee demand very interesting inferences may be deduced. According to the projections between 1950-53 to 1960, demand should increase from 2.4 to 3.0 per cent annually, owing to the continued recovery expected in European

¹¹ The reduction in tariffs and taxes was especially marked in 1953.

¹² The same results can be obtained for demand in the rest of the world by extrapolating the historical rate of increase of the imports of Canada and Argentina, the two most important consumers in the rest of the world, and by assuming that all other countries (which imported a little less coffee in 1953 than immediately before the war) will in the aggregate increase their purchases at a rate of about 2 per cent annually in the future.

¹⁰ The sources of the figures cited are, respectively : Sr. Rafael Parga C. in the *Informe del Gerente al XVIII Congreso Nacional de Cafeteros*, Bogotá, April 1954 ; Federal Trade Commission, *op. cit.* (this unduly pessimistic estimate is based on exaggerated price forecasts) ; and IA-ECOSOC, Comisión Especial del Café, *La Situación Mundial del Café* (Washington, D.C., June 1954), p. 62.

TABLE 313. WORLD PRODUCTION OF COFFEE FOR EXPORT

(Millions of bags)

Coffee year	Brazil	Colombia	Other countries			Grand total	Production surpluses	
			Western Hemisphere	Africa and Asia	Total			
1919/20-1923/24	12.0	2.0	3.8	1.9	5.7	19.6	-0.3	
1924/25-1928/29	17.3	2.5			6.7	26.4	3.7	
1929/30-1933/34	24.5	3.2			7.3	35.0	9.9	
1934/35-1938/39	22.5	4.0			8.6	35.0	7.4	
1939/40-1943/44	15.4	4.9			6.6	27.0	5.3	
1944/45-1948/49	14.0	5.6			8.0	27.6	-2.1	
1949/50-1953/54	14.8	5.3	5.4	5.3	10.6	30.7	-1.3	
1953/53	14.0	6.0	6.1	6.0	12.1	32.0	2.5	
<i>Projections</i>								
1960	A	22.0	7.5	7.5	8.0	15.5	45.0	3.9
	B	20.0	7.0	7.0	7.5	14.5	41.5	2.4

SOURCE: ECLA, on the basis of official statistics.

imports and the stimulus to consumption which would be given by the anticipated stabilization or reduction of coffee prices. During 1960-65, the rate of increase would decline until it reached from 2.0 to 2.4 per cent *per annum*. These rates compare with an annual increase of just over 2.2 per cent in world demand between 1920-24 and 1935-39, when a 50-per-cent drop in coffee prices apparently more than offset the adverse effect on demand of lower world income during the 1930s. Since it is assumed that coffee prices will be over three times higher than in 1935-39, whereas over-all world prices for foodstuffs will only be doubled, it can logically be concluded that the demand projections in table 312 are compatible with the hypothesis of maximum growth of Colombian coffee exports.

(c) *World coffee production for export*

The next step in the analysis is to estimate probable world production of coffee for export in 1960. Such a calculation is shown in table 313 where separate figures are given for the principal producer countries or areas. The historical series illustrate the severe cyclical fluctuations which coffee production has suffered since 1920. During the decade 1920-24 to 1930-34, Brazilian production doubled, while the output of the rest of the world, stimulated by the price increase during the 'twenties, rose by about 36 per cent. A coffee surplus of almost 10 million bags annually brought about an abrupt drop in prices and a gradual decline in production, so that by 1945-49 production fell short of demand by about 2 million bags *per annum*. The resulting post-war rise in prices again proved a great stimulus to new plantings, which would have affected the 1953-54 crop to a much larger extent but for the frosts in Brazil. It has been estimated that by 1955-56 the effects of the frosts will have been completely overcome, and that by 1958 or 1959 Brazil's exportable production will exceed 20 million bags *per annum*. This is not an abnormally high figure in comparison with those registered in the boom years of the 'thirties; even the maximum projection for 1960 (22 million bags) is one-third smaller than the record Brazilian output of 1934.

The fluctuations in the production of the rest of the world were less pronounced than in the case of Brazil. Except for a downward movement during the war as a result of the sharp drop in the African and Asian output, world coffee production, excluding that of Brazil, tended to rise steadily, more than doubling in the thirty years following the period 1920-24. In a conservative estimate, the production concerned may rise to between 21.5 and 23 million

bags by 1960, as compared with about 18 million in 1953-54. This output may be divided almost equally between Colombia, the rest of the Western Hemisphere, and Africa and Asia taken together, although the expansion of production will probably be somewhat more rapid in the last two areas than in this Hemisphere.

As a result of the expected recovery of coffee-planting in Brazil and its steady development elsewhere, it is reasonable to assume that there will be between 41.5 and 45.0 million bags available for export in 1960. The minimum figure, however, is almost equal to world production in 1934 and rather less than 20 per cent above the average pre-war level. In reality, the maximum figure could be reached under favourable weather conditions without any appreciable increase in current yields, if the rate of new plantings is taken into account; the minimum figure would reflect poorer yields or bad weather. Thus, the production estimates are conservative, in conformity with the aim of obtaining the most favourable conditions for the maximum hypothesis as regards Colombia's coffee exports. It should be repeated at this point, however, that the projections in this study of the future world coffee supply and demand situation are not forecasts, but simply conjectures or reasonable assumptions which enable Colombia's export prospects to be quantified for the purposes of the study.

According to the projections, world coffee demand would tend to fall considerably short of production in 1960. Even if maximum world consumption were to coincide with minimum production (a very unlikely prospect), there would be a surplus of 400,000 bags; and should minimum consumption be associated with maximum production, which is equally improbable, the difference might rise as high as 6 million bags (see again table 313). Furthermore, given the rates of increase of production and demand, a world surplus of coffee would appear before 1960, so that by this latter year stocks might already exceed normal volumes. It thus becomes clear that 1960 coffee prices cannot reasonably be expected to be above the levels assumed, or world demand would be even less than that projected, and surpluses would be greater.

(d) *Distribution of world coffee exports*

In view of the above projections, it is assumed that sizeable coffee surpluses might exist by 1960 and that producers might find it advantageous to regulate the marketing of coffee, so as to prevent a serious fall in prices. To give an idea of the possible order of magnitude of such a decline, it is sufficient to point out that a price decrease of 10 cents per pound would be necessary to

TABLE 314. DISTRIBUTION OF WORLD COFFEE EXPORTS

(Millions of bags)

	Colombia		Brazil		Other Western Hemisphere countries		Africa and Asia		Total
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)	(A)
<i>United States Market</i>									
1935-39	3.1	22.0	8.3	59.6	2.1	15.4	0.4	3.0	
1946-50	4.9	24.2	11.1	55.0	3.7	18.3	0.5	2.5	20.2
1951-53	4.8	23.3	10.0	48.5	4.5	21.8	1.3	6.3	20.6
1954	4.9	28.7	6.3	36.9	4.2	24.6	1.6	9.4	17.1
1960 { A	5.9	25.0	11.7	50.0	5.2	22.0	0.7	3.0	23.5
B	5.3	22.0	12.2	50.0	5.3	22.0	1.5	6.0	24.3
<i>Rest of the World</i>									
1935-39			6.8	49.6					13.7
1946-50			5.3	53.5					9.9
1951-53	0.7	5.6	6.3	50.0	1.3	10.3	4.3	34.1	12.6
1960 A	1.3	7.7	8.2	48.8	1.3	7.7	6.0	35.7	16.8

(A) = Bags.

(B) = Percentage.

SOURCE : ECLA, on the basis of official statistics.

absorb each additional 2.5 million bags of coffee (according to the United States demand-elasticity coefficient). And since coffee production would be expanding by about 5 per cent annually, while the yearly growth of world demand seems likely to drop as low as 2.0-2.4 per cent *per annum* after 1960, it has not been thought necessary to project production any further than this latter year ; at least during the period covered by the projections, productive capacity would exceed demand for coffee. It is thus assumed that the major coffee exporters will maintain a given share of world market demand from 1960 to 1965. In table 314, alternative hypotheses of the possible distribution of exports are presented for the same groups of countries as appeared in table 313.

With regard to the United States market, the strategic factor in determining the importance of the various sources of supply will be the impact of the recovery in Brazilian exports. In table 314 it is assumed that by 1960 Brazil will again be accounting for at least 50 per cent of United States coffee imports ; it should be remembered that only in 1953 and 1954 did its share fall below this figure. Another assumption is that the growing preference for mild coffees may make it difficult for Brazil to capture from 55 to 60 per cent of the market, as it did in the past. Coffee exports to the United States from the rest of the Western Hemisphere (excluding Colombia), have increased intensively and uninterruptedly since before the war. It is thus assumed that in 1960 the proportion absorbed by these countries will not fall below 22 per cent, which was approximately the figure prevailing during the period 1951-53. With regard to Africa and Asia, the most favourable development from Colombia's point of view would be for the share of these areas in the United States market to fall back to the pre-war level of 3 per cent. This is *not* unlikely, since the recent expansion in purchases from Africa and Asia has been motivated by the fact that the coffees produced in these areas are cheaper than those cultivated in the Western Hemisphere and are used to make less expensive blends in order to combat a sharp rise in coffee prices. The incentive to purchase these "bitter" coffees will diminish as prices fall or as United States roasting plants become accustomed to current price levels ; moreover, growing demand in Europe can be expected to absorb increasing amounts of the exports of these areas.

According to the above assumptions, the maximum share of United States coffee imports which Colombia could secure in 1960 would be 25 per cent ; this proportion was surpassed only in

1953 and 1954, when Colombian exports were favoured by very abnormal circumstances. For Colombia to attain this target, Brazilian exports to the United States market would have to be restricted to about 11.7 million bags in 1960, or only 600,000 bags more than the average for 1946-50, when production was 6-8 million bags below the projected 1960 output ; African and Asian exports would have to decrease to their pre-war proportion, and other Western Hemisphere countries would have to be content with exports to the United States amounting to 700,000 bags less than those of Colombia, although their aggregate exportable production would be almost the same as Colombia's in 1960, and they compete in the cultivation of the mild type of coffee. Furthermore, to obtain the most favourable maximum projection possible for Colombian coffee exports, it is assumed in table 314 that an optimum share of the maximum value of United States imports in 1960 will be obtained (see again table 314). The minimum hypothesis postulates that Colombia's share in United States coffee imports will be at least as large as before the war, that is, 22 per cent.

With regard to the distribution of exports to the rest of the world, the key factor is the increment in the production of Africa and Asia, which in 1951-53 supplied about one-third of the market concerned. As has been seen, exportable coffee production in these areas is projected to rise by 2.3-2.8 million bags between the latter period and 1960. Since prospects of substantially increasing the volume of sales to the United States are not very promising, most of this expansion would have to be absorbed by other markets. In addition, Brazil is also likely to make every effort to increase its shipment to the rest of the world and to exploit to the full its close commercial ties with Europe. As regards the production of other countries in the Western Hemisphere, each successive increase in their exports to the rest of the world will probably be achieved with great difficulty and at the cost of more generous price concessions or barter arrangements.¹³ Colombia has already concerted a series of trade agreements with European countries, and, given its rapid rate of economic development, could probably provide a larger and more reliable market for European exports than the other important coffee exporters in the hemisphere (excluding Brazil). Thus, table 314 presents a maximum hypothesis of 1.3 million bags for Colombian exports to the rest of the world

¹³ European consumers are also more accustomed to the stronger-flavoured grades produced in Brazil and the Eastern Hemisphere.

in 1960. For this level of exports to be achieved, African and Asian shipments would have to increase by only 1.7 million bags (which would hardly allow these countries to market their minimum output in 1960 if they exported at the maximum rate to the United States); Brazil's share in this market would have to decline slightly; and exports from the rest of the Western Hemisphere could not rise above their 1951-53 level. On the minimum hypothesis, Colombia would not account for a smaller proportion of total exports to the rest of the world than during 1951-53. Since no close correlation was found between prices and volume of production for the rest of the world, it is assumed that the maximum value of Colombian exports would coincide with the maximum projected price, and *vice versa*.

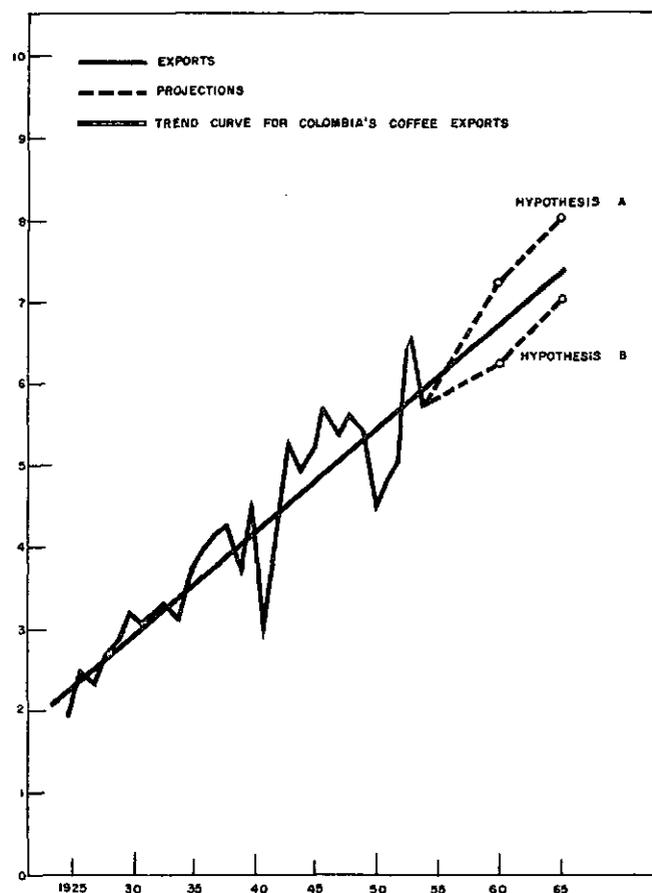
(e) *Projections of Colombia's coffee exports*

The final projections of Colombia's coffee exports are summarized in table 315. Although 1960 shipments would be from 0.5 to 1.5 million bags in excess of those of 1954, the value of coffee sales would show little improvement, owing to the lower prices for coffee assumed to prevail in 1960. In effect, the maximum projection of 570 million dollars is very little above the actual figure for 1954, while the minimum projection of 410 million dollars is equal to the average for the years 1951-53. Not even by 1965 does the minimum projection reach the 1954 value of coffee exports. With regard to the volume of exports, the maximum estimate implies an annual rate of increase between 1951-53 and 1960 of about 3.4 per cent, which is somewhat higher than the rate of growth of total world coffee consumption; after 1960, the expansion of Colombia's coffee exports is projected as parallel with that of world demand. According to hypothesis B, the rate of increase of the volume of exports up to 1960 would be 1.5 per cent annually, which is considerably below that of minimum world consumption. Thereafter, exports would rise more or less in line with the growth of world demand, as in the case of the maximum hypothesis (see figure XXVIII).

Table 315 also shows probable trends in the geographic distribution of Colombian coffee exports. The proportion shipped to countries other than the United States will probably increase until 1960, owing to a continuance of the post-war recovery of European consumption, for even the minimum projection postulates that Colombia will at least maintain its share in the market in question. After 1960, however, the more rapid long-term growth of consumption in the United States will gradually tend to restore the relative importance of this market in Colombia's total coffee sales. Even if minimum exports to the United States in 1960 were to coincide with maximum shipments to the rest of the world, the United States' share would not fall below 80 per cent. Thus, the prospects for diversification of the sales market for Colombian coffee appear to be definitely limited, unless unforeseen and important new markets open up in the future.

FIGURE XXVIII. COLOMBIA : COFFEE EXPORTS

(Millions of bags)
(Natural scale)



2. *Petroleum*¹⁴

Petroleum is Colombia's second most important export. In almost every year between 1927 and the beginning of the Second World War, this product accounted for more than 20 per cent of

¹⁴ As has repeatedly been pointed out, there are certain discrepancies between the petroleum export projections utilized in Part One of the study and the much more moderate projections formulated in Part Two, chapter IV. The remarks which follow refer to the former set, that is, to the aggregate projections.

TABLE 315. COLOMBIA : COFFEE EXPORTS IN 1946-54 AND PROJECTIONS FOR 1960-70

(Values in millions of dollars at 1953 prices)

	United States			Rest of the world			Total	
	Millions of bags	Percentage of total value	Value	Millions of bags	Percentage of total value	Value	Millions of bags	Value
1946-50	4.9	92		0.4	8		5.3	
1951-53	4.9	88		0.7	12		5.5	410
1954	5.0	86		0.8	14		5.75	550
1960 { A	5.9	82	470	1.3	18	100	7.2	570
B	5.3	85	350	0.9	15	60	6.2	410
1965 { A	6.6	83	523	1.4	17	110	8.0	633
B	6.0	86	400	1.0	14	65	7.0	465

SOURCE : ECLA, on the basis of official statistics.

TABLE 316. COLOMBIA : CRUDE PETROLEUM PRODUCTION IN SELECTED YEARS

(Thousands of barrels)

First year of production	Name of concession	1930	1940	1944	1948	1951	1954	1955: 1st quarter
1921	De Mares	20,346	21,421	18,068	9,152	13,846	11,599	2,782
1939	Barco	—	4,144	4,580	8,003	10,104	9,990	2,521
1941	Yondó	—	—	57	5,672	12,833	15,107	3,267
1943	El Dificil	—	—	25	542	725	393	120
1943	Cantagallo	—	—	40	390	429	840	175
1946	Guaguaquí (privately owned)	—	—	—	49	461	1,502	450
1953	Tetúan	—	—	—	—	—	373	90
1953	Aguachica	—	—	—	—	—	133	7
1953	Totumal and San Pablo	—	—	—	—	—	39	64
TOTAL		20,346	25,565	22,770	23,808	38,398	39,977	9,479

SOURCE : Official statistics.

the value of exports, and in 1940-41 the corresponding proportion rose to over 30 per cent. Later, however, the share of petroleum fluctuated around 15 or 16 per cent, dropping to slightly more than 11 per cent in 1954, when oil exports dropped sharply and coffee sales boomed. Nevertheless, petroleum is undoubtedly the principal Colombian product which offers prospects of contributing substantially to the diversification of the country's exports. According to the export projections appearing in this chapter, the relative importance of this commodity will tend to recover in the future.¹⁵

The main justification for an optimistic view of petroleum prospects is the anticipated increase in world market demand, which is expected to rise at the rapid annual rate of some 7 per cent up to 1975.¹⁶ Although it is thus reasonable to assume that over the longer term export markets would not constitute a significant problem, there are other factors which might seriously limit the expansion of Colombia's petroleum sales. First, the policy in Colombia is to supply the largest possible proportion of domestic fuel consumption from the country's own production. By 1960, programmed refinery capacity will absorb a considerable share of total oil production, and if liquid fuel demand continues at the projected rate thereafter, and is to be met by local supplies, export availabilities may be severely restricted or perhaps even reduced. In the second place, any substantial increase in Colombian petroleum production will have to come largely from new fields which are just beginning to give results or from areas which are still being prospected. In short, exports will depend mainly upon future domestic consumption, refinery capacity and success in the exploitation of new fields.

(a) Petroleum production

Until 1939, the development of petroleum production in Colombia depended upon the output of the De Mares Concession, operated by the Tropical Oil Company. By 1930 this concession was already yielding over 20 million barrels *per annum*, almost all of which was exported. Despite the gradual incorporation of new fields, total production did not substantially exceed this figure until

¹⁵ Only a part of the value of petroleum exports contributes to the country's capacity to import, owing to the fact that a major part of the output is produced by foreign companies. This aspect of the problem will be taken up later.

¹⁶ See Paley, William S. (Chairman), *Resources for Freedom. A Report to the President by the President's Materials Policy Commission (The Paley Report (Washington, June 1952), Vol. III). The Outlook for Energy Sources*, p. 9.

after 1948. This stagnation was the result of a decline in the flow from the De Mares concession which offset the expansion of other production. In 1954, the De Mares output amounted to only 11.6 million barrels, and was apparently still declining. It cannot be said that this decline is due to the depletion of reserves, for when the Government took over the concession in 1951 upon expiry of the foreign company's contract, De Mares had proven reserves of over 100 million barrels. Nevertheless, the post-war growth of Colombian oil production has depended almost exclusively on the increased yield of newer deposits (see table 316).

These new concessions were established in three phases, corresponding to the periods when foreign petroleum investment activity followed an upward trend. During the first of these, just before the war, the Barco and Yondó concessions were opened up, and now provide over 60 per cent of the country's oil output. Although production has increased at a more rapid rate at the Yondó deposit, which is at present the leading petroleum concession, the especially high-grade Barco crudes are of particular importance for supplying domestic refineries with the raw material which will yield the maximum amount of the light derivatives that are most in demand in Colombia. The second wave of petroleum investment occurred in the latter years of the war and early post-war years, and led to the incorporation of three new deposits (El Dificil, Cantagallo and Guaguaquí). The production of these concessions has not expanded as fast as that of the two already mentioned, but the recent increment in the yield from Guaguaquí is particularly promising. However, after 1948 investment activity again decreased, because of the unrest in Colombia. Perhaps as a direct result of this, production was stabilized from 1951 onwards at an annual 38-40 million barrels (see again table 316).

As from 1950, the Colombian Government approved a number of reforms in the existing petroleum legislation with the aim of stimulating additional foreign investment. Among other provisions, the prospection period permitted under petroleum concessions was extended, and petroleum company assets were exempted from the tax on capital during this period. In 1952 petroleum investment again revived, and the effects of this third phase on the rate of petroleum production are just beginning to make themselves felt. The Tetúan concession is in full operation, while the Aguachica and Totumal concessions are at the drilling stage. Results at the latter deposit have recently been very satisfactory.¹⁷ Prospecting and test-drilling is going forward at a rapid pace throughout the

¹⁷ Production of the Totumal and San Pablo concessions during the first quarter of 1955 exceeded output up to that time (production began in October 1953). (See again table 316.)

TABLE 317. COLOMBIA : PRODUCTION, CONSUMPTION AND EXPORTS OF PETROLEUM IN SELECTED YEARS

(Millions of barrels)

Year	Production	Apparent domestic consumption *	Exports			
			Volume	Price (Dollars/ barrel)	Value (Millions of dollars)	
1930	20.3	1.2	19.1	1.38	26.3	
1935	17.6	1.7	15.9	0.99	15.8	
1940	25.6	3.2	22.4	1.02	22.8	
1945	22.9	3.4	19.5	1.14	22.2	
1948	23.8	5.0	18.8	2.54	47.8	
1949	29.7	5.5	24.2	2.41	58.2	
1950	34.1	5.7	28.4	2.28	64.8	
1951	38.4	6.2	32.2	2.27	(73.1)	
1952	38.7	7.5	31.2	2.27	71.5	
1953	39.4	7.3	32.2	2.36	76.3	
1954	40.0	9.6	30.4	2.49	75.8	
<i>Projections</i>						
1960	A	65-70	20-25	45	2.70	122
	B	55-60		35		95
1965	A	85-100	30-45	55	2.90	160
	B	69-84		39		113

SOURCES : Official statistics and ECLA estimates.

* Apparent domestic consumption is equal to production minus exports.

country, not only in areas where potential oil reserves have already been proved, but in other sectors, such as the province of Chocó, where nothing is known of the prospects offered.

(b) *Internal and external demand for petroleum*

External demand for Colombian petroleum is not likely to raise any serious problems over the long term. The country's oil exports are shipped mainly to the United States, either directly, or indirectly after being refined in the Netherlands Antilles. The European market has been drawing to an increasing extent upon the Middle East for supplies, and this trend will probably continue in the future. Considerable investment has been placed in oil pipelines connecting deposits in that region with Mediterranean ports, thus enhancing their accessibility for the European centres of consumption. With regard to the United States market, the expansion of production in Venezuela and Canada will probably meet most of the increase in demand, but since Colombia's output is relatively small, there will no doubt be sufficient opportunity to market the proportion available for export.

Consumption of liquid fuels has been increasing rapidly in recent years. An even larger share of the output of crude is being withdrawn from export availabilities to supply domestic refineries (see table 317). The small increment in production of crude between 1951 and 1954 — amounting to 1.6 million barrels — was in fact inadequate to cover the expansion of domestic requirements, which increased by 3.4 million barrels over the same period, and in 1954 absorbed almost 25 per cent of production.¹⁸ The biggest refinery in the country, at Barrancabermeja, was recently enlarged, and accounts for about 97 per cent of the country's refining capacity. The current output of this plant — 35,000 barrels daily — is sufficient to supply most of Colombia's liquid fuel requirements, excluding those of the Pacific coast area, which, owing to transport

¹⁸ The figures for domestic consumption given in table 317 are really residuals obtained by deducting exports from total production. Although they include changes in inventories, they nevertheless give a valid impression of the rise in domestic demand.

difficulties, was still having to import petroleum products in 1955. An agreement concluded by the Government and the International Petroleum Company provided for the construction of an additional refinery near Cartagena, with a minimum daily capacity of 25,000 barrels, to be completed by 1957. This plant should represent enough additional capacity to supply domestic demand in 1960, including even the western provinces by means of sea transport via the port of Buenaventura. By 1960, installed refinery capacity should thus exceed 60,000 barrels daily, in which case it would absorb between 20 and 25 million barrels of crude *per annum*, or over 50 per cent of the country's present output.

(c) *Colombian petroleum exports*

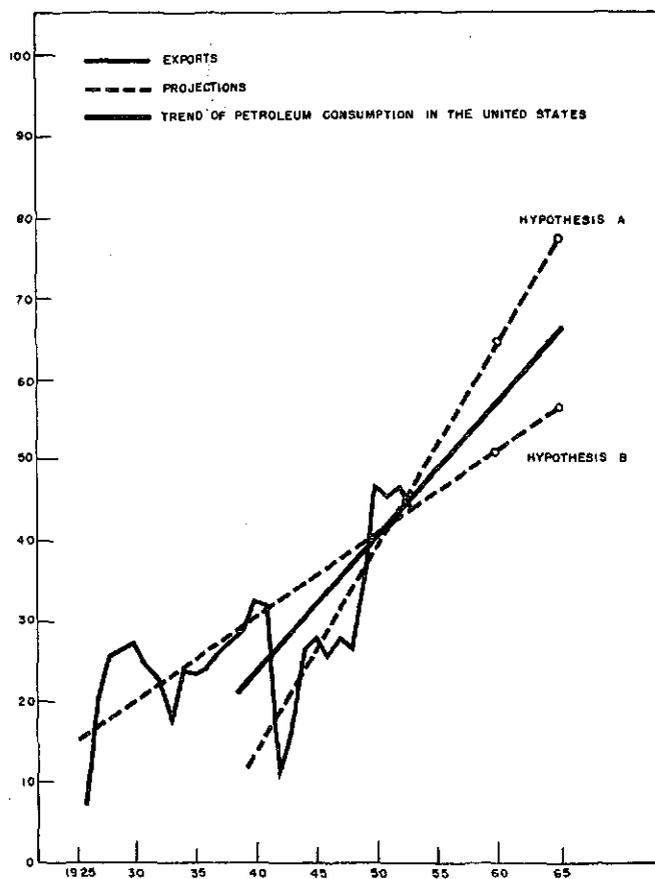
Petroleum exports are projected to increase from 30.4 million barrels in 1954 to between 35 and 45 million in 1960 (see again table 317, and figure XXIX). On the minimum hypothesis, this would mean that the 1951 and 1953 levels were exceeded by less than 3 million barrels, or only about 10 per cent. Even so, in order to meet domestic refinery needs, the output would have to rise from 40 to between 55 and 60 million barrels. This may seem a rather large figure for a minimum hypothesis, but it should be recalled that at present over 35 million barrels come from oilfields which have been in production for fifteen years or more, and that the newer deposits are expected to yield a substantial flow by 1960. Another possibility is that the Pacific coast region in particular may continue to import petroleum products from abroad, especially as domestic consumption of light derivatives is abnormally high. If the composition of consumption is not so modified that greater importance is acquired by such products as diesel and fuel oil, the planned Caribbean refinery may have to export heavier derivatives and the country may be obliged to continue to import some of the lighter liquid fuels. Thus, in 1960 exports of crude may be supplemented by moderate shipments of refined petroleum products.

According to hypothesis A for 1960, domestic production of crude would have to increase from 65 to 70 million barrels to satisfy both domestic and foreign requirements. This would permit Colom-

bia's oil sales to follow up the rapidly rising post-war trend curve (see again figure XXIX). The rate of expansion would be somewhat higher than the estimated growth of United States imports, but considerably below the curve of world demand.

FIGURE XXIX. COLOMBIA : PETROLEUM EXPORTS

(Millions of barrels)
(Natural scale)



With regard to export projections beyond 1960, it is felt that no precise calculation can be made of maximum and minimum possibilities. Although world market demand is likely to continue firm, domestic production and consumption trends for the period concerned are uncertain. Only by 1960 or thereabouts will the real petroleum production potential of Colombia be fairly accurately known, as a result of the prospecting now under way. Consequently, the rates of growth postulated by the maximum and minimum projections up to 1960 have been extrapolated to 1965. If future domestic consumption requirements are correctly estimated, even the minimum hypothesis as to exports in 1965 may imply the doubling of present production. In the case of petroleum, this is not an abnormal feat, given the relatively low original figure of 40 million barrels. On the other hand, if the substantial oil reserves indicated by geological surveys do not materialize, even the minimum assumption as to future petroleum exports may not be fulfilled, and sales abroad may not rise above their 1955 level, or may even decline as refinery capacity increases.

The last point to be discussed is the price of petroleum in the future. Oil prices rose much more rapidly between 1940 and 1955 than the over-all world price level (see again table 317). According to expert estimates, this trend is likely to continue as prospecting costs increase and demand exerts constant pressure on available

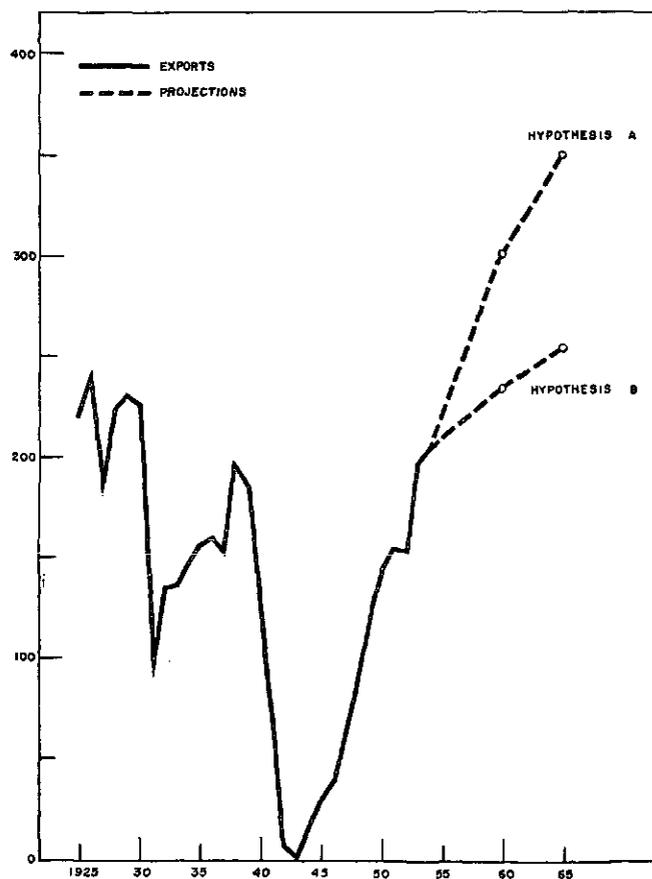
supplies. Hence it is assumed that the export price per barrel will rise from 2.50 dollars in 1954 to 2.70 in 1960 and 2.90 in 1965. In such an event, the petroleum terms of trade would improve at an annual rate of approximately 1.4 per cent, and the proportional increment in the value of exports would be considerably greater than that of their volume.

3. Bananas

Colombia's banana exports fluctuated widely during the 30-year interval between the mid-'twenties and 1955. Their average volume was smaller in the latter year than in 1925-29, while in 1943 no bananas were exported at all (see figure XXX). After the end of the war shipments recovered rapidly, reaching a little over 200,000 tons in 1954. During the post-war period, however, the share of bananas in the total value of exports has still been under 3 per cent, owing to the great expansion of other exports (mainly coffee); this proportion is less than half the corresponding pre-war figure. And although bananas continue to rank third among Colombia's export products, their relative importance is now considerably smaller than that of the minor commodities taken in the aggregate. This situation is likely to change but little in the future for, as will be seen later, even by 1965 Colombia's banana export earnings cannot be expected to exceed 35 million dollars a year, while exports of other agricultural products alone (excluding coffee) will probably reach a higher figure, even according to the more unfavourable growth hypothesis.¹⁹

FIGURE XXX. COLOMBIA : BANANA EXPORTS

(Thousands of tons)
(Natural scale)



¹⁹ A value of 35 million dollars would represent about 3.6 per cent of total exports in 1970 on the maximum growth hypothesis.

Banana-planting is an important source of income in several of the less-developed regions of Colombia. Most of the country's banana exports come from the Department of Magdalena, but other areas, such as the Chocó district, are potentially capable of making a substantial contribution to export availabilities. If in the future, however, opportunities for considerable expansion of banana-growing fail to arise, in the absence of alternative employment or new cash crops, the development of these areas will lag progressively farther behind that of the rest of the country. It is because of their special significance for certain parts of the country that a glance at the future prospects for banana exports is felt to be necessary, even though they count for very little in the total value of exports. An analysis of this kind is difficult, however, on account of the present rather hazy character of world trade in bananas, which is passing through a period of transition. New factors have apparently arisen in the United States to distort historical banana demand trends, while the growth of consumption in Europe has far outstripped expectations since the end of the war. The supply picture has also been radically altered by the ravages of disease and by the emergence of important new producers. On the other hand, the market for Colombian bananas is much more diversified than that available to any other of the staple export commodities.

TABLE 318. WORLD BANANA EXPORTS, EXCLUDING THOSE OF COLOMBIA

(Thousands of tons)

A. Mainly for the Western Hemisphere:				
	Ecuador	Other Pacific Coast producers ^a	Caribbean and Atlantic Coast producers ^b	Total
1934-38 (average)	39	377	798	1,214
1948-50 (average)	136	727	521	1,489
1951	247	645	437	1,329
1952	430	638	390	1,458
1953	406	684	381	1,472
B. Mainly for the Eastern Hemisphere:				
	Africa	Canary Islands, Brazil, ^c Martinique, Guadeloupe	Asia: Jamaica and other British possessions in the Western Hemisphere	Total
1934-39 (average)	141	406	503	1,124
1948-50 (average)	187	406	124	746
1951	250	473	96	866
1952	277	525	127	989
1953	332	465	205	1,082

SOURCE: Food and Agriculture Organization, *Yearbook of Food and Agriculture Statistics, 1954, Vol. VIII, Part Two on Trade.*

^a Costa Rica, Guatemala, Panama and Peru. See text for an explanation of the term "Pacific Coast producers".

^b Honduras, Mexico, Cuba, Nicaragua, Dominican Republic, Haiti and Venezuela.

^c Brazil has been placed in this group, since although it is virtually the sole supplier of Argentina and Uruguay, the rest of its exports are marketed in Europe.

(a) World banana supply

Although no reliable data are available on world production of bananas for export, a general idea can be obtained from statistics on the development of such exports (see table 318). These are classified under the two major markets, the Western Hemisphere and the Eastern Hemisphere. A considerable proportion of supplies for the latter market, however, is produced by European dependencies in the Caribbean. Brazil is also grouped with producers for the non-American market, since, apart from supplying Argentina

and Uruguay, sales abroad are mainly to Europe. Colombia, on the other hand, occupies the unique position of depending almost equally on both markets, and is thus excluded from the table.

Before the war, world exports were fairly evenly divided between the two markets in question, but after the cessation of hostilities production for the Western Hemisphere market forged ahead. This trend is attributable to the severe decline which has taken place in the production of Asia and the British possessions in the Western Hemisphere and the stationary output of the other countries supplying Europe (with the exception of Africa), mainly as a result of the devastation caused by the Panama disease and "Sigatoka".

These same diseases of course affected the Central American Republics as well, as is reflected in the contraction in the exports of the Atlantic Coast and Caribbean producers.²⁰ Costa Rica, Guatemala and Panama, on the other hand, raised their output considerably above the pre-war level (especially Costa Rica) and were able to avoid a serious setback during the post-war years by a fairly large-scale transfer of plantations to the Pacific Coast, which, thanks to its drier climate and distance from infected areas, is more favourable for banana cultivation. Meanwhile, Ecuador became the leading world exporter of bananas. Probably, therefore, production for the Western Hemisphere will increase somewhat more rapidly in the future, particularly since production on the Atlantic Coast is not likely to decline much further than it has already. A similar acceleration can also be expected in the rest of the world, since output in Jamaica (the largest pre-war supplier) shows signs of recovering, and cultivation in Africa continues to expand at an appreciable rate. Methods have already been discovered for controlling "Sigatoka", and there is a possibility that means of combating the Panama disease will also be found in the not too distant future.

(b) World banana demand

The United States is the world's principal importer of bananas, and although consumption in the rest of the world has been increasing more rapidly in the last few years, even as late as 1953 the United States still absorbed 50 per cent of world banana sales (as compared with 60 per cent in 1948-50). The decrease in the relative importance of the United States market is the result of the almost complete stabilization of banana consumption in this country, which has continued to fluctuate around 1,300 thousand tons yearly, or the same level as before the war, in spite of considerable increases in population and income. *Per capita* consumption has declined from an average of 23.6 pounds before the war to approximately 17 pounds in more recent years, in contrast with traditional precedents (see table 319).

During the course of the years, a rather close correlation has existed between changes in *per capita* banana consumption on the one hand and fluctuations in relative prices and income on the other. It was the latter factors that counted for the increments in consumption from 1920 to 1928 and from 1933 to 1937, as well as the decline during 1928-33. Lower *per capita* consumption in 1946 can also be explained by the sharp increase in relative prices for bananas, in conjunction with a supply shortage immediately after the war. However, although prices continued to rise until 1948, while income fell, *per capita* consumption made a marked recovery, reaching 19.5 pounds. From 1948 onwards, relative banana prices declined and United States real income increased, but, surprisingly enough, the outcome of this combination of favourable factors was that consumption dropped to a level lower than in 1920, when income was only half as great and banana prices almost 50 per

²⁰ Mexico, Nicaragua and Cuba were the countries worst affected; the exports of the first two dropped from about 300,000 tons in 1934-38 to only 50,000 in 1953, while Cuba ceased to export altogether.

TABLE 319. *Per capita BANANA CONSUMPTION IN THE UNITED STATES IN SELECTED YEARS*

	1920	1928	1933	1937	1946	1948	1953
<i>Per capita</i> consumption (pounds) . .	18.4	26.2	16.2	27.1	16.6	19.5	17.0
Index of banana retail prices deflated by over-all price index (1935-39 = 100) ^a	155	134	128	95	115	120	111
Index of United States national income at constant prices (1935-39 = 100) ^b	89	104	73	106	147	148	170

SOURCE : ECLA.

^a The index of banana retail prices is deflated by the over-all retail price index for the pre-war years and by the index of foodstuffs prices after the war.^b Joint Committee on the Economic Report, Potential Economic Growth of the United States during the next decade (United States Congress, 1955).

cent higher.²¹ In short, it appears that during recent years consumption has been affected by factors other than income and price changes, perhaps even by a fundamental shift of consumer preferences in the direction of other fruits, although it is too early to arrive at any definite conclusions. As can be seen in table 320, the supply situation is unlikely to have been responsible for this decline, since exports normally channelled towards the United States market have been growing faster than United States imports.

The European market recovered rapidly after the end of the war, and, unlike those of the United States, imports during 1948-50 were already above the pre-war level. By 1953 banana imports had reached 900,000 tons, and *per capita* consumption 6.6 pounds, as against averages of 740,000 tons and less than 6 pounds, respectively, for the years 1934-38. Consumption in France, Germany and the Benelux countries expanded with particular vigour,²² although almost all the major European consumers contributed to its growth. Banana demand in the rest of the Eastern Hemisphere market, however, failed to show the same development, and in

²¹ In 1950-54, United States consumers were spending only about half as much *per capita* income on bananas as in 1920-24, and less than 40 per cent in relation to the 1935-39 figure.

²² The expansion of consumption in Germany is of particular importance for Colombia, since in 1954 the latter country sold the former about 65,000 tons of bananas, an amount which probably represented close to one-half of Germany's total banana imports during that year.

1955 imports were still lagging some 100,000 tons behind the pre-war figure. However, exports from the traditional suppliers of Europe and the rest of the Eastern Hemisphere have barely been able to keep pace with demand (see again table 320). It is thus possible that Latin American producers (especially Colombia) may be able to increase sales to Europe if demand continues to rise with the same rapidity.²³

In contrast with production for the Eastern Hemisphere market, that exported by the traditional suppliers of the Western Hemisphere has tended to exceed demand in this market (see again table 320). The surplus would have been even greater had not Canadian imports increased substantially in recent years. Indeed, since 1950 a higher figure has been registered for *per capita* consumption in Canada than in the United States, and the slight expansion of Western Hemisphere demand has been almost exclusively due to this increment in Canadian consumption.

(c) *Projections of Colombia's banana exports*

From the above analysis some general impressions can be formed concerning future trends in world banana markets. First, the rate of growth of banana production will probably be accelerated, as new producer areas enlarge their output and old ones regain

²³ In this connexion, it is interesting to note that French interests recently decided to invest in the development of new banana plantations in Colombia.

TABLE 320. ESTIMATED SUPPLY AND DEMAND IN THE PRINCIPAL WORLD BANANA MARKETS

(Thousands of tons)

	Western Hemisphere market ^a					Eastern Hemisphere market ^a					Total	
	Colombia	Other countries	Total	Demand	Difference ^b	Colombia	Other countries	Total	Demand	Difference ^b	Supply	Demand
1934-38	(81)	1,214	1,295	1,365	-70	(81)	1,124	1,205	1,085	120	2,500	2,450
1948-50	105	1,384	1,489	1,485	4	15	746	761	765	-4	2,250	2,250
1951-53	128	1,420	1,548	1,450	98	40	979	1,019	1,016	3	2,567	2,466

SOURCE : See *Statistical Appendix*, table 27. Colombian export figures taken from official statistics.^a The Western Hemisphere market is composed of the United States, Canada and Chile ; the Eastern Hemisphere market includes the other banana-importing countries of the world.^b FAO statistics on total world banana trade show an increasing over-all disequilibrium between exports and imports during recent years. It is still significant, however, that the apparent export surplus has been accounted for by traditional suppliers of the Western Hemisphere market.

