



UNITED NATIONS
ECONOMIC
AND
SOCIAL COUNCIL



LIMITED

UNESCO/ED/CEDES/30
ST/ECLA/CONF.10/L.30
PAU/SEC/30
28 February 1962

ENGLISH
ORIGINAL: SPANISH

CONFERENCE ON EDUCATION AND ECONOMIC AND
SOCIAL DEVELOPMENT IN LATIN AMERICA

Sponsored by the United Nations Educational,
Scientific and Cultural Organization, the
Economic Commission for Latin America, the
United Nations Bureau of Social Affairs and
the Organization of American States, with
the participation of the International
Labour Organisation and the United Nations
Food and Agriculture Organization

Santiago, Chile, 5 to 19 March 1962

AGRARIAN STRUCTURE AND EDUCATION IN LATIN AMERICA

presented by the

United Nations Food and Agriculture Organization

Agrarian Structure and Education in Latin America

by Solon Barraclough

Agricultural development requires ever increasing numbers of agronomists, animal husbandry men, veterinarians, farm management specialists and even economists. Development also implies more technicians employed in agriculture from mechanics and artificial inseminators to milk testers and laboratory assistants. It will in addition, require a much higher level of skills and comprehension of the ordinary farmers and labourers working the land.

In Latin America agricultural development will undoubtedly be accompanied by profound and far reaching structural changes. There will be land tenure reforms, new credit and marketing institutions, an altered population pattern and new complexes of demand and technology. Like development, these structural changes are also going to require more trained manpower at all levels.

Finally, in a developing economy country people are going to demand more education, for its own sake and to enable them to better their economic and social status. They will no longer be content to accept the role of ignorance and poverty previously assigned to them.

Whether increases in the number of trained persons and changes in agricultural structure are causes or results of development or merely coincidental with it is irrelevant for the analysis presented in this paper.

That they are going to occur is enough to pose serious educational problems. We will take the cowardly course of avoiding the polemical controversies now raging over the extent that one can have more education and development without changes in agricultural structure and vice versa.

A glance at the complexity of the issues surrounding these controversies shows how sterile an attempt to separate cause from effect would be. Neither the educators nor the economists can come to any real agreement on the nature of the functional relationships between education and economic growth let alone with agricultural development and structure. Nor have they agreed upon the role agricultural development should ideally play in general development nor upon the importance of agricultural structural change for the whole process. 1/

Traditionally, educators have not placed economic development very high on their list of objectives. Alfred North Whitehead's classic essays on the aims of education ignore development almost completely. Only recently has it become fashionable to try to justify more expenditures for education on such a materialistic basis as money returns on the investment. Education was invented a long time before economics and it has always seemed vulgar to value in the market place its function of transmitting the

1/ See for example, B.F. Johnson and J.W. Mellor, "Agriculture in Economic Development", The American Economic Review, Sept. 1961; Doreen Warriner, Land Reform and Development in the Middle East, Royal Institute of International Affairs, London, 1957; United Nations, Land Reform - Defects in Agrarian Structure as Obstacles to Economic Development, New York, 1951; E.H. Jacoby, Inter-relationship Between Agrarian Reform and Agricultural Development, FAO Agricultural Study N° 26, Rome, 1953.

accumulated knowledge of mankind from one generation to the next.

Now educators have learned how effectively an economic justification of their work sometimes increases the flow of money to their cause. But many are still plagued by self doubts and dissatisfaction at putting education in competition with tractors for the investors' credits and with television sets for the consumers' income. Symptomatically, a recent editorial in "Science" calls upon educators to devise more effective indices than the obvious dollar contributions of education to material prosperity in order better to justify school expenditures.

Meanwhile, poor countries pursuing economic development must determine priorities. As Professor Arthur Lewis points out a poor nation cannot devote scarce resources too lavishly to education without sacrificing other important investments. Moreover, the additional education purchased as part of a development plan should be of the kind that contributes the most to its success. 1/

1/ W. Arthur Lewis, "Education and Economic Development", Social and Economic Studies, Vol. 10, N° 2, June 1961, Jamaica. The economists, however, are a long ways from agreeing upon a common framework for analyzing education's contribution to development. Thus Walter Rostow looks on education as a necessary precondition for economic growth. (Walter Rostow, The Stages of Economic Growth, Harvard, 1959). Professor Schultz analyzes education as an investment in growth that can be a partial substitute for other inputs such as land and capital (Theodore Schultz, "El Papel de la Tierra en el Desarrollo Económico", El Trimestre Económico, Octubre-Diciembre, 1959), while Professor Lewis regards education as being complementary to these other inputs (W. Arthur Lewis, The Theory of Economic Growth, Richard D. Irwin Inc., 1955). On the other hand, Professor Galbraith makes his analysis in The Affluent Society (Houghton Mifflin Co., Boston, 1958) on the premise that education is after all primarily one of the aims of economic development. Professor Ingmar Svennilson tries to reconcile these various viewpoints by specifying the marginal equalities which should prevail if there is to be an optimum rate of investment in education both as a producer's and consumer's good (Ingmar Svennilson, The Concept of Economic Growth, International Journal of Agrarian Affairs, April, 1961).