TABLE 321. COLOMBIA : BANANA EXPORTS IN 1960 AND IN SELECTED PREVIOUS YEARS

(Thousands of tons)

	To the United States		To Europe		To other areas	Total		
	Volume	Percentage of United States banana imports	Volume	Percentage of European banana imports	Volume	Volume	Percentage of world banana imports	
1930	29	..	197	..	—	226	..	
1934	60	6.2	83	10.7	1	144	6.6	
1936	79		74		7	160		
1938	104		81		10	195		
1939	61		112		11	184		
1950	113	8.4	31	4.8	—	144	6.1	
1951	128	10.1	25	3.6	1	155	6.6	
1952	108	8.1	43	4.4	2	153	6.0	
1953	145	11.0	50	5.6	1	196	7.1	
1954	(104)	(8.0)	(100)	(10.0)	(1)	(205)	(7.5)	
<i>Projections</i>								
1960 {	A	145	9.1	155	10.7	5	300	8.5
	B	120	9.1	115	10.0	—	235	8.0

SOURCE : See table 320.

former levels or cease to decline. Secondly, any significant expansion of demand is more likely to take place in the Eastern Hemisphere market than in that of the Western Hemisphere, to judge from current trends. Thus, competition in the latter market will probably become keener, so that Colombia's prospects of increasing its banana exports to Europe appear to be definitely more optimistic. It is doubtful, however, whether Colombia will be able to secure a much larger relative share in the European market, in view of the production increments likely to be achieved by its traditional suppliers. Table 321 shows the projections of Colombia's banana exports prepared in line with the foregoing considerations.

On the minimum hypothesis, it is assumed that in 1960 Colombia's exports to the United States will be equal to the average for the years 1950-54 (120,000 tons). This would be consistent with a hypothetical continuance of the stagnation of United States imports combined with the maintenance of Colombia's average share in this market during 1950-54 (9.1 per cent); or, on the other hand, with a reduction of this share and somewhat heavier imports. Minimum exports to Europe in 1960 are estimated at 115,000 tons, or 15,000 tons more than in 1954. This figure could be reached if Colombia continued to absorb the same proportion of the European market as in 1954 (about 10 per cent) and European banana consumption rose to 1,150,000 tons, or about 8 pounds *per capita*. Under the minimum growth hypothesis it is assumed that there will be no exports other than those to the United State or Europe.

The formulation of a maximum export projection is complicated by the problem of future export availabilities of bananas in Colombia. All but a very few thousand tons of the country's current banana exports are produced in the Department of Magdalena and shipped via the port of Santa Marta. It is considered by some authorities that production in this zone cannot be raised more than 40 per cent by 1960, which would put a rather low ceiling on maximum export in that year unless exportable production could be expanded very greatly in other parts of the country. Such an expansion would undoubtedly require additional investment in transport and possibly port facilities, which might be considered inadvisable in view of the uncertainty of market prospects. Nevertheless, the maximum projection of 300,000 tons is based on the assumption that some 20,000 to 40,000 tons will be forthcoming

from these other areas. On this hypothesis, exports to the United States are placed at 145,000 tons, which would correspond to Colombia's 1950-54 share in total United States banana imports, if these were to rise to 1,600,000 tons. Such a level of imports would be equivalent to a *per capita* consumption of 18.4 pounds, which was the average recorded in 1948-50. Maximum exports to Europe are set at 155,000 tons, which would be consistent with Colombia's pre-war share of the European market if demand were to rise here to 10 pounds *per capita*. Exports to other areas are estimated at 5,000 tons, which would still be only one-half of the average 1938-39 figure.²⁴

Banana export projections for the year 1965 were formulated by extrapolation of the 1960 figures at given annual rates of increase. In the case of hypothesis B, it is assumed that the expansion of sales will keep parallel to the estimated increase in world population, or in other words, that *per capita* consumption will remain stable. On the maximum hypothesis, the assumption is that exports will rise to 350,000 tons by 1965, which implies a rate of growth about twice as rapid, that is, 3.3 per cent *per annum*. This rate of increase is lower than that registered between 1954 and 1960, but it is assumed that world *per capita* banana consumption would not continue to expand at the post-war rate, nor would Colombia's share of the market improve after 1960.

There remains only one problem to be considered, namely, the valuation of future banana exports. To begin with, it appears that banana exports in the past have been considerably undervalued. The undervaluation mainly affects sales to the United States, which appear in official statistics at half the unit value of exports to the rest of the world. To determine real values, it would be necessary to make a more detailed study than time permits. However, for the purposes of the projections, the unit value of Colombia's banana exports to the rest of the world is employed.²⁵

²⁴ Maximum projections of exports to Europe and the United States are also below or equal to previous peak levels (see table 321).

²⁵ On the basis of this unit value, the undervaluation of Colombia's banana exports to the United States would be approximately equal to the valuation adjustments for bananas in the balance of payments of Costa Rica and Ecuador (about 50 to 55 dollars per ton).

TABLE 322. COLOMBIA : BANANA EXPORT PROJECTIONS FOR 1960, 1965 AND 1970

	1960		1965		1970	
	A	B	A	B	A	B
Volume (Thousands of tons) ...	300	235	350	255	400	275
Value (Millions of dollars)	30.0	23.5	35.0	25.5	40.0	27.5

SOURCE: ECLA estimates.

In the second place, it is necessary to consider whether relative prices for bananas can be expected to rise in the future. Costs of production have increased considerably in recent years as a result of the destruction of plantations by disease and the need to clear new areas for cultivation, which in many instances require irrigation during the dry season. On the other hand, at current prices producers are frequently able to amortize their plantations completely in two or three years before diseases seriously affect the crop. In more normal circumstances, and as world production recovers, such a rate of amortization will not be necessary to provide an incentive for increasing output. Hence, in this study the 1953 price—about 100 dollars per ton—is used in projecting the future value of Colombia's banana exports (see table 322).

4. Minor commodities

As has been observed, Colombia's secondary exports steadily lost ground over a decade or more. Not only did the relative importance of these exports decline, but they also remained stationary in absolute terms, fluctuating around 30 million dollars a year during the period in question, despite the over-all rise in prices. The drop in gold exports was particularly marked. From an average of 21 million dollars a year in the period 1940-44, which constituted over 17 per cent of the total value of exports, the sums accruing from gold sales fell to between 14 and 15 million dollars, that is, to only 2.5 per cent of export earnings. During the war, exports of other minor commodities accounted for as much as 10 per cent of the country's total, whereas by 1955 they came to represent about the same proportion as gold, so that all minor commodities in the aggregate barely made up 5 per cent (see table 323).

In the light of the limited rate of growth projected for major exports, expansion prospects for exports of minor commodities must be re-appraised. Recent trends should not be interpreted to mean that Colombia does not possess an abundant variety of natural resources upon which greater diversification can be based. They are probably due to the fact that the country's capacity to import has been growing so fast since the war, and production for the expanding domestic market has been so attractive, that little interest has been generated in producing for export markets, in spite of occasional government measures aimed at counteracting this situation. It also appears that in the case of some minor commodities, production for export has not been remunerative under existing exchange regulations. This applies to gold, for many of the smaller mines were withdrawn from production between 1942 and 1948, as costs rose and prices remained stable.²⁶ As from the latter year gold production and sales recovered somewhat in consequence of more favourable exchange treatment, subsidies and the authorization, in 1953, of free trade in gold. Encouragement was also given to other secondary products through improved exchange treatment; but it must be admitted that up to 1955 the success of these measures had been very limited if assessed in terms of the increase in exports.

For a number of years the Colombia Government has been concerned with the problem of diversifying exports, and a number of steps have been taken to achieve this end. These measures are analysed in some detail in Part Two, chapter I. However, the application of a free rate of exchange to minor export earnings in

²⁶ Between 1941 and 1948, gold production fell from 656,000 to 362,000 troy ounces, and the percentage of output provided by enterprises based on domestic capital dropped from 51.5 to 39.5.

TABLE 323. COLOMBIA : COMPOSITION OF EXPORTS

(Millions of dollars)

Annual averages	Staple products ^a		Gold ^b		Other minor products		Total value
	Value	Percentage of total	Value	Percentage of total	Value	Percentage of total	
1925-29	99.0	88.3	3.6	3.2	9.6	8.5	112.2
1930-34	61.8	85.1	7.8	10.7	3.0	4.2	72.6
1935-39	73.5	78.0	15.8	16.8	4.9	5.2	94.2
1940-44	92.5	76.4	21.0	17.3	7.6	6.3	121.1
1945-49	224.5	88.0	14.1	5.5	16.7	6.5	255.3
1950	382.1	93.7	12.3	3.0	13.4	3.3	407.8
1951	439.1	92.6	14.3	3.0	20.7	4.4	474.1
1952	460.5	94.6	13.7	2.8	12.7	2.6	486.9
1953	591.2	95.1	14.5	2.3	16.2	2.6	621.9
1954 ^c	699.2	95.3	(15)	(2.2)	16.8	2.5	(671)

SOURCE: ECLA, on the basis of official statistics.

^a Coffee, petroleum and bananas. Banana export figures are not adjusted for under-valuation.

^b For 1946-53, data on gold exports represent total production valued at 35 dollars per fine ounce, minus sales for domestic uses other than minting. For all other years, gold production alone was used, valued at 20.67 dollars per ounce before 1934 and 35 dollars thereafter.

^c Provisional.

TABLE 324. COLOMBIA : PROJECTIONS OF AGGREGATE EXPORTS OF MINOR COMMODITIES, 1960 AND 1965

(Millions of dollars)

		Staple products		Gold		Other minor products		Total value
		Value	Percentage of total	Value	Percentage of total	Value	Percentage of total	
1960	A	723	90.0	20	2.5	60	7.5	803
	B	530	90.0	15	2.5	45	7.5	590
1965	A	830	85.0	25	2.5	121	12.5	976
	B	606	87.0	17	2.5	73	10.5	696

SOURCE : See table 323 for source and notes.

1955 is likely to prove a stronger incentive than the previous exchange certificate system, especially as, with the decline in exports and the re-enforcement of import restrictions, the difference between free and official exchange rate quotations is likely to be considerably greater than it was between the certificate and official rates when the capacity to import was rising rapidly.

A considerable expansion of secondary exports may also be of some help in balancing Colombia's trade with countries other than the United States and Canada. Trade with Europe, most of the countries of Latin America, and the rest of the world, has traditionally been in a state of disequilibrium; each year large credit balances with dollar countries must be accumulated to compensate these deficits. The imbalance is particularly severe with Europe, which regularly exports to Colombia about twice as much as it imports. In 1954, Colombia purchased over 28 million dollars' worth of goods from France, against sales to the value of only one million; in its trade with Great Britain the corresponding figures were approximately 18 and 1 million dollars respectively. Since service payments to Europe are almost as large as purchases of goods, the current account deficit with that area has been exceedingly heavy.²⁷ If Colombia could offer a more comprehensive assortment of goods for sale, there would be no reason why such a situation should persist. With Venezuela and certain Central American Republics, Colombia has much more balanced trade, based in large part on exports of minor commodities such as cement and textiles; with Argentina the trade balance has also been stabilized since 1950 as a result of the oil exports effected by the government petroleum corporation. Colombia's bilateral agreements with some ten countries could be used to considerable advantage in securing markets for minor exports. The intention of this study is not to suggest that Colombian trade should be balanced by means of bilateral treaties with every country in the world, but simply to point out that a disequilibrium exists, which could be to some extent remedied.

Intra-regional trade also offers prospects for the development of secondary exports. Up to 1955, Colombia's trade with the other American republics consisted mainly in supplying the more developed countries with foodstuffs or raw materials and the less developed areas with manufactured goods. Even so, its exports were only one-quarter as large as its imports. Any considerable expansion of intra-regional trade, however, would have to derive from a substantial increase in the total volume of such trade, rather than from the correction of this disequilibrium, since Colombia's foreign commerce with other Latin American countries is still relatively insignificant. The expansion in question might be based on an interchange of manufactures with other nations which are

developing rapidly. The majority of such countries are finding that demand for manufactured consumer and capital goods is rising at a much greater rate than the capacity to import, so that consumption must increasingly be satisfied from domestic production. As substitution requirements extend into the durable goods field, it would be advantageous if countries like Colombia could specialize in the production of certain goods which could be exchanged for others in which trading partners had specialized. The consequent saving through division of labour and larger-scale production would in many cases offset transport costs and would be reflected in higher real income for all concerned. The possibilities of such an increase in intra-regional trade are not taken into account in the projections of minor exports, however, because of the many obstacles to its expansion. In any event, the evolution of trade among the Latin American republics does not depend on what any one country can do, since it would entail a high degree of economic complementarity and the regional integration of development programmes.

Aggregate projections for exports of minor commodities are summarized in table 324. It is assumed that these products will gradually regain an increasing share of total exports in the future, rising from about 5 per cent in 1952-54 to 10 per cent in 1960, and from 10.5 to 12.5 per cent in 1965. The projected growth is easily within the country's capacity, since to no small extent it will come about automatically as a result of the slower rate of increase projected for major exports in the aggregate. Furthermore, even in 1945-49 the average proportion represented by minor exports was more than 10 per cent, while it exceeded 20 per cent in the years immediately preceding the war. Recent exchange regulations and more efficient utilization of trade agreements for the marketing of these commodities should also greatly facilitate the attainment of the projected goals.

In order to simplify the projections, the proportion of gold is kept constant at 2.5 per cent. Were it to increase above the projected figures the burden falling on the other minor commodities would be reduced, even though the projections formulated for exports of the latter can be justified separately. One factor which is not taken into account is the rather high value of the contraband or unregistered trade carried on with neighbouring countries, principally Venezuela and Ecuador. If transactions of this kind were recorded in foreign trade statistics, they would probably contribute more than 20 million dollars to Colombia's balance of payments. A large part of these unregistered exports — other than precious metals — consists of foodstuffs and manufactured consumer goods traded between areas which, owing to transport problems, are not adequately supplied by the economies of the countries of which they form a part; in so far as this is the case, the effects of inclusion of such trade in the balance of payments would simply cancel one another out.

The projections of minor exports excluding gold are given in table 325, where they are arranged by principal product groups. The projections given are adequate to cover requirements of the

²⁷ According to balance-of-payments statistics, in 1951 and 1952 Colombia's current account deficit with the rest of the world (excluding Western Hemisphere countries) amounted to 75 and 45 million dollars respectively; these deficits were offset in part by an inflow of capital, mainly from Europe.

growth hypothesis *A* presented in table 324. Agricultural exports are assumed to grow the most rapidly, in time increasing their relative importance as compared with the other groups.

TABLE 325. COLOMBIA : MAXIMUM PROJECTIONS OF EXPORTS OF MINOR COMMODITIES, BY PRINCIPAL GROUPS,^a 1960 AND 1965

(Millions of dollars)

	Agricultural commodities	Minerals	Manu- factures	Total
1951	17.4	2.2	1.4	21.0
1952	8.5	3.0	1.2	12.7
1953	11.5	3.3	1.4	16.2
<i>Projections :</i>				
1960	39	10	11	60
1965	76	22	23	121

SOURCE : Official statistics and ECLA estimates.

^a Excluding gold.

There are very substantial possibilities of expanding production and exports of such products as maize and cotton, and if sufficient care is devoted to growing them, exportable surpluses equivalent to the exports projected for 1960 could be obtained within 1-3 years. In any event, these commodities are valued at 1953 prices, whether they were sold abroad or marketed at world prices although not exported in the year in question.

The expansion of mineral exports will be achieved mainly through the inclusion of coal. Although Colombia is very well endowed with coal deposits, this mineral has not so far been exported, chiefly on account of transport problems ; nevertheless, one of the advances made in this field is constituted by the building of a coal-washing plant near Cali, for treating the output of the local mines. According to estimates, current transport services will allow from 300,000 to 500,000 tons to be exported yearly when production is in full swing. This would represent from 3 to 5 million dollars out of the 10 million projected for mineral exports in 1960. The difference could easily be covered by means of a moderate expansion of production of those minerals which are already sold abroad, especially platinum and emeralds. By 1965 a further increase in coal exports can be expected, in virtue of the programmes for improving transport services from Cali to the coast, and perhaps partly through the addition of export availabilities obtained from the projected mine at El Cerejón in the Department of Magdalena, of which the estimated annual capacity is 1 million tons. Of the 22 million dollars corresponding to exports in 1965, coal might again account for 50 per cent or more. In that year, production of certain minerals not so far exploited on any large scale — for example, asbestos, sulphur, lead, zinc and iron ore — might also contribute to the growth of exports.

As regards exports of manufactured goods, the projections concerned are explained in the chapter on industry. They are fairly moderate, although Colombia is still at a preliminary stage of industrialization and making efforts to satisfy the increasing domestic demand for essential manufactured goods. According to hypothesis *A*, in 1960 exports will represent only 0.4 per cent of the value of manufacturing output, as compared with 0.8 per cent in some of the war years and in those immediately following the war. On the hypotheses for 1965, the figure referred to would rise to between 0.5 and 0.7 per cent only.

Annex II

NOTE ON METHODS OF ESTIMATING PROJECTIONS OF THE STOCK OF CAPITAL

The purpose of this note is to give a very brief account of some of the criteria taken into consideration in formulating the projections of the stock of capital discussed in Part One, chapter II (table 40).

(1) For the projections of capital requirements in the agricultural and industrial sectors, the figures were taken directly from the relevant chapters, where the background data on which these investment estimates were based are set out in detail. The only correction which had to be made was due to conversion at 1950 instead of 1953 prices, the latter having been those utilized in the chapters concerned ; for this purpose use was made of the price index (in Colombian currency) for imports of machinery and equipment, which shows an increase of 96 per cent between 1950 and 1953.

(2) Estimates of capital in the energy sector were deduced from the net investment requirements for 1954-65, as calculated in the relevant chapter. Since they were expressed in terms of 1954 dollars, they first had to be converted to dollars at 1950 prices, by means of the deflator implicit in the index of United States national income, and then to Colombian pesos, also at 1950 prices, the purchasing power parity exchange rate being applied.

To this end only investment in electricity was taken into account, as investment in crude petroleum and coal was included under the stock of capital in the mining sector.

Capital figures for the intermediate year (1960) were estimated on the assumption that during the seven years covered by the period 1953-60 the absolute volume of investment was approxi-

mately the same as in the next five years (1960-65), since specific projections for each of these partial periods were not formulated in the pertinent chapter.

(3) In the case of mining, projections were based on capital requirements for coal and petroleum enterprises ; for the purpose of estimating the stock of capital in the sector as a whole, these two commodities are assumed to account for 80 per cent of mining activities.

Where coal was concerned, the estimates of net investment formulated in the chapter on energy were taken as a point of departure, the figures for 1960 being based on the same postulates as in the case of energy.

In the case of petroleum due allowance had to be made for the fact that the production increments assumed in the aggregate projections were more favourable than the hypotheses adopted in the energy chapter. Hence the estimates of unit investment (capacity in terms of barrels per day) were taken from the latter chapter and applied to the higher production estimates (see annex I, table 316) for 1960 and 1965.

For both coal and petroleum investment, the figures given in dollars at 1954 prices had to be converted to terms of 1950 prices, as explained above under point (2).

(4) With respect to transport, the capital statistics calculated for 1965 in the appropriate chapter were utilized. As they were based on the hypothesis that the product-capital ratio would improve, it was assumed that this improvement would be gradual ;

thus the figures for capital in 1960 were finally established on the basis of the relevant projections for the gross product generated by this activity and product-capital ratios of 0.25 on hypothesis *A* and 0.24 on hypothesis *B*.

(5) The estimates for the services sectors were not based, as in the preceding cases, on the detailed sectorial analyses. For purely illustrative purposes it was assumed that the capital required for housing would increase proportionately to demand for this service. For the remaining services as a whole, the projections of the gross product in the trade, finance and government sectors were taken

into account, and improvements were postulated in the product-capital ratio raising it from 0.38 in 1953 to 0.42 and 0.40 in 1960, on hypotheses *A* and *B* respectively, and, similarly, to 0.45 and 0.43 in 1965.

Hence the conclusion is reached that variations resulting from the product-capital ratio are significant only for those sectors where capital estimates were formulated independently (agriculture, industry, mining, energy), not for those (transport and services) in which it was precisely on this ratio that the relevant projections were based.

Annex III

NOTE ON POSSIBILITIES OF EXTENDING THE IRRIGATED AREA

Part Two, chapter II, of the present study included an indication of areas where irrigation and draining projects could be executed (see table 126). The specific projects on which these estimates were based are described in outline below.

Atlántico.¹ Irrigation projects are as follows :

	<i>Hectares</i>
Ponedera-Candelaria	12,122
Canal del Dique	17,000
TOTAL	29,122

Bolívar.² Irrigation projects are as follows :

	<i>Hectares</i>
Tolú	55,000
Canal del Dique	17,000
TOTAL	72,000

Boyacá.³ Drainage and irrigation of 50,000 hectares in Sogamoso, Villa de Leiva and Chiquinquirá.

Caldas.⁴ The project makes provision for the irrigation of 5,600 hectares in the Valle de Riseralda.

Cauca.⁵ Project for utilizing the River Palo (Caloto), to irrigate 8,134 hectares.

Córdoba.⁶ Project for irrigation and drainage of 328,000 hectares, and for draining an additional 30,000 in the Sinú valley.

Cundinamarca.⁷ Project for drainage of 100,000 hectares and irrigation of 45,000 on the Bogotá Savanna.

¹ For Ponedera-Candelaria, the irrigation project was prepared in 1951 by a Colombian firm for the Department of Agriculture of Atlántico. The data on the Canal del Dique irrigation project were taken from a report by R. J. Tipton and Associates, Inc. entitled *Possibilities for the development of water resources of the Department of Bolívar, Republic of Colombia* (January 1952). For the drainage of 50,000 hectares, information was obtained from several sources. This is a joint project for the construction of a road from Puerto Giraldo to Canal del Dique. The road will be built on an embankment which will serve as a dyke to prevent periodic flooding.

² See the report by R. J. Tipton and Associates, Inc., cited in the preceding footnote.

³ Economic and Fiscal Programming Department, *Plan de Boyacá*, investments for 1954-58.

⁴ "Plan de desarrollo del Valle del río Cauca", published in *Semana*, No. 435 (Bogotá, 7 March 1955).

⁵ Olarte, Ospina, Arias y Pagán Ltda., *Plan para el fomento económico de la zona del Valle del Cauca* (June 1952).

⁶ R. J. Tipton and Associates, Inc., *op. cit.*

⁷ *Caja de Crédito Agrario Industrial y Minero — Fomento Agrícola, Un plan de aprovechamiento total del río Bogotá.*

Huila.⁸

<i>Irrigation project</i>	<i>Hectares</i>
Río Suaza	7,700
La Plata	462
El Agrado — Altamira	1,800
Betania	20,000
Río Páez	6,000
Río Neiva	2,000
Laguna	1,000
Potosí — Río Cabrera	1,000
TOTAL	39,962

Magdalena.⁹

<i>Irrigation project</i>	<i>Hectares</i>
Río Guatapuri-Valledupar	13,600
Caño Shiller-Pivijay	4,000
Río Piedras-Santa Marta	2,000
Río César-Sector Valledupar	5,000
Río César-Sector Ariguani	2,000
Río César-Sector San Juan	1,000
Río Ranchería	10,000
TOTAL	37,000

Nariño.¹⁰

<i>Drainage</i>	<i>Hectares</i>
Sabana de Túquerres	30,000
Valle de Sibundoy	8,000
TOTAL	38,000

⁸ The data for the projects of the Río Suaza, La Plata, El Agrado, Altamira, Betania and the Río Páez were provided by the National Institute of Water Utilization and Electricity Development. Those corresponding to the projects for the Río Neiva and Laguna were obtained from the Department of Agriculture of Neiva, which also confirmed the data for other projects. The data for the Potosí-Río Cabrera project was obtained from *Estudios sobre riego*, by Mr. Humberto Gutiérrez (Medellín, 1952), Facultad Nacional de Economía.

⁹ The data for the Guatapuri-Valledupar and Caño Shiller-Pivijay projects were taken from the study by Humberto Gutiérrez, *op. cit.* The rest of the data were collected in the field by the members of the ECLA study group, as well as the information on the possibility of draining 10 hectares on the banks of the Río Magdalena in the Municipality of Ciénaga.

¹⁰ A. I. Staffe, *La situación lechera en Nariño*, prepared under the direction of the Ministry of Agriculture at the request of the ECLA Study Group (Bogotá, February 1955), unpublished; *Plan de desarrollo agrícola y ganadero para el Departamento de Nariño*, prepared by the *Sociedad de Agricultores de Nariño* (Pasto, May 1954), unpublished.

Norte de Santander.¹¹

Irrigation project	Hectares
San Faustino-Cúcuta	3,000
Orozco-Chinácota	500
Caney-Chinácota	100
Corozal-El Rosario	3,000
Sardinata	10,000
Los Vados-El Rosario	1,000
Zulia-Cúcuta	35,000
Abrego	8,000
TOTAL	60,000

Santander.¹²

Irrigation project	Hectares
Capitanejo	732

¹¹ The departmental authority for agriculture.

¹² Humberto Gutiérrez, *op. cit.*; the departmental authority for agriculture.

Tolima.¹³

Irrigation project	Hectares
Saldaña-Extension of the Chenche Canal	3,000
Saldaña-Several works on the Río Chenche...	500
Coello-Sector Coello-Río Magdalena Río Luisa	25,000
Río Saldaña-Purificación-Coyaima-Natagaima	25,000
Río Prado	12,000
Río Opia-Llanos de Piedra	5,000
Río Sabandijas	5,000
Río Guarinó	10,000
TOTAL	95,500

Valle del Cauca. The projects for irrigating and draining 200,000 hectares and draining an additional 30,000 are discussed in the programme for the economic development of the Valle del Cauca area, prepared by Olarte, Ospina, Arias y Payán, Ltda.

¹³ The data were directly supplied to the ECLA Study Group by the engineer in charge of the irrigation works at Coello and Saldaña, who has made surveys and studies of these projects. Only preliminary surveys are available for the works on the Sabandijas and Guarinó rivers.

Annex IV

BRIEF ACCOUNT OF ACTIVITIES IN THE FIELD OF AGRICULTURAL RESEARCH

Allusion was made in the text (Part Two, chapter II) to activities in Colombia in the field of agricultural research. As this is a matter of such vital importance for the development of the country's crop and livestock production, a fuller account will be given here of the work of the various organizations that have taken most active part in the research in question.

Between 1915 and 1917 the organization of national agronomic services under the Ministry of Agriculture and Trade was begun along the lines of the so-called "Deneumostier" programme,¹ which attempted to cover all aspects of the agricultural, forestry and livestock sectors falling within the sphere of action of the Ministry of Agriculture, in order to solve the innumerable problems which were then hampering the progress of agriculture. The recommendations of this programme were only partially executed, owing to lack of fiscal resources and technical personnel. Some of the institutions created at that time were later suppressed or abandoned, but the programme's greatest merit lay in its having awakened interest in the country's agricultural problems.

In subsequent years, up to 1926, further programmes were formulated, many of them well-conceived from the technical point of view but none resulted in concrete and lasting achievements. Under these programmes, experimental work was constantly being embarked upon, only to be very soon suspended in favour of new projects, so that, naturally, no significant conclusions were reached.

Among the most important projects undertaken during the period referred to was the introduction of a series of forage plants, imported from Canada in 1924,² for the Bogotá Savannah.

Mention should also be made of the 1923 legislation (Act No. 11) which authorized the central Government to establish an agri-

¹ This programme comprised the creation of the National Institute of Agronomy (*Instituto Nacional de Agronomía*), of the National Agronomic Services (*Servicios Agronómicos*), and of the Board of Agriculture (*Consejo Superior de Agricultura*). As dependencies of these basic organizations were to function institutes of advanced studies as well as of secondary and technical education, agricultural research stations and experimental farms, laboratories, libraries, information centres, etc.

² The tested forage plants included hybrid clover and several species of *bromus* and other cool-climate *Gramineae*.

cultural sanitation bureau for study and research in parasitology applied to agriculture and derived activities, and to disseminate the findings obtained. The bureau was empowered to institute measures to control the entry of micro-organisms which might prove harmful to plants or animals, and to set up internal barriers in order to isolate the plagues already existing within the country and thus prevent them from spreading to uninfested areas. The organization was also responsible for the elimination of such plagues.

In 1924 the Advanced School of Agriculture (*Escuela Superior de Agricultura*) was created as a subsidiary first of the Ministry of Education and then, later in the same year, of the Ministry of Industries, which had replaced the Ministry of Agriculture and Trade. An experimental sericultural station was established in 1925, but was subsequently closed down.

General legislation relating to agricultural development (Act No. 74) was passed in 1926. This authorized, among other measures, the creation of experimental stations at both national and departmental levels. Under the terms of this law, the Department of Agriculture was reorganized in 1928 within the Ministry of Industries.³

At the experimental station "La Fiesta", research was begun on wheat, maize, barley, oats, peas, potatoes, and cool-climate forage plants and livestock. The first experiments encountered numerous difficulties, the majority of which were due to lack of competent technical personnel. In 1929 changes were introduced into both programmes and policy. Owing to the adoption of new criteria, the work was suspended without its having had time to produce any concrete results. A little later—in 1931—new research programmes were established, while existing ones were

³ The Statistical, Practical Service and Technical Sections thereby established were in control of the experimental stations. Three foreign experts, who were in charge of the last-named section during their short stay in Colombia, initiated the organization of the experimental station "La Picota", which was established in April 1927, near Bogotá. The fundamental objectives of the work of this station were: (a) the selection of high-yielding varieties resistant to disease and insects; (b) trial of the foreign varieties that had given the most successful results in their countries of origin; and (c) production of new varieties through hybridization.

expanded. Special impetus was given to projects relating to potatoes, wheat, barley and maize, as well as to experiments with various breeds of livestock, such as Holstein, Ayrshire, Normandy, Jersey, Aberdeen Angus and Hereford cattle; Belgian and Percheron horses; Leicester and Romney Marsh sheep; Saanen goats, etc. Entomological research was promoted, and investigation of the effect of fertilizers on various crops was begun. An agricultural chemistry laboratory was installed and an industrial section set up for the purpose of reproducing good seeds and distributing them among farmers. At about the same time a beginning was made on experimental poultry and rabbit-breeding programmes, which later declined and were ultimately suspended altogether. Fruit research programmes were embarked upon, and pilot rice plantations were established in the Department of Bolívar; wheat farms in the Department of Antioquia; sugar-cane and rice plantations and wheat farms in the Department of Santander del Sur; and artificial pastures and rice plantations in the *Intendencia* of Meta.

Thanks to the incentives offered by the agricultural development legislation passed in 1926, whereby the central Government was obliged to contribute 50 per cent of the expenditure involved in the work of experimental farms founded by departmental authorities, the following farms were established: "Tulio Ospina", at Medellín, in Antioquia, 1927; Palmira, in the Department of Valle del Cauca, 1928; "La Frontera", at Manizales, in Caldas, 1929; Armero, in Tolima, 1933; and Atlántico and Santander, in the Departments of the same names, in 1936 and 1946 respectively.⁴

In 1928 a contract was signed between the central Government and the *Federación de Cafeteros*, in which one of the clauses stipulated that the *Federación* should adopt all necessary measures to introduce the best systems of growing and processing coffee.⁵

In order to combat the rubber shortage arising from the Second World War, the Governments of Colombia and the United States signed an agreement in 1951, under the terms of which the Ministry of Economy of the former country was to establish centres for testing, experimenting with, and reproducing rubber trees, while the Bureau of Plant Industry of the United States would provide reproduction material and technical assistance. Implementation

⁴ The following additional experimental farms were established, with or without the participation of departmental authorities: Granja Experimental de las Mercedes, in Boyacá; Granja Agrícola Experimental del Huila, in Huila, 1930; Granja Agrícola Experimental de Montería, in Bolívar (now capital of the Department of Córdoba), 1935; Granja Agrícola del Cauca, in Cauca; two crop farms in Nariño ("Ovonuco" at Pasto, and "La Espriela" alongside the Tumaco railroad), 1931; Granja de San Andrés y Providencia in Providencia, 1931; Granja Ganadera del Nus, in Antioquia, 1936; three livestock farms in the Llanos Orientales (one in Casanare, 1935, the second at Orocué, Meta, 1936, and the third at San Martín, Meta); Granja Ganadera de Valledupar, in Magdalena; Granja Ovina de Termales, Caldas, 1936; Granja Agrícola "La Facatativa" in Cundinamarca; Granja de Buga and Granja de Andalucía, in Valle; Sub-estación experimental "La Pubenza", in Cundinamarca; Granja Experimental de Sevilla and Granja Codazzi, in Chiquiquirá, in Boyacá; Estación Ovina de San Jorge; Granja Caprina de San Isidro, Norte de Santander, 1945; Estación Experimental de Urabá in Antioquia; Granja Arrocera de Mompós, Bolívar; Estación Pecuaria Experimental de Sabanas de Bolívar, in Toldá, Bolívar; Granja Equina del Michú, Tolima; Estación Agroforestal del Pacífico, at Calima, near Buenaventura, in the Department of Valle del Cauca, this last having been established in 1947 as a dependency of the Department of Agriculture of Valle del Cauca.

⁵ In compliance with this agreement, the *Federación* established an experimental service, and either directly or through the Departmental coffee committees, organized the following experimental farms: La Esperanza, Cundinamarca, 1930; Venecia, Antioquia, 1931; Chinchiná, Caldas, 1931; and Blonay, Norte de Santander, 1931. Later, pilot and demonstration farms were established in the Departments of Tolima (Libano), Valle del Cauca (Sevilla), Santander (Rio Negro), Boyacá (Moniquirá), Cauca (Popayán), Huila (Santa Juanita), Magdalena (Robles) and Nariño.

of the programme began in 1942 at Acandí, in the north of the Department of Chocó, and at Turbo and Riogrande, both located on the Gulf of Urabá. Financial difficulties compelled the Ministry of Economy to suspend the programme in 1943, but it was resumed in 1944 under the control of the *Caja de Crédito Agrario* and financed by an Export-Import Bank credit. Since Acandí, Turbo and Riogrande were totally isolated, the *Caja* decided to abandon these sites and to replace them by the Villa Arteaga Experimental Station, located in Antioquia, and still within the area considered suitable for rubber plantations.

Research work was virtually non-existent on many of the farms; on some it was abandoned altogether. The following are among the most interesting projects carried out. The Granja Experimental de Palmira began its work programme with research on cotton and sugar-cane. In a short time it was able to select certain varieties of cotton superior to that traditionally used, and to control pink worm, the chief pest attacking cotton. In 1936 and 1937 the work on sugar resulted in the recommendation and extension of varieties resistant to mosaic, a disease which was ravaging and destroying plantations of the traditional varieties of cane. This experimental farm also made important contributions to the improvement of rice and bean crops, by introducing new varieties producing higher yields than those previously in use. In 1938, the Granja de Palmira was taken over by the central Government, and its programmes were expanded to include livestock, poultry, forage plants, cacao, maize, fruit-trees, etc. The Granja Experimental de Medellín began its activities in 1927 with work on sugar-cane, cotton, forage plants and cacao. It made important contributions in the shape of acclimatization of cane varieties and the introduction of a new variety of tobacco. When this farm became national property, its programmes were extended to include maize, fruit-trees, forage plants, etc. From the time of its establishment in 1935, the Granja de Armero worked mainly on the agronomic, genetic and plant sanitation aspects of cotton- and sesame-growing. In 1940 this farm came under national administration, and fresh impetus was given to its current work, while new lines of research were opened up on livestock, forage plants, maize and tropical fruit. In 1948, the *Sección de Investigaciones Algodoneras* became a dependency of the *Instituto de Fomento Algodonero*. The best results of the work of this farm relate to the introduction and selection of improved varieties of cotton and all aspects of the production of this crop. It was thus possible to extend its cultivation on sound bases and on a large scale. The Granja de Montería, established in 1935, worked from the outset on a programme for the selection and improvement of the creole strain of cattle known as *Romo-sinuano*. Its programmes were later expanded to include cotton, maize, beans sugar-cane, etc. The Valledupar farm is engaged in the selection of the *Costeño* breed of long-horned creole cattle, a task which is also being performed by the Estación Pecuaria Experimental de las Sabanas de Bolívar. The cattle farm at Nus is working upon the selection and improvement of the creole strain called *Blanco-orejinegro*. The experimental farm at Sevilla was created mainly for the purpose of studying the different aspects of banana cultivation. This farm was later transferred to a different part of the same area, and is now called the Estación Agropecuaria del Magdalena. Its work programme includes research on oil-seeds, fibres, fruit-trees, maize, rice, vegetables, forage plants, etc. The Estación Experimental Cafetera de Chichiná, like other experimental and demonstration farms under the *Federación de Cafeteros*, has been carrying out research programmes on improved varieties of coffee, the use of fertilizers, disease and pest control, study and conservation of soils, shading, spacing-out, pruning, crops grown in association with coffee-processing, etc.

By 1945, although some successes of national importance had been achieved by the experimental stations, the conclusion had been reached that only by means of a well-conceived programme and a more efficient organization of State agricultural services could speedier and more substantial progress be made in Colombia's agriculture. It was necessary to solve the serious problems which

had handicapped research and extension, such as lack of personnel, frequent changes of programme, want of co-ordination within the services themselves, insufficient resources at the experimental stations, dissipation of activities and the inadequacy of the budget to cover basic and overhead costs.

A general outline of the programme was approved and the Department of Agriculture of the Ministry of Development, which had replaced the Ministry of Industry, was reorganized. Future agricultural research was to be carried out, in conformity with co-ordinated programmes, and findings were to be transmitted rapidly to the farmers through local offices in charge of extension, development and plant sanitation and protection. Organizations dealing with agricultural economy, rural engineering and study and conservation of the soil were also created. Although the application of the programme, in its initial stages, did something to improve the internal organization of the services and, consequently, their efficiency, its agricultural production targets were far from being attained. In the first place, the implementation period was too short — only five years — and the programme in itself could not solve the problems arising from the lack of technicians and economic resources, the uncertainty of the staffing situation and the tendency towards over-frequent changes of plan, all of which have constituted factors limiting the work programmes of Colombia's agricultural services. Moreover, no attention whatever was paid to the livestock sector, nor was there even any attempt to establish some form of liaison between the Departments of Agricultural and of Livestock, or with the agricultural services of the departmental authorities.

In 1947 the Ministry of Agriculture was reinstated, and organized on the basis of a General Secretariat, Departments of General Affairs and of Rural Economy, a Livestock Division, an Agriculture Division and a Natural Resources Division. This organization was maintained, with only slight modifications, until 1950, when the Ministry was again remodelled and the services were redistributed among three divisions — Research, Extension, and Natural Resources — under a Department of Programme Co-ordination. The Ministry assumed responsibility for research work of national importance, in conformity with a single programme, in order to prevent isolated and uncoordinated activities and duplication of effort.

These successive processes of reorganization did not produce the favourable effects that were aimed at; what is more, practically all work on livestock research dropped to a very low level with the suppression of the Livestock Division. Experimental livestock stations were *ipso facto* abandoned, and the selection and improvement of creole breeds interrupted, as was also all the veterinary research formerly undertaken by the Ministry. The limitations alluded to above persisted, and probably made themselves felt with greater intensity than in previous periods.

Crop research, on the other hand, patently made progress along certain lines, thanks to the impetus given to such work by the Special Research Bureau (*Oficina de Investigaciones Especiales*), which was established as a dependency of the Ministry of Agriculture under the terms of an agreement signed in May 1950 between the Government of Colombia and the Rockefeller Foundation. This office, though up to a point autonomous, is jointly maintained by the two parties to the agreement, which co-operate in financing its overhead expenditure and supplying it with technical personnel, equipment, manpower and other facilities. Its main target is to develop agricultural research in order to expand production and improve the quality of the staple crops for the Colombian diet. Originally, the activities of this office were mainly concentrated on projects for obtaining improved varieties of maize and wheat, thus reinforcing and supplementing similar programmes carried out by the Ministry of Agriculture. The Special Research Bureau is free from many of the usual limitations; resources are available, its technical personnel has security of tenure and work programmes are altered only on proper grounds.

In order to extend its research facilities, in 1951 the Ministry purchased a large estate of 460 hectares on the Savannah of Bogotá, where the *Estación Experimental Central de Tibaitatá* was established, since la Picota was becoming too small for the normal progress of the programmes under way. Moreover, from the outset the various experimental farms belonging to the Ministry throughout the country were placed at the disposal of the Special Research Bureau. Apart from the Tibaitatá station, basic research centres were reestablished in Medellín, Palmira and Montería, and some of the other experimental stations were used as pilot farms where the findings of the research were applied.

To the research programmes for maize and wheat were added others for potatoes, beans and barley, entomology, plant sanitation, soils and fertilizers. Advantage was taken of the similar work already done by the Ministry of Agriculture, which was continued and expanded. In 1954, work on rice, cotton, sugar-cane, grasses and forage plants and livestock production was projected. In 1952, the Ministry allocated 300,000 pesos to the co-operative programme, while the Rockefeller Foundation contributed 114,000 dollars.

The Special Research Bureau is closely linked with the Faculties of Agronomy of Palmira and Medellín, to which it contributed 67,000 dollars in 1952. It would appear that satisfactory co-ordination with the Ministry's extension services has not always been successfully achieved.⁶ A co-ordinated programme for the reproduction of varieties of wheat, maize and potato seed superior to those traditionally sown by farmers is maintained with the *Caja de Crédito Agrario*. The Special Research Bureau has begun the collection of native varieties of maize in the Andean region comprising Venezuela, Colombia, Ecuador, Perú, Bolivia and Chile, in order to form an international germ plasm bank in Colombia which it is estimated will contain some 5,000 selections. The United States National Research Council has allocated special funds to collaborate with the Rockefeller Foundation on this project, in which the countries listed also participate. The object of collecting the largest possible number of native varieties for the germ plasm bank is to study the special features of each selection in relation to such aspects as speed of maturation, yields, resistance to weather conditions (drought, humidity, wind, rain, etc.), hardiness, resistance to pests and disease, capacity for acclimatization to certain habitats, food content, fertility of pollen, size of the cob, size, colour and texture of the grain, number of rows of grain per cob, number of cobs per stem, development of the plants, etc. When it is projected to take the steps indicated by genetics in order to improve some existing strain or to produce some new variety with specific characteristics, the inventory of the collections in the germ plasm bank provides the necessary information whereby to determine which collection to use and the appropriate seed for the initial work.

With regard to development programmes, the Ministry of Agriculture is in charge of formulating and executing the various livestock programmes at national level. The provincial Departments of Agriculture and Livestock Production also discharge these duties within their respective areas. The *Asociación Colombiana de Ganaderos*, the *Sociedad Nacional de Agricultura*, the *Caja de Crédito Agrario*, the *Fondos Ganaderos*, the National Programming Committee, the universities, professional associations and other private and public organizations co-operate in these development programmes.

Since the Ministry of Agriculture is mainly responsible for the direction of national extension and research campaigns, particular significance attaches to the changes in its technical services and organization. For many years, up to 1950, a National Department of Livestock Production existed within this Ministry, sub-divided into sections dealing with sanitation, zootechnical aspects and feeds. Under the direction of an expert, greater progress was achieved

⁶ See *Tercer Informe Anual sobre el Progreso del Programa Cooperativo de Investigación Agrícola entre el Ministerio de Agricultura y la Fundación Rockefeller* (May 1952-May 1953).

year by year until the structure of the department was adjusted to the requirements of livestock production and the most important problems were included in its programme. Veterinary surgeons were in charge of a laudable undertaking, namely, a systematic and rational survey of the main animal diseases, behaviour of the various breeds and feeding conditions. Moreover, for many years they co-operated in technical assistance programmes for farmers through local extension committees. The technical survey of livestock was not completed because this service was suppressed, but it did serve as a basis for extension and research programmes. It was possible to wage special sanitary campaigns against Bang's disease, hog cholera and other ailments, so that their incidence declined appreciably. The Veterinary Research Institute (*Instituto de Investigaciones Veterinarias*) was created as an annex to the sanitation section, with laboratories for the study of material collected in the field. This permitted the classification and identification of various pathogen agents, as well as their distribution by areas. The collection of indigenous microbe strains enables several biological products to be prepared, both by the Institute and by private laboratories. All this scientific work declined with the disappearance of the Department of Livestock Production.

The Department in question channelled its zootechnical improvement campaigns through its Zootechnical and Dairy Production Control Sections. In 1947 it had about forty-five dependencies, comprising experimental livestock stations and stud facilities located in the country's main stock-breeding areas. Apart from the improvement of the different strains through selection and cross-breeding, the Zootechnical Section organized a forage campaign and a special artificial insemination service. At present the Ministry no longer has stud posts, nor has the forage campaign been continued. Some of the experimental stations and sub-stations have also been suppressed.

Two other sections were also included in the National Department of Livestock Production, one dealing with pisciculture, fishing and hunting and the other with livestock economics sections. Through these five sections, an integrated and co-ordinated development of livestock production was possible, since a single director was responsible for them all.

As has already been stated, substantial changes were introduced into the organization of the Ministry of Agriculture in 1951, when the Divisions of Extension, Research, Natural Resources and

Co-ordination were created, while the National Departments of Agriculture and Livestock Production and the Division of Rural Economies were abolished. Outstanding among subsequent modifications was the creation of the Crop and Livestock Research Department (*Departamento de Investigaciones Agropecuarias*) in 1955, for the purpose of imparting greater flexibility and stability to agricultural research and providing adequate financial resources. This Department is a semi-autonomous organization, directly dependent upon the Ministry of Agriculture, but managed by a board of directors. It will be financed by a budgetary allocation of 8 million pesos annually and by a further sum, estimated at 2 million, to be obtained from receipts accruing to the experimental farms and stations. The Division of Research will form part of this Research Department, and it is thus considered that in the near future the latter will operate the whole of the agricultural research machinery on stable bases and by means of flexible and effective procedures.

Various plans have been prepared for the development of Colombia's livestock production by both domestic and foreign enterprises and technical experts. The Ministry of Agriculture prepared a livestock credit development plan in 1952⁷ and later a United States expert⁸ was engaged to study conditions and prospects in the beef industry and make recommendations. Despite these efforts and the permanent interest shown by the Government in livestock activities, they have not developed commensurately with the natural resources available and with consumer requirements.

It should be stressed that a number of stock farmers in Colombia are intent on solving the problem of breeds and finding the most suitable strain for their respective areas. They have all independently carried out cross-breeding, the minority on scientific and technical lines and the rest according to their own judgment. Such experiments might prove useful for the improvement of breeds and should merit special attention from official organizations. An inventory and classification of the private sector's experimental work — both the failures and the successes — with a view to profiting by its lessons would supplement current achievements and provide a basis for their more efficient utilization.

⁷ Prepared by a former Minister of Agriculture, Mr. Camilo J. Cabal Cabal.

⁸ Mr. Cortés G. Randell.

Annex V

DETERMINATION OF INPUT IN THE AGRICULTURAL SECTOR FOR 1953

The purpose of this annex is to give further details of the calculations on which the determination of inputs in the agricultural sector in 1953 was based. The significance of these data has already been fully discussed in the text (Part Two, chapter II). The various inputs will be classified in three principal groups: I. Materials; II. Services; and III. Indirect taxation.

In the case of groups I and II a distinction was made between inputs supplied by the agricultural sector itself and items from other sectors.

Where available statistical data was of a global nature, an analysis was made of the possible components, and by means of estimates based on known values the share of input or cost of production was deduced, as well as the proportion corresponding to investment, where appropriate. Investment items were excluded from the cost structure.

Table 326 outlines total and detailed costs for the various types of input. The system of calculation and methodology is explained below.

I. MATERIALS

1. Seed

This calculation was based on data as to the area under cultivation, supplied by the Ministry of Agriculture. The amount of seed used per unit of area corresponds to averages for the country derived from information given by the *Caja de Crédito Agrario* and the Ministry of Agriculture, and from other data obtained directly from farmers by members of the ECLA study group. Its value was determined on the basis of current prices plus an additional sum allowed for selection and cleansing (see table 327).

Of the 72.4 million pesos' worth of seed used in all, the respective percentages supplied by the sector itself and obtained from other sources — in this case imports of seed during 1953 — has to be established. According to the Yearbooks of foreign trade, the figures for the latter were as follows:

Type of seed	Tons	C.i.f. value (Thousands of pesos)
Grasses and forage plants . . .	85.0	167
Vegetables and pulses	47.0	220
Unspecified	22.0	84
TOTAL	154.0	471

The c.i.f. value of this seed was increased by 66 per cent to allow for inland freight, distribution costs and importers' and dealers' profits, and by 3.84 per cent through adjustment of the exchange rate to domestic purchasing power. This brought the value of imported seed to 800,000 pesos.

2. Fertilizers and soil amendment

The fertilizers used in agriculture are practically all purchased abroad. Table 328 shows the various imports for 1953, 53.84 per cent having been added to the c.i.f. value to cover commissions, profits, preparation for marketing and exchange rate adjustments to domestic purchasing power.

As regards consumption of domestic fertilizers, only the aggregate value was available. Total consumption, according to table 328, would seem to have been 18.3 million pesos, of which only 2.5 million apparently corresponded to domestic fertilizers.

Consumption for soil amendment was established on the basis of the amount of lime sold by the *Caja de Crédito Agrario*, and an estimate of sales — especially of calcium oxide — by other organizations. With the inclusion of freightage, liming would seem to have represented an outlay of 152,000 pesos, as can be seen in table 329.

To sum up, consumption of fertilizers and lime in 1953 accounted for represented an expenditure of 18.5 million pesos, and its composition was as follows :

	Thousands of pesos
Fertilizers	18,305
Liming or soil amendment	152
TOTAL	18,457

TABLE 326. COLOMBIA : INPUTS IN THE AGRICULTURAL SECTOR, 1953

(Millions of pesos at 1953 prices)

Item	From the same sector	From other sectors	Total
I. Materials	181.8	100.4	282.2
Seeds	72.4	0.8	73.2
Fertilizers	—	18.5	18.5
Insecticides	—	10.1	10.1
Feeds, mineral salts, vaccines and medicines for livestock	109.4	37.1	146.5
Fuels and lubricants	—	18.0	18.0
Packing and cordage	—	15.9	15.9
II. Services	2,033.5	334.9	2,368.4
Remuneration of labour	2,033.5 ^a	—	2,033.5
Maintenance (upkeep expenses)	—	76.0	76.0
Replacements	—	169.8	169.8
Irrigation and drainage	—	13.6	13.6
Interest and commissions on credit	—	75.5	75.5
III. Taxes			
Property and indirect taxes			11.2
TOTAL (I plus II plus III)			2,661.8

SOURCE : ECLA, on the basis of the data indicated in the following pages.

^a Including only remuneration of labour employed in agricultural production.

TABLE 327. COLOMBIA : ESTIMATE OF SEED USED AND OF ITS VALUE, 1953

Crop	Area under seed (Thousands of hectares)	Seed			Total value (Thousands of pesos at 1953 prices)
		Kilo-grammes per hectare	Total (Thousands of tons)	Price per ton (Pesos)	
Wheat	175	90	15.8	700	11,060
Maize	700	20	14.0	380	5,320
Rice	170	100	17.0	600	10,200
Potatoes	115	800	92.0	350	32,200
Garlic and onions	20		1.0	1,400	1,400
Other vegetables	17		—	—	1,700
Beans	85	50	4.3	1,000	4,300
Other pulses	75	50	3.8	800	3,040
Cotton	67	30	2.0	200	400
Sesame	17	15	2.6	700	180
Barley	53	90	4.8	500	2,400
Miscellaneous					1,000
TOTAL					73,200
From the agricultural sector					72,400
From other sources (imports)					800

SOURCES : Ministry of Agriculture, *Caja de Crédito Agrario* and ECLA estimates.

TABLE 328. COLOMBIA : TOTAL CONSUMPTION OF DOMESTIC AND IMPORTED FERTILIZERS, 1953

Fertilizer	Total weight (Tons)	Content of pure elements						C.i.f. value (Thousands of pesos)
		Nitrogen		Phosphorus		Potassium		
		Percentage	Tons	Percentage	Tons	Percentage	Tons	
<i>Imported</i>								
Nitrate, unrefined	622	16	100	—	—	—	—	123
Ammonium sulphate	2,750	21	577	—	—	—	—	435
Unclassified nitrogenous chemical fertilizers ..	5,495	40	2,198	—	—	—	—	2,068
Natural phosphates	1,363	—	—	30	409	—	—	173
Calcium super-phosphates and potassium	64	—	—	20	13	5	3	9
Soluble phosphates	9,547	—	—	44	4,201	—	—	2,351
Raw salts of potassium	486	—	—	—	—	40	194	92
Potassium chloride	2,587	—	—	—	—	60	1,552	380
Potassium sulphate	1,623	—	—	—	—	48	779	376
Mixed chemical fertilizers	999	5	50	24	240	20	200	209
Other mineral fertilizers	14,382	—	—	20	2,876	10	1,438	4,013
Miscellaneous fertilizers	130	10	13	20	216	5	7	45
TOTAL	40,048		2,938		7,765		4,173	10,274
Freight, commissions, profits, preparation for market, etc. (53.84 per cent of c.i.f. value) ..								5,531
Value on delivery at farm								15,805
<i>Domestic</i>								
Over-all consumption								2,500
GRAND TOTAL								18,305

SOURCE : ECLA, on the basis of official statistics in *Anuarios de Comercio Exterior* (Yearbooks of foreign trade).

TABLE 329. COLOMBIA : CONSUMPTION OF AGRICULTURAL LIME (DOMESTIC), 1953

	Sale price per ton (Pesos)	Tons	Calcium oxide		Value (Thousands of pesos at 1953 prices)
			Percentage	Tons	
Sold by the <i>Caja de Crédito Agrario</i>	6	13,224	51.3	6,784	79
Other enterprises *	12	4,000	80.0	3,200	48
TOTAL		17,224		9,984	127
Freight to farms (an additional 20 per cent)					25
Value on delivery at farm					152

SOURCES : *Caja de Crédito Agrario* and ECLA estimates.

* Estimated ; chiefly quicklime (calcium oxide).

3. Insecticides, fungicides and pesticides

Consumption of insecticides, fungicides, weed-killers and other similar materials was calculated on the basis of the relevant import figures. An addition of 50 per cent was made to the c.i.f. value to provide for freightage, commissions, preparation for market, importers' and distributors' profits, etc., and another of 3.84 per cent for adjustment of the exchange rate to domestic purchasing power. With respect to domestically-produced insecticides, only data on their value could be obtained. Hence table 330 indicates a total consumption amounting to 10.1 million pesos.

4. Feeds, salts, vaccines and veterinary medicines

(a) Feeds

Animal feeds are provided both by the agricultural sector itself and by other sectors. In order to calculate the former's contribution, technical experts from the Ministry of Agriculture were consulted ; the figures so obtained point to a total value of 109.4 million pesos (see table 331).

Feeds from other sources may be imported or domestically-produced. Data on imported feed were taken from the yearbooks

TABLE 330. COLOMBIA : CONSUMPTION OF INSECTICIDES, FUNGICIDES, AND OTHER PESTICIDES FOR PLANT DISEASE AND PEST CONTROL, 1953

	Tons	C.i.f. value (Thousands of pesos at 1953 prices)
<i>Imported</i>		
Insecticides, fungicides, etc.	3,081	5,083
Carbon disulphide	476	318
Copper sulphate	1,500 *	926
TOTAL	5,057	6,327
Freight, commissions, preparation, distribu- tion, etc. (53.84 per cent of c.i.f. value) ..		3,406
Value on delivery at farm		9,733
<i>Domestic</i>		
Production of insecticides		330
GRAND TOTAL		10,063

SOURCE : *Anuarios de Comercio Exterior (Yearbooks of foreign trade)*.

* Estimate.

TABLE 331. COLOMBIA : CONSUMPTION OF FEED CONCENTRATES AND OTHER FEEDS, SALTS, VACCINES AND MEDICAMENTS FOR LIVESTOCK, 1953

	Thousands of tons	Millions of pesos at 1953 prices
<i>(A) Feeds</i>		
<i>(i) From the agricultural sector</i>		
Maize (grain)	250.0	55.0
Barley	1.0	0.4
Yucca	43.5	5.2
Plantains	95.5	10.0
Panela	14.0	4.2
Syrup or molasses	11.0	1.9
Bananas	7.1	0.8
Whole milk	83.0	11.0
Miscellaneous : spoiled products unfit for human consumption ...		20.9
TOTAL		109.4
<i>(ii) From other sectors</i>		
Oil-cake, and prepared and miscel- laneous feeds (imported)	1.0	0.6
Oil-cake	55.0	11.0
Brewery by-products	16.0	2.7
Flour-mill by-products	40.0	6.8
Hotel refuse	—	3.0
TOTAL		24.1
<i>(B) Salts, vaccines, and medicaments</i>		
Mineral salts		7.0
Vaccines and medicaments		6.0
TOTAL		13.0
GRAND TOTAL (A + B)		146.5

SOURCE : ECLA, from information supplied by technical experts from the Colombian Ministry of Agriculture, and *Anuarios de Comercio Exterior (Yearbooks of foreign trade)*.

of foreign trade. The c.i.f. value was increased by 50 per cent to cover commissions, inland freight charges, preparation for market, profits, etc., and by 3.84 per cent for exchange rate adjustments. Among items of domestic origin, production of oilcake was deduced from the fact that processing of vegetable oils and fats in 1953 amounted to 25,000 tons. The average oil yield of the raw material was assumed to be 30 per cent, a coefficient which, applied to total production of processed goods, indicated a consumption of 83,000 tons of raw material. By-products of the industry would seem to have totalled 58,000 tons, of which 55,000 were assumed to represent oilcake, and 3,000 other derivatives and wastage.

An estimate of the by-products from breweries and flour-mills was made on similar lines.

(b) *Mineral salts, vaccines, etc.*

This calculation is also based on estimates by technical experts from the Colombian Ministry of Agriculture.

5. *Fuels and lubricants*¹

Calculations of inputs of fuels and lubricants were based on the consumption of tractorine, diesel oil, petrol and lubricants in 1953. The following considerations were taken into account :

(a) *Tractorine*

Total imports of tractors between 1944 and 1953 were 9,868, all of which are assumed to be in service. According to the report on *La industria del petróleo en Colombia* prepared by the National Petroleum Board (*Consejo Nacional de Petróleo*) and the Foster Wheeler Corporation (December 1959), 90 per cent of the tractors consumed tractorine and the remaining 10 per cent diesel fuel. If this hypothesis were adopted, there would have been 8,881 tractors consuming tractorine, and 987 operating on diesel fuel. The latter were heavy tractors, of which it is estimated that only 50 per cent were used for agricultural work. The rest were in service for road-building, in the petroleum industry, etc. Of the 8,881 tractors using tractorine, it is estimated that 5 per cent were not employed in agriculture. In brief, there would seem to have been 8,940 tractors operating in agriculture, of which 78,43 used tractorine and 584 diesel oil. Of the latter only 40 per cent, or 197 tractors, may be considered as in use for productive work.

According to official statistics supplied by the Ministry of Mines and Petroleum, total consumption of tractorine in 1953 amounted to 8,151,426 gallons. The average consumption of tractors using this type of fuel was 966 gallons (which at a rate of 7 gallons per working day implies that the tractors worked an average of 138 days in the year). On this basis, consumption of tractorine in the agricultural sector would have amounted to 8.15 million gallons (see table 332).

(b) *Diesel fuel*

Estimates by the Ministry of Agriculture place average annual consumption of diesel fuel at 2,300 gallons per tractor. Thus the 493 heavy tractors used for agricultural work would have consumed

	For agriculture	For other purposes	Total
¹			
Tractors imported between 1946 and 1953 :			
Heavy (diesel oil)	493	494	987
Light (Tractorine)	8,437	444	8,881
TOTAL	8,940	938	9,868
Tractors for agricultural produc- tion :			
Light	8,437		
40 per cent of heavy tractors ..	197		
TOTAL	8,634		

TABLE 332. COLOMBIA : CONSUMPTION OF FUELS AND LUBRICANTS IN AGRICULTURE, 1953

Type of fuel	Quantity (Millions of gallons)	Retail price (Pesos per gallon)	Total value (Millions of pesos)
Tractorine	8.150	0.40	3.26
Diesel oil	0.450	0.38	0.171
Petrol	22.300	0.60	13.38
Lubricants	0.465	2.50	1.162
TOTAL			17.974

SOURCE : ECLA, on the basis of National Petroleum Board and Foster Wheeler Corporation. *La Industria del Petróleo en Colombia (The Petroleum Industry in Colombia)*, December 1949.

a total of 1,333,900 gallons of diesel fuel. A major part of the work of these heavy tractors consists in opening up roads in newly-incorporated areas, clearing of forested areas, construction of storage-tanks for watering livestock, levelling of the ground, etc. Forty per cent of the activities of these tractors may be assumed to be accounted for by production itself, and 60 per cent by investment. Consequently, the consumption of diesel fuel which should be regarded as part of annual production costs is some 453,000 gallons.

(c) *Petrol*

Colombia's total petrol consumption in 1953 amounted to 204,078,000 gallons, 0.7 per cent ² of which — or 1,428,546 gallons — was used for tractors. Average consumption per tractor would seem to have been 144 gallons per annum, and the amount attributable to agriculture 1,243,000 gallons (8,634 tractors).

It is estimated that, in addition, motor-driven agricultural machinery, stationary motors in coffee-processing plants, etc., absorb another 0.3 per cent of total petrol consumption, that is, 612,000 gallons.

Finally it is estimated that 10 per cent of aggregate petrol consumption, that is, 20,408,000 gallons, is accounted for by lorries and automobiles used in the process of agricultural production, under which head is included farm management, as well as transport of seed, spare parts and other agricultural inputs, though it does not cover transport of crops or livestock to market. To sum up, consumption of petrol in the agricultural production process in 1953 was as follows :

	Gallons
Tractors	1,243,000
Machinery	612,000
Lorries and automobiles	20,408,000
TOTAL	22,263,000

² National Petroleum Board and Foster Wheeler Corporation, *La industria del Petróleo en Colombia, op. cit.*

TABLE 333. COLOMBIA : QUANTITY AND VALUE OF PACKING MATERIALS USED IN AGRICULTURE, 1953

Product	Production		Capacity of packing materials		Total number of containers required (Thousands of units)	Duration (Years)	New containers per annum (Thousands of units)	Value of containers	
	Harvested (Thousands of tons)	Packed (Thousands of tons)	Per occasion used (Kilogrammes)	Total for year (Kilogrammes)				Unit (Pesos)	Total (Thousands of pesos)
Garlic and onions	25	25	30	120	208	1	208	1.0	200
Sesame	10	10	50	50	200	1	200	0.6	120
Aniseed	1	1	50	50	20	3	7	2.0	15
Cotton (harvest)	50	50	50	300	166	3	55	8.0	440
Paddy rice	289	263	62.5	62.5	420	2	210	1.5	315
Cacao	15	15	62.5	62.5	240	3	80	1.5	120
Coffee	384	384	70	105	3,660	3	1,220	1.5	1,830
Panela	600	500	50	50	10,000	3	3,330	1.0	3,330
Barley	65	60	62.5	62.5	900	3	300	1.5	450
Copra	3	3	60	60	50	2	25	1.0	25
Beans	50	40	62.5	62.5	640	3	215	1.5	320
Other pulses	60	40	62.5	62.5	640	3	215	1.5	320
Maize	770	500	62.5	100	5,000	3	1,700	1.5	2,550
Yucca	870	500	62.5	125	4,000	2	2,000	1.0	2,000
Vegetables	130	100	50	300	330	1	330	1.0	330
Dried fruits	250	200	40	200	1,000	1	1,000	1.0	1,000
TOTAL	3,572	2,691			27,474		11,095		13,365
Fruit (boxes)	260	200	50	200	1,000	1	1,000	1.0	1,000
Tomatoes (boxes)	40	40	25	25	1,000	1	1,000	0.6	600
TOTAL	300	240			2,000		2,000		1,600
GRAND TOTAL	3,872	2,931			29,474		13,095		14,965
Cordage : 1,500 tons at 600 pesos per ton									900
Total containers and cordage									15,865

SOURCE : ECLA, in collaboration with technical experts from the Ministry of Agriculture.

(d) *Lubricants*

This item was determined on the premise that in mountainous tropical countries consumption of lubricants by motor vehicles, including tractors, was equivalent to approximately 1.5 per cent of their fuel consumption.

6. *Packing and cordage*

Calculations as to the amounts and value of packing materials used in agriculture, the results of which are given in table 333, were based on estimates obtained through the collaboration of the Ministry of Agriculture.

For this purpose the total harvest was taken into account, and an estimate made of the percentage for which sacks or other containers would be required. The useful life of the latter was also taken into consideration, so that annual replacement needs could be calculated.

II. SERVICES

1. *Remuneration of labour*

In order to arrive at the remuneration paid to labour employed in agricultural production, use was made of the data resulting from about 1,000 individual surveys of labour input and production

costs, carried out by the *Caja de Crédito Agrario*, the Ministry of Agriculture, and by members of ECLA's study group. They covered all Departments, *Intendencias*, and *Comisarias*, and dealt with livestock and seventeen crops (including those of major importance, such as coffee, sugar-cane, cotton, potatoes, rice, yucca, plantains, bananas, barley, etc.). In the course of the same investigation, data were collected on wages paid for each kind of labour in the various crops and areas.

Tabulation of the questionnaires provided information on the number of working days per hectare, with details of all types of labour input in each crop. Where concrete data were lacking, an estimate was made on the basis of information collected in the field.

Labour input in stock farming was also determined by means of surveys carried out in the country's principal stock-breeding areas. Labour employed in the care of livestock was expressed in terms of working-days per head of stock, and input in the maintenance of pastures in working-days per hectare. To determine the total number of working-days per crop, the number of days worked per hectare was multiplied by the area under the crop in question (see table 334).

To complete the picture of the labour input an estimate was made of working-days absorbed by (a) farm management and professional services; (b) transport of produce to market, whenever this was handled by the farmers themselves; (c) all operations

TABLE 334. COLOMBIA : LABOUR INPUT IN AGRICULTURAL ACTIVITIES, 1953

(A). CROPS

	Area (Thousands of hectares)	Working- days per hectare	Total number of working-days (Thousands)	Value of labour		Expenditure in wages per hectare
				Per day (Pesos)	Total (Thousands of pesos)	
Sesame	17	43.2	734	3.40	2,495.6	146.9
Garlic and onions	20	120.0	2,400	4.00	9,600.0	480.0
Cotton	67	60.9	4,078	4.50	18,351.0	274.1
Aniseed	2	56.0	112	4.00	4,480.0	224.0
Rice	171	72.1	12,329	3.70	45,617.3	266.8
Bananas	45	43.0	1,935	4.00	7,740.0	252.0
Cacao	32	47.9	1,533	4.30	6,591.9	205.9
Coffee	831	72.6	60,331	4.42	266,663.0	320.9
Cane for sugar	29	60.0	1,740	4.50	7,830.0	539.1
Cane for <i>panela</i> and molasses	123	160.0	20,295	3.50	71,032.5	419.3
Rubber	4	95.0	380	3.40	1,292.0	323.0
Barley	53	36.0	1,908	2.40	4,579.2	150.2
Copra	5	40.0	200	3.40	1,680.0	323.0
Sisal (<i>fique</i> or <i>cabaya</i>) ...	20	48.0	960	3.00	2,880.0	144.0
Beans	85	77.9	6,622	3.75	24,832.5	292.1
Fruit	77	48.0	3,696	3.70	13,676.0	177.6
Vegetables	17	360.0	6,120	4.00	24,480.0	144.0
Pulses, excluding beans ..	75	50.0	3,750	3.75	14,062.5	187.5
Maize	700	57.8	40,460	3.40	137,564.0	196.5
Potatoes	115	95.6	10,994	2.85	31,332.9	272.5
Plantains	120	35.0	4,200	3.50	14,700.0	87.5
Tobacco	22	353.0	7,766	3.50	27,181.0	1,235.5
Tomatoes	8	150.0	1,200	4.00	4,800.0	600.0
Wheat	175	38.0	6,650	2.45	16,692.5	181.3
Yucca	76	93.0	7,068	3.50	24,738.0	325.5
Miscellaneous crops * ...	11	61.0	668	3.70	2,473.0	224.8
TOTAL	2,900	71.8	208,129		785,964.3	

* Including coconut, and tubers other than potatoes.

(B) LIVESTOCK

	Total number of working-days (Millions)	Value of labour	
		Per day (Pesos)	Total (Millions of pesos)
<i>Cattle</i>	91.0	—	513.0
Beef : 11.1 million head : 1 day's work per year for every 50 head	80.0	3.50	280.0
Milch : 1.2 million head : 1 day's work per year for every 33.3 head	11.0	3.00	33.0
<i>Horses</i>	3.0	3.00	9.0
1.4 million head : care included under cattle	—	—	—
0.2 million head : 15 days' work per head per annum	3.0	3.00	9.0
<i>Hogs</i>	20.7	—	45.6
350,000 head in sties : 12 days' work per hog/year ..	4.2	3.00	12.6
1,650,000 head on range : 10 days' work per hog/year	16.5	2.00	33.0
<i>Sheep and goats</i>			
1.8 million head : 5 days' work per head per annum	9.0	2.00	18.0
<i>Poultry</i>			
22 million head : 0.75 days' work per head per annum	16.5	2.00	33.0
TOTAL	140.2		618.6
<i>Care of pastures</i>	38.7		116.1
Artificial pasture : 10.07 million hectares : 3 days' work per hectare per annum	30.2	3.00	90.6
Natural pasture : 16.8 million hectares : 0.5 day's work per hectare per annum	8.5	3.00	25.5
<i>Renewal of pastures</i>			
1 million hectares per annum : 10 days' work per hectare	10.0	3.00	30.0
TOTAL	48.7		146.1
GRAND TOTAL FOR STOCK FARMING	188.9		764.7

(C) OTHER AGRICULTURAL ACTIVITIES

Farm management and professional services	26.4	15.00	396.0
Miscellaneous	18.2	3.90	70.9
Transport of produce to market	15.3	3.00	45.9
Investment	21.0	3.50	73.5
TOTAL	80.9		586.3

SOURCE : ECLA, on the basis of surveys carried out by the *Caja de Crédito Agrario*, the Ministry of Agriculture and the ECLA study group itself.

involving capital investment such as soil reclamation (clearing, irrigation, drainage, etc.), replacement and/or enlargement of permanent plantations and pasturage, and so forth ; (d) miscellaneous items, which include everything not specified under the foregoing heads, and which, broadly speaking, are not attributable to any one specific crop or type of farm. This last category was

estimated to account for 5 per cent of total labour input in crops, care of livestock and pasture management.

According to table 334, in 1953 the active agricultural population did 478 million days' work (averaging 9 hours each), valued at 2,137 million pesos. The relevant break-down is given in table 335.

TABLE 335. COLOMBIA : BREAK-DOWN OF LABOUR AND WAGES COSTS, 1953

Item	Millions of working-days	Millions of pesos
Production		
Crops	208.1	786.0
Care of pastures and livestock	178.9	734.7
Farm management	26.4	396.0
Transport of produce to market	15.3	45.9
Miscellaneous	18.2	70.9
TOTAL	446.9	2,033.5
Investment		
Renewal of pasturage	10.0	30.0
Other investment: soil reclamation, renewal and enlargement of plantations etc.	21.0	73.5
TOTAL	31.0	103.5
GRAND TOTAL	477.9	2,137.0

SOURCE : ECLA, on the basis of table 334.

2. Maintenance costs

Costs of maintenance of agricultural assets were calculated by applying rates or percentages to the various capital groups. The rates selected for dwelling-houses and other farm buildings are apparently high, since they are applied to depreciated and not to original values (see table 336).

TABLE 336. COLOMBIA : EXPENDITURE ON MAINTENANCE OF AGRICULTURAL ASSETS, 1953

(Millions of pesos)

Specification	Value of asset	Maintenance	
		Per-centage	Total
Real estate			
Rural dwellings	936.5	3	28.1
Other farm buildings	215.3	3	6.5
Installations	347.5	5	17.4
Fences	148.5	6	8.9
TOTAL			60.9
Non-real estate			
Tractors	138.2	6	8.3
Ploughs and harrows	16.8	5	0.8
Miscellaneous machinery	88.6	6	5.3
Small tools	14.1	5	0.7
TOTAL			15.1
TOTAL MAINTENANCE COSTS			76.0

SOURCE: ECLA.

In the determination of the rates to be applied to fixed capital, the proportion of maintenance costs corresponding to labour was excluded on the grounds that this factor of input had already

been included under the head of labour. The same criterion was used in order to arrive at the rate to be used in the case of smaller tools. In both cases the rate includes only the cost of materials purchased.

The rates for movable capital, with the exception referred to, include materials purchased (spare parts) and labour, the latter item because major repairs calling for the use of spare parts are ordinarily carried out at workshops in urban centres. Expenditure under this head reached 76 million pesos in 1953, as can be seen from table 336.

3. Replacement costs

The depreciation of dwelling-houses and other farm buildings was calculated on the depreciated current value (at 1953 prices) and the number of years the capital in question is likely to continue in

TABLE 337. COLOMBIA : BREAK-DOWN OF AGRICULTURAL EQUIPMENT BY LENGTH OF USEFUL LIFE

Length of useful life	Original value	Depreciated value
12 years		
Unclassified farm machinery	16,733	11,738
Wheeled vehicles and other durable machinery	9,600	6,400
TOTAL	26,333	18,138
10 years		
Ploughs and ploughshares	12,407	7,751
Rakes and harrows	4,372	2,381
TOTAL	16,779	10,132
8 years		
Tractors and accessories	138,150	89,407
Unclassified farm machinery	30,579	17,285
TOTAL	168,729	106,692
7 years		
Seeders and accessories	3,283	1,849
Fertilizer sprayers and accessories	731	457
TOTAL	4,014	2,306
6 years		
Threshers and accessories	2,548	1,628
Harvesters and accessories	6,521	4,663
TOTAL	9,069	6,291
5 years		
Other iron and steel tools	11,871	5,991
Copper accessories	178	100
Fumigators	6,591	4,349
TOTAL	18,640	10,440
2 years		
Spades, picks, hoes, etc.	3,979	2,854
Axes, hatchets, machetes, sickles, etc. .	8,117	6,021
Miscellaneous	2,000	1,200
TOTAL	14,096	10,075
GRAND TOTAL	257,660	164,074

SOURCES : ECLA and *Anuarios de Comercio Exterior* (Yearbooks of foreign trade.)

use. For other assets, the calculation was based on the value of the original investment in terms of 1953 prices, and the total useful life of each component.

For this purpose the original value of all movable capital subject to depreciation was first determined at 1953 prices, and a classification by years of serviceability was then established (see table 337).

The estimate of depreciation expenses for 1953 is shown in table 338, and reaches a total of 169.8 million pesos.

TABLE 338. COLOMBIA: DEPRECIATION OF AGRICULTURAL ASSETS (REPLACEMENT), 1953
(Millions of pesos)

Specification	Value of asset	Depreciation	
		Percentage	Total
(a) Buildings			
Rural dwellings	936.0	2.0	18.7
Other agricultural buildings	215.3	3.0	6.5
Installations	347.5	5.0	17.4
Fences	126.0	6.5	8.2
	22.5	3.0	0.7
	TOTAL		51.5
(b) Plantations			
Bananas	22.5	3.3	0.7
Plantains	36.0	4.0	1.4
Coffee	623.2	3.0	18.7
Cacao	41.6	2.5	1.0
Cane for sugar	17.4	10.0	1.7
Cane for <i>Panela</i> and syrup or molasses	49.2	10.0	4.9
Rubber	8.0	2.0	0.2
Coconut palms	9.0	2.0	0.2
Sisal (<i>fique</i>)	6.0	3.3	0.2
Fruit	46.2	3.3	1.5
Artificial pastures	503.5	10.0	50.4
	TOTAL		80.9
Non-real estate			
Wheeled vehicles and unclassified machinery	26.3	6.5	1.7
Ploughs and rakes	16.8	10.0	1.7
Tractors and unclassified agricultural machinery	168.7	12.5	21.1
Seeders and fertilizer-sprayers	4.0	14.0	0.6
Threshers and reapers	9.1	16.0	1.5
Fumigators, copper accessories and other implements	18.6	20.0	3.7
Spades, axes, hoes, machetes, etc. ...	14.1	50.0	7.1
	TOTAL		37.4
	GRAND TOTAL		169.8

SOURCE: ECLA.

4. Cost of irrigation and drainage

There are 220,000 hectares of irrigated land in Colombia, most of it irrigated with water from relatively important works whose administration and maintenance costs have to be defrayed by the properties served. In the case of some works recently constructed, water-rights are rented to properties requiring irrigation for an

amount considered sufficient to cover administration, maintenance and interest on the capital invested. In other cases beneficiaries must, in addition, pay an amortization quota. The average cost of irrigation is estimated at 1,000 pesos per hectare. A 5 per cent rate of interest and an additional quota of 10 pesos per hectare for upkeep and management of the works represent an annual expenditure of 60 pesos per irrigated hectare. The labour employed in keeping the channels clear is not included in the quota of 10 pesos, having been already given under the heading "Cost of farm labour". The total cost of irrigation for the whole area concerned amounts to 13.2 million pesos.

The cost of maintenance of drainage works, which benefit 30,000 hectares, is similarly calculated. Costs per hectare are estimated at 12 pesos and the annual total at 360,000 pesos. The aggregate figure for both items is 13.6 million pesos.

5. Interest and commission on credits

For this purpose credit granted by banks and development institutions was taken into account, as well as that supplied by private individuals. For the former the *Superintendencia de Bancos* supplied basic information in the shape of balances of loans outstanding on 30 June 1953 (see table 339). This figure was felt to be representative of the average amount loaned during the whole course of the year. Interest and commissions correspond to the standard rates charged by the various institutions. As regards commissions, it was assumed that funds intended for loans gave rise to an average of two operations a year.

Loans to stock farmers and the interest on them are more a matter of estimates than of any official data; on the other hand, loans issued by the *Instituto de Colonización e Inmigración* were obtained from that institution's own balance-sheet, as at 30 June 1953.

In these circumstances, expenditure on account of interest and commission on loans from credit institutions represented some 51.5 million pesos in 1953 (see again table 339).

In order to arrive at the amount of private credit granted, it was borne in mind that small farmers are accustomed to resort to dealers, stores and shopkeepers for foodstuffs, clothing and other essential goods, which they usually obtain on credit payable out of the harvest returns, and bearing a high rate of interest (sometimes exceeding 10 per cent monthly).

According to the information obtainable, there are in Colombia approximately 530,000 farmers with properties of less than 5 hectares in area, and 265,000 whose land ranges from 5 to 20 hectares, apart from 31,000 more who farm land without being actually owners.

The aggregate number of loan operations carried out by development organizations and commercial banks in 1953 was 183,000. It was assumed that not less than 100,000 loans were granted to owners of under 5 hectares, and also that some of the farmers possessing more than 5 hectares must have obtained credit from storekeepers and other private sources. It was also assumed that not all those with less than 5 hectares had recourse to credit. It was thus calculated that about 400,000 farmers availed themselves of credit granted by dealers, tobacco manufacturers, rice-hulling plants, etc.

The average amount loaned was estimated at 200 pesos, and the average term at six months, with a rate of interest of 5 per cent monthly, implying total expenditure on interest amounting to 24 million pesos.

III. TAXATION

This includes property farm taxes, the amount of which was estimated on the basis of taxable assessments, according to data supplied by the Colombian Department of Statistics.

TABLE 339. COLOMBIA : LOANS TO AGRICULTURE AS AT 30 JUNE 1953

	Outstanding 30 June 1953			Interest and commission	
	Stock farming	Crop farming	Total	Annual rate (Percentage)	Total (Millions of pesos)
(a) <i>Credit organizations</i>					
Commercial banks	117.6	60.6	178.2	14	24.9
Caja de Crédito Agrario	127.8	111.3	239.1	9	21.5
Banco Agrícola	9.7	13.8	23.5	10	2.4
Banco Central Hipotecario ..	4.4	6.2	10.6	10	1.1
TOTAL	259.5	191.9	451.4		49.9
Instituto de Crédito Territorial			16.2	3	0.5
Instituto de Colonización e Inmigración			6.4	5	0.3
Fondos Ganaderos			8.0	10	0.8
TOTAL			30.6		1.6
TOTAL FOR CREDIT ORGANIZATIONS			482.0	60	51.5
(b) <i>Private credit</i>			40.0		24.0
GRAND TOTAL			522.0		75.5

SOURCES : *Superintendencia de Bancos*, and ECLA estimates.

Annex VI

VALUATION OF AGRICULTURAL ASSETS

In order to complete the diagnosis of Colombia's agriculture contained in the present study (Part Two, chapter II), and to analyse the behaviour of the various factors of production, an evaluation of agricultural assets was indispensable. For this purpose, existing investment in the agricultural sector was classified in three main categories, i.e. : I. Real estate ; II. Non-real estate ; and III. Working capital.

Group I includes land improvement by means of felling, clearing and irrigation ; buildings, installations and fences, and plantations of perennial crops such as fruit, industrial crops and artificial pastures. Group II comprises animal stocks of all kinds and agricultural equipment, and Group III covers the volume of working capital required to bring the factors in Groups I and II into operation and to make them productive.

The evaluation of each item in the first two groups is based first of all on the original investment, and in all those cases in which the value of the capital diminishes through use or the mere passage of time, the sum required for replacement of the part depreciated is deducted from the original investment.

The whole calculation relates to the situation in 1953. The final conclusions are presented in tables 340 and 341, and some account will now be given of the methodology and sources used.

I. REAL ESTATE

1. Land improvements

(a) *By felling and clearing*

The cost of reclamation per unit of land is based on an estimate of expenditure on felling and clearing and on the corresponding access roads, and includes labour, fuels and lubricants, spare parts,

TABLE 340. COLOMBIA : AGRICULTURAL ASSETS, BY SECTORS
(Millions of pesos)

	Crop farming	Stock farming	Total
I. <i>Real estate</i>	2,273.8	2,213.7	4,487.5
1. Land improvements ...	710.9	1,631.2	2,342.1
2. Buildings, installations and fences	1,127.8	330.5	1,458.3
3. Plantations	435.1	252.0	687.1
II. <i>Non-real estate</i>	152.1	3,597.1	3,749.2
1. Animal stocks	—	3,585.1	3,585.1
2. Agricultural equipment	152.1	12.0	164.1
III. <i>Working capital</i>	671.9	735.7	1,407.6
Total agricultural assets ...	3,097.2	6,546.5	9,644.3

SOURCE : ECLA.

repairs and amortization of the equipment used, and overhead and administrative expenditure. It does not cover the original value of the land nor interest on capital, except such as may be included in working costs when equipment is hired.

Separate studies were made for land under crops and under pasture. The first was broken down by origin for the purpose of distinguishing between the different areas in terms of reclamation

TABLE 341. COLOMBIA : SUMMARY OF THE VALUATION OF AGRICULTURAL ASSETS
(Millions of pesos)

I. Real estate			
1. Land improvements		2,342.1	4,487.5
(a) Through felling and clearing	2,117.1		
(1) Crops : 2.9 million hectares	508.4		
(2) Livestock : 26.9 million hectares	1,608.7		
(b) Other improvements	225.0		
(1) Irrigation : 220,000 hectares	220.0		
(2) Drainage : 30,000 hectares	5.0		
(3) Others (no data available)			
2. Buildings, installations and fences		1,458.3	
(a) Rural housing		936.5	
(b) Other building		215.3	
(c) Installations		200.7	
(1) For processing coffee	163.2		
(2) For <i>panela</i>	30.0		
(3) Others	7.5		
(d) Fences		105.8	
3. Plantations : perennial crops		687.1	
(a) Fruit (coffee, cacao, bananas, etc.)	387.3		
(b) Industrial crops (sugar-cane, rubber, etc.)	47.8		
(c) Artificial forests (no data available) .....	...	
(d) Artificial pastures	252.0		
II. Non-real estate			
1. Animal stocks		3,585.1	3,749.2
(a) Cattle (12.9 million head)	2,925.6		
(b) Horses (1.86 million head)	394.8		
(c) Pigs (1.96 million head)	154.0		
(d) Sheep and goats	43.7		
(e) Poultry and rabbits	67.0		
2. Agricultural equipment		164.1	
(a) Imported	154.3		
(b) Domestically-produced	9.8		
III. Working capital			
			1,407.6
Total value of agricultural assets			9,644.3

SOURCE : ECLA.

costs. Two groups were established on the basis of a rough estimate taking into consideration the climatic levels and zones where the crops are grown. The first comprises land originally covered by sparse forest or bushy vegetation, which could be cleared at a low cost. It was considered that in this group should be included cultivated land in the cool-climate zones and at high altitudes, and on savannahs in all types of climate. The second group consists of farm land originally covered by dense forests, where reclamation costs are higher. All land in the sub-tropical and torrid zones were included here, except the savannahs.

In a more complete analysis it would have been interesting to draw a distinction between cultivated and utilized areas, since in fact several crops are partially repeated on the same soil during a single year. Thus the area actually utilized for these crops is smaller than the area on which they are grown in any given year. The extent of such differences could not be determined for want of data, but as the common practice is to leave the land fallow, that is, completely unutilized, when its low yields indicate depletion, it was judged that there would be some degree of equivalence between the areas which are used more than once a year and those which are lying fallow. The estimate of assets was based on the area under cultivation (see table 342).

Land used for livestock was roughly classified according to its pristine state ; the areas falling within the different climatic zones in each Department were taken into account, as well as the flat lands of the savannahs. The area under artificial pasture was also approximately estimated on the basis of information directly collected throughout the country, and the calculation was checked against very similar assessments made by the Ministry of Agriculture. The final estimates show a total of 26.9 million hectares used for livestock, of which 10.1 million were under artificial pasture. Originally, some 16.6 million had been under sparse forest and 12.3 million densely forested (see table 343).

Information having been obtained as to the land used for crops and livestock, and as to its original state according to the criteria indicated, clearing costs of 100 pesos per hectare were assigned to sparsely forested land if used for crops and of 35 pesos if incorporated as pasturage. For land originally covered by dense forest, reclamation costs of 200 and 100 pesos per hectare, respectively, were estimated.

Hence, investment in land improvements effected through felling and clearing amounted to 2,100 million pesos, distributed between crops and stockfarming in proportions of 24 and 76 per cent (see table 344).

TABLE 342. COLOMBIA : CULTIVATED AND UTILIZED AREA ^a BY CROPS

(Thousands of hectares)

Crop	Cultivated area		Total
	Originally under sparse forest	Originally under dense forest	
Sesame	—	17	17
Garlic and onions	10	10	20
Cotton	—	67	67
Aniseed	2	—	2
Rice	71	100	171
Bananas	—	45	45
Cacao	—	32	32
Coffee	—	831	831
Sugar-cane for sugar	—	29	29
Sugar-cane for <i>panela</i>	—	110	110
Sugar-cane for molasses	—	13	13
Rubber	—	4	4
Barley	53	—	53
Coconut	—	5	5
Sisal (<i>Fique</i> or <i>cabuya</i>)	10	10	20
Beans	40	45	85
Fruit	8	10	18
Vegetables	12	5	17
Pulses (excluding beans)	40	35	75
Maize	150	550	700
Potatoes	115	—	115
Plantains	—	120	120
Tobacco	—	22	22
Tomatoes	—	8	8
Wheat	175	—	175
Yucca	6	70	76
Miscellaneous	24	46	70
TOTAL	716	2,184	2,900

SOURCE : For total area : Ministry of Agriculture, Rural Economy Section. For break-down by origin : ECLA estimates prepared in collaboration with Ministry of Agriculture experts.

^a Classified according to whether the area concerned was originally land in a cool-climate zone, *páramo*, or savannah in any type of climate ; or densely-forested land in the sub-tropical or torrid zones.

(b) Other improvements

Irrigation, and drainage of swampy ground, are other investment items coming under the head of land improvements. Available information from the sources indicated in table 345 led to the conclusion that the area under irrigation in Colombia in 1953 extended over 220,000 hectares, while 30,000 hectares had been drained.

Average irrigation costs were estimated at 1,000 pesos per hectare, on the basis of investment and area irrigated at the Coello, Saldaña, Río Recio (Ambalema-Lérida) and Sanacá works, where the average registered was 969 pesos per hectare.

In the case of drainage, figures were based on investment and areas reclaimed at the Fúquema and Valle de Sogamoso works, where an investment of 140 pesos per hectare was involved.

Investment in irrigation would therefore total 220 million pesos, and in drainage 5 million (see again table 345).

In brief, agricultural investment in land reclamation in Colombia would seem to have reached a total of 2,342.1 million pesos, with the following break-down :

Clearing and felling	2,117.1
Irrigation and drainage	225.0
TOTAL	2,342.1

Millions of pesos

2. Buildings, installations and fences

(a) Rural housing

According to the housing inventory made in 1951, there were 1,103,274 rural dwellings in Colombia estimated by ECLA to be worth about 921.74 million pesos at 1953 prices. This value includes depreciation, at an estimated rate of 2 per cent annually.

The cost of housing built in rural areas in 1952 and 1953 is calculated to have been some 6.55 and 8.16 million pesos respectively, or a total of 14.71 million pesos at 1953 prices, including depreciation of the buildings put up in 1952.

Thus, the value of rural housing amounted to approximately 936.45 million pesos. It is estimated that 75 per cent of these assets belonged to the crops sector.

(b) Other buildings

According to this same census and to ECLA estimates, "other rural buildings" existing in 1951 were worth 854 million pesos at 1953 prices. The value corresponding to industrial construction was deducted from this amount, leaving 212 million pesos under the head in question. The same procedure was applied to determine the value of agricultural construction in 1952 and 1953, which reached the sum of 10 million pesos. The total of 222 million pesos was reduced by 3 per cent, the annual rate of depreciation for 1952, so that the final value of "other rural buildings" thus obtained was 215.3 million pesos, 10 per cent of which was to be found in the livestock and 90 per cent in the crops sector.

(c) Installations

Basically, installations fell into three categories, namely, coffee-processing plants, *panela* mills and a miscellaneous group.

Information on the first of these was provided by the Technical Department of the *Federación Nacional de Cafeteros*, which estimates their number at 410,000 ; of these, from 50,000 to 60,000 have installations with water laid on in pipes, pulping machinery (three or more jets), cement troughs with running water for washing, and drying yards with cement floor and vertical ovens (called *guardiolas* or *elvas* in different parts of the country). It is assumed that 5,000 were establishments with large plants having an original average value of 3,000 pesos each, while 55,000 were of medium size with an original average value of about 1,500 pesos each. The remaining 350,000 plants, the original value of which is estimated by the *Federación* at an average of 500 pesos each, are establishments with a minimum installation consisting of an open water conduit (rarely a pipe), pulping machinery (maximum four jets), wooden boxes for washing (in exceptional cases cement tanks), sacking or other devices for drying, etc.

Estimated depreciation was kept down to 40 per cent of the original value of 272.5 million pesos, since many of these installations were built, or remodelled and improved, in recent years (see table 346).

Information on the number of sugar-mills for making *panela* was provided by the Experimental Station at Palmira, according to which there were 20,000 installations for manufacture of *panela* and molasses. Their average original value was estimated at 3,000 pesos each. Total depreciation was taken as 50 per cent of this value which would give a depreciated investment figure of only 30 million pesos.

The group "other installations" includes the following : (i) those for processing cacao ; (ii) those available on large banana plantations in the Department of Magdalena for plague control, com-

prising plant for manufacturing and pumping the pesticides and a system of pipes for their distribution throughout the plantations ; and (iii) windmills and other drinking-water and cattle-watering facilities. No data are available on these installations. Their original value was estimated at 15 million pesos.

Total assets in the shape of installations represented investment of 200.7 million pesos in 1953.

(d) *Fences*

This estimate includes the value of both barbed-wire fencing and other kinds. In the former case, the calculation was based on imports of barbed wire and staples for fencing during the last fifteen years, a period which is considered as the average useful

life of this type of fence. A little over 145,000 tons were imported in 1939-53, and it is assumed that 20 per cent (30,000 tons) was used to repair existing fences and for non-agricultural purposes, so that 115,000 tons were left for the construction of new fences.

In one kilometre of 4-strand fencing, 500 kilogrammes (at 8 metres to the kilogramme) of wire and 10 kilogrammes of staples are used, that is 510 kilogrammes in all. On this assumption, 115,000 tons would have been sufficient to build 225,000 kilometres of new fences (15,000 kilometres as an annual average). The c.i.f. cost in Colombia averaged 478.60 pesos per ton during 1951-53. An additional 43.84 per cent for commissions, freightage, etc., and for the parity coefficient brings up the cost to the farmer to 688.42 pesos per ton.

TABLE 343. COLOMBIA : AREA USED FOR LIVESTOCK, BROKEN DOWN BY ORIGIN (PARAMOS AND SAVANNAHS, OR LAND UNDER DENSE FOREST) AND BY DEPARTMENTS

(Thousands of hectares)

	Territorial area	Livestock area			
		Land originally under brush or sparse forest	Land originally under dense forest	Total	Under artificial pasture
<i>Department :</i>					
Antioquia	6,581	1,300	1,000	2,300	1,100
Atlántico	347	100	170	270	200
Bolívar	3,527	510	600	1,110	700
Boyacá	6,458	2,300	600	2,900	700
Caldas	1,337	310	300	610	400
Cauca	3,020	700	300	1,000	500
Córdoba	2,429	400	430	830	600
Cundinamarca	2,359	800	400	1,200	800
Chocó	4,657	—	70	70	70
Huila	2,070	500	600	1,100	500
Magdalena	5,392	550	1,800	2,350	1,400
Nariño	3,256	580	500	1,080	600
Norte de Santander	2,069	400	580	980	600
Santander	3,207	500	500	1,000	400
Tolima	2,299	550	700	1,250	600
Valle del Cauca	2,094	190	570	760	630
TOTAL DEPARTMENTS	51,102	9,690	9,120	18,810	9,800
<i>Intendencias</i>					
Meta	8,522	600	260	860	100
Caqueta	10,299	1,300	600	1,900	60
San Andrés y Providencia	5	—	—	—	—
TOTAL INTENDENCIAS	18,826	1,900	860	2,760	160
<i>Comisarias</i>	43,907	5,000	300	5,300	40
TOTAL FOR THE COUNTRY	113,835	16,590	10,280	26,870	10,070

SOURCES : Territorial area, by Departments and total : National Administrative Department of Statistics, *Boletín Mensual (Monthly Bulletin)*, No. 40 (July 1954). Livestock area, Departments of Córdoba, Bolívar, Boyacá, Huila and Santander : National Administrative Department of Statistics, *Revista de Economía y Estadística (Economic and Statistical Review)*, Nos. 74, 75, 76, 77 and 78. Department of Valle del Cauca : Agricultural census of the Department. Departments of Chocó and Atlántico : Ministry of Agriculture, *Economía Agropecuaria de Colombia (Agricultural Economy of Colombia)*, 1950. Departments of Antioquia, Caldas, Cauca, Cundinamarca, Magdalena, Nariño, Norte de Santander and Tolima : the figures for these Departments published by the Ministry of Agriculture in *Economía Agropecuaria de Colombia (Agricultural Economy of Colombia)* were considered excessively high, but were adjusted by means of a one-third reduction. *Intendencias* and *Comisarias* : Ministry of Agriculture, *Economía Agropecuaria de Colombia (Agricultural Economy of Colombia)*, 1950.

TABLE 344. COLOMBIA : SUMMARY OF THE VALUE OF IMPROVEMENT (RECLAMATION COSTS) OF CROP AND LIVESTOCK LANDS THROUGH FELLING AND CLEARING

Specification	Utilization		Value per hectare	Total value		
	Crops (Thousands of hectares)	Live-stock (Thousands of hectares)		Crops (Millions of pesos)	Live-stock (Millions of pesos)	Total
<i>Originally under sparse forest or brush</i>						
For crops	716	—	100	71.6	—	71.6
For livestock	—	16,590	35	—	580.7	580.7
<i>Originally under dense forest</i>						
For crops	2,184	—	200	436.8	—	436.8
For livestock	—	10,280	100	—	1,028.0	1,028.0
TOTAL	2,900	26,870		508.4	1,608.7	2,117.1

SOURCE : ECLA, on the basis of tables 342 and 343.

TABLE 345. COLOMBIA : AREA UNDER IRRIGATION AND UNDER DRAINAGE

(Thousands of hectares)

Department	Irrigated areas	Drained areas
Huila	10.0	—
Tolima	90.0	—
Valle del Cauca	50.0	—
Cundinamarca	15.0	16.0
Boyacá	3.2	9.2
Norte de Santander	7.0	—
Santander	12.0	—
Magdalena	15.0	—
Cauca	1.2	—
Atlántico	1.0	—
Other areas, including Eastern Llanos	15.6	4.2
TOTAL AREA	220.0	30.0
Investment per hectare	1,000 pesos	140 pesos
TOTAL	220 million	5 million

SOURCE : ECLA estimates.

The cost of building a fence, by linear kilometre, comprises the following items :

	Pesos
Posts : 150, at 1 pesos each	150
Wire and staples : 510 kilogrammes, at 0.688 each	513
Labour	50
Administrative and miscellaneous expenditure ..	9
TOTAL COST	560

The 225,000 kilometres of barbed-wire fencing, at 560 pesos each, represented a total investment of 126 million pesos. If it is assumed that most were built between 1947 and 1953, depreciation for replacement equivalent to 25 per cent of total investment (i.e., an annual rate of 6.5 per cent) might be considered reasonable. The current value of barbed-wire fencing in 1953 therefore totalled some 94.5 million pesos.

As the result of a very rough sampling of fences and farm gates built of adobe, stone, etc., these were estimated as amounting

TABLE 346. COLOMBIA : INVENTORY OF AGRICULTURAL INSTALLATIONS, 1953

(Millions of pesos)

	Original value	Depreciated value
<i>For processing coffee :</i>		
Coffee plants and their corresponding dryers	272.5	163.2
5,000 at 3,000 pesos each = 15.0 million		
55,000 at 1,500 pesos each = 82.5 million		
350,000 at 500 pesos each = 175.0 million		
<i>For manufacture of panela and molasses</i>		
20,000 mills at 3,000 pesos each = 60.0 million	60.0	30.0
Other installations	15.0	7.5
TOTAL	347.5	200.7

SOURCE : Number of mills : Estación Experimental de Palmira, *Boletín No. 102* (Bulletin No. 102), *Panela* (July 1953). Coffee processing plants : Technical Department of the *Federación Nacional de Cafeteros*.

to 22,500 kilometres. The original value per kilometre was about 1,000 pesos, and replacement depreciation was calculated at 50 per cent of the original investment (representing an annual replacement rate of 3 per cent). The current value in 1953 was therefore 11.3 million pesos.

To sum up, the total original value of fencing amounted to 148.5 million pesos, and its current value, taking into account depreciation through replacement, was 105.8 million pesos.

Total investment in buildings, installations and fences stood at 1,448.3 million pesos in 1953, with the following break-down :

	Millions of pesos
(a) Rural housing	936.5
(b) Other buildings	215.3
(c) Installations	200.7
(d) Fences	105.8
TOTAL	1,458.3

TABLE 347. COLOMBIA : VALUE OF IMPROVEMENTS FOR PERENNIAL CROPS

Crop	Area (Thousands of hectares)	Value per hectare (Pesos)	Total value (Millions of pesos)	Depreciation (Percentage)	Current value (Millions of pesos)
Sugar-cane for sugar	29	600	17.4	43	9.9
Sugar-cane for <i>panela</i>	110	400	44.0	43	25.1
Sugar-cane for molasses	13	400	5.2	43	3.0
Plantains	120	300	36.0	50	18.0
Bananas	45	500	22.5	40	13.5
Other fruit	77	600	46.2	50	23.1
Copra	5	1,000	5.2	50	2.5
Coconut	4	1,000	4.0	50	2.0
Sisal (<i>fique</i>)	20	300	6.0	50	3.0
Rubber	4	2,000	8.0	15	6.8
Coffee	831	750	623.2	50	311.6
Cacao	32	1,300	41.6	60	16.6
TOTAL	1,290		859.1		435.1
<i>Summary</i>					
(a) Fruit	1,114		778.5		387.3
(b) Industrial crops	176		80.6		47.8
TOTAL	1,290		859.1		435.1

SOURCES : Ministry of Agriculture, Rural Economy Section ; *Caja de Crédito Agrario*, Department of Economic Research ; and ECLA estimates.

3. Plantations. Perennial crops

(a) and (b) Fruit-trees and industrial crops

Information on areas under crops of this kind was provided by the Rural Economy Section of the Ministry of Agriculture. Unit values (per hectare) for most species were estimated from the basic data in costs studies carried out by the Economic Research Department of the *Caja de Crédito Agrario*. In each case the number of years between planting and the first economic crop was taken into account. Investments include costs of labour, reproduction material, use of equipment, fuels, lubricants, fertilizers, plague-killers, management and overheads. It does not cover the value or rent of the land, nor interest on capital. For crops like coffee and cacao which are planted to begin with in association with others such as plantains, maize and yucca, common expenses were equally divided between the main and the associated crops.

In order to determine depreciation, consideration was given not only to the age of plantations, on which only vague data were available, and the period of useful life, under normal or traditional farming conditions, but also to the frequency with which it happens that the application of modern techniques may promote the recovery, up to a point, of older or deteriorated plantations, with the consequent expansion of production. The risk of total or partial destruction through weather conditions or the possible appearance of uncontrollable plagues was disregarded.

The results of all this research are shown in table 347.

Consequently, in 1953 the various plantations covered almost 1.3 million hectares with an initial formation cost of 859.1 million pesos at 1953 prices, and a current value of only 425.1 million pesos.

(c) Artificial forests

A total absence of data made it impossible to appraise this sector. The general impression gathered in the field was that the area under artificial forests was very small, and that the value

of this type of improvement would have little effect on the determination of the stock of capital in Colombia's agricultural sector.

(d) Value of artificial pastures

A preliminary and very rough estimate shows that there were about 10 million hectares under artificial pasture in Colombia in 1953. Broadly speaking, these pastures had apparently been formed in association with other crops (cotton, maize, etc.) so that costs of pasture formation worked out at a low figure. In other cases, the pastureland had been formed by tenant farmers, leaseholders or other kinds of farmers who pay for their usufruct by converting the land into pasture.

In these circumstances, the value of pasture formation was estimated at about 50 pesos per hectare. This value includes clearing the ground of scrub (but not of trees), cost of reproduction materials, sowing and care of the pasture during the early months and general overhead expenses for the same period. It does not include interest. The useful life of a pasture is assumed to be ten years. A depreciation of 50 per cent of the initial investment or total cost of formation was postulated, and an annual rate of depreciation for replacement equivalent to 10 per cent of the investment per hectare. The current value of the pastures was therefore 252 million pesos (see table 348).

TABLE 348. COLOMBIA : AREA UNDER ARTIFICIAL PASTURE AND CURRENT COST

Area under artificial pasture	10,070,000 hectares
Investment per hectare to form the pasture	50 pesos
Total investment	503.5 million pesos
Depreciation	252.0 million pesos
Current value	252.0 million pesos

SOURCE : Estimates prepared by ECLA and technical experts from the Ministry of Agriculture.

Hence it may be concluded that the aggregate value of real estate was 4,487.5 million pesos, broken down as follows :

	<i>Millions of pesos</i>
Land improvements	2,342.1
Buildings, installations and fences	1,458.3
Plantations and perennial crops	687.1
TOTAL	4,487.5

II. NON-REAL ESTATE

1. Animal stocks

The figures on animal stocks shown in table 349 are estimates prepared by ECLA and experts from the Ministry of Agriculture on the basis of the national agricultural sample. Unit values were determined from the prices paid to stock farmers, as published by the Farm Produce Defence Corporation (*Corporación de Defensa de los Productos Agrícolas*), and from average prices paid at cattle fairs, with a reduction to allow for delivery at the farm.

2. Value of agricultural equipment

(a) Imported equipment

To ascertain stocks of equipment purchased abroad, imports in each group were taken for a number of years which corresponded to the estimated useful life of the machinery. In the case of tractors, for example, imports during the 8-year period (1944-53) were included, because, in the light of available data, the useful life of these machines in Colombia is computed to be ten years. The c.i.f. value at 1953 prices was calculated as follows : a price-index for agricultural machinery, in Colombian currency, was drawn up by multiplying the price index for agricultural machinery in the United States by the index of Colombian exchange rates, both on the basis 1953 = 100. The index thus arrived at was used as a weighting factor to adjust current c.i.f. values of imported agricultural machinery (see table 351).

The resulting figures were raised by 43.84 per cent in order to bring them closer to the actual price paid by farmers. This rate had two components : the higher (40 per cent) represented commissions, freight and importers' and middlemen's profits, and the lower (3.84) corresponded to the coefficient for adjusting the exchange rate to domestic purchasing power.

Depreciation was based on values of sales to the farmer, totalled for each year, and the number of years the equipment had been in service, deduced from the year in which it had been imported (see table 350). This led finally to an initial value of 242.4 million pesos for stocks of imported equipment, reduced to only 154.3 million by 1953.

(b) Other agricultural equipment

No information is available on stocks and value of domestically-manufactured farm equipment, nor was it possible to determine with any accuracy imports of machinery and implements other than those listed in previous tables. Among the material of domestic origin and the imports not so far included are all the machinery, instruments, utensils and apparatus for poultry-farming, bee-keeping, viticulture, dairy farming and the production of cheese and butter, as well as veterinary equipment and implements and harness for horses and draught animals. Carts of all kinds are also excluded. These are used for internal service on the farms, especially those producing bananas, sugar-cane for sugar and livestock.

According to a rough estimate, the original value of these machines and implements stood at 15.3 million pesos at 1953 prices, with a depreciated value of 9.8 million pesos (see table 352).

Hence, non real estate assets totalled 3,753.6 million pesos, with the following break-down :

	<i>Millions of pesos</i>
Animal stocks	3,585.1
Agricultural equipment	168.5
TOTAL	3,753.6

TABLE 349. COLOMBIA : VALUE OF ANIMAL AND POULTRY STOCKS, 1953

	<i>Thousands of head</i>			<i>Unit value (Pesos)</i>	<i>Total value (Millions of pesos)</i>
	<i>In the Departments</i>	<i>In the rest of the country</i>	<i>Total</i>		
(a) Cattle	11,190.0	1,000.0	12,190.0	240	2,925.6
(b) Equine stock :					
Horses	1,156.6	52.4	1,209.0	223	269.6
Mules	411.2	8.8	420.0	267	112.1
Asses	297.5	6.5	304.0	43	13.1
TOTAL					394.8
(c) Sheep	1,168.9	119.1	1,288.0	27	34.8
Goats	295.5	200.5	496.0	18	8.9
TOTAL					43.7
(d) Pigs	1,960.0	40.0	2,000.0	77	154.0
(e) Poultry	20,000.0	2,000.0	22,000.0	3	66.0
Rabbits and guinea-pigs			1,000.0	1	1.0
TOTAL					67.0
GRAND TOTAL					3,585.1

SOURCE : Stocks : Estimates prepared by ECLA and Ministry of Agriculture experts on the basis of the agricultural sample. Prices : *Corporación de Defensa de Productos Agrícolas*.

TABLE 350. COLOMBIA : VALUE OF IMPORTED AGRICULTURAL EQUIPMENT

Equipment	Period covered by imports		Value of equipment		
	Date	Number of years	C.i.f. in Colombia at 1953 prices	Sales price to farmer at 1953 prices	Depreciated (at replacement cost)
				(Thousands of pesos)	
Ploughs, ploughshares, and spare parts	1939-53	10	8,626	12,407	7,751
Seeders and accessories	1947-53	7	2,282	3,283	1,849
Unclassified machinery for crop farming and accessories	1939-53	12	11,661	16,773	11,738
Tractors and accessories	1944-53	8	96,044	138,150	89,407
Reapers and accessories	1948-53	6	4,534	6,521	4,663
Threshers and accessories	1948-53	6	1,772	2,548	1,628
Unclassified agricultural machinery	1944-53	8	18,686	26,879	15,085
Other iron and steel agricultural implements	1949-53	5	8,253	11,871	5,991
Copper accessories for agricultural machinery	1949-53	5	124	178	100
Fertilizer sprayers and accessories	1947-53	7	509	731	457
Harrows and rakes	1939-53	10	3,040	4,372	2,381
Agricultural fumigators	1949-53	5	4,582	6,591	4,349
Spades, picks, hoes, etc.	1952-53	2	2,766	3,979	2,854
Axes, hatchets, sickles, etc.	1952-53	2	5,643	8,117	6,021
TOTAL			168,522	242,403	154,274

SOURCE : ECLA, on the basis of import data from *Anuarios de Comercio Exterior* (Yearbooks of foreign trade).

TABLE 351 : COLOMBIA : AGRICULTURAL MACHINERY : INDICES UTILIZED FOR EXPRESSING AT CONSTANT REAL PRICES IMPORTS OF AGRICULTURAL MACHINERY AT CURRENT PRICES, AND THE PERTINENT VALUES

(1953 = 100)

Year	Price index for agricultural machinery in the United States (A)	Rate of exchange (B)	Index of exchange rates (C)	Price index for agricultural machinery in Colombian currency (A) × (C)	Imports of agricultural machinery (Thousands of pesos)	Imports of agricultural machinery (Thousands of pesos at 1953 prices)	+ 43.84 per cent
1929	55.3	1,033.5	41.3	22.8			
1930	56.0	1,035.0	41.4	23.2			
1931	56.0	1,035.0	41.4	23.2			
1932	55.1	1,049.2	42.0	23.1			
1933	60.8	1,245.0	49.8	30.3			
1934	58.8	1,625.5	65.0	38.2			
1935	54.1	1,783.0	71.3	38.6			
1936	54.4	1,751.6	70.1	38.1			
1937	56.3	1,767.9	70.7	39.8			
1938	57.9	1,788.2	71.5	41.4	3,092	7,469	10,743
1939	56.8	1,752.3	70.1	39.8	3,218	8,085	11,629
1940	57.4	1,751.8	70.1	40.2	2,217	5,515	7,933
1941	58.1	1,754.4	70.2	40.8	2,283	5,596	8,049
1942	60.1	1,752.6	70.1	42.1	824	1,957	2,815
1943	60.2	1,747.9	69.9	42.1	873	2,074	2,983
1944	60.3	1,746.5	69.9	42.1	2,235	5,309	7,636
1945	60.4	1,752.0	70.1	42.3	4,818	11,390	16,383
1946	64.4	1,751.4	70.1	45.1	5,412	12,000	17,261
1947	72.3	1,754.6	70.2	50.8	9,133	17,978	25,960
1948	81.9	1,760.2	70.4	57.7	9,715	16,837	24,218
1949	87.9	1,960.0	78.4	68.9	16,047	23,290	33,500
1950	90.1	1,960.0	78.4	70.6	16,896	23,932	34,424
1951	98.5	2,377.8	95.1	93.7	22,364	23,868	34,332
1952	99.4	2,500.0	100.0	99.4	20,344	20,467	29,440
1953	100.0	2,500.0	100.0	100.0	29,054	29,054	41,791

SOURCE : ECLA, on the basis of official statistics.

TABLE 352. COLOMBIA : VALUE OF OTHER AGRICULTURAL EQUIPMENT

(Millions of pesos)

Specification	Value of equipment	
	Original	Depreciated for replacement
Wheeled vehicles and machinery of long duration	9.6	6.4
Other machinery and implements of medium duration	3.7	2.2
Tools, implements and accessories of short duration	2.0	1.2
TOTAL	15.3	9.8

SOURCE : ECLA.

III. WORKING CAPITAL

The working capital necessary for farming in Colombia was estimated on the basis of the direct inputs previously determined, and with due regard to the following circumstances : (a) expenditure in agriculture is spread throughout the farm year and not confined to its beginning ; (b) during the whole course of the year the sale of produce enables the farmer to cover part of his expenses, the most typical case in point being the production of milk and eggs ; and (c) from these two considerations it may be inferred that the farmer can cover a considerable proportion of his operational expenses, which in turn arise gradually. Table 353 shows coefficients and absolute figures for working capital requirements in the aggregate and by type of expenditure.

In the special case of expenditure on conservation or maintenance of assets a distinction was drawn between outlays on housing and other farm buildings on the one hand, and installations, fences and mechanical equipment on the other. The former do not necessarily involve a given amount of working capital, since such

expenditure is generally undertaken by the farmer when he has money to spare after the crop has been sold, so that profits rather than working capital are used.

Among inputs is included amortization on a number of the items listed as assets. It is natural that expenditure under this head should not be shown as working capital.

Although it was felt that farmers' outlays on purchase of animal stocks should not be incorporated in the structure of costs (estimate of inputs), the working capital must include an item representing outlays for all the commercial fattening of stock undertaken by those entrepreneurs who do not breed or rear their own animals.

In 1953 1,353,000 head of cattle were slaughtered, of which about 800,000 were steers. Cows for slaughter were generally fattened by the breeders themselves. It was estimated that out of the total number of steers about 500,000 were also fattened by breeders, and 300,000 by entrepreneurs engaging only in this activity. A further estimate established that 50 per cent of these steers were fattened on property belonging to the entrepreneurs and that the remainder grazed on rented land. The fattening period was calculated as twelve months. In 1953 the average price of steers for fattening was 330 pesos per head and the cost of rented pasture was 10 pesos monthly. Working capital requirements therefore totalled 118 million pesos.

It was estimated that of the total number of pigs slaughtered in 1953 about 350,000 head were fattened by entrepreneurs who did not breed their own stock. The total sum expended on purchases of pigs for fattening amounted, at the rate of 80 pesos per head, to 28 million pesos. The cost of all feeds not included under other input heads (maize, yucca, plantains, skimmed milk, etc.) was estimated at 10 pesos per head, or 3.5 million pesos in the aggregate. As the fattening period lasts on an average four months, the working capital required was 10.5 million pesos.

In all, the commercial fattening of cattle and pigs required a working capital of 128.5 million pesos. The total working capital, amounting to 1,407.6 million pesos in 1953 (see again table 353), was distributed on a *pro rata* basis between the livestock and crop sectors, and within the latter the share of coffee was calculated in the same way.

TABLE 353. COLOMBIA : WORKING CAPITAL IN AGRICULTURE, 1953

(Millions of pesos)

Item	Total expenditure	Working capital	Percentage of total expenditure	Break-down		
				Crops	Live-stock	Coffee
Labour costs	2,137.0 ^a	1,068.5	50	542.0	526.5	186.0
Seed	73.2	54.9	75	54.3	0.6	—
Fertilizers and soil amendments	18.5	13.7	75	13.7	—	2.3
Pesticides	10.1	5.0	50	5.0	—	0.5
Feed concentrates, medicaments and salt for livestock	146.5	50.2	35	—	50.2	—
Fuels and lubricants	18.0	13.4	75	9.9	3.5	2.3
Packing and cordage	15.9	4.0	25	3.9	0.1	0.5
Conservation	4.14 ^b	20.7	50	15.5	5.2	5.0
Irrigation and drainage	13.6	5.3	40	4.8	0.5	—
Interest and commissions on credit	75.5	37.8	50	20.0	17.8	10.0
Indirect taxation	11.2	5.6	50	2.8	2.8	1.4
Commercial fattening of cattle	—	128.5	100	—	128.5	—
Total working capital	—	1,407.6	—	671.9	735.7	208.0

SOURCE : ECLA.

^a Including labour inputs in agricultural production and investment.^b Including only agricultural equipment, installations and fences.

Annex VII

NOTE ON SOURCES AND METHODS USED IN THE CONSTRUCTION AND APPLICATION OF THE INPUT-OUTPUT MATRIX

Much of the analysis of the present and prospective characteristics of industrial development given in Part Two, chapter III of this study was based on the data summarized in table 213 (*Composition of Input and Output of the Manufacturing Sector and Availability of Manufactured Products, 1953*), which appears in section II. The object of this Note is to give some additional information on the sources and methods used in the construction of the matrix, principal limitations and on certain specific problems confronted during its preparation.

1. It should first be noted that this is not a typical input-output table, mainly because it is restricted to the manufacturing sector, other important sectors of the economy not being explicitly covered.

Agriculture and mining are considered only in so far as they supply raw materials to industry; but neither their input nor the distribution of the end goods they produce is analysed in detail. Such an analysis was made in more or less arbitrary fashion, only when it was necessary for the completion of the various tables of coefficients derived from the original matrix.

The exclusion of other sectors—principally transport and trade—in turn results in certain limitations and inconsistencies of some significance, particularly as regards methods of assessing the different types of products. The figures referring to raw materials and intermediate products represent sums actually paid out by the industries which consume them (purchases which are shown in the appropriate vertical columns of the table), so that they do not correspond only to the producer factory values (given in the horizontal rows), but also incorporate additional costs entailed by freight and marketing. In other words, the sales of domestically-produced intermediate products shown for the producer industries are over-estimated, since they include distribution costs actually paid to other sectors.

This again has repercussions on the assessment of domestically-produced end goods. The value of these is determined by deduction of the intermediate sales concerned from the total value of production in each branch at ex-factory prices. Thus the computation of figures higher than those actually paid for intermediate sales means that the values of the end goods are under-estimated.

The amount of over-estimation of some products and under-estimation of others is probably not so large as might normally be expected, owing to the policy pursued by many enterprises producing intermediate goods in that they directly absorb distribution costs in order to maintain the same prices throughout the country; in these cases the ex-factory prices coincide with the corresponding values in the industries which are consumers of such intermediate products.

In any event it is clear that to limit the field in this way to the manufacturing sector is undesirable and hinders consideration of several problems when the data obtained are outlined for purposes of analysing future development prospects, as in the present study. The sole justification which might be put forward is that this is a first attempt which could be more satisfactorily completed without a great deal of additional work.

2. Another general aspect which should be stressed is that of the treatment accorded to imports. Since the relative importance of these is not at all the same in Colombia as in the other countries for which input-output tables have been prepared, it was deemed necessary to treat imports in much more detail than usual. This is not only because in a case like the present greater interest attaches to defining the share of imports in availabilities of different kinds

of products, but also because of the special problems that arise during the analysis.

One of the most important objects of a table of this sort is to provide data which can be used for projecting requirements of intermediate products, given certain assumptions as to the composition of final demand. The practical solution for other similar analyses was based on inversion of the input-output matrix and determination of "coefficients of direct and indirect requirements per unit of final demand"; a certain final demand having thus been obtained, it is possible to ascertain the effects which it will necessarily have on every sector of production.

At this point, however, doubts arose as to whether this same type of solution could be applied when the data in the matrix were to be utilized for a case such as that of the Colombian economy. The grounds for these doubts are as follows. The utilization of coefficients of direct and indirect requirements per unit of final demand implies assumption of a necessary interdependence between intermediate and final demand, modifications of the one being inconceivable without changes in the other; but such interdependence would appear necessary only in an economy where imports corresponded to a very low percentage of domestic production (or even, in some contexts, an economy in which the relative importance of imports was high, but in which there were few possibilities for substitution). On the other hand, in a case like that of Colombia, there might perfectly well be some appreciable change in final demand which, supplied by means of imports, would have practically no effect on intermediate demand (except on demand for certain services); again, an import substitution policy for intermediate goods might conceivably be adopted, which would completely change all aspects of intermediate demand, although final demand might not vary at all (at least not over the short term). It would therefore seem necessary for purposes of the analysis to maintain a complete distinction between inter-industrial transactions in domestic and imported products, and a similar classification for final demand. In the study of the composition of inputs in each branch of industry, two tables showing input per unit of production were also worked out, one for domestic and the other for imported products.

For similar reasons, the coefficients of direct and indirect requirements were calculated in the form of "coefficients of direct and indirect requirements of domestic products per unit of final demand for domestic products", since there was no reason why an increase in either requirements of imported intermediate products or final demand met by imports should affect other domestic sectors of production (except certain services).¹

It is important to remember that where the coefficients of direct and indirect requirements are defined only in terms of the need for domestic raw materials and intermediate products, their constancy depends not only on technological changes, but also on any alteration in the proportion in which domestic production and imports contribute to supplying the demand concerned. In any case this simply means an additional difficulty in the process of calculation, since, through the volume of imports, the composition of total input is always maintained.

By means of the table of coefficients of direct and indirect requirements thus obtained, it was possible to determine the amount of gross production necessary to cover any given volume and composi-

¹ For the actual determination of the coefficients of direct and indirect requirements a shortened method of convergent iteration was employed.

tion of final demand for domestically-produced goods. Once the corresponding gross production values had been established, the composition of intermediate transactions in domestic and imported products could then be determined separately, by using the two tables on input per unit of product to which reference has been made.

It remained to settle the method of approach to hypotheses for the substitution of domestic products for imported intermediate goods. The solution adopted consisted in considering the amount of the projected substitutions as equivalent to a new final demand for domestic products, and in determining what increases over gross production this implied by once again using the coefficients of direct and indirect requirements. Since these substitutions in their turn meant additional need for the imports which it was planned to replace, it was necessary to proceed by means of successive approximations.

It is needless to emphasize the tentative nature of the methods employed, in view of the complexity of the subject.

3. The actual way in which imports were assessed is another aspect deserving of brief description, in view of the different criteria which might be adopted, and the special importance which this may have for an analysis of the substitution process.

The total amount of imported intermediate products utilized, assessed at the prices paid by the consumer enterprises, was tentatively divided into four parts: ex-factory value in the country of origin, expenditure abroad, customs duties and expenditure within the country. Estimates of the first two elements were based on a more or less arbitrary distribution of the c.i.f. value; the main defect to be mentioned in this respect is that a similar percentage was used for all products, no attempt having been made to measure the varying incidence of freight and insurance charges on articles of different kinds. In order to prepare the estimates of customs duties, special research was carried out: a sample of the main products, broken down by branches of industry, was utilized, and in each case the average incidence of the duties was determined. Finally, expenditure in the country was established by deduction of the c.i.f. value plus import duties from the value at the consumer factory.

In that part of the table which summarizes inter-industrial transactions, the only values distributed are those of imported intermediate products which correspond to estimates of ex-factory prices in the country of origin, whereas all other expenditure for imported products is given separately, only the totals per consumer industry being shown. The justification for this treatment lies in the fact that it seems illogical to attribute to the producer industry concerned values which—like expenditure abroad or customs duties—represent payments to other sectors. It must in every case be remembered that use of this background data as a basis for projecting the substitution of intermediate goods imports implies an assumption that production costs within the country will be the same as in the country which is at present the supplier.

Much the same applies to imported end goods, for which the break-down by industries of origin is confined to estimated values at ex-factory prices in the country of origin, other expenditure abroad, as well as customs duties, being shown separately. In this case, no estimate of expenditure in the country is included, so that the total valuation represents c.i.f. values plus customs duties; the reason is that from the standpoint of assessing total availability of end goods it was considered that this method of valuation was more comparable with that adopted for domestic production to meet final demand (at producers' prices).

4. Another important limitation which should be mentioned is the treatment of the fuels sector in the course of construction of the matrix. Here a simplification was used which may not be very desirable. Even though among the sixteen branches of industry there is one headed "Petroleum derivatives and coal", its sales to other productive sectors were restricted to products utilized directly as raw materials, the proportion used as fuel being excluded.

This last was directly assigned to final demand, as a special item entitled "Fuels and lubricants". From the point of view of input, the figures for fuels and energy do not appear in inter-industrial transactions either, but are given separately as "Consumption of fuels and energy", a heading under which, in addition, no distinction is made between imported and domestic products. There is no justification for this treatment other than purely practical reasons deriving from shortage of data.

5. The demarcation of the manufacturing sector coincides with the definitions used by the National Statistics Service when preparing the Industrial Census in 1953. In this connexion, the point which requires most careful consideration is the position of the foodstuffs industries, which in Colombia very largely consist of establishments engaged in extremely elementary processing of agricultural products (coffee-threshing plants, for example). The foodstuffs industries thus appear in the table, where the figures are expressed in terms of gross value, with a weighting which is far removed from any that would be assigned to them in terms of value added. (Coffee exports, for instance, are presented as exports of manufactures.)

In the table the manufacturing sector is broken down by sixteen groups of industries. However, this constitutes only an outline of all the background material prepared; in actual fact, the composition of inputs was worked out for some fifty-five sub-divisions although the basic classification into sixteen groups was retained for the producer industries. This means that there is enough material available to allow of a rectangular expansion of the table, taking into account fifty-five consumer and sixteen producer industries (apart from the other sectors and services).

This restriction to a small number of very broad sectors led, in the course of utilization of the matrix, to some fairly substantial errors, especially in the analysis of the repercussions of substitution of domestic production for certain imported raw materials and intermediate products. In fact, when the coefficients of direct and indirect requirements were used to determine the incidence of a specific substitution, marked variations were estimated in the production of industries which may be quite unaffected by the projected substitution process, a circumstance which warrants additional effort to work on the basis of a larger number of more homogeneous sectors.

6. Broadly speaking, the figures utilized in the analysis are provisional, and many future rectifications will be required. The Statistics Department undertook an Industrial Census for 1953, the findings of which would have constituted the most suitable basis for the calculations in question. For the most part, however, it was carried out at the very time when the present study was being prepared, so that, while the valuable collaboration of the Department concerned placed at ECLA's disposal the preliminary tabulations of the most important aggregate figures, the delays and difficulties inherent in detailed tabulation made it impossible to obtain complete statistics on consumption of raw materials and intermediate products by branches of industry.

Provisionally, a sample of enterprises operating in various fields of manufacturing activity was selected, and in each case the detailed composition of their inputs was studied on the basis of the preliminary census tabulations; it was thus possible to determine the significance of the sample within each activity as a whole, and therefore to make complete estimates for the entire industrial sector.

The data available for 1953 seemed inadequate in a number of cases. Consequently, the tabulations of the 1945 Industrial Census were used to supplement them, the relative composition of inputs in the latter year being adjusted to the aggregate figures for 1953.

The basic figures utilized are therefore derived from many estimates which may be subject to more or less wide margins of error. Their presentation in this form is attributable, like several other aspects of the study, to the need for illustrating the methodology employed.

Annex VIII

NOTE ON SOURCES AND METHODS USED IN THE CONSTRUCTION OF THE QUANTUM INDICES OF INDUSTRIAL PRODUCTION

For a type of analysis such as that given in earlier sections — especially those referring to the historical development of industrial production, and the evolution of supplies of manufactured products — it was imperative that quantum indices should be available for aggregate industrial production and for each of its principal branches. However, systematic and detailed indices of this nature had not been prepared over sufficiently long periods,¹ and many of the statistical data which are considered essential for a long-term analysis were not available.

The indices shown in earlier tables thus relate to estimates based on various approximate criteria, which are briefly summarized in this Note so as to illustrate their characteristics and possible deficiencies.

1. In the majority of cases the variations in consumption of some basic raw materials were taken as an indication of the increase of production in the sector concerned.

This was the criterion used for estimating the quantum indices of production of the various branches of the foodstuffs industry. Thus, for example, the apparent consumption of cacao (domestic and imported) was taken as an indication of the expansion of the chocolate industry; the production of sugar-cane, as representing the variations in activity at the sugar-mills; production and imports of oleaginous raw materials, as a means of estimating the increased production of vegetable oils and fats; and the respective volumes of production of staple articles, as the basis for computing the indices relating to products of mills and threshers.

In the case of the cotton branch of the textile industry, it was considered that the variations in the volume of production must have been very similar to the fluctuations in the quantity of cotton consumed in the country; the relative index was thus estimated on the basis of imports and domestic production of this article. The import figures for wool yarn and wool in bulk (reduced to terms of yarn) were used in the same way as indications of the growth of production of woollen cloth; moreover, a separate quantum index was estimated for the output of domestic spinning mills. For the index relating to silk and artificial fibre textiles, the consumption of thread and fibres was taken as a basis, as deduced from import statistics and estimates of domestic production of these articles.

Amongst the chemicals industries, the index for artificial fibre output was based on import statistics for cellulose in the manufacture of rayon and for the raw materials required in the manufacture of acetate. In the case of soap and candles, the estimates were based principally on figures relating to consumption of tallow, fatty acids and imports of stearine. The index corresponding to the production of paint was determined by taking into account imports of pigments, metal oxides and dyes.

The evolution of raw rubber consumption — excluding that intended for inner tubes and tyres — was considered representative for the production index of other rubber manufactures.

As regards the pulp and paper industries, separate estimates were made for the actual production of paper and board, based on imports of pulp for paper, and for other manufactures of these

¹ The Report of the Currie Mission contained some estimates for the period 1939 to 1945, based on a relatively small number of products, amongst which were not included, for example, those of the textile industry. Since 1945, the National Administrative Department of Statistics has been periodically establishing the indices for certain groups of industry, basing its figures on a sample of enterprises and using weightings deduced from the 1945 Industrial Census.

products, taking into consideration mainly the production and imports of paper and board for the manufacture of packing materials.

The estimates of variations in the volume of production in the leather industry were based on relative figures for the consumption of hides, estimated from the relevant figures for production, exports and imports.

The same sort of criteria were also used for estimating the quantum indices of some branches of the cement, pottery, glass and similar industries. This was particularly true of the glass industry (for which figures relating to imports and domestic production of sodium carbonate were used), and to asbestos-cement manufactures (in which the imported tonnage of raw asbestos was taken into account).

Of course, the use of such criteria as these in order to estimate the respective quantum indices of production is not entirely satisfactory from many points of view. The following are only some of the possible defects or limitations which may arise:

(a) The indices are not based on real consumption figures for the different raw materials, merely upon apparent consumption; consequently, fluctuations in stocks of these raw materials are disregarded. In cases where this appeared especially important, some more or less arbitrary adjustments of the yearly figures were made so that this factor could be taken into account, albeit very approximately. In any event, this problem particularly affects short-term movements; but its significance is probably not very great if interest attaches mainly to general trends, as is the case here.

(b) No allowance was made for variations in the degree of utilization of raw materials. Although the range of possibilities does not seem to be great for most of the commodities included, this factor may have caused a certain under-estimation of the expansion registered in some branches of industry.

(c) These indices reflect the growth of manufacturing production as a whole, without making any distinction between industrial production proper and artisan industries. In effect, when variations in total consumption of raw materials are studied, there is no means of differentiating between the types of establishment in which they are utilized. This may also be a factor causing under-estimation of industrial growth, if due consideration is given to other data which in several cases indicate a marked shift from artisan types of production to industry proper.

In order to eliminate as far as possible some of these defects, an effort was made to check the estimates against data — at least for recent periods — such as the volume of production according to the 1945 census in the different branches of industry.

2. In some cases, particularly when most of the production was concentrated in a very small number of establishments, it was possible to obtain figures or estimates on total production in previous periods directly from the enterprises themselves.

Such figures formed the basis for the quantum indices of production of cement, matches, sulphuric acid, soda and tyres and inner tubes.

3. Statistics on consumption controlled by the Government were another source utilized in the preparation of quantum indices. These were the principal data used in the case of certain branches of the beverages industry,² (beer, spirits, wines and — for earlier

² For non-alcoholic beverages, the corresponding index was estimated mainly on the basis of imports of essences and other raw materials, such as citric acid.

periods — *chicha* and *guarapo*), and the tobacco industry (cigarettes and cigars).

4. In several cases, none of the criteria previously described could be used, and the estimates were therefore based on still more indirect data for the long-term series. This was mainly true of the indices for the mechanical and metallurgical, wood and wooden furniture, and printing and engraving industries.

For more recent periods census data for 1945 were taken as a point of reference, together with other figures, such as information as to personnel employed, date of foundation of some of the most important firms, etc.

5. A final aspect which should be mentioned is the way in

which the different specific items were combined to obtain indices of the quantum of production for larger industrial groups and for the manufacturing sector as a whole. Basically, the method consisted in utilizing as weighting factors in each case the corresponding values added in 1953, which were obtained from the preliminary tabulation of the census taken in that year by the National Administrative Department of Statistics. On the basis of these figures and of the indices estimated for each specific sector, it was possible to calculate value added time series at constant 1953 prices. From these, in turn, the quantum indices could be inferred for more general branches and for industry as a whole. Within the latter, a distinction was made between the production indices for final and for intermediate goods.

Annex IX

MANUFACTURED GOODS : CHARACTERISTICS OF PRODUCTION AND DEMAND IN THE MAIN BRANCHES OF INDUSTRY

I. PURPOSES OF THIS ANNEX

In the analysis of the industrial sector contained in Part Two, chapter III, various aspects of the past development, present characteristics and future prospects of Colombian industry are examined, with reference to both manufacturing as a whole and to its main branches. Each of the latter in its turn frequently comprises many activities presenting more or less diverse features, which for reasons of simplicity are considered as forming a homogeneous sector.

The purpose of this annex is to present the available statistical data in more detailed form and to indicate briefly the main characteristics of each of the sub-groups forming the general branches to which reference has so far been made. Frequent repetitions appear unavoidable ; they are justified only because of the convenience of presenting all the basic information in the relevant chapter, so as to permit a more complete appraisal of the methods used in it. In point of fact, many of the figures cited in that chapter are merely summaries of those to be included here, so that, from a strictly chronological standpoint, the data for this annex were prepared before those included in the chapter.

As regards projections of future development, those which will be introduced here are of a much more limited nature, being almost entirely restricted to a detailed analysis of prospective demand for certain manufactured consumer goods, without specific reference to projections of requirements of intermediate products and capital goods such as those included in the analysis of the manufacturing sector as a whole.

In the first place, in the construction of the table of inter-industrial relationships in 1953 a more detailed break-down by sectors proved impossible at this initial attempt, a circumstance which prevented the determination of direct and indirect requirements of raw materials and intermediate products by specific sub-divisions of industrial activities. As already mentioned, this limitation led to margins of error which may reach considerable dimensions in the projections of requirements of intermediate products presented in the relevant chapter ; it might therefore be desirable in future to attempt to expand the table of inter-industrial relations by including a larger number of sectors, if it is intended to make use of this type of analytical instrument in formulating more specific projections.

A somewhat similar contingency arises with regard to the projection of investment requirements. Information concerning the amount of capital employed by activities is most incomplete ; this is a further aspect which will probably require more careful investigation. For the purposes of the present study, preliminary estimates have been used which were prepared for the main branches

of the manufacturing sector only, so that similar projections could not be made for more specific industrial groups.

The description which will be given here of the major manufacturing branches will necessarily be highly schematic. Instead of an analysis of the most important problems affecting each of these, an attempt has been made to present a summary of the information utilized in the earlier analysis, so as to illustrate the kind of background material available and to facilitate later revision or amplification of that analysis.

II. FOODSTUFFS INDUSTRIES

1. Past development and present characteristics

(a) General characteristics and distribution of production in 1953

The broad scope given to the definition of the manufacturing sector for the purposes of this study makes it necessary to consider numerous activities which represent very minor processing of agricultural commodities and are thus included in the foodstuffs industries.¹ One of the main consequences of the ample criteria adopted is that coffee threshing, which plays an important part in determining the proportion represented by this branch of the manufacturing sector within over-all industrial production, is also included among these industries.

Therefore, although the production of typically processed foodstuffs was still of very secondary importance in Colombia, the foodstuffs industries represented a very high percentage (about 42 per cent), of the total gross value of manufacturing production in 1953, whereas their relative importance in terms of value added was much lower (only 18 per cent).

In conformity with the preliminary results of the 1953 Industrial Census, the number of enterprises which were operating in the various production lines of this branch of industry amounted to about 5,000, and employed a total of over 40,000 persons ; thus the foodstuffs industries represented 11 per cent of the total number of manufacturing concerns and employed 17 per cent of the total active population in industry.

Apart from coffee threshing and roasting, other large-scale activities within the foodstuffs industries were the processing of wheat products — flour milling, baking and the manufacture of biscuits and food pastes — and sugar refining and rice hulling, while lesser importance attached to the processing of chocolates,

¹ This breadth of definition was largely a result of the coverage in the 1953 Industrial Census, for which use was made of the Standard International Trade Classification (SITC) proposed by the United Nations Statistical Office.

the manufacture of edible oils and fats, the processing of milk products and canning. The relative proportions of these groups may be assessed from table 354.

TABLE 354. COLOMBIA : ESTIMATED COMPOSITION OF PRODUCTION OF THE FOODSTUFFS INDUSTRIES, 1953

(Thousands of pesos)

	Gross Value	Value added
Total	1,731,651	287,317
Green coffee	912,390	68,464
Roasted coffee	39,000	5,940
Milled flour	102,850	15,430
Bread, etc.	126,000	37,768
Biscuits and confectionery ..	74,500	33,500
Food pastes	18,695	6,035
Refined sugar	63,600	35,630
Hulled rice	153,700	26,160
Chocolate	70,000	14,750
Vegetable oils and fats	58,160	16,338
Milk products	101,172	21,484
Canned meat and fish	6,000	2,938
Canned fruit and vegetables ..	5,584	2,880

SOURCE : ECLA.

As regards wheat flour, a total of 160,000 tons was milled in 1953, which was only a fraction of the country's total installed capacity. It is estimated that there were more than 80 enterprises in existence endowed with modern and efficient equipment, as well as about 10 with a smaller capacity and some 50 stone mills in isolated areas.² Of the first group, at least five were fitted with automatic equipment, capable of milling 40,000 to 70,000 kilograms of flour in 24 hours, and with ample storage facilities.

² Information and figures obtained from a memorandum by Mr. Raúl Varela of the Ministry of Agriculture.

It is therefore considered that existing installations are sufficient to serve milling requirements of four to five times the 1953 figure.

A percentage of the total flour produced in the country was consumed as such, while the greater part of the remainder was destined for the bakeries. In 1953 there were more than 3,000 bakeries in the country, but as a rule only those in the main urban centres were fitted with modern equipment.

Bakeries and pastry-shops were also responsible for a large part of the manufacture of biscuits and confectionery and processed about 22,000 tons of flour in 1953. Although numerous concerns existed, a high proportion of the total production came from two important enterprises, one situated in Medellín and the other in La Rosa, near Pereira. In the latter, which started five years ago, almost the entire capital came from the United States, while the management was in the hands of Dutch experts.

The number of enterprises producing food pastes was much smaller, and several of them were fitted with modern installations for shaping and drying. Some indication of the quantity produced in 1953 is afforded by the fact that consumption of semolina — the staple raw material employed — amounted to slightly more than 10,000 tons.

Sugar refining was mainly concentrated in a few large and efficient units ; in 1953, about three-quarters of the total production came from 11 mills. The total amount of cane consumed during that year was more than 1.7 million tons, from which approximately 160,000 tons of sugar were produced.

So far as chocolate-making is concerned, there would appear to have been a rapid absorption of the production of many smaller concerns by two large-scale enterprises, utilizing, for the most part, post-war equipment. Total installed capacity in the country was estimated at 300,000 pounds of chocolate per day (working one shift), but it was utilized on a relatively small scale in 1953.

Vegetable oils and fats constituted one of the branches of the foodstuffs industries most recently developed on an appreciable scale, and, as a result, a small number of relatively large enterprises with modern equipment predominated. Here too there was active participation by foreign capital, chiefly Dutch. Total production of vegetable lard, margarine and oils in 1953 was about 40,000 tons, the main raw materials used being copra, sesame and cotton-seed.

TABLE 355. COLOMBIA : ESTIMATED DISTRIBUTION OF PRODUCTION OF THE FOODSTUFFS INDUSTRIES, 1953

(Gross value in thousands of pesos)

	Total production	End products			Intermediate products		
		Total	Export	Consumption	Total	Sales to manufacturing sector	Sales to other sectors
Total	1,731,651	1,603,849	806,000	797,849	127,802	113,602	14,200
Green coffee	912,390	900,390	800,085	100,305	12,000	12,000	—
Roasted coffee	39,000	39,000	—	39,000	—	—	—
Milled flour	102,850	22,850	—	22,850	80,000	74,800	5,200
Bread, etc.	126,000	126,000	—	126,000	—	—	—
Biscuits and confectionery ..	74,500	74,500	—	74,500	—	—	—
Food pastes	18,695	18,695	—	18,695	—	—	—
Refined sugar	63,600	36,798	20	36,778	26,802	26,802	—
Hulled rice	153,700	153,700	5,880	147,820	—	—	—
Chocolate	70,000	70,000	5	69,995	—	—	—
Vegetable oils and fats	58,160	49,160	10	49,150	9,000	—	9,000
Milk products	101,172	101,172	—	101,172	—	—	—
Canned meat and fish	6,000	6,000	—	6,000	—	—	—
Canned fruit and vegetables ..	5,584	5,584	—	5,584	—	—	—

SOURCE : ECLA.

Milk processing mainly comprised the pasteurization of milk for direct consumption and the preparation of cheeses and butter. In addition, one large-scale enterprise was rapidly increasing production of powdered milk and similar products, and succeeded in processing a little more than 14 million litres of milk in 1953.

The canning industries for meat, fish, fruit and vegetables were still comparatively unimportant in 1953. Several of them represented new ventures which were beginning to find their feet, and usually had plans for large-scale expansion. In 1953 there were only three enterprises of any importance (situated on the Atlantic Coast), for the canning and preserving of fish and seafood, two of them equipped with canning machinery, and the third specializing in frozen products packed in cellophane and cardboard containers. There was also a small number of canning factories for fruit and vegetables, among which certain recently-formed enterprises were outstanding, one of them, situated at Cali, operating on joint contributions of Colombian and foreign capital.

In 1953, almost 47 per cent of total foodstuffs produced was for export and about 45 per cent for domestic consumption. The remaining 7 per cent represented intermediate products sold to other sectors of production. A detailed break-down by sub-groups is given in table 355.³

As may be seen, the majority of the branches under consideration produced exclusively for home consumption. In the case of milled flour, direct flour consumption was relatively low, so that the greater part of its production was destined for processing in other branches of the foodstuffs industries (mainly bakeries and biscuit manufacturers); threshed coffee was divided among exports, direct consumption and intermediate sales (mainly for roasting). A considerable proportion of sugar production was destined for other sectors, both the industries producing foodstuffs (biscuits, confectionery and chocolate) and other manufacturing branches (mainly producing gaseous beverages). Finally, intermediate sales of vegetable oils and fats consisted of derivatives (oil-cake) intended for cattle-feed.

(b) Growth during the period 1925-53

The relative share of the foodstuffs industries within manufacturing production as a whole had declined substantially in 1953 in comparison with previous periods—18 per cent as against 27 per cent in 1925-29 and 25 per cent in 1937-39. Their average cumulative rates of growth per annum during the period from 1925 to 1953 were much lower than that of over-all industrial production, being 6.4 and 7.7 per cent respectively.

The slow development of the foodstuffs industries was, above all, due to the strong preponderance of activities—mainly threshing, hulling, etc.—directly connected with total production of many agricultural commodities. Thus the expansion of the foodstuffs industries was contingent upon that of agricultural production, which, in its turn, was much lower than the total output of the manufacturing sector.

The disparity in the rates of growth of production in the foodstuffs industries and total industrial production was particularly marked between 1925 and 1937. From that time onwards, and especially during the post-war years, certain new ventures made it possible to accelerate development to a point approaching that of other manufacturing branches. The figures in table 356 facilitate an appraisal of the tendencies shown by the various components of the foodstuffs industries. (See also annex VIII in which the methods of estimation used in these indices are described.)

The expansion of coffee threshing was logically-g geared to coffee

³ As already pointed out, a distinction of this kind is of special importance for an analysis of future development prospects, since the predictable behaviour of demand depends upon very different factors, according to whether exports, goods for domestic consumption or intermediate products are involved.

production and its export possibilities, whereas that of coffee roasting was the result of increased domestic consumption, whose rate of growth was slightly more rapid than that of the total population of Colombia. Sugar production remained almost stationary up to the war, despite the fact that the requirements of the home market made it necessary to supplement domestic production by imports; on the other hand, output was nearly doubled between 1940 and 1953, which enabled imports to be almost entirely replaced. There was a substantial increase in rice hulling at the beginning of the period, owing to a rapid expansion of rice cultivation. This was so intensive that, in spite of a subsequent moderation, it was possible to export part of the production in 1953. The chocolate industry as a whole showed one of the lowest rates of growth, largely owing to inadequate domestic cacao availabilities. Notwithstanding this, industrial production proper expanded much more rapidly, thereby causing an increasing shift away from small-scale and artisan production. The milling of wheat products increased very slowly, since most of the requirements were covered by imports not only of grain but also of flour; this explains why the growth of baking and biscuit-making as well as of food pastes was much more rapid, domestic production of which had only recently begun.

The production of vegetable oils and fats, milk processing, and canning should be reckoned among the more recent and intensive development activities. In each case a sizeable market already existed which was chiefly supplied by means of imports, so that an acceleration in its development was largely made possible by the replacement of imported articles by domestic production. As regards production of vegetable oils and fats some of the factors which indicated that future growth would continue to be rapid were the maintenance of imports at the same level, the predictable increases in domestic supplies of raw materials and the high income-elasticity of demand for these products. Much the same occurred in the canning industry which was still at an early stage of development.

2. Characteristics of demand

(a) Availability of processed foodstuffs during the period 1937-53

The availability of processed foodstuffs grew rapidly from 1937 to 1953, so that *per capita* consumption of these products during that period showed a high income-elasticity. However, within the over-all pattern of behaviour, the various types of product included in this category followed very different trends the increment in *per capita* consumption varying from 28 per cent for such commodities as rice to over 180 per cent in bakery and biscuit-factory products, while consumption of canned fruit and milk products increased three- and five-fold respectively.

Table 357 gives detailed figures for availabilities of the various types of processed foodstuffs during the period indicated, a distinction being made in each case between domestic production and imports. At a later stage a summary will be given of the resulting ratios in terms of income-elasticity coefficients, which are compared with similar ratios computed during the survey of income and expenditure carried out in a sample of urban families in 1953.

Several of the processed foodstuffs illustrate a phenomenon similar to that recorded for manufactured products in general, and characterized by the fact that the high income-elasticity of the consumption of such foodstuffs during 1937-53 tends to diminish when the analysis is limited to the latter part of that period. Apart from the influence of the general factors mentioned before, the level of consumption in many of these cases may well have been very low in the opening years of the 1937-53 period (*inter alia* owing to the supply situation), so that it tended to grow intensively until a more normal level was reached; a typical example is that of rice consumption, which at the outset increased much faster than total *per capita* income, but which showed a clear trend towards stability from 1946 onwards.

TABLE 356. COLOMBIA : QUANTUM INDICES OF PRODUCTION OF THE FOODSTUFFS INDUSTRIES, 1925-53

(1953 = 100)

Year	Total	Green coffee	Roasted coffee	Milled flour	Bread, etc., and confectionery	Food pastes	Milled sugar	Hulled rice	Chocolate	Vegetable oils and fats	Milk products	Canned meat and fish	Canned fruit and vegetables
1925	29.3	33.6	34.4	...	...	—	33.5	9.4	38.3	...	...	...	...
1926	33.6	42.4	43.3	...	...	—	35.2	9.9	39.2	...	...	...	...
1927	33.8	40.7	41.7	...	...	—	36.9	10.2	40.9	...	...	...	...
1928	35.1	46.0	46.9	...	...	—	31.2	9.6	43.5	...	...	...	...
1929	36.4	49.0	50.0	44.3	...	...	26.8	10.5	48.7	...	...	...	...
1930	39.7	54.8	56.1	45.0	...	—	29.3	11.0	49.6	...	...	...	...
1931	37.7	52.6	55.6	43.1	...	...	18.7	25.5	39.2	...	...	...	...
1932	43.7	54.0	45.0	42.9	...	—	35.7	32.9	53.0	...	...	...	...
1933	44.1	56.6	33.3	37.4	...	—	35.2	33.3	56.0	...	...	...	...
1934	43.6	53.5	27.8	43.4	...	—	31.2	35.2	67.2	...	...	...	...
1935	44.4	54.7	35.6	49.7	...	—	31.1	35.6	60.3	...	...	...	...
1936	49.0	65.6	42.5	54.9	...	—	28.6	36.9	59.0	...	...	...	...
1937	38.6	68.1	38.6	56.5	24.8	—	26.2	38.2	55.6	27.1	10.0	40.0	6.0
1938	40.5	69.7	38.6	50.3	23.0	—	38.9	45.0	59.9	22.9	12.0	42.0	6.0
1939	46.2	69.0	55.6	75.1	34.4	—	37.6	48.3	70.2	34.4	12.0	44.0	8.0
1940	46.3	69.5	64.7	73.0	34.4	—	38.8	49.4	71.5	25.4	13.0	46.0	8.0
1941	49.3	74.4	72.2	73.6	34.7	—	46.1	56.0	64.6	31.1	14.0	48.0	9.0
1942	50.1	85.7	77.8	61.9	30.4	—	50.2	56.2	62.9	16.5	15.0	50.0	10.0
1943	49.4	82.5	77.5	67.9	35.4	—	52.8	41.8	50.9	17.0	15.0	53.0	10.0
1944	56.4	86.4	80.6	70.7	51.1	—	55.9	50.7	55.2	22.3	18.0	57.0	12.0
1945	56.5	85.6	82.8	90.5	45.7	—	58.3	46.1	67.2	20.6	18.0	61.0	14.0
1946	62.4	90.0	83.3	80.4	54.8	—	52.2	75.8	79.7	19.4	25.0	65.0	20.0
1947	66.6	96.2	83.3	86.7	61.0	1.8	51.9	72.3	53.9	50.5	34.0	69.0	26.0
1948	71.8	90.2	86.7	97.6	66.2	2.4	61.8	87.7	68.1	57.1	44.0	73.0	35.0
1949	75.7	96.1	92.5	87.7	60.6	11.5	73.0	100.6	76.3	60.8	55.0	78.0	45.0
1950	80.9	88.0	94.2	97.8	76.8	33.3	80.1	75.9	97.8	84.4	65.0	82.0	58.0
1951	91.4	78.7	95.6	111.1	90.3	46.6	105.2	96.2	93.9	126.6	80.0	86.0	70.0
1952	97.9	104.9	99.2	104.0	95.4	89.0	81.7	97.7	98.7	125.0	90.0	92.0	82.0
1953	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE : ECLA.

TABLE 357. COLOMBIA : ESTIMATED AVAILABILITY
(Thousands of pe

		1937	1938	1939	1940	1941	1942	1943
Coffee :	Domestic ...	53,775	53,775	77,459	90,137	100,585	108,387	107,96
Wheat flour :	Domestic * ..	41,582	36,514	54,484	52,433	52,855	43,786	46,90
Bread, etc :	Domestic ...	31,248	28,980	43,344	43,344	43,722	38,304	44,60
Biscuits and confectionery :	Domestic ...	18,476	17,135	25,628	25,628	25,852	22,648	26,37
Food pastes :	Domestic ...	—	—	—	—	—	—	—
Sugar :	Total	7,920	6,983	7,347	9,319	8,641	8,779	8,86
	Domestic ...	4,396	6,523	6,308	6,510	7,735	8,422	8,85
	Imported ...	3,524	460	1,039	2,809	906	357	
Rice :	Total	63,714	74,246	83,793	79,990	86,140	85,983	64,20
	Domestic ...	58,713	69,165	74,237	75,928	86,072	85,973	64,19
	Imported ...	5,001	5,081	9,556	4,062	68	10	1
Chocolate :	Domestic ...	38,917	41,927	49,136	50,046	45,217	44,027	35,62
Vegetable oils and fats :	Total	13,596	11,608	17,290	12,665	15,504	8,234	8,37
	Domestic ...	13,320	11,255	16,908	12,484	15,286	8,110	8,35
	Imported ...	276	353	372	181	218	124	1
Milk products :	Total	12,879	13,930	14,804	16,354	16,430	16,637	16,92
	Domestic ...	10,117	12,141	12,141	13,152	14,164	15,176	15,17
	Imported ...	2,762	1,789	2,663	3,202	2,266	1,461	1,75
Canned meat and fish :	Total	7,048	4,888	6,168	5,683	5,871	4,379	3,71
	Domestic ...	2,400	2,520	2,640	2,760	2,880	3,000	3,18
	Imported ...	4,648	2,368	3,528	2,923	2,991	1,379	53
Canned fruit and vegetables :	Total	1,531	1,349	1,843	2,287	1,541	1,264	1,09
	Domestic ...	335	335	447	447	502	558	55
	Imported ...	1,196	1,014	1,396	1,840	1,039	706	53
TOTAL		290,686	291,335	381,286	387,886	402,358	382,428	364,65
	Domestic ...	273,279	280,270	362,732	372,869	394,870	378,391	361,79
	Imported ...	17,407	11,065	18,554	15,017	7,488	4,037	2,85

SOURCE : ECLA.

No such tendency, on the other hand, is to be observed in the cases of vegetable oils and fats, milk products and canned fruit and vegetables, which maintained high income-elasticity coefficients throughout the entire period.

As regards the origin of processed foodstuffs availabilities, imports as a whole were insignificant and had been gradually diminishing since 1937. However, in some individual branches, their relative importance was still considerable in 1953 : almost 50 per cent in the case of canned meat and fish, and about 25 per cent in that of canned fruit and vegetables ; in addition, minor imports of milk products, sugar, and vegetable oils and fats were recorded.⁴

(b) *Consumption of processed foodstuffs according to the sample of urban families*

Together with the previous ratios, it is interesting to compare the behaviour of demand for processed foodstuffs with the respective *per capita* income levels in the sample of urban families taken by the National Administrative Department of Statistics. Mention has already been made of some of the factors which justify the difference between the results obtained here and those obtained from the comparison of time series. However, in the case of pro-

⁴ Since imported flour was not intended for direct consumption, but for subsequent processing by bakeries, biscuit factories, etc., it was considered as an intermediate product and is therefore not included in these remarks.

cessed foodstuffs, the disparities are far more marked than in other kinds of manufactured products, and the income-elasticity coefficients were much lower.

In fact, whereas the historical coefficient of total processed foodstuffs amounted to 1.7, for the whole period 1937-53, and 1.03 for 1947-53, the sample showed a coefficient of only 0.53.

Table 358 is a comparison of the historical coefficients with those corresponding to urban families in 1953, and also includes the average coefficients used for projections of future demand.

The final coefficient derived from these partial estimates for total processed foodstuffs was 0.9, compared with 1.03 for 1947-53 and 0.53 for the sample.

(c) *Projections of demand for processed foodstuffs*

The projections presented in the analysis of the industrial sector as a whole were based on two hypotheses of the future growth of aggregate *per capita* consumption of goods and services, assuming a cumulative annual increment of 4 per cent for the period from 1953 to 1965 in the one case and, in the other case, a cumulative annual increment of 2 per cent between 1953 and 1950 and 3 per cent between the latter year and 1965.⁵

On the basis of these general hypotheses and of the previously established income-elasticity coefficients, it is possible to estimate

⁵ The first chapters of this study give a detailed description of the background material on which these hypotheses are based.

F PROCESSED FOODSTUFFS, 1937-1953

(at 1953 prices)

1944	1945	1946	1947	1948	1949	1950	1951	1952	1953
12,288	115,353	116,049	116,049	120,786	128,866	131,235	133,185	138,479	139,315
41,036	63,329	48,480	51,235	59,029	52,430	53,415	59,005	49,277	42,850
54,386	57,582	69,048	76,860	83,412	76,356	96,768	113,778	120,204	126,000
88,070	34,046	40,826	45,445	49,319	45,147	57,216	67,274	71,073	74,500
—	—	—	336	449	2,150	6,225	8,712	16,638	18,695
10,903	12,948	10,122	10,121	10,371	12,248	13,444	17,655	13,998	19,311
9,379	9,782	8,758	8,708	10,369	12,248	13,439	17,650	13,708	16,778
1,524	3,166	1,364	1,413	2	—	5	5	290	2,533
77,909	70,785	113,271	113,749	135,545	153,850	116,899	151,024	150,177	147,860
77,895	70,779	113,071	111,125	134,795	153,820	116,408	147,859	150,165	147,820
14	6	200	2,624	750	30	491	3,165	12	40
88,637	47,037	55,786	37,727	47,666	53,406	68,455	65,725	69,085	69,995
10,984	10,320	9,621	25,081	28,287	30,307	42,509	62,516	61,946	50,148
10,960	10,125	9,535	24,821	28,065	29,883	41,483	61,929	61,437	49,150
24	195	86	260	222	424	1,026	587	509	998
20,758	22,271	28,642	36,888	46,076	56,762	66,676	82,518	92,388	102,174
18,211	18,211	25,293	34,398	44,516	54,645	65,762	80,938	91,055	101,172
2,547	4,060	3,349	2,490	1,560	2,117	914	1,580	1,333	1,002
5,039	6,895	6,055	8,952	6,920	4,936	9,792	6,466	6,108	11,534
3,420	3,660	3,900	4,140	4,380	4,680	4,920	5,160	5,520	6,000
1,619	3,235	2,155	4,812	2,540	256	4,872	1,306	588	5,534
1,660	2,973	4,199	5,418	3,762	3,152	5,545	4,363	5,406	7,259
670	782	1,117	1,452	1,954	2,513	3,239	3,909	4,579	5,584
990	2,191	3,082	3,966	1,808	639	2,306	454	827	1,675
21,670	443,539	502,099	527,861	591,622	619,610	668,179	772,221	794,779	809,641
14,952	430,686	491,863	512,296	584,740	616,144	658,565	765,124	791,220	797,859
6,718	12,853	10,236	15,565	6,882	3,466	9,614	7,097	3,559	11,782

* Imports were not included, since they were intended for subsequent processing.

the probable supply of processed foodstuffs which would be required in 1960 and 1965. The relevant figures are given in table 359, which shows estimated *per capita* expenditure for each year, and kind of processed food, together with total consumption assessed at constant 1953 prices.

Even in the case of the more moderate hypothesis on the growth of *per capita* income, the effects of such growth, in conjunction with the increase in the population, would be to provoke a substantial rise in total demand, especially for those products with the highest income-elasticities. In such branches as the canning industry, where considerable imports were recorded in 1953, account should also be taken of import substitution, which would enable domestic production to achieve a higher rate of growth.

It must be remembered that these estimates refer solely to domestic demand for end products, and that, in order to appreciate the degree in which total production should be raised in each case, consideration will also have to be given to exports prospects, as well as to requirements of intermediate goods, many of which, such as flour and sugar, are produced by the branches described.

3. Composition of inputs in the foodstuffs industries

The table of inter-industrial relations presented in Part Two, chapter III, of the present study includes the composition of inputs in the foodstuffs industries as a whole, with a break-down of the raw materials and intermediate products used by industries of

origin. In table 360 these inputs are shown in detail for each of the main groups of food-processing industries.

A high percentage of the raw materials consumed naturally consisted of agricultural commodities, mainly coffee, rice, sugarcane, wheat, cacao and oil-seed. In the case of the last three, many of the 1953 requirements were met by imports, which meant that the latter constituted a high proportion of total raw materials and intermediate products consumed by the mills and by the chocolate and vegetable oils and fats industries. Even allowing for an increase in requirements as a result of the rise in demand, it may be estimated that by 1960 the country will probably be self-sufficient as regards supplies of cacao and oil-seed, although imports of wheat will continue to be necessary.

Other important inputs consisted of transactions among the foodstuffs industries themselves, mainly purchases of flour by bakeries and factories making biscuits and food pastes, and sugar consumption in various other branches. These, in their turn, increased the share of imported intermediate products within total raw materials consumed by the food paste and biscuit industries, the possibility of replacing imports by domestic production being apparently much lower in view of the special grades of flour required by those industries.

The analysis of the input of imported products in some groups of foodstuffs industries shows that a high percentage of the total value of these products for the consumer factories represented import costs. The reason lies mainly in the duties levied on wheat

TABLE 358. COLOMBIA : INCOME-ELASTICITY COEFFICIENTS OF CONSUMPTION OF PROCESSED FOODSTUFFS

Product	Coefficients				
	Historical coefficients		Survey of urban families	Coefficients estimated for the projections	
	1937-53	Other periods			
Coffee .....	...	0.20 (1940-53)	0.35	0.35	
Wheat flour	0.68	-0.15 (1946-53)	1.05	0.5	
Bread, etc.	2.20	0.8 (1951-53)	0.55	0.8	
Biscuits and confectionery	2.00	1.0 (1951-53)	1.02	1.0	
Food pastes	—	9.0 (1950-53)	0.52	0.7	
Sugar	1.57	2.25 (1947-53)	0.27	0.9	
Rice	1.30	0.22 (1946-53)	0.28	0.3	
Chocolate	0.97	0.97 (1946-53)	0.57	0.8	
Vegetable oils and fats	3.75	3.75 (1947-53)	0.41	1.5	
Milk products	3.20	3.20 (1944-53)	0.75	1.8	
Canned meat and fish .....	...	10.5 (1949-53)	1.01	1.6	
Canned fruit and vegetables	3.0	2.50 (1947-53)	2.10	2.4	
Total processed foodstuffs	1.70	1.03 (1947-53)	0.53	0.9	

SOURCE : ECLA.

TABLE 359. COLOMBIA : PROJECTIONS OF DEMAND FOR PROCESSED FOODSTUFFS

(Total in millions of pesos at 1953 prices; per capita figures in pesos at 1953 prices)

Product	1960						1965			
	1953		Hypothesis A		Hypothesis B		Hypothesis A		Hypothesis B	
	Total	Per capita	Total	Per capita	Total	Per capita	Total	Per capita	Total	Per capita
Total processed foodstuffs	821	67.8	1,206	85.2	1,076	76.0	1,603	101.0	1,372	86.5
Coffee	139	11.5	176	12.4	169	11.9	207	13.0	198	12.5
Wheat flour	23	1.9	30	2.1	29	2.0	36	2.3	35	2.2
Bread, etc.	126	10.4	180	12.7	163	11.5	231	14.6	204	12.9
Biscuits and confectionery	74	6.1	112	7.9	99	7.0	150	9.5	128	8.1
Food pastes	19	1.6	26	1.8	24	1.7	33	2.1	30	1.9
Sugar	42	3.5	62	4.4	55	3.9	81	5.1	70	4.4
Rice	148	12.2	185	13.1	179	12.6	216	13.6	208	13.1
Chocolate	70	5.8	100	7.1	91	6.4	129	8.1	114	7.2
Vegetable oils and fats	51	4.2	89	6.3	73	5.2	131	8.3	101	6.4
Milk products	103	8.5	194	13.7	154	10.9	303	19.1	224	14.1
Canned meat and fish	13	1.1	23	1.6	19	1.3	35	2.2	27	1.7
Canned fruit and vegetables	13	1.1	29	2.0	21	1.5	51	3.2	33	2.1

SOURCE : ECLA.

and flour imports. It was estimated that on the basis of 270 pesos c.i.f. Barranquilla per ton of imported Canadian wheat, the ultimate cost was over 620 pesos, taking into account specific and *ad valorem* tariff duties, the quota of 0.20 pesos per kilogramme — intended for the *Corporación de Defensa de Productos Agrícolas* with the object of encouraging domestic wheat cultivation — and other lesser taxes.

III. BEVERAGES INDUSTRY

1. Past development and present characteristics

(a) General characteristics of the beverages industry in 1953

This branch of manufacturing has been divided into three principal activities: the production of beer and malt, of non-alcoholic beverages and of wines and spirits (see table 361).

The foregoing figures demonstrate the beverages industry to be the most important branch of the entire manufacturing sector in terms of value added; at the same time, it is among those which show the highest figures for value added and for wages and salaries per person employed.

Much of the relative importance and high productivity of this branch may be attributed to the brewing of beer. Total production in 1953 amounted to about 110 million dozen bottles,⁶ almost entirely concentrated in only five enterprises. One of these, which covered about 70 per cent of total output, had more capital than any other enterprise in the country, and an annual production value equivalent to that of three of the largest textile enterprises; it also had plants in three different towns. The remainder of the production was divided among concerns operating in Barranquilla, Bogotá, Medellín and Bucaramanga.

⁶ About 430 million litres.

TABLE 360. COLOMBIA : ESTIMATED INPUTS IN THE FOODSTUFFS INDUSTRIES, 1953

(Thousands of pesos)

	Green coffee	Roasted coffee	Milled flour	Bread, etc.	Biscuits and confectionery	Food pastes	Refined sugar	Hulled rice	Chocolate	Vegetable oils and fats	Milk products	Canned meat and fish	Canned fruit and vegetables	Total
A. Raw materials	842,836	32,610	86,720	85,271	38,800	12,489	25,270	126,540	55,000	40,585	77,664	3,000	2,662	1,429,447
<i>Domestic</i>	842,829	32,410	58,490	79,414	16,000	1,695	24,990	126,520	35,000	15,198	73,720	2,910	1,506	1,310,682
Producer industry :														
Non-manufacturing sectors	835,029	18,740	56,200	12,327	800	—	19,187	125,890	31,824	14,286	70,104	2,908	1,066	1,188,361
Foodstuffs	—	11,700	200	64,549	15,100	802	—	140	2,707	—	2,288	—	180	97,666
Beverages	—	—	—	14	—	—	—	—	—	—	—	—	—	14
Textiles	7,800	—	2,000	—	—	—	510	470	16	—	—	1	—	10,797
Wood and cork	—	90	—	4	—	—	—	—	211	—	—	—	—	305
Pulp and paper	—	1,600	10	140	—	878	4,400	—	8	—	780	—	—	7,816
Printing and engraving, etc.	—	200	—	—	—	—	—	—	213	—	—	—	—	413
Chemicals	—	70	—	2,340	100	—	863	—	6	462	—	1	—	3,842
Cement, ceramics, glass, etc.	—	—	—	—	—	—	—	—	—	—	—	—	112	112
Mechanical and metallurgical industries	—	—	—	4	—	—	—	—	15	394	332	—	54	799
Other industries	—	10	80	36	—	15	30	20	—	56	216	—	94	557
Imported	7	200	28,230	5,857	22,800	10,794	280	20	20,000	25,387	3,944	90	1,156	118,765
<i>Value at factory of origin</i> ..	7	200	9,600	1,618	6,300	5,271	280	20	15,000	16,474	1,926	44	564	57,304
Producer industry :														
Non-manufacturing sectors	—	—	9,370	28	200	—	100	—	14,358	10,800	—	21	87	34,964
Foodstuffs	—	—	—	1,520	5,300	5,246	—	—	8	—	148	—	276	12,498
Textiles	—	—	200	—	—	—	—	—	—	—	—	2	—	202
Pulp and paper	—	—	—	—	—	25	—	—	549	—	—	1	—	575
Printing and engraving, etc.	—	—	—	—	—	—	—	—	26	—	—	—	—	26
Chemicals	7	—	10	62	800	—	180	—	14	5,674	127	4	42	6,920
Cement, ceramics, glass, etc.	—	—	—	—	—	—	—	—	—	—	50	—	—	59
Mechanical and metallurgical industries	—	—	—	7	—	—	—	—	42	—	1,545	15	24	1,633
Other industries	—	200	20	1	—	—	—	20	3	—	47	1	135	427
Expenditure abroad	—	—	1,200	385	1,500	1,004	—	—	1,300	1,830	367	8	108	7,702
Customs duties	—	—	5,100	3,597	14,000	1,984	—	—	2,000	5,253	725	17	212	32,888
Expenditure in the country ..	—	—	12,330	257	1,000	2,535	—	—	1,700	1,830	926	21	272	20,871
B. Fuels and power	1,090	450	700	2,961	2,200	171	2,700	1,000	250	1,237	2,024	62	42	14,887
Fuels and lubricants ..	300	300	200	2,783	2,000	73	2,500	800	150	807	1,580	45	32	11,570
Electric energy	790	150	500	178	200	98	200	200	100	430	444	17	10	3,317

SOURCE : ECLA.

TABLE 361. COLOMBIA : MAIN STATISTICAL DATA ON THE BEVERAGES INDUSTRY, 1953

(Thousands of pesos)

	Total	Beer and malt	Non-alcoholic beverages	Spirits and wines
Gross value of production	479,000	300,000	66,000	113,000
Value added by production	303,800	184,300	39,100	80,400
Consumption of raw materials :				
Total	164,900	107,900	26,000	31,000
Domestic	111,800	68,800	16,000	27,000
Imported	53,100	39,100	10,000	4,000
Consumption of fuel and energy	10,300	7,800	900	1,600
Remunerations :				
Total	57,700	39,100	12,000	6,600
Wages and salaries	47,500	30,400	11,000	6,100
Social benefits	10,200	8,700	1,000	500
Number of persons employed	13,575	6,075	4,500	3,000

SOURCE : ECLA.

TABLE 362. COLOMBIA : ESTIMATED QUANTUM INDICES OF PRODUCTION OF THE BEVERAGES INDUSTRY, 1925-1953

(1953 = 100)

Year	Total	Malt	Beer	Non-alcoholic beverages	Spirits	Wines	Chichas and guarapos *
1925	4.5	—	3.3	3.5	..	..	..
1926	5.3	—	3.7	5.6	..	..	..
1927	6.6	—	4.2	10.3	..	..	..
1928	8.2	—	5.1	15.3	..	..	..
1929	8.2	—	4.6	17.9	..	..	..
1930	6.9	—	4.6	10.3	..	..	..
1931	5.8	—	3.9	7.7	..	..	..
1932	4.9	—	3.3	5.2	..	..	..
1933	12.0	—	5.3	2.6	29.8	..	57.2
1934	15.0	—	9.9	5.3	28.1	..	75.9
1935	16.4	4.9	10.0	6.8	30.7	..	90.8
1936	19.0	8.5	11.6	11.6	34.1	..	95.6
1937	20.3	6.2	13.1	15.3	33.9	..	99.5
1938	22.2	13.0	14.3	15.6	37.9	..	95.9
1939	24.7	10.8	17.4	20.5	38.5	..	95.3
1940	23.4	10.6	17.2	19.5	34.2	..	95.0
1941	26.7	24.9	20.0	19.0	39.4	..	93.0
1942	29.6	24.5	22.5	17.9	45.6	..	96.1
1943	29.6	27.7	21.1	16.6	48.7	..	99.8
1944	38.4	22.7	25.4	29.8	67.7	..	97.3
1954	44.4	19.8	30.9	31.8	78.2	..	100.0
1946	47.6	30.9	35.1	50.8	69.3	42.5	104.7
1947	51.8	31.8	36.0	56.4	80.6	57.2	107.4
1948	56.1	49.7	45.5	56.9	72.7	57.5	110.0
1949	70.6	76.7	65.3	83.2	75.8	62.1	1.7
1950	79.1	76.6	74.5	89.5	85.2	74.1	..
1951	81.6	70.8	78.8	92.4	84.5	72.1	..
1952	91.6	93.1	90.6	94.8	92.4	88.0	..
1953	100.0	100.0	100.0	100.0	100.0	100.0	..

SOURCE : ECLA.

* 1945 = 100.

Beer production was supplemented by several concerns manufacturing malt, which were either the property of the breweries or closely linked to them financially. Their total production in 1953 was about 39,000 tons of malt which, however, had to be augmented by imports of over 18,000 tons.

The manufacture of non-alcoholic drinks was of more modest proportions than brewing, and production was dispersed among a greater number of units. Total production in 1953 may be estimated at 80 million dozen bottles of various kinds of gaseous beverages. About 50 per cent was produced by two large and very old-established national firms ; among other enterprises of some dimension there were several which were created in the post-war period will foreign capital contributions, and others established previously from domestic funds ; finally, there were numerous small undertakings designed to supply more restricted local markets.

The preponderant activity in the third group mentioned was the distillation of spirits. In contrast to other branches of the beverages industry, the enterprises concerned were not private companies but were controlled by the Departmental governments ;⁷ their plants were thus distributed among different areas and their markets were limited to their own Departments. Since such beverages were subject to additional tax if they passed from one province to another, competition on a national scale was prohibitive. The main lines of production consisted of *aguardiente*, rum, and, to a lesser extent, industrial alcohol, aniseed and lotions. According to the consumption statistics kept by the fiscal authorities, the production of spirits as such reached 22 million litres in 1953.

Wine production, which was in the hands of private enterprise, reached a total of some 3.5 million litres in 1953. Incidentally, it is worth mentioning as background information that fermented drinks (*chicha* and *guarapo*) were formerly produced, which represented a large proportion of total consumption of beverages until their prohibition in 1948 ; in that year output stood at more than 140 million litres.

(b) Estimates of past development

The beverages industry is one of the oldest branches of Colombian manufacturing, since many of the most important enterprises now in existence entered production before 1925. Its growth was so rapid that — even taking into account the new activities which subsequently played a part in domestic production — its relative importance within the whole manufacturing sector was not only maintained but even increased considerably (from 10.8 per cent

⁷ Some of them (in Antioquia, Boyacá, Caldas and Santander) were in fact managed as private enterprises ; they had their own budgets and delivered part of their profits to the local government authorities ; the remainder were granted special budgetary appropriations and their whole earnings were paid directly into departmental funds.

in 1925-29 to 14.3 per cent in 1937-39 and to 19.6 per cent in 1953, in terms of value added). Moreover, since imports during the whole of this period were of little significance (except for spirits), the entire expansion derived from a proportional increase in domestic consumption.⁸

Table 362 demonstrates the changes in the quantum of production in the different branches. The rapid growth recorded was not impeded by a relatively slow development in spirits production, since the latter was more than offset by the progress achieved in other types of product. The increase in the production of malt, which started in 1935, was more marked than that of beer-brewing, thanks to a gradual shift away from imports. Finally, it is worth noting that the rate of growth of beer production accelerated after the prohibition of *chicha* and *guarapo* manufacture in 1948, when the demand for fermented drinks was diverted to beer.

2. Characteristics and projections of demand

The intense rate of growth recorded by the beverages industry results in exceptionally high income-elasticity coefficients when historical comparisons are drawn between *per capita* expenditure on this type of product and total *per capita* income available. (In fact, they are higher than for almost any other type of manufacture.) This conclusion is valid even in so far as more recent periods are concerned when the coefficients declined considerably.

The high *per capita* consumption of some of the products in question appears to indicate that their rate of growth tended to decline rapidly. Nevertheless, such a conclusion is not confirmed by the sample of urban families taken during the 1953 survey, when one of the highest coefficients was also obtained for these products⁹ (see figure XXXI).

The results of these comparisons are summarized in table 363, which also gives the average coefficients employed in estimating future consumption.

Taking as a basis the 1953 levels, the predictable population increase, and the two hypotheses on the future growth of total *per capita* consumption mentioned previously, the income-elasticity coefficients thus obtained would give estimated increments in the consumption of beverages in 1960 and 1965 that would still be very large (see table 364).

⁸ It is also probable that part of the production increment was due to a shift away from artisan production or home-brewing of fermented drinks not included in the statistics.

⁹ Although for beverages as a whole there are no great disparities between the historical coefficients and those obtained from the survey, the discrepancies are appreciable as regards certain individual products. The interpretation of the survey becomes more difficult in this case, since there may have been a tendency to under-estimate expenditure on beverages consumed outside the home.

TABLE 363. COLOMBIA : INCOME-ELASTICITY COEFFICIENTS FOR BEVERAGES CONSUMPTION

	Coefficients			
	Historical coefficients		Survey of urban families	Coefficients estimated for the projections
	1937-53	Other periods		
Total beverages	2.72	1.66 (1945-53)	1.19	1.55
Beer	4.01	2.88 (1948-53)	1.07	1.6
Spirits	1.90	0.52 (1944-53)	1.71	1.8
Wines	2.40	2.20 (1947-53)	...	1.8
Non-alcoholic beverages	4.20	0.63 (1949-53)	0.88	0.8

SOURCE : ECLA.

In the more moderate hypothesis on the growth of total consumption, such estimates would postulate an increment of over 50 per cent in *per capita* beer consumption between 1953 and 1965, to achieve which the total production of 1953 would need to be more than doubled. The increase in spirit consumption would be even more marked, while that of gaseous beverages would be smaller.

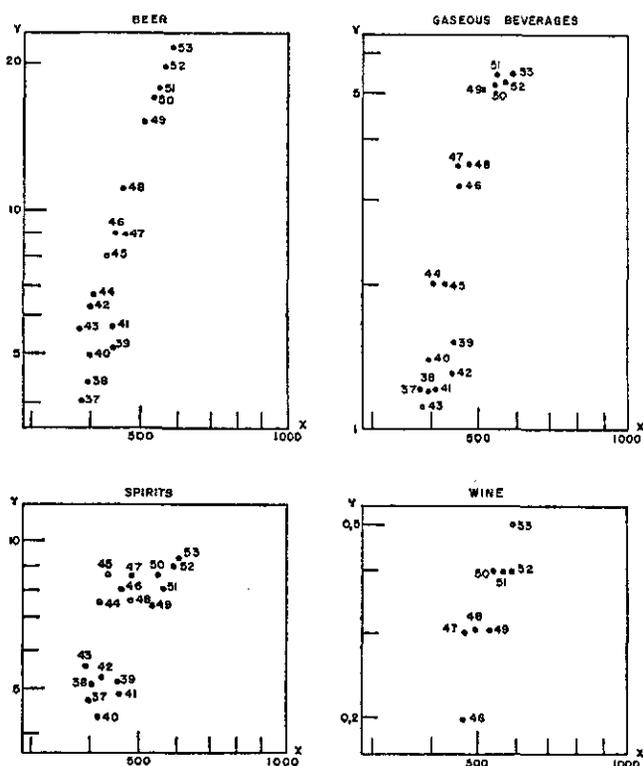
FIGURE XXXI. PART A. COLOMBIA : RATIO BETWEEN *per capita* CONSUMPTION OF THE VARIOUS TYPES OF BEVERAGE AND TOTAL *per capita* PRIVATE CONSUMPTION, 1937-53

(Pesos *per capita* at 1953 prices)

(Logarithmic scale)

Y = Consumption of beverages.

X = Total private consumption.



Despite the magnitude of these increments, the estimated levels of future demand would certainly call for a lower growth rate of the beverages industry than that recorded in earlier periods. Import substitution possibilities are limited to a relatively low proportion of malt requirements, and to spirits that are not directly competitive, without of course considering raw materials and intermediate products from other industrial or non-manufacturing sectors.

In addition, installed capacity in 1953 was only partially utilized in many cases, so that the investment requirements in the beverages industry will probably not increase to an extent commensurate with the expansion of consumption.

PART B. COLOMBIA : RATIO BETWEEN CONSUMPTION OF BEVERAGES AND *per capita* INCOME IN THE SAMPLE OF URBAN FAMILIES, 1953

(Monthly statistics)

(Logarithmic scale)

Y = Consumption of beverage.

X = Average *per capita* income.

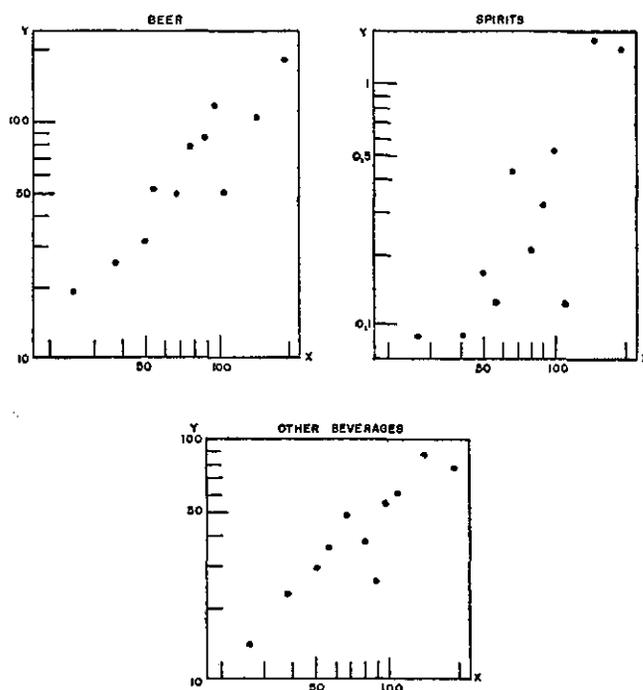


TABLE 364. COLOMBIA : PROJECTIONS OF DEMAND FOR BEVERAGES

(Total in millions of pesos at 1953 prices : *per capita* figures in pesos at 1953 prices)

	1953		1960				1965			
	Total	Per capita	Hypothesis A		Hypothesis B		Hypothesis A		Hypothesis B	
			Total	Per capita	Total	Per capita	Total	Per capita	Total	Per capita
Total beverages	452	37.3	789	55.7	649	45.8	1,182	74.5	908	57.2
Beer	261	21.6	470	33.2	384	27.1	708	44.6	541	34.1
Spirits	119	9.8	213	15.0	170	12.0	334	21.0	246	15.5
Wines	6	0.5	11	0.8	9	0.6	17	1.1	13	0.8
Non-alcoholic beverages	66	5.4	95	6.7	86	6.1	123	7.8	108	6.8

SOURCE : ECLA.

TABLE 365. COLOMBIA : ESTIMATED INPUTS IN THE BEVERAGES INDUSTRY, 1953

(Thousands of pesos)

	Beer and malt	Non- alcoholic beverages	Spirits and wines	Total
A. Raw materials	107,900	26,000	31,000	164,900
Domestic	68,800	16,000	27,000	111,800
Producer industry :				
Non-manufacturing sectors	21,413	55	15,843	37,311
Foodstuffs	2,465	12,017	802	15,284
Beverages	35,250	19	2,519	37,788
Textiles	1,757	29	283	2,069
Wood and cork	—	16	591	607
Pulp and paper	14	—	17	31
Printing and engraving, etc.	732	392	191	1,315
Chemicals	223	1,839	32	2,094
Cement, ceramics, glass, etc.	1,513	118	6,570	8,201
Mechanical and metallurgical industries	5,314	1,500	100	6,914
Other industries	119	15	52	186
Imported	39,100	10,000	4,000	53,100
Value at factory of origin	20,090	5,350	1,800	27,240
Producer industry :				
Non-manufacturing sectors	8,723	22	272	9,017
Foodstuffs	199	18	—	217
Beverages	6,000	—	172	6,172
Textiles	6	—	5	11
Pulp and paper	19	9	82	110
Chemicals	846	3,639	717	5,202
Cement, ceramics, glass, etc.	506	—	—	506
Mechanical and metallurgical industries	3,429	1,603	130	5,162
Other industries	362	59	422	843
Expenditure abroad	3,910	1,050	400	5,360
Customs duties	9,300	2,000	1,200	12,500
Expenditure in the country	5,800	1,600	600	8,000
B. Fuel and power energy	7,800	900	1,600	10,300
Fuels and lubricants	4,500	700	1,150	6,350
Electric energy	3,300	200	450	3,950

SOURCE : ECLA.

3. Composition of raw materials and intermediate products consumed by the industries

Table 365 gives detailed estimates of the composition of inputs in production of the various kinds of beverages. Up to 1953, a considerable proportion of the raw materials and intermediate products consumed by the brewing industry was imported. This proportion would have been still higher were it not for the fact that domestic malt production used a certain amount of imported barley. Barley was the most important of the inputs from the non-manufacturing sectors, from which imported hops also came. Other major intermediate products consisted of those supplied by the beverages industry itself (chiefly malt), and by the mechanical and metallurgical industries (crown caps, and tinsplate for their manufacture).

The far-reaching development which may be anticipated in the light of the criteria given above will in its turn lead to similar increases in the requirements of raw materials and intermediate products. It would therefore be useful to make at least a brief examination of the repercussions which such development might have on the production of other sectors or on imports. As regards barley, domestic production increased so rapidly that imports — which were mainly from Ecuador — were of little significance in 1953. However, production is hardly likely to expand at a higher

rate than total requirements, so that there are grounds for expecting that a certain amount of imports will still be necessary. The growing capacity of domestic malthouses will probably enable malt imports to be eliminated, which would imply an additional increase in barley requirements. So far as crown caps are concerned, there was a tendency to increase their manufacture in the country, imports of these articles being replaced by those of tin-plate. Plans for expanding the Paz del Río iron and steel works may in future also do away with the necessity for bringing tinsplate in from abroad.

In the production of non-alcoholic beverages, the principal domestic raw materials used were sugar (with a total consumption of about 25,000 tons in 1953), carbon dioxide and crown caps (made from imported tinplate). The most significant imports comprised extracts and essences — for which it appeared to be difficult to find domestic substitutes — citric acid — for which the necessary raw materials could probably be found in the country — and tinplate.

The greater part of the raw materials used for the distillation of spirits was of domestic origin — *panela*, sugar, honey, aniseed and alcohol accounting for about two-thirds of the total. As regards wines, not less than 40 per cent was composed of sugar, bananas, oranges and other fruits and alcohol. Ammonium sulphate represented one of the few large-scale imports of raw materials for these industries.

The supply of containers was largely domestic, with the exception of certain special types for which the necessary facilities were installed in recent years.

IV. TOBACCO INDUSTRY

Table 366 summarizes some of the more important aspects of the tobacco industry in 1953. The figures show that there was a marked contrast between the two principal activities which make up this industry. Whereas cigarette production constituted an industrial activity, and was in the hands of a small number of enterprises usually endowed with modern and efficient equipment, production was, on the whole, of the artisan type. This explains the great discrepancies between the value of production and the number of persons employed per establishment, and between value added and remuneration per worker.

TABLE 366. COLOMBIA : MAIN STATISTICAL DATA ON THE TOBACCO INDUSTRY, 1953

(Thousands of pesos)

	Total	Cigarettes	Cigars
Gross value of production	96,688	74,592	22,096
Value added by production	55,820	45,970	9,850
Consumption of raw materials			
Total	40,629	28,397	12,232
Domestic	34,741	22,802	11,939
Imported	5,888	5,595	293
Remunerations :			
Total	12,703	8,961	3,742
Salaries and wages	11,166	7,644	3,522
Social security contributions ...	1,537	1,317	220
Number of persons employed	9,123	1,612	7,511
Number of enterprises	1,088	11	1,077

SOURCE : ECLA.

More than two-thirds of total tobacco consumption in the country¹⁰ consisted of cigarettes, some 645 million packets being produced in 1953. Production was almost entirely in the hands of one large enterprise, with plants in different parts of the country. Cigar production reached about 406,000 tons, averaging about 180 units per kilogramme.

Table 367 contains estimates of the quantum indices of the tobacco industry as a whole during the period 1925-53, and data on the volume of production in both branches from 1934 onwards. From these, it is clear that the rate of growth of the industry — one of the slowest in the whole manufacturing sector — was retarded by cigar production, since cigarette-making developed much more rapidly, absorbing almost the entire increment in consumption resulting from the rise in population and *per capita* income.

The differing pattern of demand in the two cases may be better appreciated from figure XXXII, which compares *per capita* consumption of cigarettes and cigars with the total corresponding figures for *per capita* income, both for the period 1937-53 and for the sample of urban families surveyed in 1953.

These comparisons indicate that if the whole of the period from 1937 to 1953 is considered, cigarettes had a high income-elasticity coefficient (1.7) ; it is also clear that this tended to drop sharply in more recent periods (1.1 during 1947-53 and only 0.7 according to the survey sample). On the other hand, the historical coefficients for cigars were negative (minus 0.2 in 1937-53 and minus 0.3 in 1947-53) and the sample figure was also very low (0.1).

¹⁰ Total production in 1953 was about 25,000 tons, a little over 5,000 being exported.

TABLE 367. COLOMBIA : ESTIMATED QUANTUM OF PRODUCTION OF THE TOBACCO INDUSTRY, 1925-1953

Year	Total production (Index: 1953 = 100)	Cigarette production (Millions of packets)	Cigar production (Tons)
1925	52.8	...	...
1926	56.4	...	...
1927	39.8	...	...
1928	38.4	...	...
1929	38.4	...	...
1930	38.3	...	...
1931	35.5	...	...
1932	35.5	...	...
1933	31.3	...	...
1934	28.1	...	...
1935	37.7	...	...
1936	39.4	...	...
1937	41.0	206	3,816
1938	43.5	221	3,971
1939	48.6	258	4,066
1940	49.8	283	3,555
1941	44.6	231	3,944
1942	46.0	269	3,512
1943	52.3	295	3,823
1944	55.7	325	3,700
1945	54.6	319	3,586
1946	62.3	351	4,516
1947	70.4	417	4,454
1948	76.9	463	4,630
1949	78.4	480	4,466
1950	89.4	551	4,973
1951	101.9	647	5,030
1952	98.2	627	4,708
1953	100.0	645	4,590

SOURCE : ECLA.

In view of the foregoing, it would seem reasonable to base future estimates on an income-elasticity coefficient of 0.8 for cigarettes and a more or less stable level of *per capita* cigar consumption. If the hypotheses on the future increase in total expenditure on goods and services are added to these, projections of demand for the two types of products in 1960 and 1965 may be formulated (see table 368).

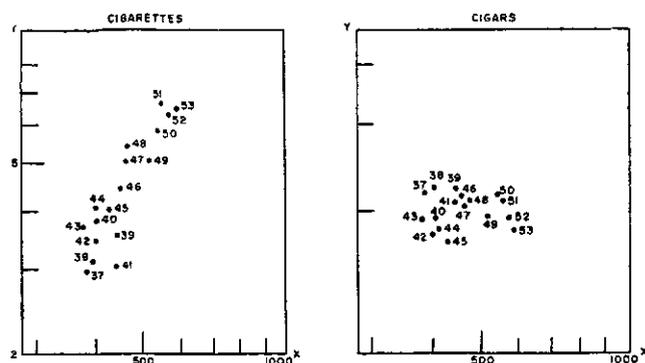
Since imports of these products were already at a very low level in 1953 (they consisted of certain types of cigarettes that were different from those produced in the country and priced much higher), these projections of demand in their turn indicate the rate of growth which — under the conditions assumed — would need to be attained by domestic industry. In the case of the most favourable hypothesis, the increase in cigarette production between 1953 and 1965 would amount to 86 per cent.

The estimates in table 369 enable an assessment to be made of the possible effect of these increases in total production on requirements of raw materials and intermediate products, both national and imported, for the tobacco industry. Agricultural inputs — in which leaf tobacco predominated — constituted in both cases the highest proportion of the total value of raw materials consumed ; in the case of these inputs, there would not appear to be any special difficulty as regards future requirements, since there was already a fairly large exportable surplus in 1953 and domestic production had possibilities of expanding. Imports were very restricted in that year, being limited to certain special types of tobacco which were used in very small amounts for blending.

FIGURE XXXII. PART A. COLOMBIA : RATIO BETWEEN
per capita CONSUMPTION OF TOBACCO AND TOTAL per
capita INCOME, 1937-53

(Logarithmic scale)

Y = Consumption of tobacco.
X = Total private consumption.



PART B. SURVEY OF URBAN FAMILIES

(Monthly statistics)

(Logarithmic scale)

Y = Consumption of tobacco.
X = Average income.

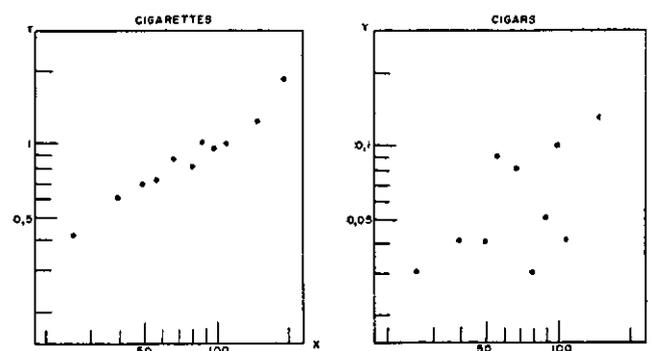


TABLE 368. COLOMBIA : PROJECTIONS OF DEMAND FOR TOBACCO

(Total in millions of pesos at 1953 prices; per capita figures in pesos at 1953 prices)

	1953		1960				1965			
	Total	Per capita	Hypothesis A		Hypothesis B		Hypothesis A		Hypothesis B	
			Total	Per capita	Total	Per capita	Total	Per capita	Total	Per capita
Total tobacco	102	8.4	142	10.0	134	9.5	178	11.2	164	10.3
Cigarettes	80	6.6	116	8.2	108	7.6	149	9.4	135	8.5
Cigars	22	1.8	26	1.8	26	1.8	29	1.8	29	1.8

SOURCE : ECLA.

TABLE 369. COLOMBIA : ESTIMATED INPUTS
IN THE TOBACCO INDUSTRY, 1953

(Thousands of pesos)

	Cigarettes	Cigars	Total
A. Raw materials	28,397	12,232	40,629
Domestic	22,802	11,939	34,741
Producer industry :			
Non-manufacturing sectors ..	19,959	10,506	30,465
Pulp and paper	631	—	631
Printing, engraving, etc.	2,039	597	2,636
Other industries	173	836	1,009
Imported	5,595	293	5,888
Value at factory of origin	3,427	175	3,602
Producer industry :			
Non-manufacturing sectors ..	171	175	346
Pulp and paper	1,932	—	1,932
Chemicals	491	—	491
Mechanical and metallurgical industries	833	—	833
Expenditure abroad	651	35	686
Customs duties	950	50	1,000
Expenditure in the country	567	33	600
B. Fuel and energy	225	14	239
Fuels and lubricants	125	10	135
Electric energy	100	4	104

SOURCE : ECLA.

The cigarette industry also had considerable inputs of other types of imported products, mainly cigarette paper, cellophane and aluminium for packing, inks for printing, glues and other chemical products. It is highly probable that a considerable degree of import substitution of several of these items may shortly be effected—paper and board for packing, and aluminium foil, for example; in other cases import substitution was more difficult since the industry's high degree of mechanization made it necessary to use standardized raw materials of high quality.¹¹

V. TEXTILE INDUSTRIES

1. Past development and present characteristics

Part Two, chapter III, of this study contains an analysis of the manufacturing sector as a whole, in which reference is made to several of the main characteristics of the textile industries, emphasizing the considerable importance attaching to them within the country's over-all industrial production and their role in the process of import substitution. For a more detailed consideration of these characteristics the five major branches should be distinguished: cotton spinning and weaving, wool spinning and weaving, the production of silk textiles and artificial fibres, the production of hardfibre textiles, and the manufacture of knitwear.

Table 370 summarizes some of the salient aspects of these five branches, and also shows the relative importance of each within total textile production in 1953.

¹¹ For example, attempts to use adhesive materials produced in the country were so far unsatisfactory.

TABLE 370. COLOMBIA : MAIN STATISTICAL DATA ON THE TEXTILE INDUSTRIES, 1953

(Thousands of pesos)

	Total	Cotton	Wool	Artificial fibres	Hard fibres	Knitwear
Gross value of production	480,277	230,188	85,198	103,074	20,890	40,927
Value added by production . . .	233,616	134,132	32,610	44,693	3,638	18,543
Consumption of raw materials :						
Total	238,220	91,256	51,488	56,590	17,002	21,884
Domestic	120,176	43,902	18,108	34,808	14,888	8,470
Imported	118,044	47,354	33,380	21,782	2,114	13,414
Consumption of fuel and energy	8,441	4,800	1,100	1,791	250	500
Remunerations :						
Total	85,745	41,006	15,900	18,700	2,650	7,489
Wages and salaries	74,640	35,060	13,900	16,500	2,500	6,680
Social security contributions	11,105	5,946	2,000	2,200	150	809
Number of persons employed .	36,594	15,600	6,000	7,000	3,500	4,494

SOURCE : ECLA.

A large part of the total value of 480 million pesos for textile production during that year did not, however, consist of end products for direct consumption, but of intermediate products which still required processing and constituted raw materials for other sectors. This referred especially to that part of production represented by hard fibre fabrics — formed entirely by packing materials purchased by other enterprises — much of the output in woollen yarns and fabrics and, to a lesser extent, cotton and artificial fibres. The following is an approximate break-down of total production by branches and types of products (see table 371).

Woollen yarn is obviously an intermediate product. As regards the intermediate products arising from the processing of cotton textiles, woollen fabrics and artificial fibres, they were mainly sold to the ready-made clothing industry.

Tables 372 and 373 deal with other important aspects of the textile industry. The first-named estimates variations in the quantum of total and in that of the five specific branches, so as to give some indication of the rate of growth of these industries since 1925. The second contains estimates of the composition of input in 1953 in production of the various types of textile, classifying the raw materials and intermediate products by industries of origin and giving a break-down of domestic production and imports.

Owing to the notable discrepancies between different branches of the textile industry in several of the aspects mentioned, it is necessary to make a brief statement on each of them separately.

(a) Cotton textiles

This is the oldest branch of the Colombian textile industries, several of the existing enterprises having started operations at the beginning of the century. It is also in this branch that the largest production units in the country were to be found, with as many as 4,000 workers in a single plant.

In spite of its relatively old-established nature, the manufacture of cotton in Colombia was generally carried on with modern equipment, owing to the large-scale renovations and expansion of capacity effected by the most important enterprises in the early post-war years. Production was mainly concentrated in a few large units; numerous smaller concerns also existed, but it may be estimated that about 90 per cent of total output came from twelve enterprises, and that 75 per cent of this again was in the hands of only three firms.

Although no exact figures are available, it may be estimated that this branch as a whole currently possessed about 300,000 spindles and 7,000 looms. It is interesting to record that — in so far as the

TABLE 371. COLOMBIA : ESTIMATED DISTRIBUTION OF TEXTILE PRODUCTION, 1953

(Gross value in thousands of pesos)

	Total production	End products			Intermediate products		
		Total	Exports	Consumption	Total	Sales to manufacturing sector	Sales to other sectors
Total	480,277	317,277	2,040	315,237	163,000	151,000	12,000
Cotton	230,188	179,780	1,439	178,341	50,408	50,008	400
Woollen yarn	11,702	—	—	—	11,702	11,702	—
Woollen fabrics	73,496	23,496	136	23,360	50,000	50,000	—
Artificial fibres	103,074	73,074	—	73,074	30,000	30,000	—
Hard fibres	20,890	—	—	—	20,890	9,290	11,600
Knitwear	40,927	40,927	465	40,462	—	—	—

SOURCE : ECLA.

TABLE 372. COLOMBIA : ESTIMATED QUANTUM INDICES OF TEXTILE PRODUCTION, 1925-1953

(Base: 1953 = 100)

Year	Total	Cotton	Wool		Artificial fibres	Hard fibres	Knitwear
			Yarn	Fabrics			
1925	7.3	12.5	—	—	—	...	—
1926	7.9	13.5	—	—	—	...	—
1927	8.8	15.1	—	—	—	...	—
1928	5.4	9.3	—	—	—	...	—
1929	6.6	11.3	—	—	—	...	—
1930	7.3	10.7	—	—	—	74.8	—
1931	9.0	13.7	—	—	—	74.1	—
1932	10.1	15.6	—	—	—	74.1	—
1933	15.1	18.5	—	17.7	1.9	74.1	11.0
1934	16.4	19.4	—	19.6	4.6	74.1	11.9
1935	20.0	22.6	—	27.9	7.4	74.1	14.3
1936	21.9	24.6	—	33.8	7.4	74.1	15.5
1937	27.6	31.6	—	36.5	12.6	74.1	20.3
1938	30.4	37.2	—	32.8	11.3	74.1	23.4
1939	37.8	47.6	—	34.9	14.8	74.1	30.0
1940	29.8	38.2	—	21.4	11.9	74.1	24.0
1941	55.3	74.3	—	25.0	25.2	74.1	47.1
1942	62.1	83.0	5.5	49.4	17.1	74.1	50.8
1943	57.5	74.6	6.2	49.9	20.0	74.1	46.5
1944	61.7	81.2	14.1	54.9	16.5	74.1	49.7
1945	55.6	68.4	25.5	51.5	26.6	74.1	43.9
1946	71.3	88.5	46.0	47.4	42.2	76.3	58.2
1947	66.7	76.4	40.8	59.9	48.4	77.8	55.1
1948	68.8	75.3	58.0	64.9	55.6	81.5	59.8
1949	70.3	78.8	63.0	69.9	49.2	88.9	58.6
1950	86.6	93.7	114.9	77.4	72.6	87.4	74.9
1951	79.6	78.5	74.8	82.4	84.1	85.2	72.3
1952	89.5	94.4	59.1	91.1	81.8	88.9	78.9
1953	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE : ECLA.

relation between spindles and looms constituted an indication of the average quality—these products compared favourably with those of other Latin American countries (see table 374).

Total production of cotton textiles in 1953 was estimated at slightly more than 210 million yards of fabric of various kinds, with a value of about 240 million pesos at manufacturers' prices. The general tendency was to produce cheap fabrics, but their quality has been gradually improved.

In this class of goods domestic production had almost completely replaced imports by 1953, so that the only remaining purchases from abroad were articles of higher quality, such as poplin for shirt-making; it was also estimated that the experience gained by the industry would shortly enable import substitution to be effected to a still greater degree.

Production in 1953 was already approaching the limit of installed capacity; in fact, the large factories were normally working three shifts a day for six days a week.¹² Expansion plans were therefore under way or being studied, and it was hoped that through these productive capacity would shortly increase by 20 to 25 per cent.

Almost all the important firms in this branch were organized

¹² The situation was less favourable in some of the smaller enterprises, which were working no more than two shifts and sometimes only partially utilizing their installations.

in the form of joint stock companies, in some of which a number of small shareholders participated; this was an interesting experiment in the channelling of small savings into industrial investment.¹³

The figures for value added and total remuneration per person employed also indicate relatively high productivity; the main difficulties arose from over-diversification as a result of market conditions which made it difficult to specialize in particular kinds of fabrics. Apart from ensuring the efficiency of their equipment, the large enterprises also attended to the technical training of their workers; some of them started in-service training courses and introduced time and motion studies.

Another important aspect is that of raw materials and intermediate products. In 1953 total consumption amounted to more than 90 million pesos, of which over 52 per cent represented imports.

This heavy dependence on imported raw materials diminished considerably in recent years, particularly after the exceptional development of national cotton production, which already supplied about 85 per cent of all raw materials and intermediate products consumed by the industry.

As may be seen from the figures in table 375, domestic cotton covered more than half the industry's requirements during 1935-37,

¹³ One of them had about 17,000 shareholders, more than half of whom held less than 100 shares.

TABLE 373. COLOMBIA : ESTIMATED INPUTS IN THE TEXTILE INDUSTRIES, 1953

(Thousands of pesos)

	Cotton	Wool	Artificial fibres	Hard fibres	Knitwear	Total
A. <i>Raw materials</i>	91,256	51,488	56,590	17,002	21,884	238,220
<i>Domestic</i>	43,902	18,108	34,808	14,888	8,470	120,176
Producer industry :						
Non-manufacturing sectors	37,574	5,000	1,262	14,888	2,036	60,760
Textiles	1,647	11,727	64	—	3,296	16,734
Chemicals	3,757	1,365	32,957	—	2,235	40,314
Other industries	924	16	525	—	903	2,368
Imported	47,354	33,380	21,782	2,114	13,414	118,044
Value at factory of origin	30,118	23,089	11,742	1,332	7,155	73,436
Producer industry :						
Non-manufacturing sectors	25,949	6,578	517	1,034	2,448	36,526
Textiles	1,430	16,088	702	107	1,489	19,816
Chemicals	2,736	421	10,522	191	3,217	17,087
Other industries	3	2	1	—	1	7
Expenditure abroad	5,457	3,849	2,511	244	1,547	13,608
Customs duties	6,039	2,400	4,891	282	3,088	16,700
Expenditure in the country	5,740	4,042	2,638	256	1,624	14,300
B. <i>Fuel and energy</i>	4,800	1,100	1,791	250	500	8,441
Fuels and lubricants	1,800	600	913	100	200	3,613
Electric energy	3,000	500	878	150	300	4,828

SOURCE : ECLA.

TABLE 374. NUMBER OF SPINDLES AND LOOMS INSTALLED IN SELECTED COUNTRIES, 1949-1950

Country	Spindles	Looms	Spindles per loom	Index
Colombia	263,216	6,597	39.9	100.0
Brazil	3,279,677	100,146	32.6	81.7
Chile	173,534	5,012	34.6	86.7
Ecuador	37,000	1,454	26.0	65.2
Mexico	935,582	34,133	27.4	68.7
Peru	176,332	6,304	28.0	70.2
Germany	—	—	48.0	120.3
United States	23,007,000	—	50.0	125.3
France	8,113,000	—	50.0	125.3
Japan	3,906,000	—	48.0	120.3
United Kingdom	28,625,000	—	81.2	230.5

SOURCES : *Asociación Nacional de Industriales de Colombia, Bulletin No. 61*, and basic ECLA estimates ; ECLA, *Productivity of labour in the cotton textile industry in five Latin American countries* (E/CN.12/219), United Nations publication, Sales No. 1951.II.G.2 ; and CETEX, *Current problems of the Brazilian textile industries* (original Portuguese), 1951. The figures for Colombia cover fourteen firms, and are based on a special survey carried out by ANDI.

but from that time onwards its production lagged behind industrial development and made it necessary to import more. Up to 1945, domestic cotton did not satisfy more than 20-25 per cent of total requirements, while imports amounted to some 20,000 tons annually. A vigorous campaign for increased cultivation of cotton and improvements of its quality was then launched. This is particularly interesting, since seldom had a policy designed to encourage the domestic production of an agricultural commodity achieved such complete success.

The first conclusive results of this campaign were obtained during the later years, when production rose to 10,000 tons in

1952 and 17,000 tons in 1953, compared with only 4,000-5,000 tons produced in the immediate post-war years and a little over 6,000 in 1949.

An official *ad hoc* organization, which was assisted by industry itself, namely, the *Instituto de Fomento Algodonero*, played an important part in this success. Its work consisted not only in encouraging cotton-growing, but also in providing technical assistance to planters in such matters as selection of seed and farming methods and subsequently in supplying cotton-gins, participating in classification of the product, intervening in price-fixing and fostering measures to ensure an adequate market.

TABLE 375. COLOMBIA : CONSUMPTION OF RAW COTTON
(Tons)

Year	Production	Imports	Consumption
1925	2,976	628	3,604
1926	2,850	1,049	3,899
1927	2,790	1,551	4,341
1928	2,664	6	2,670
1929	2,800	458	3,268
1930	2,900	196	3,096
1931	3,000	934	3,934
1932	3,137	1,351	4,488
1933	3,100	2,225	5,325
1934	3,100	2,500	5,600
1935	2,900	3,600	6,500
1936	4,500	2,600	7,100
1937	5,800	3,300	9,100
1938	6,300	4,400	10,700
1939	7,000	6,700	13,700
1940	2,800	8,200	11,000
1941	3,800	17,600	21,400
1942	4,900	19,000	23,900
1943	4,400	17,100	21,500
1944	5,700	17,700	23,400
1945	4,700	15,000	19,700
1946	4,800	20,700	25,500
1947	6,400	15,600	22,000
1948	6,000	17,300	21,700
1949	6,600	16,500	22,700
1950	8,500	21,500	27,000
1951	6,500	13,800	22,600
1952	10,600	18,200	27,200
1953	17,000	15,100	28,800

SOURCES : *Anuarios de Comercio Exterior (Yearbooks of foreign trade)*; *Instituto de Fomento Algodonero*.

NOTE : Production data for 1926-27, 1929-31 and 1933 were estimated by interpolation of the figures available for 1925, 1928, 1932 and 1934. A number of minor exports were not taken into account in the consumption estimates, especially during the 'twenties. Consumption figures for 1948-52 were adjusted to allow for changes in factory inventories, and therefore do not coincide with the sum of production plus imports. For 1953, consumption was estimated on the basis of data supplied by the factories themselves.

The success of the latter was ensured by the establishment, from 1948 onwards, of obligatory quotas to be accepted by the industry at government-controlled prices; in this way the granting of import licences was made conditional upon previous evidence that the industry had purchased its quota of domestic raw material. For the actual purchases, a special body (known as the *Diagonal*) financed by the industry itself, was set up to act as an intermediary in distributing domestic cotton supplies.

This system, with all its attendant long-term benefits to the country, was apparently a source of further difficulties to the industry and raised production costs. In fact, the price of domestic cotton was normally 20-25 per cent higher than that of the imported article, although its yield was lower.

There was a consequent tendency to lower production costs, and cotton prices had already begun to drop, which proves that some success was being achieved in this direction.

The second difficulty was that of the quality of domestic cotton. Although considerable progress had been made, there was still a wide margin for improving selection methods. In general, the cotton was of short fibre, but in some regions much more favourable fibre lengths were being produced.

Yet a third difficulty arose from the use of *cabuya* (agave) as packing for domestic cotton, since its fibres adhere to the cotton and damage it. Industrialists generally believed the resulting loss to be considerable. The industry itself therefore undertook a campaign, through the intermediary of *Diagonal*, to substitute cotton sacks for *cabuya*.

Despite these drawbacks, results obtained so far have been promising, and if the programmes for expanding and improving cotton-growing are continued, the textile industry will, in the long run, benefit by the creation of a domestic source of supply for its principal raw material.

Other raw materials mainly consisted of aniline and other dyes, which were almost entirely imported. It is generally felt that technical difficulties — and probably the insufficient size of the market — will prevent their production in the country in the near future; however, there may be more possibility of doing so when raw materials from the coal distillery at Paz del Río are available, as well as by-products from petroleum refining. Apart from these, there was another series of raw materials which were all imported but which could probably be produced within the country without great difficulty; among these were acetic acid, alum, calcium hypochloride, sodium hydrosulphite, etc.

Domestic production of various raw materials had already replaced imports, principally soda and other chemical products used in sizing and mercerization. Requirements of starches and sulphuric and hydrochloric acids, for example, were wholly satisfied by domestic production.

(b) Woollen textiles

In contrast to the corresponding activity in the cotton industry, there was clear differentiation between the processes of spinning and weaving of woollen textiles, and therefore integration was not as complete. One firm, indeed, was engaged exclusively in the manufacture of yarn for sale: only two of the large weaving mills produced any of the yarn they consume, while the remainder purchased some of their requirements locally and the major part abroad.

The woollen textile industry was established much later than the cotton industry. Although production had previously existed on a small scale, it was not until the crisis of the 'thirties that any considerable operations were begun.

It is not easy to make a reasonably accurate estimate of the progress made since then. Between the 'thirties and the end of the Second World War, activities were confined to weaving, with imported yarn only. From then on, yarn was also produced domestically, and national sources were recently able to supply most of the woollen industry's requirements. Table 376 provides an estimate of total yarn consumption, based on imports of wool in bulk, wool tops and yarn.¹⁴

According to these estimates fabrics production was approximately trebled between 1933 and 1943, while in the following decade it was barely doubled; in the latter period a high degree of import substitution had already been achieved.

Despite the decline in the rate of growth of production, new plants continued to be installed, which led to the formation of a considerable margin of idle capacity.¹⁵

¹⁴ Variations in inventories, which were apparently considerable, were the main source of difficulty in arriving at these estimates. When the Korean war broke out, for example, there was a sudden rise in the world price of wool, and factories tended to accumulate large stocks, which had to be consumed in the following years, when the price fell again sharply.

¹⁵ In 1953 only one of the larger firms was working three shifts; the remainder had adopted a single or double shift system without arriving at full utilization of capacity. It is estimated that, on the whole, not more than 60 per cent of weaving capacity was utilized.

TABLE 376. COLOMBIA : ESTIMATED CONSUMPTION OF WOOLLEN YARN

(Tons)

Year	Imports of wool ^a	Domestic production of yarn ^b	Imports of yarn	Apparent consumption	Estimates of real consumption ^c
1933			354	354	354
1934			393	393	393
1935			559	559	559
1936			677	677	677
1937			732	732	732
1938			657	657	657
1939			1,011	1,011	700
1940			298	298	428
1941			319	319	500
1942	130	45	1,173	1,218	990
1943	150	51	1,014	1,065	1,000
1944	345	116	691	807	1,100
1945	615	210	821	1,031	1,031
1946	1,038	379	570	949	949
1947	916	336	1,343	1,679	1,200
1948	1,169	478	880	1,358	1,300
1949	1,280	519	806	1,325	1,400
1950	1,949	947	1,408	1,600	1,550
1951	962	616	1,149	1,765	1,650
1952	697	487	675	1,197	1,824
1953	1,208	824	1,179	2,003	2,003

SOURCE : Basic statistics from the *Anuarios de Comercio Exterior (Yearbooks of foreign trade)*.^a Includes greasy wool, washed wool and wool tops.^b Estimated on the basis of wool imports. Different percentages of yield in terms of yarn were used for each of the three types of wool indicated in note *a*.^c The figures represent a more or less arbitrary redistribution of those for apparent consumption, because of the lack of data on the stocks accumulated during each period.

In view of the slow rate of growth of cloth production in the last decade, it should not be forgotten that the contribution of this branch to total industry may be measured not only by the output of end goods but also the production obtained by the spinning process. Table 377 estimates value added by both spinning and weaving at 1953 prices, as an indication of the over-all development of the industry.

Since a high proportion of current production was in the hands of recently-founded enterprises, equipment was generally fairly modern. Several of the older firms pursued a renovation policy which left them equally well-equipped. This procedure was not, however, invariably adopted, and there were some cases in which the machinery was not so up-to-date; as a result it is calculated that in the largest firms the number of looms per worker varied on an average from 1.8 to 4, although in most cases it approached the latter figure.

Investment consisted mainly of domestic capital. However, in some of the larger firms, Colombian and foreign capital — chiefly French — participated jointly. Foreign investment was more widespread in spinning mills, while in weaving it was limited to two or three large-scale enterprises.

Total production in 1953 may be estimated at over 4 million metres of cloth with an average weight of 450 grammes per metre. To this sum should be added the manufacture of *ruanas*, blankets and similar articles, largely from domestic wool. Spinning output in the same year amounted to about 800 tons of yarn.

The woollen industry was even more dependent than cotton textiles on imports for its raw materials and intermediate products in 1953. As confirmed by previous tables, imports represented over 60 per cent of the value of total inputs, and, moreover, part of the

yarn produced from imported wool was shown as domestic material.

In 1953 domestic production supplied no more than 40 per cent of total yarn requirements, so that there was a considerable margin in which import substitution could take place. There was ample capacity available for this purposes, but the domestic mills were then faced with heavy dumping on the world market which not only prevented any increase in production, but even led to temporary closures in one case.

Domestic wool production was inadequate to meet total requirements and was, moreover, of poor quality. Most of it was therefore destined for the manufacture of carded yarns employed in the production of *ruanas*, blankets, covers, etc. No change in this situation is to be expected in the near future, so that future increases in consumption will necessarily entail more imports.

The remaining raw materials consumed by the industry were of scant importance, as they constitute only 5 per cent of total value. They consisted largely of aniline and other dyes, and size, to which similar comments to those referring to cotton textiles are applicable.

(c) *Silk and artificial fibre fabrics*

The silk and artificial fibre mills resembled the woollen textile industry in that they began operations in the country during the crisis of the 'thirties. They were of little importance, however, until the outbreak of the Second World War, when most of the present large enterprises were either formed or consolidated. In many cases production began as a side-line in cotton or wool concerns already in existence.

There are no direct statistics which trace the development of production in this branch of the textile industry since its incep-

TABLE 377. COLOMBIA : ESTIMATES OF VALUE ADDED
IN THE WOOLLEN TEXTILE INDUSTRY

(Thousands of pesos at constant 1953 prices)

Year	Spinning ^a	Weaving ^b	Total
1933		2,826	2,826
1934		3,137	3,137
1935		4,462	4,462
1936		5,404	5,404
1937		5,843	5,843
1938		5,245	5,245
1939		5,588	5,588
1940		3,417	3,417
1941		3,991	3,991
1942	273	7,903	8,176
1943	309	7,983	8,292
1944	704	8,781	9,485
1945	1,274	8,230	9,504
1946	2,300	7,576	9,876
1947	2,039	9,580	11,619
1948	2,900	10,378	13,278
1949	3,149	11,176	14,325
1950	5,746	12,374	18,120
1951	3,738	13,172	16,910
1952	2,955	14,561	17,516
1953	5,000	15,990	20,990

SOURCE : ECLA.

^a Product of the amount of value added in 1953 multiplied by the index of domestic yarn production, in tons (figures from table 376).

^b Product of the amount of value added in 1953 multiplied by the index of total yarn consumption, in tons (figures from table 376).

tion. A rough idea may be obtained, however, from variations in the consumption of yarn and fibres, which increased more than sevenfold since pre-war years and almost doubled since 1946-48, thus signifying a marked expansion in the production of fabrics (see table 378).

In common with other textile branches, artificial fibre enterprises appeared to be generally equipped with up-to-date plants, either because they were of recent formation or because, in the case of the older-established firms, they had adopted a policy of renovation since some of them began with second-hand equipment.¹⁶ This situation, however, did not always obtain, and some of the older firms were slow to modernize themselves. They were thereby placed in a disadvantageous competitive position, and production tended more and more to be concentrated in the larger and more efficient undertakings.

¹⁶ A special survey carried out by the *Asociación Nacional de Industriales* gathered some interesting information concerning a group of the more important enterprises. For example, for 1951 — the last year included in the inquiry — the following data were obtained :

Number of looms (10 firms)	1,463
Yarn consumed per loom per year (11 firms)	1,361 kilogrammes
Waste in processing (9 firms)	1.92 per cent
Total employees and workers (9 firms) .	3,335
Number of persons employed per loom (9 firms)	2.39

It should nevertheless be remembered that the rapid development of the industry may have substantially modified these figures in more recent periods.

TABLE 378. COLOMBIA : ESTIMATED CONSUMPTION
OF YARN AND ARTIFICIAL FIBRES, 1933-1953

(Tons)

Year	Production ^a	Imports ^b	Consumption ^c
1933		122	122
1934		290	290
1935		464	464
1936		464	464
1937		796	796
1938		713	713
1939		935	935
1940	87	664	751
1941	773	819	1,592
1942	734	347	1,081
1943	813	450	1,263
1944	652	388	1,040
1945	1,213	465	1,678
1946	1,535	1,130	2,665
1947	1,617	1,441	3,058
1948	1,716	1,792	3,508
1949	1,315	1,790	3,105
1950	1,806	2,774	4,580
1951	2,387	2,919	5,306
1952	3,699	1,645	5,164
1953	5,117	1,194	6,311

SOURCE : *Anuarios de Comercio Exterior* (Yearbooks of foreign trade).

^a Estimates based on domestic production of acetate rayon and viscose rayon (see the relevant tables on domestic production of artificial fibres included in the paragraphs on the chemical industries).

^b Composed of imports of yarn and artificial fibres, including nylon.

^c Apparent consumption, excluding inventory variations.

About 12 enterprises were responsible for about 80 per cent of domestic production in 1953, the remaining 20 per cent being distributed among numerous smaller firms.

Much of the initial financing of this industry was provided from investments by large enterprises belonging to other textile branches, while there was also considerable participation by foreign capital.

A special feature of this branch is the fact that — in contrast to the cases of cotton and woollen textiles — the increase in domestic production was due not to import substitution, but to an expansion in domestic consumption. Imports of artificial silk fabrics reached their peak in 1947, when they amounted to about 4 million yards, which was nevertheless a relatively small amount in comparison with domestic output. In 1953, imports were already insignificant, whereas the national factories were turning out an estimated 40 million yards of various kinds of cloth.

The total value of raw materials and intermediate goods employed by artificial fibre mills in 1953 was estimated at about 56 million pesos. The ratio between domestic and imported raw materials was apparently much more favourable than in the case of the other textile branches (62 and 38 per cent respectively), mainly owing to the increase in the domestic output of rayon yarn and fibres. A high degree of import substitution was achieved, the only items still imported being nylon and certain special types of yarn which will be produced within the country in the near future.¹⁷ Nevertheless, from the standpoint of dependence on external supplies,

¹⁷ See the comments on the chemical industries in the present annex, section X.

imported raw materials still played a dominant part in the actual production of fibres.

(d) *Hard fibre textiles*

The major product of this industry is *cabuya* sacking, but other less important products, such as ropes and cordage, were also manufactured.

In contrast to other branches of the textile industry, the manufacture of hard fibre products in Colombia was still mainly an artisan activity. In 1953, there were only two large-scale factories — one in Medellín and the other in San Gil, Santander — with which hundreds of small establishments were associated, while a large part of the agricultural population in certain Departments, especially Santander, was engaged in the manufacture of *fique* sacking as an additional occupation.

In the larger enterprises, the major item of production consisted of bags for coffee exports, which represented about 80 per cent of total output. In the smaller establishments the predominant feature was the manufacture of coarser sacking for the packaging of *pane'a*, yucca and other agricultural commodities, while they also competent with the larger concerns in the manufacture of packing materials for salt, maize, rice, bottles, etc.

Total consumption of packing material for agricultural commodities may be estimated at about 23 million units in 1953. Of these, about 7 million were produced by the two larger enterprises, some 500,000 were obtained from the packing used for agricultural imports, while the remainder — about 15 million units — represented handicrafts and homecrafts production.¹⁸

In 1953, imports of this type of product were insignificant, with the exception of certain articles of cordage, domestic production of which was expanding rapidly.¹⁹ Together with the internal

¹⁸ These estimates are confirmed as approximately accurate by the figures for *fique* consumption. Apparent total consumption in 1953 was about 13,500 tons, of which the two large enterprises consumed some 6,000. The average weight of a sack was about 600 grammes, with a net loss of 8 per cent.

¹⁹ The resistance of *fique* rope is estimated at 18 per cent less than that of sisal; however, in view of the accepted margin of tolerance, it succeeds in complying with international specifications.

market prospects, there would also appear to be some possibility of exporting *cabuya* sacking. During the war years, certain amounts were in fact exported to Central America and to Chile. The main obstacle to regular exporting appears to be the prohibitive costs which rule out any competition with the Mexican or Indian product until such time as the cultivation of this fibre is rationalized and mechanized, and a much greater quantity produced.

2. *Characteristics and projections of demand*

In the analysis of the industrial sector included in the corresponding chapter, projections are made of total demand for textiles in 1960 and 1965. One of the principal conclusions to be drawn from these and other auxiliary projections is that the future rate of growth of the textile industry according to the hypotheses in question would be considerably lower than that recorded in earlier periods.

This conclusion is based on two main facts: firstly, the estimated income-elasticity coefficient for these products as a whole was relatively moderate (around unity); and, secondly, there was a large gap in previous periods between the growth of domestic production and that of textile consumption, since the principal object of the former was to replace imports.

It is easier to appreciate the disparity if a comparison is made between the figures in table 379 for the three principal types of product. For the period from 1937 to 1953, these show the volume of imports, and the production and consumption of cotton fabrics, woollen cloth and silk and artificial fibre materials. It may also be observed that the possibilities of import substitution were already almost exhausted in 1953, since imports were then only an insignificant fraction of total consumption.

Figure XXXIII illustrates the ratios between *per capita* expenditure on each of the principal types of textile products and total *per capita* expenditure on goods and services, both for the period 1937-53, and for the survey of urban families carried out in 1953. On the basis of the average ratios between consumption of the different types of textiles and total *per capita* expenditure derived from this information, it is possible to estimate future demand for these goods according to the two hypotheses previously described. (These estimates are given in table 380.)

TABLE 379. COLOMBIA : APPARENT CONSUMPTION OF STAPLE TEXTILE PRODUCTS, 1937-1953

Year	Cotton fabrics			Woolen fabrics			Silk and artificial fibre fabrics		
	Imports	Production	Apparent consumption	Imports	Production	Apparent consumption	Imports	Production	Apparent consumption
	(Thousands of yards)			(Thousands of metres)			(Thousands of yards)		
1937	95,969	66,360	162,329	1,377	1,460	2,837	1,141	5,040	6,181
1938	52,542	78,120	130,662	945	1,312	2,257	319	4,520	4,839
1939	70,102	99,960	170,062	1,646	1,396	3,042	403	5,920	6,323
1940	32,590	80,220	112,810	567	856	1,423	266	4,760	5,026
1941	37,377	156,030	193,407	468	1,000	1,468	430	10,080	10,510
1942	7,267	174,300	181,567	469	1,976	2,445	475	6,840	7,315
1943	7,168	156,660	163,828	550	1,996	2,546	580	8,000	8,580
1944	5,328	170,520	175,848	260	2,196	2,456	928	6,600	7,528
1945	9,401	143,640	153,041	782	2,060	2,842	1,447	10,640	12,087
1946	3,168	185,850	189,018	1,089	1,896	2,985	2,084	16,880	18,964
1947	7,489	160,440	167,929	1,110	2,396	3,506	4,042	19,360	23,402
1948	12,727	158,130	170,857	1,344	2,596	3,940	2,993	22,240	25,233
1949	6,481	165,480	171,961	584	2,796	3,380	644	19,680	20,324
1950	7,452	196,770	204,222	466	3,096	3,562	993	29,040	30,033
1951	5,419	164,850	170,269	209	3,296	3,505	621	33,640	34,261
1952	10,566	198,240	208,806	54	3,644	3,698	165	32,720	32,885
1953	9,402	210,000	219,402	100	4,000	4,100	48	40,000	40,048

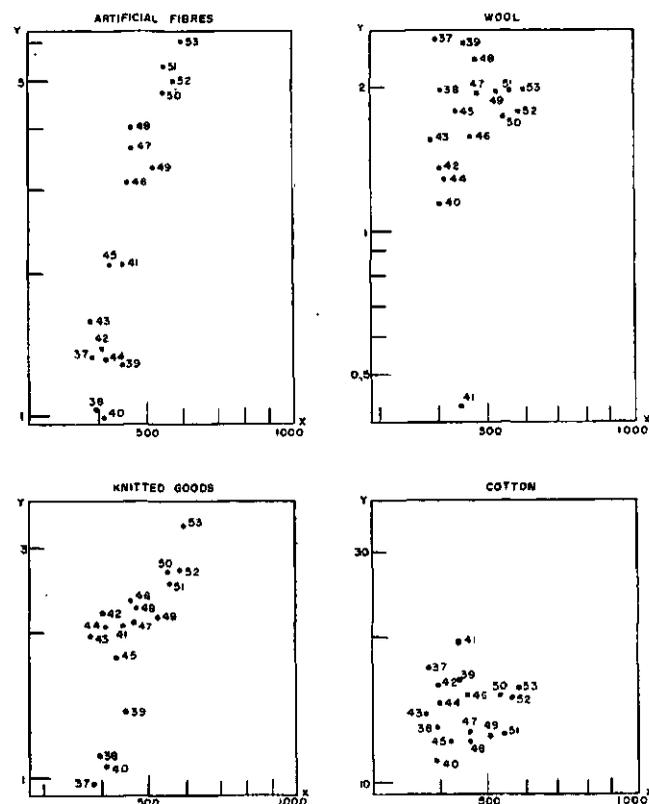
SOURCE : ECLA.

FIGURE XXXIII. PART A. COLOMBIA : RATIO BETWEEN *per capita* CONSUMPTION OF SELECTED TEXTILES AND TOTAL *per capita* PRIVATE CONSUMPTION, 1937-53

(Pesos *per capita* at 1953 prices)

(Logarithmic scale)

Y = Consumption of textiles.
X = Total private consumption.

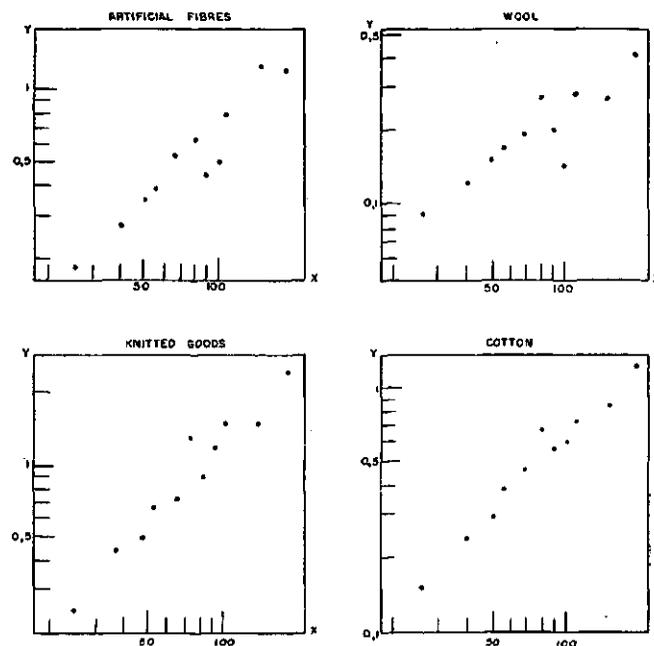


PART B. COLOMBIA : RATIO BETWEEN CONSUMPTION OF SELECTED TEXTILES AND AVERAGE *per capita* INCOME IN THE SAMPLE OF URBAN FAMILIES, 1953

(Monthly statistics)

(Logarithmic scale)

Y = Consumption of textiles.
X = Average income.



VI. FOOTWEAR AND CLOTHING INDUSTRIES

A number of varied activities are grouped under this heading, including the manufacture and repair of footwear — except rubber shoes — the manufacture of ready-made clothing — suits, shirts, underwear, etc. — and the manufacture of hats and other articles of dress.

Since detailed information is not available on all these activities, the comments made in previous sections can be supplemented only by some additional data relative to the estimated quantum indices of production during 1937-53 and to the composition of input in these industries in 1953. An attempt has been made to distinguish between the two major groups at least : the manufacture and repair of footwear and the manufacture of clothing in general. The relevant estimates are presented in tables 381 and 382 respectively.

It should be stressed at this juncture that the earlier figures do not represent projections of the country's total increase in textile production, since they refer only to end products and omit intermediate goods sold to other industries for processing. The projections formulated in other sectors for the textile industry as a whole postulate larger increments in total production value : almost 70 per cent between 1953 and 1960, and 40 per cent between the latter year and 1965, on the more favourable hypothesis, and 49 and 34 per cent respectively on the less favourable hypothesis.

TABLE 380. COLOMBIA : PROJECTIONS OF DEMAND FOR TEXTILES

(Totals in millions of pesos at 1953 prices: *per capita* figures in pesos at 1953 prices)

	1953		1960				1965			
	Total	Per capita	Hypothesis A		Hypothesis B		Hypothesis A		Hypothesis B	
			Total	Per capita	Total	Per capita	Total	Per capita	Total	Per capita
Total	336	27.7	510	36.0	447	31.6	686	43.2	577	36.4
Cotton fabrics	198	16.3	294	20.8	259	18.3	391	24.6	332	20.9
Woollen cloth	24	2.0	34	2.4	31	2.2	43	2.7	38	2.4
Silk and artificial fibre fabrics	73	6.0	119	8.4	102	7.2	166	10.5	135	8.5
Knitwear	41	3.4	63	4.4	55	3.9	86	5.4	72	4.5

TABLE 381. COLOMBIA : ESTIMATED QUANTUM INDICES OF PRODUCTION OF FOOTWEAR AND CLOTHING, 1925-53

(Base: 1953 = 100)

Year	Total	Footwear	Clothing
1925	...	5.4	...
1926	...	5.4	...
1927	...	5.3	...
1928	...	5.3	...
1929	...	6.0	...
1930	...	6.9	...
1931	...	8.6	...
1932	...	20.1	...
1933	...	23.0	...
1934	...	19.2	...
1935	...	21.2	...
1936	...	15.2	...
1937	48.2	12.2	68.5
1938	41.5	18.2	54.7
1939	55.2	24.2	72.7
1940	39.9	39.0	40.4
1941	50.2	38.4	56.8
1942	56.4	37.8	67.0
1943	59.0	48.2	65.2
1944	62.3	55.8	66.0
1945	67.7	68.0	67.5
1946	71.2	60.9	77.0
1947	72.3	57.8	80.5
1948	78.1	62.4	87.0
1949	79.9	81.4	79.1
1950	87.9	86.2	88.9
1951	80.7	77.8	82.3
1952	91.9	92.1	91.8
1953	100.0	100.0	100.0

SOURCE : ECLA.

These two activities were also differentiated when an examination was made of the alternative hypotheses of demand in 1960 and 1965, which were analysed as a whole in the corresponding chapter. Detailed estimates are given in table 383.

Although these projections indicate the approximate increase in total demand for these commodities that may be assumed according to whichever hypothesis is utilized, the prospects for the

development of industrial production proper would seem to be more extensive in view of the predominance of handicraft production until 1953, previously noted as one of the salient features of these industries. In fact most of the larger factories were installed fairly recently and showed a very high rate of growth.

TABLE 382. COLOMBIA : ESTIMATED INPUTS IN THE FOOTWEAR AND CLOTHING INDUSTRIES, 1935

(Thousands of pesos)

	Footwear	Clothing	Total
A. Raw materials	67,200	148,008	215,208
Domestic	57,600	127,118	184,718
Producer industry:			
Non-manufacturing sectors	140	11,435	11,575
Textiles	3,970	111,843	115,813
Wood and cork	989	83	1,072
Pulp and paper	161	346	507
Printing and engraving, etc.	16	21	37
Leather	49,163	1,012	50,175
Rubber	1,521	—	1,521
Chemicals	453	392	845
Mechanical and metallurgical industries	948	11	959
Other industries	239	1,975	2,214
Imported	9,600	20,890	30,490
Value at factory of origin	4,636	10,641	15,277
Producer industry:			
Non-manufacturing sectors	—	11	11
Textiles	975	9,734	10,709
Wood and cork	100	—	100
Pulp and paper	49	131	180
Leather	2,798	225	3,023
Rubber	9	6	15
Chemicals	66	154	220
Mechanical and metallurgical industries	486	21	507
Other industries	153	359	512
Expenditure abroad	883	2,026	2,909
Customs duties	2,588	5,482	8,070
Expenditure in the country	1,493	2,741	4,234
B. Fuel and energy	190	649	839
Fuels and lubricants	40	299	339
Electric energy	150	350	500

SOURCE : ECLA.

TABLE 383. COLOMBIA : PROJECTIONS OF DEMAND FOR FOOTWEAR AND CLOTHING

(Totals in millions of pesos at 1953 prices: per capita figures in pesos at 1953 prices)

	1953		1960				1965			
	Total	Per capita	Hypothesis A		Hypothesis B		Hypothesis A		Hypothesis B	
			Total	Per capita	Total	Per capita	Total	Per capita	Total	Per capita
Total	367	30.3	572	40.4	495	35.0	785	49.5	648	40.8
Footwear	120	9.9	183	12.9	161	11.4	246	15.5	208	13.1
Clothing	247	20.4	389	27.5	334	23.6	539	34.0	440	27.7

SOURCE : ECLA.

VII. PAPER AND PAPER PRODUCTS INDUSTRY

The main activities comprised in this industry are the production of certain kinds of paper and board, and of manufactures based on these, mainly for containers for industrial goods.

Production of paper and board was almost entirely centralized in one plant with facilities for manufacturing several kinds of board and kraft paper. In 1953 output amounted to slightly more than 12,000 tons, part of which was sold in the form of processed products (paperboard boxes and kraft paper bags, mainly for cement) and another part destined for processing in other factories.

This volume of production, however, represented only a very small share of total installed capacity in the industry, which is estimated at some 30,000 tons annually. Many of the facilities available were used for only two or three days a week. This was not because of the limited domestic market — demand for these products being estimated at about 24,000-25,000 tons annually — but because of the serious competition that several lines of production had to face from imported goods. Paper imports in 1953 were substantial, including not only those grades (such as newsprint and printing paper) for which the country lacked the necessary production facilities, but also articles that could be produced domestically.

According to several sources, the customs tariff proved inadequate for the purpose of effecting complete import substitution nor has it provided incentives for initiating new lines of production.²⁰

The staple raw materials used by the industry in 1953 consisted of 6,000 tons of imported kraft and sulphite pulp, more than 1,000 tons of newsprint waste — also imported, since domestic supplies were mainly used for wrapping — and about 6,000 tons of domestic paperboard and scrap. About 4,000 tons of domestic sugar-cane bagasse were also used in the mixtures, supplies of which were difficult to obtain owing to the widespread utilization of bagasse as fuel in the sugar mills.

Other paper and paperboard mills were supplied by domestic industry to a certain extent and also had a high proportion of imports. Most of the processed goods consisted of paperboard boxes and paper bags, to which other manufactures such as cellophane and plastic containers were added in later years.

Apart from the considerable development potential of these industries, the activities of the *Instituto de Fomento Industrial* constituted a promising augury. This Institute aimed at installing a large-scale pulp and paper plant, not only to satisfy the demand for articles not manufactured in the country at present, but also to provide most of the raw materials necessary for this and other important industries.

VIII. LEATHER INDUSTRY

This industry was one of the first to be established in Colombia and ranks among those which have expanded most rapidly. The inclusion of footwear in a separate group (together with clothing) limits consideration of the leather industry to two main branches : tanning and general preparation of hides, and the manufacture of other leather goods. The first was more important, since it accounted for about three-quarters of total production value of the leather factories in 1953 ; moreover, the largest enterprises were to be found in this group, since the manufacture of other leather goods was mainly carried out with artisan labour.

²⁰ The outlook seems particularly discouraging for bleached paperboard and high-grade packing paper ; for similar reasons no effort has been made to install the necessary equipment for the manufacture of glazed paper. With respect to kraft paper — imports of which were also sizeable — tariff duties were 100 pesos per ton plus a 6 per cent *ad valorem* tax. This was deemed insufficient in view of the fact that freight costs from Barranquilla to the plant also amounted to approximately 100 pesos per ton.

Total production in 1953 may be estimated at about 1.2 million hides. A large proportion of this output came from a few big, well-equipped establishments. In that year, the leather industry absorbed the total domestic output of hides, and it recently became necessary to import as well. As in the case of other agricultural raw materials, the accelerated rate of expansion of industrial production causes a shortage of domestic supplies. For several years, in fact, Colombia was an important exporter of hides, which took a prominent place among its over-all exports,²¹ but the export margin has since contracted rapidly.

TABLE 384. COLOMBIA : ESTIMATED INPUTS IN THE LEATHER INDUSTRY, 1953

(Thousands of pesos)

	Tanning	Other leather manufactures	Total
A. Raw Materials	38,000	13,121	51,121
Domestic	30,000	11,477	41,477
Producer industry :			
Non-manufacturing sectors ..	27,394	318	27,712
Foodstuffs	15	—	15
Beverages	10	—	10
Textiles	40	1,055	1,095
Wood and cork	—	153	153
Paper and pulp	—	100	100
Leather	60	8,974	9,034
Rubber	—	21	21
Chemicals	2,415	62	2,477
Petroleum and coal derivatives	16	—	16
Cement, ceramics, glass, etc. .	—	33	33
Mechanical and metallurgical industries	—	526	526
Other industries	50	235	285
Imports	8,000	1,644	9,644
Value at factory of origin	4,863	794	5,657
Producer industry :			
Textiles	—	172	172
Paper and pulp	—	11	11
Leather	—	159	159
Rubber	—	2	2
Chemicals	3,966	20	3,986
Cement, ceramics, glass etc. .	—	2	2
Mechanical and metallurgical industries	—	377	377
Other industries	897	51	948
Expenditure abroad	1,100	151	1,251
Customs duties	600	443	1,043
Expenditure in the country	1,437	256	1,693
B. Fuel and energy	782	50	832
Fuels and lubricants	433	20	453
Electric energy	349	30	379

SOURCE : ECLA.

Apart from the probable inadequacy of domestic production, the industry had to face problems arising from the poor quality of domestic hides, mainly owing to the considerable damage caused by certain parasites (*nuche* and ticks), lack of adequate branding techniques, damage to animals caused by barbed-wire fences and carelessness in slaughter-houses, etc.

²¹ In 1938, for example, about half the domestic production of hides was exported, amounting to about 1 million units annually.

Table 384 gives a break-down of raw materials and intermediate products (by industry of origin) consumed in the two main activities of this industry. Apart from hides, the raw materials used for tanning were mainly tanning agents, both vegetable and mineral. About 70 per cent of these were imported. Other chemicals, such as sulphuric acid, sodium bicarbonate, dyes and pigments were also used. In the manufacturing sector, raw materials consisted mainly of tanned hides and some textiles and metal products. On the whole imported intermediate products accounted for a much smaller share of the total.

IX. RUBBER INDUSTRY

The rubber industry was one of the most recently-established branches of manufacturing in the country. Two main activities may be distinguished: the production of tyres and inner tubes, and the manufacture of a wide range of other articles, the most important of which were rubber boots and shoes.

TABLE 385. COLOMBIA: MAIN STATISTICAL DATA ON THE RUBBER INDUSTRY, 1953

(Thousands of pesos)

	Total	Tyres and inner tubes	Other rubber manufactures
Gross value of production	62,558	41,413	21,145
Value added by production	34,902	22,500	12,402
Consumption of raw materials:			
Total	26,536	18,424	8,112
Domestic	5,544	825	4,719
Imported	20,992	17,599	3,393
Consumption of fuel and energy	1,120	489	631
Remuneration:			
Total	7,909	3,752	4,157
Wages and salaries	7,092	3,385	3,707
Social security contributions	817	367	450
Number of persons employed	2,731	862	1,869

SOURCE: ECLA.

The relative importance of each of these activities may be appreciated more clearly from table 385.

In 1953 there were only two enterprises manufacturing tyres and inner tubes, with a total productive capacity of about 350,000 tyres annually.²² The volume of production attained represented a high degree of utilization of capacity, and, together with the prospects for an expansion of the domestic market, constituted sufficient incentive for the consideration of large-scale expansion plans. These encompassed not only the two existing enterprises but also the installation of new plants; their complete execution would involve raising total productive capacity to a level of more than 600,000 tyres yearly within a relatively short period.

The growth of this industry was not only significant as a contribution to recent industrial development, but also in relation to the volume of imports replaced. In short, imports of tyres alone in 1946 represented about 9 million pesos, and would have been considerably more in 1953, in view of the fact that the value of domestic production exceeded 40 million pesos and it was still necessary to import special types and sizes of tyres to the value of 5 million.

Table 386 gives the import composition of these products during the two years in question.

This industry also included some important plants for retreading, many of them established during the war, when they received a strong impetus owing to the impossibility of importing new tyres.²³ There were far more factories for the manufacture of other rubber articles, although production was mainly in the hands of a few important enterprises. Apart from footwear, existing lines of production chiefly consisted of rubber coverings, pressed articles for industry, rubber-coated fabrics, hosepipes, etc.

Table 387 summarizes the inputs in the two branches, and demonstrates that in 1953 practically all the raw materials and intermediate products used for the manufacture of tyres and inner tubes were imported.

²² The most important was established in 1953 under the sponsorship of the *Instituto de Fomento Industrial* and financed initially by private Colombian and foreign capital. The plant installed near Bogotá began operations in 1945 with second-hand equipment which has since been gradually replaced. The second enterprise — at Cali — is a subsidiary of a foreign company and started in 1944 with a small plant for retreading; equipment for tyre production was installed in 1946 and was considerably expanded later.

²³ It was estimated that total installed capacity was sufficient for retreading about 100,000 tyres annually.

TABLE 386. COLOMBIA: COMPARISON OF TYRE IMPORTS IN 1946 AND 1953

Type of tyre	Number	C.i.f. value (Pesos)	
		1946	Tons
1946			
Tyres for automobiles, buses and lorries	156,964	8,874,959	3,912.0
Tyres for agricultural machinery		74,043	35.6
Tyres for motor-cycles, etc.		19,189	5.8
1953			
Tyres with a unit weight between 9 and 70 kilogrammes	5,099	490,057	133.2
Tyres with a unit weight of more than 70 kilogrammes	10,668	3,150,389	906.6
Tyres for tractors and agricultural equipment	4,533	598,745	167.5
Tyres with a unit weight of less than 9 kilogrammes	103,674	354,801	93.1
Tyres for aeroplanes	1,012	239,297	44.2
Tyres for industrial use	2,021	171,582	42.4

SOURCE: ECLA.

TABLE 387. COLOMBIA : ESTIMATED INPUTS IN THE RUBBER INDUSTRY, 1953

(Thousands of pesos)

	Tyres and inner tubes	Other manufactured goods	Total
A. Raw materials	18,424	8,112	26,536
Domestic	825	4,719	5,544
Producer industry :			
Non-manufacturing sectors ..	653	618	1,271
Textiles	67	3,141	3,208
Leather	—	79	79
Rubber	—	200	200
Chemicals	20	123	143
Petroleum and coal derivatives	—	21	21
Other industries	85	537	622
Imports	17,599	3,393	20,992
Value at factory of origin	11,473	2,213	13,686
Producer industry :			
Non-manufacturing sectors ..	4,561	1,393	5,954
Textiles	4,593	20	4,613
Rubber	—	500	500
Chemicals	1,168	234	1,402
Petroleum and coal derivatives	37	—	37
Mechanical and metallurgical industries	270	—	270
Other industries	844	66	910
Expenditure abroad	2,186	421	2,607
Customs duties	2,263	436	2,699
Expenditure in the country	1,677	323	2,000
B. Fuel and energy	489	631	1,120
Fuels and lubricants	238	351	589
Electric energy	251	280	531

SOURCE : ECLA.

The two principal items were raw rubber and cord (rayon or nylon canvas for tyres). The supply of domestic raw rubber was low in relation to total requirements and was mainly obtained

from tapping wild rubber-trees. Although efforts are being made to promote rational cultivation, there seem to be no prospects of a radical change occurring for quite a long period. One of the rayon factories was studying the possibility of installing equipment for the manufacture of cord, which, as a raw material, is almost as important as rubber in terms of value. There is also a possibility of replacing other imported raw materials, mainly chemicals, by domestic production.

The proportion of imported raw materials was much lower in other rubber manufactures—about 40 per cent of total raw materials and intermediate products consumed by this industry. In the first place, this was due to the fact that rubber represented a much lower share of total manufacture and that, moreover, reconstituted rubber could be used, which was bought on the domestic market at lower prices than imported raw rubber; secondly, fabrics accounted for a much higher proportion of expenditure and were almost entirely purchased from domestic textile industries. Other raw materials used by the rubber industry consisted of chemicals, partly imported (lamp black and titanium dioxide) and partly of domestic origin (solvents, calcium carbonate, etc.), and containers, mostly of domestic manufacture.

X. CHEMICAL INDUSTRY

This was one of the most important branches of manufacturing in Colombia, not only because of its contribution in terms of value added, but also because it produced several commodities which were indispensable raw materials for many other industries, so that it was closely linked to over-all industrial production.

Another factor which makes this industry particularly interesting is the heavy volume of chemical imports, which indicates that it is probably one of the fields which offers the greatest possibilities of import substitution. It is necessary, however, to bear in mind that these imports included a wide range of articles, with varying production possibilities from the point of view of technical difficulties, market size, etc.

The figures given in table 388 summarize the composition of the chemical industry in 1953 broken down into main activities and showing value of production, consumption of raw materials and labour. Table 389 estimates the distribution of production between end goods for direct consumption, and intermediate products for processing by other industries. Among the former the principal items were pharmaceutical and toilet articles, soap and candles,

TABLE 388. COLOMBIA : MAIN STATISTICAL DATA ON THE CHEMICALS INDUSTRY, 1953

(Thousands of pesos)

	Gross value of production	Value added by production	Consumption of raw materials			Number of employed persons
			Total	Domestic	Imported	
Total	207,001	108,452	93,776	39,259	54,517	13,300
Pharmaceutical products ..	82,586	47,666	34,580	16,362	18,218	5,000
Matches	5,280	3,542	1,700	120	1,580	510
Soap and candles	49,000	19,404	28,906	13,253	15,653	4,000
Paint	11,300	4,537	6,700	2,000	4,700	500
Rayon	33,100	19,685	11,478	1,265	10,213	1,400
Soda	5,427	1,899	2,436	2,273	163	345
Sulphuric acid	1,983	1,071	909	909	—	30
Tanning agents	1,856	1,215	459	398	61	140
Chloride and acids	257	176	29	29	—	25
Industrial gases	3,032	2,381	486	44	442	300
Fertilizers and insecticides	2,830	1,387	1,404	643	761	250
Unclassified	10,350	5,489	4,689	1,963	2,726	800

SOURCE : ECLA.

TABLE 389. COLOMBIA : ESTIMATED DISTRIBUTION OF PRODUCTION OF THE CHEMICALS INDUSTRY, 1953

(Gross value in thousands of pesos)

	Total production	End products				Intermediate products		
		Total	Exports	Capital goods	Consumer goods	Total	Sales to the manufacturing sector	Sales to other sectors
Total	207,001	137,459	480	11,300	125,679	69,542	65,712	3,830
Pharmaceutical products ...	82,536	71,879	480	—	71,399	10,707	10,707	—
Matches	5,280	5,280	—	—	5,280	—	—	—
Soap and candles	49,000	49,000	—	—	49,000	—	—	—
Paint	11,300	11,300	—	11,300	—	—	—	—
Rayon	33,100	—	—	—	—	33,100	33,100	—
Soda	5,427	—	—	—	—	5,427	5,427	—
Sulphuric acid	1,983	—	—	—	—	1,983	1,983	—
Tanning agents	1,856	—	—	—	—	1,856	1,856	—
Chloride and acids	257	—	—	—	—	257	257	—
Industrial gases	3,032	—	—	—	—	3,032	3,032	—
Fertilizers and insecticides .	2,830	—	—	—	—	2,830	—	2,830
Unclassified	10,350	—	—	—	—	10,350	9,350	1,000

SOURCE : ECLA.

and smaller quantities of paint and matches ; among intermediate products, the greatest share went to artificial fibres, soda, sulphuric acid, tanning agents and industrial gases, followed by other minor commodities. As may be noted, about two-thirds of the value of total production represented final products ; on the other hand, about 50 per cent of the total value of intermediate goods was accounted for by artificial fibres.

Although the proportion of intermediate products was still relatively low, it increased progressively in recent years, thanks to a more rapid development than that registered by chemical consumer goods. A more detailed view of the changes in the composition of the chemical industry since 1937 may be obtained from table 390 which gives quantum indices for most of the activities mentioned.

One of the most important general characteristics of the chemical industry was that it used a high proportion of imported raw materials and intermediate products (see table 391). This was true of most of its branches, with the exception of those producing soda, sulphuric acid and tanning agents, and was of particular importance in the case of rayon, matches and paint. In the same table, raw materials and intermediate products are classified by industry of origin, in order to illustrate the global estimates presented in previous sections for the chemical industry as a whole.

1. Pharmaceutical products

The production of pharmaceutical products and toilet articles in 1953 represented about 40 per cent of the total value of the domestic chemical industries. Since pre-war years, production has increased sixfold in real terms, thus recording one of the most accelerated rates of growth within aggregate industrial production. This was due largely to the installation of numerous laboratories which operated as branches of foreign companies and formerly acted as distributors only (they continue to do for a high percentage of the total products they supply to the market).²⁴

There were two main incentives for the development of these activities. First, a considerable reduction of transport costs was

²⁴ It is estimated that 15 years ago there were only about 10 United States and 3 or 4 Colombian enterprises of various sizes operating in the country, whereas in 1953 there were about 30 United States, more than 40 Colombian and several European firms.

effected by replacing imports of articles ready for sale by basic raw materials to be subjected to fairly elemental transformation or mixing processes and packed in the country. Secondly, the competitive position of the firms has been improved, owing to the lower customs duties applicable to these raw materials in comparison with final products.

In view of the relative simplicity of the processes carried out in the country, heavy investment was unnecessary, the main outlay being on buildings (apart from the financing of inventories), while equipment was usually limited to a few tanks, mixers and pill-making machines.

As domestic production in 1953 supplied little more than 50 per cent of total requirements for pharmaceutical products and toilet articles, a large volume of imports was necessary, amounting to more than 50 million pesos in that year. According to expansion plans, however, the accelerated rate of import substitution would be maintained, and some new lines of production, such as antibiotics, initiated.

Imports also provided a high percentage of raw materials and intermediate products required by this industry. Possibilities of replacing imports of the latter seem to be far more remote, both for technical and marketing reasons and because of the degree of tariff protection. The main domestic raw materials utilized comprised alcohol, sugar, sodium bicarbonate and different types of containers, with the exception of neutral glass, which was not manufactured in the country.

2. Paint

Total production of this branch of the chemical industry during 1953 may be estimated at some 600,000 gallons of enamels and varnishes, which represented a high proportion of the country's requirements.

Most of this was produced by a few important concerns, which had been set up a short while before, and in which foreign capital also participated. In general, installed capacity was much greater than actual production so that expansion plans were chiefly aimed at introducing new lines of production (one firm planned to initiate the production of lacquer, for instance).

In 1953, about 70 per cent of the raw materials and intermediate products used by this industry was imported. Several of these seem to be difficult to replace (such as pigments, because of their

TABLE 390. COLOMBIA : ESTIMATED QUANTUM INDICES OF PRODUCTION IN THE CHEMICALS INDUSTRY, 1925-53

(1953 = 100)

Year	Total	Pharmaceutical products	Matches	Soap and candles	Paint	Rayon	Soda	Sulphuric acid	Tanning agents	Chloride and acids	Industrial gases	Fertilizers and insecticides
1925	9.3	...	...	22.4	10.8	—	—	—	—	—	—	—
1926	8.8	...	...	21.1	10.8	—	—	—	—	—	—	—
1927	10.6	...	...	24.9	13.9	—	—	—	—	—	—	—
1928	10.8	...	...	25.2	15.2	—	—	—	—	—	—	—
1929	10.2	...	...	23.8	14.7	—	—	—	—	—	—	—
1930	9.1	...	...	22.3	8.1	—	—	—	—	—	—	—
1931	7.8	...	...	19.1	6.2	—	—	—	—	—	—	—
1932	9.9	...	...	23.9	10.9	—	—	—	—	—	—	—
1933	9.6	...	...	23.1	10.8	—	—	—	—	—	—	—
1934	10.8	...	...	25.5	13.8	—	—	—	—	—	—	—
1935	13.0	...	...	31.2	15.3	—	—	—	—	—	—	—
1936	13.5	...	...	31.8	18.2	—	—	—	—	—	—	—
1937	15.6	15.0	30.0	35.0	20.3	—	—	—	—	—	—	10.0
1938	16.4	16.7	31.3	35.0	20.3	—	—	—	—	—	—	12.0
1939	18.8	18.7	33.2	40.7	20.8	—	—	—	—	—	9.5	14.0
1940	19.4	22.0	32.1	35.2	12.8	1.7	—	—	—	—	15.0	16.0
1941	25.0	25.0	36.5	40.7	19.8	15.1	—	7.1	—	—	20.0	18.0
1942	23.2	28.0	42.6	25.9	5.6	14.3	—	7.1	—	—	25.0	18.0
1943	25.5	31.0	45.8	24.1	16.3	15.9	—	8.9	20.0	5.0	30.0	20.0
1944	27.8	33.0	56.8	29.6	17.9	12.7	—	10.7	40.0	6.0	40.0	22.0
1945	33.0	36.3	65.3	33.3	17.7	23.7	—	14.2	72.4	6.4	45.0	24.7
1946	40.7	45.0	71.7	42.6	20.9	30.0	—	17.8	75.0	16.0	50.0	34.0
1947	49.1	54.0	75.1	59.2	25.8	31.6	—	21.4	78.0	25.0	60.0	43.0
1948	55.0	62.0	87.6	64.8	24.4	33.5	—	35.6	81.0	40.0	65.0	50.0
1949	57.7	70.0	81.3	66.7	24.4	25.7	—	46.2	84.0	50.0	70.0	60.0
1950	68.8	81.8	95.1	74.1	51.8	35.3	—	78.2	87.0	60.0	75.0	70.0
1951	74.6	88.0	91.9	74.1	59.5	46.6	17.8	78.2	90.0	70.0	80.0	80.0
1952	83.7	87.0	80.1	92.6	54.6	72.3	86.3	78.2	95.0	80.0	90.0	90.0
1953	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE : ECLA.

TABLE 391. COLOMBIA : ESTIMATED INPUTS IN THE CHEMICAL INDUSTRY, 1953

(Thousands of pesos)

	Pharmaceutical products	Matches	Soap and candles	Paint	Rayon	Soda	Sulphuric acid	Tanning agents	Chloride and acids	Industrial gases	Fertilizers and insecticides	Unclassified	Total
A. Raw materials	34,580	1,700	28,906	6,700	11,478	2,436	909	459	29	486	1,404	4,689	93,776
Domestic	16,362	120	13,253	2,000	1,265	2,273	909	398	29	44	643	1,963	39,259
Producer industry :													
Non-manufacturing sectors	2,420	—	9,595	330	211	2,152	909	398	21	—	447	251	16,734
Foodstuffs	467	—	—	—	—	—	—	—	—	—	90	1	558
Beverages	847	—	—	10	—	—	—	—	—	—	1	693	1,551
Textiles	141	—	16	—	18	—	—	—	—	—	2	21	198
Wood and cork	929	—	1,000	20	—	—	—	—	—	—	6	54	2,009
Pulp and paper	2,336	90	30	184	—	—	—	—	—	—	4	129	2,773
Printing and engraving, etc.	1,226	—	—	30	—	—	—	—	—	—	6	57	1,319
Leather	—	—	—	—	—	—	—	—	—	—	—	21	21
Rubber	95	—	—	—	—	—	—	—	—	—	—	—	95
Chemicals	5,528	20	2,527	354	769	—	—	—	6	8	10	396	9,618
Petroleum derivatives and coal ..	84	—	—	120	—	121	—	—	—	36	15	77	453
Cement, ceramics, glass, etc.	1,190	—	—	414	—	—	—	—	—	—	7	181	1,792
Mechanical and metallurgical industries	834	—	55	498	—	—	—	—	—	—	15	47	1,449
Other industries	265	10	30	40	267	—	—	—	2	—	40	35	689
Imported	18,218	1,580	15,653	4,700	10,213	163	—	61	—	442	761	2,726	54,517
Value at factory origin	12,075	1,047	10,376	3,116	6,769	108	—	40	—	293	504	1,807	36,135
Producer industry :													
Non-manufacturing sectors	487	—	2,640	—	—	—	—	—	—	—	146	87	3,360
Foodstuffs	119	—	—	—	—	—	—	—	—	—	—	2	121
Beverages	—	—	—	—	—	—	—	—	—	—	—	17	17
Textiles	—	—	431	—	—	—	—	—	—	—	—	9	440
Wood and cork	—	—	—	—	—	—	—	—	—	—	—	13	13
Pulp and paper	—	641	40	—	1,602	—	—	—	—	—	—	36	2,319
Printing and engraving, etc.	—	—	—	—	—	—	—	—	—	—	—	30	30
Leather	—	—	—	—	—	—	—	—	—	—	—	—	—
Rubber	—	—	—	—	—	—	—	—	—	—	—	—	—
Chemicals	8,150	186	2,615	2,590	4,828	108	—	40	—	258	351	1,113	20,239
Petroleum and coal derivatives ..	—	137	4,640	—	—	—	—	—	—	1	—	24	4,802
Cement, ceramics, glass, etc.	3,319	—	—	—	—	—	—	—	—	3	—	420	3,742
Mechanical and metallurgical industries	—	—	10	394	—	—	—	—	—	—	7	29	440
Other industries	—	83	—	132	339	—	—	—	—	31	—	27	612
Expenditure abroad	2,299	199	1,975	593	1,289	21	—	8	—	56	96	344	6,880
Customs duties	1,838	160	1,579	474	1,031	16	—	6	—	44	77	275	5,500
Expenditure in the country	2,006	174	1,723	517	1,124	18	—	7	—	49	84	300	6,002
B. Fuel and energy	340	38	690	63	1,937	1,092	3	182	52	165	39	172	4,773
Fuels and lubricants	210	28	570	28	566	795	—	144	22	40	16	90	2,509
Electric energy	130	10	120	35	1,371	297	3	38	30	125	23	82	2,264

SOURCE : ECLA.

variety); it is probable, however, that domestic production will increase in future, in view of the possibility of producing synthetic resin from the by-products of the Paz del Río coking plant, and utilizing other products, which were employed as fillers, on a larger scale (kaolin, diatomaceous earth, talcum, etc.). Furthermore, many of these firms manufacture their own containers using imported tinplate, an item which could also be replaced according to plans for the expansion of the national steelmaking industry.

3. Matches

This was one of the oldest branches of the chemical industry, unlike those previously described. Total production in 1953 stood at about 1.3 million gross of boxes containing 60 matches each, which was three times the 1938 level but only slightly above that of recent years (see table 392).

TABLE 392. COLOMBIA : PRODUCTION OF MATCHES, 1938-53

(Thousands of gross of boxes containing 60 matches)

Year	Production	Year	Production
1938	409.5	1946	938.1
1939	434.0	1947	982.0
1940	420.2	1948	1,145.6
1941	477.7	1949	1,063.7
1942	557.7	1950	1,244.2
1943	599.4	1951	1,202.8
1944	743.8	1952	1,048.3
1945	854.6	1953	1,308.3

SOURCE : ECLA.

This total is manufactured almost entirely by four enterprises, the leading firm operating with English and Swedish capital. All domestic requirements are met and the low degree to which installed capacity is utilized indicates that a considerable expansion of production could take place without new investment.

Most of the raw materials used by these industries in 1953 were imported. The main items were paper for matches, paperboard, kraft paper, potassium chlorate and paraffin for impregnation; only glue and paperboard containers were obtained from domestic sources.

4. Soap and candles

The high value of the products included in this category — about 50 million pesos in 1953 — was mainly derived from handicrafts since large-scale enterprises were relatively few.

It may be observed from the production indices in table 390 that this is one of the branches of the chemical industry with the slowest rate of growth. Its future prospects are not very promising either, since candle consumption is tending to become stationary and competition between detergents and soap will probably intensify.²⁵

Raw materials used in 1953 for the manufacture of candles — mainly paraffin wax, stearin and plaited wick — were almost entirely imported. The major raw materials for soap manufacture were tallow — raw or melted and refined — mostly of domestic origin; caustic soda, and on a lesser scale, sodium carbonate and bicarbonate, also purchased on the domestic market; vegetable

²⁵ A recently established factory manufactured between 12,000 and 15,000 tons monthly of detergents from petroleum derivatives in 1953. This production was not sold directly to the public but to other industries.

oils and fats; and some imported products such as colophony, sodium silicate, anilines and other dyes, essences, etc.

5. Artificial fibres

This was the most important intermediate product manufactured by the domestic chemical industry. Its output, which was valued at approximately 33 million pesos in 1953, accounted for about 48 per cent of the total value of intermediate products.

Production was centralized in three concerns which were fairly new, two of them equipped to manufacture viscose rayon and the third to produce acetate.²⁶ Total production in 1953 may be estimated at about 5,100 tons²⁷ which was sufficient to cover total domestic requirements with the exception of special products for specific purposes. Total installed capacity was not much greater than the level of production, so that expansion plans were under consideration, including the production of rayon cloth for tyre manufacture.

Although the development of this industry involved considerable import substitution, purchases abroad were still fairly heavy and amounted to more than 10 million pesos in 1953. At one moment these mainly comprised acetates and acetone, although the latter showed a recovery of more than 90 per cent, so that effective consumption was low. For viscose rayon, imports included wood pulp and soda, domestic production of which was being studied. Domestic raw materials were carbon bisulphide and sulphuric acid, for which one of the enterprises had its own production plant.²⁸

6. Soda

In 1947 the *Instituto de Fomento Industrial* promoted the construction of a soda plant, which was installed at Zipaquirá, some 46 kilometres from Bogotá. About 25 million pesos were invested, and installed capacity was 100 tons of carbonate per day,²⁹ with equipment for the production of 30 tons of caustic soda daily and as much as 12,000 tons of bicarbonate.

Actual production began at the end of 1951, but serious initial difficulties were encountered as a result of the large stocks of these products which had been accumulated by the enterprise during previous years, and normal production did not begin until the last six months of 1953.

Although the productive capacity of carbonate was more than sufficient to satisfy domestic consumption, the demand for caustic soda in 1953 surpassed output possibilities and the enterprise had to resort to imports to cover the deficit; for this reason it is planned to enlarge existing capacity. The intensified development of the glass industry will tend to absorb the current surplus of carbonate.

Aside from the 30,000 tons of domestic caustic soda mainly intended for the textile industry, the rayon industries also had to import some 10,000 tons in 1953, as they required special conditions of purity. Thus the installation of a plant for the production of electrolytic soda was also considered, possibly on the salt dunes of the north coast (Galerazamba).

²⁶ The first plant was established in Barranquilla before the war. It was originally financed by foreigners living in the country, who later transferred it to two large textile concerns. The second plant — located in Medellín — was established in 1947 with domestic capital which was later supplemented by foreign contributions. An acetate plant, financed by domestic and foreign capital, was established in Cali in 1950.

²⁷ About 2,800 tons of viscose and 2,300 tons of acetate rayon; in both cases production included filaments and staple.

²⁸ With a daily capacity of 20 tons of sulphuric acid and approximately 3 tons of carbon bisulphide.

²⁹ Lately, it has been estimated that with some small additional investment this capacity may reach 125 tons daily.

The soda plant was managed by the *Banco de la República*. In common with other important industries, it bore its own transport costs and sold its product at a flat rate throughout the country.

Most of the raw materials used were domestic in origin. Limestone, with 90 per cent purity, comes from the Belencito deposits and was transported by railway; salt was brought in the form of brine from Zipaquirá, through an 8-kilometre pipeline; sulphur was also of domestic origin and coal is mined in the same region. The raw materials imported in 1953 included ammonium sulphate — of which 20-25 tons were consumed monthly, and which will probably be purchased later from Paz del Río; and sulphate of alum, for water disinfection.

7. Sulphuric acid

Total production of sulphuric acid in 1953 may be estimated at nearly 9,000 tons; this was another of the fairly recently established branches of the chemical industry in the country. The major share of its output came from three enterprises, which had an installed capacity of well over present requirements: a rayon factory producing chiefly for its own needs; another plant at Medellín — founded some 13 years ago — which sold approximately one-half of its production to other enterprises and employed the remainder in manufacturing superphosphates for fertilizers; and a third established at Bogotá in 1950 with a smaller output and a branch producing some 40 tons of hydrochloric acid per month.

The sulphur used had a content of about 40 per cent and was extracted from mineral deposits some 50 kilometres from Popayán, at 3,600 metres above sea-level, where abundant reserves are thought to exist. Extraction began only about eight years ago; monthly output in 1953 was 400 tons and it was hoped to expand this to 600 tons by 1957. Production in 1953 was sufficient to meet the country's necessities, and imports were limited to the requirements of the rubber industry, which needs very uniform granulation that is unlikely to be obtained with current equipment.³⁰

8. Tanning materials

There is only one enterprise in the country, located at Buenaventura, which is devoted to the production of tanning materials; it was also established by the *Instituto de Fomento Industrial*. The enterprise began operations by pulverizing mangrove bark and only started to produce the extract in 1943. In 1953, it consumed some 1,500 tons of bark per month, from which it obtained about 250 tons of extract; this level of production was very close to full utilization of installed capacity since the factory was working 24 hours a day.

Appreciable imports of other tanning materials, mainly *quebracho*, were also recorded. These imports were competitive only up to a certain point, because of the different qualities they imported, a fact which often made it necessary to use them in blends.³¹

The factory's concessions for mangrove exploitation were considered sufficient to meet 10 to 15 years' requirements; on the other hand, there was no provision for replanting. Renewal of the plantation took place naturally, each three taking from 20 to 30 years to mature.³² The only raw material imported

³⁰ Since sulphur production developed later than that of sulphuric acid, imports were much larger in earlier periods; in 1950, for instance, more than 2,000 tons were imported as against 600 tons in 1953.

³¹ Mangrove extract is best suited to the tanning of leather soles, because of the hardness it gives to the material used, but apparently it is less practical in other ways than tanning with chrome.

³² The tree is cut down for stripping, and the wood, which is unsuitable for extraction purposes owing to its very low tanning content, is wasted; it does have a certain hardness, however, which might make it useful for building purposes, always provided that it is not exposed to the weather.

was sodium sulphite — which was employed in the ratio of 60 kilogrammes to one ton of extract — since it made the leather more penetrable.

9. Fertilizers

Although still of little significance, this was one of the branches of the chemical industry with the greatest short-term development prospects. Up to 1953, apart from the output from some mixer plants, the only fertilizers produced were superphosphates. In that year, they amounted to some 1,700 tons, on the basis of imported phosphoric rock and domestic sulphuric acid. On the other hand, imports were considerable — more than 7 million pesos in 1953 — although it was calculated that total requirements far surpassed supplies.

There were nevertheless two prospects of interest: one, the employment of phosphoric slag obtainable as a by-product from the iron and steel works at Paz del Río, and, two, the plan being formulated under the auspices of the *Instituto de Fomento Industrial* for an enterprise to produce nitrogenous fertilizers with the natural gas from oil-wells.

The authorized capital for the latter enterprise amounted to 20 million pesos and it was planned to install the plant at Barrancabermeja. Its projected annual productive capacity was 13,900 tons of elementary nitrogen, obtained from 4,750 tons of ammonium, 3,750 of nitric acid and 5,400 of organic nitrogen. Implementation of this plan would in its turn permit the development of other industries, such as those of explosives, nylon, cattle feed based on urea, and plastics.

10. Other products

Apart from those already mentioned, the domestic chemical industry also manufactured many other products in 1953. In general these were of lesser importance, although many showed a considerable development potential.

The production of oxygen, for instance, increased notably in recent years, reaching a total of about 800,000 cubic metres in 1953. During that year, about 240,000 kilogrammes of acetylene as well as appreciable quantities of carbon dioxide and chlorine were produced.³³

Other branches produced what was still only a limited proportion of chemicals for the textile and tanning industries (mainly materials for sizing) and others for the building industry (water-proofing elements for cement, quick-setting agents, heat insulators, anti-corrosive paints, etc.).

Mention may also be made of the production of flash-light batteries which was initiated by a foreign firm in 1948; 700,000-800,000 batteries were produced per month in 1953, i.e., about 50 per cent of domestic requirements.

XI. CEMENT, CERAMICS, GLASS AND SIMILAR INDUSTRIES

The above industries comprised the manufacture of five main products: cement, asbestos-cement products, glassware, other earthenware articles and chinaware and porcelain. The figures in table 393 represent some of the most important aspects of each of these activities.

Tables 394 and 395 give the estimated quantum indices of production for the period 1925-53 and a detailed break-down of the composition of input in 1953 for each of the five activities mentioned.

1. Cement

The high cost of transport involved in importing this product is one of the reasons why the cement industry is among the oldest

³³ The last-mentioned item was produced by an enterprise which started operations in 1943 at Bogotá and also produced small amounts of electrolytic caustic soda.

TABLE 393. COLOMBIA : MAIN STATISTICAL DATA ON THE CEMENT, CERAMICS, GLASS AND SIMILAR INDUSTRIES, 1953

(Thousands of pesos)

	Total	Cement	Asbestos-cement products	Glass	Earthen-ware	Chinaware and porcelain
Gross value of production	177,673	60,700	35,000	26,000	45,973	10,000
Value added by production	113,974	36,800	17,005	17,552	35,717	6,900
Consumption of raw materials :						
Total	47,276	15,900	17,845	7,780	3,251	2,500
Domestic	34,251	15,900	8,420	5,680	3,251	1,000
Imported	13,025	—	9,425	2,100	—	1,500
Consumption of fuels and energy	16,423	8,000	150	668	7,005	600
Remuneration :						
Total	35,358	9,600	3,950	4,500	12,808	4,500
Wages and salaries	31,398	8,045	3,500	4,000	11,853	4,000
Social security contributions . .	3,960	1,555	450	500	955	500
Number of persons employed . . .	22,290	3,150	2,000	1,800	12,340	3,000

SOURCE : ECLA.

TABLE 394. COLOMBIA : ESTIMATED QUANTUM INDICES OF PRODUCTION IN THE CEMENT, CERAMICS, GLASS AND SIMILAR INDUSTRIES, 1925-53

(1953 = 100)

Year	Total	Cement	Asbestos-cement products	Glass	Earthen-ware	Chinaware and porcelain
1925	4.2	1.0	—	4.0	9.7	...
1926	5.6	1.0	—	4.4	13.6	...
1927	7.6	1.0	—	4.2	19.7	...
1928	11.8	1.1	—	6.7	31.1	...
1929	12.1	1.1	—	6.7	31.9	...
1930	5.8	1.1	—	4.6	14.1	...
1931	4.8	2.3	—	3.0	10.5	...
1932	4.6	2.3	—	2.6	10.0	...
1933	8.8	5.7	—	6.7	17.3	...
1934	12.6	8.3	—	10.7	23.9	...
1935	13.3	9.0	—	12.0	24.7	...
1936	16.6	12.0	—	15.2	30.1	...
1937	22.9	14.1	—	15.8	39.2	60.0
1938	23.1	17.6	—	17.7	35.0	62.0
1939	31.5	19.1	—	32.0	52.5	65.0
1940	29.7	21.5	—	33.6	43.1	68.0
1941	33.1	24.2	—	29.7	52.6	70.0
1942	30.9	23.8	—	30.7	45.0	72.0
1943	37.9	28.9	14.0	42.7	49.3	74.0
1944	43.0	32.2	24.2	44.7	55.9	75.0
1945	44.9	34.7	29.7	34.7	61.3	78.0
1948	49.6	38.0	30.2	36.4	71.5	80.0
1947	51.7	40.0	35.5	51.0	65.9	82.0
1948	58.4	41.7	33.5	58.6	82.4	85.0
1949	64.1	54.5	30.7	64.0	85.3	88.0
1950	77.7	66.4	57.8	69.4	100.4	90.0
1951	73.5	77.2	67.3	73.3	69.3	92.0
1952	86.2	80.7	98.5	84.0	85.1	96.0

SOURCE : ECLA.

TABLE 395. COLOMBIA : ESTIMATED INPUTS IN THE CEMENT, CERAMICS, GLASS AND SIMILAR INDUSTRIES, 1953

(Thousands of pesos)

	Cement	Asbestos-cement products	Glass	Earthenware	Porcelain and chinaware	Total
A. Raw materials	15,900	17,845	7,780	3,251	2,500	47,276
Domestic	15,900	8,420	5,680	3,251	1,000	34,251
Producer industry :						
Non-manufacturing sectors	9,940	2,690	1,000	3,100	700	17,430
Wood and cork	—	80	100	—	200	380
Pulp and paper	4,870	—	50	—	—	4,920
Chemicals	—	100	4,030	—	—	4,130
Cement, ceramics, glass, etc.	—	5,500	300	51	—	5,851
Other industries	1,090	50	200	100	100	1,540
Imports	—	9,425	2,100	—	1,500	13,025
Value at factory of origin	—	6,091	1,360	—	970	8,421
Producer industry :						
Non-manufacturing sectors	—	4,268	15	—	20	4,303
Wood and cork	—	204	—	—	—	204
Pulp and paper	—	362	20	—	—	382
Chemicals	—	325	500	—	940	1,765
Cement, ceramics, glass, etc.	—	932	750	—	—	1,682
Mechanical and metallurgical industries	—	—	10	—	—	10
Other industries	—	—	65	—	10	75
Expenditure abroad	—	1,161	258	—	185	1,604
Customs duties	—	1,448	322	—	230	2,000
Expenditure in the country ...	—	725	160	—	115	1,000
B. Fuel and energy	8,000	150	668	7,005	600	16,423
Fuels and lubricants	5,200	50	400	6,885	500	13,035
Electric energy	2,800	100	268	120	100	3,388

SOURCE : ECLA.

in the country, especially in the interior ; in fact, the first enterprise was founded in 1908 and had a small plant, located near Bogotá, with a productive capacity of some 10 tons of cement daily. Later output has been impressive, attaining approximately 900,000 tons in 1953 (see the pertinent figures in table 396).

TABLE 396. COLOMBIA : ESTIMATED CEMENT PRODUCTION, 1933-1953

(Thousands of tons)

Year	Production	Year	Production
1933	50.0	1944	280.9
1934	72.0	1945	302.6
1935	77.0	1946	332.3
1936	105.0	1947	346.2
1937	123.0	1948	363.7
1938	153.8	1949	475.8
1939	166.7	1950	580.0
1940	187.8	1951	647.5
1941	210.9	1952	704.4
1942	207.8	1953	873.1
1943	252.6		

SOURCE : ECLA.

In 1953 there were 8 concerns operating in the country. Five of them with plants at Medellín, Cali, Barranquilla and in the south of the Department of Antioquia supplied all the needs of the country's western zone. Three supplied the eastern zone, one of them located in the vicinity of Bogotá, another with works at Apulo and Bucaramanga, and the third with a small factory at San Gil. The total capacity of the plants in the west was 2,200 tons daily, of which 800 tons were supplied by the plant at Valle, which had the highest output in the country ; those of the eastern zone had an aggregate production of 1,200 tons daily.

The degree of utilization of this capacity was very high as a whole in 1953, especially in the eastern zone. In the west, the plant at Valle produced only 600 tons a day because of an inadequate power supply, and the plant at Medellín was faced with the problem of transport for its raw materials ; the plant at Nare was the only one that had not yet worked at full capacity owing to marketing difficulties.

The high degree of utilization of installed capacity and the rapid growth of the country's requirements called for expansion plans affecting the majority of the above-mentioned factories. Execution of the projects already under consideration would signify an increment of nearly 50 per cent in the output of grey cement, in a relatively short time. Furthermore, it was planned to start production of white cement, with an initial output of 100 tons daily.⁸⁴

⁸⁴ Consumption of white cement was assessed at 30-35 tons a day, so that planned production would allow of an appreciable surplus for which there were thought to be ample export possibilities.

In the majority of cases, the basic raw materials required were to be found very near the plants, with the sole exception of one works whose lime deposits lie at an average distance of 145 kilometres by railway. On the other hand, there were apparently some problems concerning the supply of gypsum, part of which was imported. Other items of some significance, which were imported up to 1953, were spare parts for grinding-mills — these had to be made of special steel and it was hoped to manufacture them at Paz del Río in the future — and refractory bricks, which it was also hoped to replace by domestic production.

2. Asbestos-cement products

This branch encompasses the manufacture of a number of different types of goods, some produced in large factories and others in many small artisan-type establishments.

One of the most interesting activities was the manufacture of "eternit" products which began in 1943 and for which three plants were installed in Bogotá, Cali and Barranquilla with the aid of Swiss capital. The staple products manufactured may be classed in four groups : flat and corrugated sheets for building ; pressure tubes for aqueducts ; sanitary and drainage piping ; and a great variety of moulded articles such as roofing accessories, gutters, ridging and other objects of household use.

The staple raw materials used were cement (purchased from domestic firms, with an annual consumption of some 40,000 tons), and asbestos, apart from a few rubber accessories also produced in the country. Asbestos — in the ratio of approximately 1 ton to 10 tons of cement — was imported from South Africa and Canada. Private enterprise collaborated with the *Instituto de Fomento Industrial*, and a foreign firm to survey some deposits in Yarumal (Department of Antioquia) ; but their findings were unfavourable, mainly because of the high transports costs anticipated as a result of the inaccessible location of the deposits. Despite this disappointment, there is still hope of finding a domestic source of this raw material.

It is also worth while to comment upon another branch of production, which, although of a slightly different nature, is also important — namely, the manufacture of fire clay piping. This was produced by a very old-established domestic enterprise, whose recently-renovated installations include equipment for the production of piping up to 38 inches in diameter, and which has increased its output considerably during the last few years.

3. Glass

This is another fairly old-established manufacturing activity in Colombia, characterized some 15 years ago by a high predominance of artisan production. Since then — and under the incentive provided by the development of the beverages industry — bottle manufacture, which tended to become concentrated in a few large mechanized establishments, has acquired a growing importance.

In fact, two firms practically accounted for all domestic production, which may be estimated at 150 tons per day in 1953. Although this covered a substantial part of the country's overall needs, imports were still appreciable, consisting, for the most part, of sheet-glass — which could not be manufactured in Colombia owing to the lack of equipment — and opaque and neutral glass for pharmaceutical use.

The productive capacity of the two large firms had practically reached saturation point by 1953, so that plans were drawn up for expansion on a large scale, including production of some of the items that had previously been imported. Preparation also went forward for the setting-up of a new plant at Bogotá, originally intended for the manufacture of bottles for gaseous beverages, but with the intention of producing sheet-glass as well at a later stage.

In 1953, the greater part of the raw materials (including soda) used by this industry were of domestic origin ; the few items imported comprised metallic oxides for colouring, borax as a melting agent and refractory materials to line the furnaces.

4. Other earthenware products

In contrast to the foregoing, the largest volume of production came from a great number of small units operating in a very rudimentary fashion. The major part of the production was made up of bricks and roof tiles of different kinds ; while some large factories also manufactured fire clay piping and floor and wall tiles.³⁵

5. Chinaware and porcelain

An appreciable percentage of output also came from artisan-type establishments. Nevertheless, there was at least one older firm, established in 1882, which operated on a large scale and was a major supplier of the domestic market. This had a plant at Caldas (Antioquia) and a newly-established branch at Madrid, near Bogotá. Its principal manufactures were various porcelain and china articles and floor and wall tiles.

Total production in 1953 may be assessed at some 7 million pieces of chinaware and more than 600,000 of porcelain. During that year a large number of similar articles were imported, and heavy competition was offered by Japanese goods, which were sold very cheaply on the market.

Since installed capacity was much greater than the level of production attained in 1953, an expansion in production of the same types of manufactured goods was not contemplated. Instead, it was proposed to initiate the manufacture of sanitary appliances in the country, for which there would be a considerable market currently supplied by imports.

The majority of the raw materials used were of domestic origin, but gypsum, dyes, decorating materials and diverse chemical products had to be imported.

XII. MECHANICAL AND METALLURGICAL INDUSTRIES

The analysis of the industrial sector as a whole, contained in the relevant chapter, refers in a very general way to some of the main development characteristics and the current situation of the mechanical and metallurgical industries, to their importance within total manufacturing, to the distribution of output by types of product, and to the parts played by domestic and foreign production respectively within the supply of domestic requirements, and the behaviour and prospects of demand for the different groups of metal products.

Moreover, these industries form the subject of a special study by ECLA,³⁶ where these and other aspects are analysed in greater detail. No further reference to specific problems in this branch of the manufacturing sector will therefore be made here.

Nevertheless, it would probably be useful to sketch some of the background history of the domestic iron and steel industry at Paz del Río in view of the many allusions that have been made to it in earlier sections, and more especially in view of the possible repercussions of domestic production of iron and steel on the composition and availability of capital goods, durable consumer goods and intermediate metal products.

³⁵ In 1953, one of those, considered to be one of the largest units in the country, produced about 15,000 pieces daily, in the form of bricks, pipes, piping accessories and tiles.

³⁶ In conjunction with the study of the mechanical and metallurgical industries in Brazil and Chile (see document E/CN.12/377).

This is one of the most important enterprises that has been developed by the *Instituto de Fomento Industrial*, which, since its inception, has included in its programme studies on the possibility of creating a large-scale domestic iron and steel industry.

The choice of a location in the neighbourhood of coal, iron ore and limestone deposits was a further incentive to the creation of this industry. The building of the plant itself at Belencito began in June 1952, on the basis of a project prepared by a United States company, and was jointly financed by domestic capital and a foreign loan.⁸⁷ Nine thousand workers were employed during the most intensive stage of construction, including personnel occupied in equipping the coal and iron ore mines.

In June 1954, the heating of the battery of coke ovens was begun followed two months later by the production of coke for the blast furnace. The first tapping was made on 10 October 1954; the steel works began to operate a month later, and regular rolling-mill operations were initiated in the second half of December, a 4-inch angle thus being produced for the first time in the country. At the beginning of April 1955 wire rod production started, the drawing installations having used imported material.

The aggregate cost of the enterprise was 320 million Colombian pesos (some 127 million dollars). However, it must be understood that this figure comprised substantial investments in works not directly related to iron and steel: the Belencito-Paz del Río Railway (36 kilometres of track with a 1-yard gauge); the building of the port of Agudelo on the River Magdalena, for the unloading of equipment and materials employed in the construction of the mill; laying of the Puerto Agudelo-Belencito highway; geological and topographical surveys; preparation of the coal and iron mines and limestone quarries; and the building of houses for the personnel, etc. Moreover, apart from the considerable cost of the iron and steel works itself, there was the heavy expenditure on transport from Barranquilla to Belencito of 110,000 tons of material and equipment for the plant, at an estimated cost of over 100 pesos a ton. The cost of the iron and steel plant itself, including a thermal power-station for the generation of 25,000 kW, may thus be assessed at 80 million dollars.

The principal installations held by the enterprise in 1955 were the following: (a) a highly mechanized coal mine, which was capable of producing 1,600 tons daily and was being enlarged to produce an extra 2,000 tons; (b) an open iron-ore mine, also highly mechanized, with an output far above current needs; (c) a coal-washer and an iron-ore sorting machine, both supplied by aerial cables from their respective mines; (d) a limestone quarry, located in the neighbourhood of the iron and steel plant, with a daily output of around 1,000 tons, of which some 250 were sold to the soda plant; (e) a battery of coking ovens, with an output capacity of 600 tons a day, thus providing 500 tons of coke for the blast furnace; and a plant for by-products producing tars,

⁸⁷ Part of the domestic capital was obtained by means of an interesting scheme for compulsory saving, which consisted in offering income-tax payers with a gross income above a certain sum the option of paying 2½ per cent of their taxes either in case or through the purchase of shares in the iron and steel industry; by this method, the plant has amassed capital amounting to 50 million pesos in 4½ years, and it is estimated that total current income from this source was 13-14 million pesos annually. In regard to foreign credit, the Bank of Paris granted a loan of 30 million dollars, which was reduced to 25 million by an immediate refund of 5 million; its amortization was covered by a contract for ten six-monthly payments of 2½ million dollars, each instalment bearing an annual interest of 5 per cent.

light and medium oils and benzol; (f) a blast furnace with a capacity of 500 tons of pig iron daily, though this output was not reached during the first six months of operations for the obvious reason that personnel had to be trained in the different phases of production; (g) a steel factory, possessing 3 basic converters, of 22 tons each, which implied ample capacity for pig-iron utilization; in addition it possessed an electric furnace with a 20-ton capacity; (h) installations chiefly composed of a large rolling-mill for the production of shapes and bars of between 3.5 and 8 inches and rails of 45-75 pounds, and a small rolling-mill for shapes and bars of lesser dimensions, including wire rods. Because of the limitations of the blast furnace, rolled products totalling some 130,000 tons a year of bars and shapes were manufactured; this may, however, be increased to 160,000 tons. The actual rolling installations would also allow for the production of thick sheets of 8 mm. to 25 mm.; (i) wire-drawing installations, capable of producing up to producing up to 30,000 tons of drawn articles, which manufactured ordinary and barbed wire; and (j) a thermal power-station, with a generating capacity of 25,000 kW.

In view of the marked expansion of the domestic market, and the fact that actual installations did not permit the finishing of flats, the enterprise recently began to study plans for enlargement. The main object of such expansion would be the production of flats, present requirements of which are estimated at 160,000 tons annually.

One of the alternative projects under consideration involves the raisings of aggregate output to 374,000 tons, distributed as follows: bars, shapes, rails and wires, 164,000 tons; flats, 210,000. This would require the construction of a second blast furnace, with an approximate daily capacity of 1,000 tons, as well as enlargement of the coking-plant, steel factory and power plant. The additional investment for this project is estimated at 60 million dollars, apart from the extra expenditure involved in expanding the existing mines and opening up new ones.

It is calculated that a complete plan of this kind could be carried out in three years, and that foreign credit would be available.

The by-products constitute another interesting feature. Among the main items were fertilizers of various kinds. Thomas slag, ammonium sulphate and agricultural lime. Thomas slag was obtained directly from the refining process of the converters; ammonium sulphate was produced by utilizing the sulphuric acid from the same plant, and ammonia — which is a by-product of the distillation of coal — from the coking-plant; agricultural lime consisted of the fines that remained as residue from the manufacture of lime for the converter process. Normal output of the plant would allow for some 3,000 tons of ammonium sulphate annually, about 25,000 of Thomas slag and about 12,000 tons of agricultural lime.

Furthermore, cement may be produced out of slag from the blast furnace, and an enterprise has been formed with this end in view. It is proposed to install a new plant with a capacity of 400 tons daily, this figure later rising proportionately to the capacity of the iron and steel mill.

It is also hoped to utilize the tar from the coking-plant, which, when mixed with gravel obtained from the lime quarry, could be used for paving.

Various proposals have been formulated for the acquisition of by-products from coal distillation to be used in the derivatives industries.

Annex X

NOTE ON SOURCES AND CONCEPTS USED IN THE CHAPTER ON THE ENERGY SECTOR

1. PRINCIPAL DEFINITIONS AND CONCEPTS USED

Chapter IV in Part Two of the present study was prepared in accordance with the method used by ECLA in *The development of energy production and utilization in Latin America. Possibilities and problems* (E/CN.12/384).

In this document it is recommended that the analysis of a given country's energy situation be based on the composition of energy consumption at various points in the transition of fuels from their natural state to their final utilization.

For various reasons, set forth in the study in question,¹ this process was divided into three phases, namely :

Level (i) : Gross energy, or the potential of all types of energy, whether primary or not, at the time when they are incorporated into the economy, either through domestic production or in the shape of imports.²

Level (ii) : Net energy, or the energy potential contained in fuels and electricity (thermic and hydraulic) in the forms and places in which it will be used, but without weighting with respect to the characteristics or yields of such use. It is equivalent to gross energy after deduction of the energy required to prepare it for utilization in its final form and for its final purpose as energy proper. All types of energy are included, whether they have undergone a transforming process or not, provided they are ready for consumption. It should be noted that derived forms of energy are considered as such and that the primary fuels by which they were generated (for example, fuels consumed in the generation of thermo-electricity) are not taken into account.

Level (iii) : Energy used (effective energy), or the power, heat or light into which part of net energy is transformed for absorption in a given process, such as mechanical work, an industrial process, transport, heating, lighting, etc. It must be explained that this phase comprises only the energy absorbed in the performance of a function, not the energy incorporated in the product of that function. A few examples will help to illustrate the difference between phases (ii) and (iii). The fuel consumed by a locomotive constitutes net energy, and the tons/kilometre covered by the train — expressed in terms of calories — are the energy used. In a metallurgical furnace, the net energy is that represented by the fuel burnt, while the energy used, or effective energy, is that part of the heat produced which is absorbed by the material and equipment.

Gross energy is important because it is with this stage that domestic primary production and imports are associated. The net energy stage — at which the energy is really utilized — is related to the country's economic activity. The projections were therefore formulated on the basis of the ratio between net energy and the gross product, the corresponding gross energy being calculated subsequently.

Strictly speaking, in order to reach reliable conclusions as to the historical evolution of energy consumption *per capita* or per unit of product, or as to the differences in such consumption from one country to another, energy used or effective energy (level (iii))

would have to be considered rather than net or gross consumption. The disparities between the two cases may be so great that an increasing unit consumption in the latter instance may in reality represent a relative decrease in the unit consumption of effective energy. However, the calculation could not be made on this basis for lack of data, a statistical weakness which is by no means peculiar to Colombia.

In practice, gross energy, net energy and the difference between them were estimated by the following methods.

Petroleum. Gross consumption was calculated by the method indicated below in the notes under point 2. To obtain net consumption the following percentages were discounted from gross consumption :

(a) Under the head of energy used for transport to the place of consumption, 3 per cent of total consumption.

(b) Under the head of energy used for the extraction of crude for domestic consumption, 2 per cent of the crude petroleum output minus exports, up to 1941 ; 2.5 per cent in 1942-47 ; and 3 per cent in subsequent years.

(c) Under the head of energy used for refining, 3.5 per cent of the crude petroleum refined during the period 1947-50 ; real consumption at the Barrancabermeja refinery in 1950-54 ; and 7 per cent of the crude petroleum refined in 1955 and 1965.

Coal. Data on local production were considered as referring to consumption of gross energy. To obtain net energy, 14 per cent was discounted from gross energy (4 per cent consumed in extraction, 6 per cent in washing and preparation and 4 per cent in transport).

Vegetable fuels. From gross consumption, estimated as indicated in *Energy in Latin America, op. cit.*, annex III, 15 per cent was discounted for transport and losses.

Electricity. The hydro-electricity produced was considered as gross energy, with an equivalence of 4,500 calories per kWh. In order to calculate total net energy, aggregate electricity production (hydraulic and thermic) was discounted from gross energy, with an equivalence of 4,500 calories per kWh, and total consumption was added at 860 calories per kWh.

Net consumption of fuels as such. Net consumption of fuels as such is equivalent to consumption of total net energy, minus net electricity consumption.

Electrification coefficient. The electrification coefficient is the quotient of electricity consumption in terms of kWh, and net consumption of fuels as such, expressed in kilogrammes of petroleum equivalent. This coefficient, which assesses the relative position of electrification within the use of energy in a given country, was established by the method described — which differs from the well-known "degree of electrification" for the reasons set forth in the ECLA document cited at the outset.

Calorific coefficients. To reduce the various fuels to the unit adopted — 1 ton of petroleum equivalent at 10,700 k.cal/kg — the conversion factors shown in the *Statistical Appendix*, table 148, were utilized.

2. SOURCES AND NOTES FOR THE CONSUMPTION TIME SERIES

(a) *Petroleum derivatives and natural gas*

For 1925-46, the figures given represent apparent consumption (production plus imports minus exports). From 1927 onwards the fuel oil added to crude petroleum for export was taken into account. For 1947-55 the figures represent real consumption.

¹ See E/CN.12/384/Add.1, chapter V (Spanish only). The subject is also dealt with in the revised version of the same study subsequently issued as *Energy in Latin America* (E/CN.12/384/Rev.1), United Nations publication, Sales No. : 1957.II.G.2, Part One, chapter I, point 3.

² Including primary fuels and hydro-electricity from domestic sources, and imports in the forms in which they were effected. In every case the definition covers energy used within the country in the operations relating to extraction, transport and transformation of energy itself.

The kerosene series includes tractorine, and A.C.P.M. is covered by the diesel and gas oil series.

To bring the series into line with the concept of total gross consumption, it was completed by the addition of energy consumed within the country in the extraction and refining of crude petroleum for domestic consumption, which was considered to be excluded from the basic statistical series. The additions made to fuel oil and natural gas were as follows: from 1925 to 1941, 2 per cent of the crude petroleum produced, minus exports; from 1942 to 1946, 2.5 per cent; and from 1947 to 1955, 3 per cent, attributed to consumption at the oilfields. Similarly, 3.5 per cent of the crude petroleum refined in 1947-50 was added, and 7 per cent of that refined in 1955, these proportions representing the energy consumed in the refining process. For 1951-54, real consumption at the Barranca-bermeja refinery was added to each derivative.

The source used was the *Informe Estadístico 1954 de la Empresa Colombiana de Petróleos (Statistical Report of the Colombian Petroleum Company, 1954)*. Estimates for 1955 were based on the real consumption data given by the Ministry of Mines and Petroleum in its *Boletín del Petróleo (Petroleum Bulletin)*.³

(b) Coal and coke

Apparent consumption is registered. The production series corresponds to an ECLA estimate based on national data gathered directly in the country itself. Import and export statistics were obtained from the Colombian *Anuarios de Comercio Exterior (Yearbooks of foreign trade)*.

(c) Vegetable fuels

See ECLA, *The development of energy production and utilization in Latin America. Possibilities and problems (E/CN.12/384/Add.2)*, annex II (Spanish only), or *Energy in Latin America, op. cit.*, annex III.

³ From 1947 onwards, the real consumption figures recorded in the *Boletines de Petróleo (Petroleum Bulletins)* of the Ministry of Development are invariably lower than those for current consumption (except in the cases of petrol in 1950-53 and diesel and gas oil in 1952), with very marked differences in some instances. For the last few years there are discrepancies between the *Boletines de Petróleo* and the *Revista del Banco de la República* with respect to the petroleum treated at the refineries.

(d) Electricity

The series for the production and consumption of electricity were estimated by ECLA on the basis of data on electricity consumption in the main consumer centres. The consumption of electricity for public use during 1938-53 was deduced from annual consumption statistics for Barranquilla, Bogotá, Bucaramanga, Buenaventura, Buga, Cali, Girardot, Honda, Medellín, Pereira, Santa Marta, Palmira and Tubia, and from data for different years relating to Cartagena, Cúcuta, Ibagué, Cartago, Armenia and Manizales.⁴ For 1934-37, consumption estimates were based on data for Barranquilla, Bogotá and Medellín. Electricity production was computed from the figures for consumption and percentages of loss given by Cecil A. Ellis, in the report entitled *Electricity in Colombia*, with respect to 14 of the main distributors in 1948-51. Production of private electricity — equivalent to consumption — was obtained from the industrial censuses for 1945 and 1953 and from the *Plan Nacional de Electrificación (National Electrification Programme)* for 1948-50.⁵ For the other years it was estimated. Production of hydro-electricity was calculated as 70 per cent of public production. Public installed capacity in 1953 amounted to 326,210 kW, 22.7 per cent of which represented thermo-electricity. According to the *Plan de Electrificación*, installed capacity in 1951 was 305,000 kWh in the case of the public service and 76,500 kWh in that of privately-generated electricity. A very approximate estimate suggests that in 1937 65 per cent of installed capacity was hydro-electric.⁶

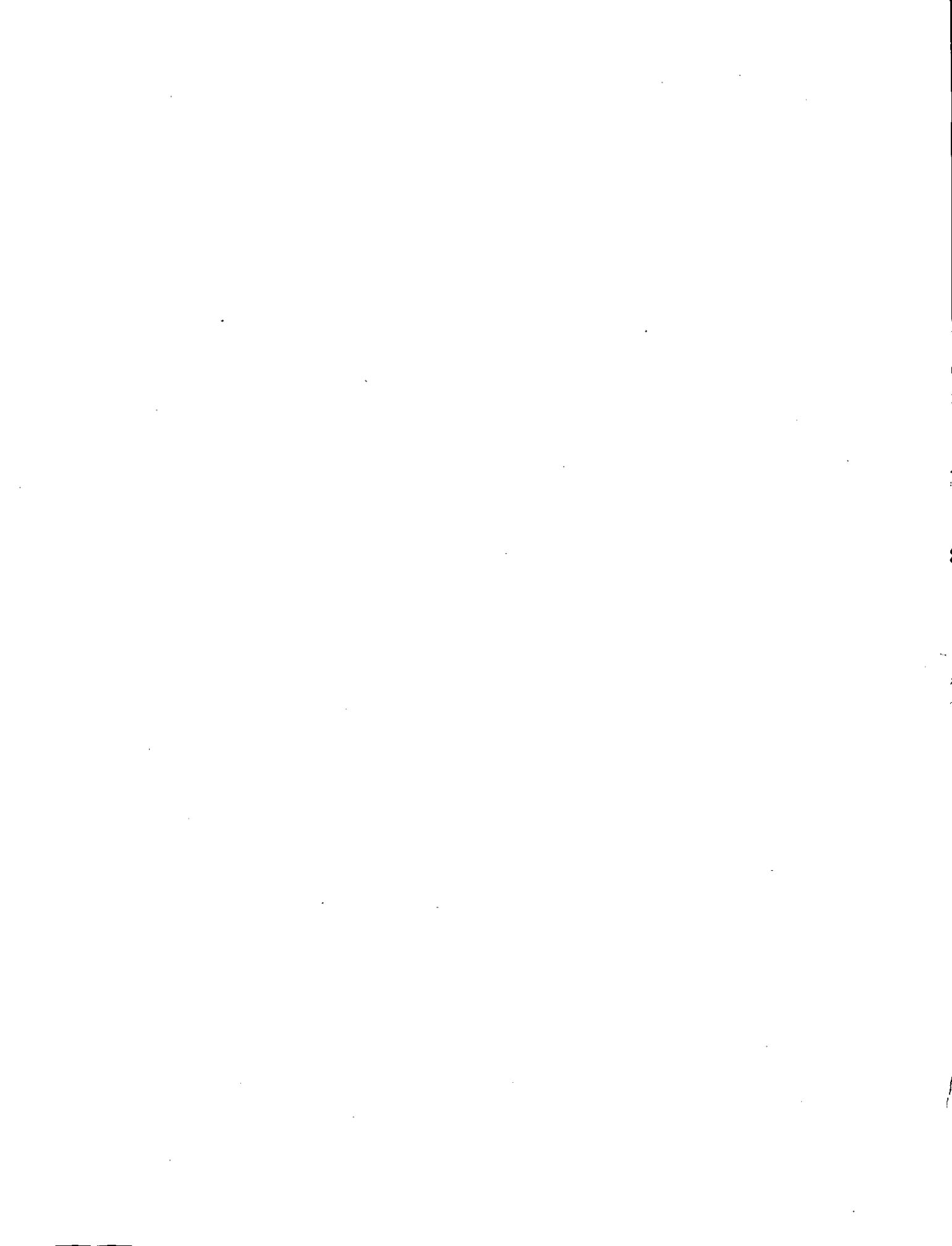
For 1954 and 1955 total production was estimated on the basis of the production statistics given in the *Boletín Mensual de Estadística (Monthly Bulletin of Statistics)*, and comprises the output of three enterprises supplying the Departments of Antioquia, Cundinamarca, Valle del Cauca, Atlántico, Magdalena and Tolima. In 1953 these companies generate 67 per cent of total public production and 57 per cent of all production in the aggregate. The break-down by hydro- and thermo-electricity, like consumption, was worked out on the basis of the 1953 ratios. For 1955 the estimate was prepared from data for the first 10 months.

⁴ For 1953, data on all the centres listed were available. Consumption in the centres for which data as to certain years were not available was estimated proportionately to the total.

⁵ Private production does not include that of mining (extraction of petroleum and precious metals), which amounted to 123 million kWh in 1953.

⁶ According to the number of plants given in the *Anuario Estadístico de 1938 (Statistical Yearbook for 1938)*.





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