In the present analysis we will consider education as being complementary to agricultural development and to agricultural structural change. If certain projected increases in per capita income and changes in agricultural institutions take place, this is going to require a predictable additional number of trained people at various levels. Our task is to estimate these as realistically as possible.

Agricultural Structure and Structural Change

Before talking about education in relation to agricultural structure it is necessary to have a clear idea of what agricultural structure means. Briefly, structure in social or economic analysis is nothing more than the elements related to the problem that do not change for the question under study, as it is impossible to solve any problem if everything is variable. We must always seek our answers assuming that some values and relationships are constant - these parameters constitute the structure. ^{1/}

In our everyday thinking about many agricultural problems the tenure system is regarded as essentially fixed while prices, costs and outputs are variable. Upon this basis land tenure is usually regarded as part

^{1/}-"The structure of a system is that set of properties of its component parts and their relations or combinations which, for a particular set of analytical purposes, can both logically and empirically be treated as constant within definable limits. If, however, there is built up strong empirical evidence that treating such elements as constant for particular types of systems is helpful in understanding the patterning of variation of other elements, then this structure is not simply an arbitrary methodological assumption, but propositions about it and its limits of empirical stability become empirical generalizations which are just as important as are "dynamic" generalizations".
Talcott Parsons, "Some Considerations on the Theory of Social Change", Rural Sociology, Vol. 26, No 3, September, 1961.

of agricultural structure. Similarly, institutions such as banks and credit agencies, the marketing organization and the tax system are generally regarded as being structural. Education itself is usually regarded as part of agricultural structure as are health services, the patterns of taste and demand, the distribution of population and the general level of technology. 1/

In our present exploration of the relation of education to agricultural structure these "structural elements" in common usage will themselves be considered as variable. We must ask ourselves how educational requirements will change in relation to changes in tenure and the other institutions usually considered as fixed. This problem must of course, be analyzed within a wider structural framework where natural resources, geographic and

1/ United Nations, Land Reform - Op. cit.

"Among the most important factors which affect rural living standards is the agrarian structure. This term is here used to mean the institutional framework of agricultural production. It includes, in the first place, land tenure, the legal or customary system under which land is owned; the distribution of ownership of farm property between large estates and peasant farms or among peasant farms of various size; land tenancy, the system under which land is operated and its product divided between operator and owner; the organization of credit, production and marketing; the mechanism through which agriculture is financed; the burdens imposed on rural populations by governments in the form of taxation; and the services supplied by governments to rural populations, such as technical advice and educational facilities, health services, water supply and communications.

The agrarian structure may reduce the standard of living of the peasant by imposing on him exorbitant rents or high interest rates; it may deny him the incentive or opportunity to advance and it may check investment because it offers him no security; it may lead to the prevalence of farms which are too small to be efficient units of production or too large to cultivate intensively. The influence of the land tenure system varies greatly from region to region and there are no defects which are present to the same degree in all the under-developed countries, though certain ones are very widespread."

political boundaries and most of the other important parts of the physical, social and economic environment are still regarded as constants. Otherwise, systematic analysis is impossible. The social analyst needs to work from a given structure just as much as Archimedes needed a fulcrum for his lever if he were to move the world.

In our present analysis we will concentrate on probable changes in one important aspect of agricultural structure: tenure and tenure related institutions. This is often labelled "Agrarian structure" to distinguish it from the broader agricultural framework. Population, demand patterns and technology will also change but these will be considered only incidentally. We will then ask ourselves how much more trained manpower will be required during the next decade to realize these structural changes while at the same time greatly increasing agricultural production.

We will assume the population projections made by the U.N. are valid and form part of the super-structure for our problem. Also, we will accept as effective the Charter of Punta del Este in which the Latin American countries promise themselves an annual increase in per capita gross product of at least 2,5%, accompanied by various important reforms. We will assume further that gross agricultural production will have to increase by about 5% per year during the early stages of this development. This would allow for feeding a population growing at 2,8% annually, a slow increase in the quantity and quality of per capita consumption of food and fiber and some margin for more agricultural exports (or less imports).

In projecting structural changes the economist is denied use of many

of his most cherished tools. He cannot predict on the basis of conventional supply and demand models as these depend for their accurate operation upon the invariability of the very structural elements that are changing. Neither can he use regression analyses with such familiar variables as GNP, disposable income or total population. Obviously, the structural elements of the agricultural system have not been varying very much in relation with these in the past or they would not have been classified as structural. If land tenure had varied in a regular manner in relation with total output, for example, tenure would not form part of agricultural structure.

Lacking these conventional tools, the economist is prone to fall back on his prejudices and intuition. Thus, one observer recalling the highly productive small peasant farms of his boyhood will presume a similar institution developing for Latin America when he is forced to think of what tenure changes will accompany rapid agricultural development. Another will envision good-sized family-operated commercial farms with a few non-union labourers and tenants confidently climbing the tenure ladder to successful ownership. A third observer from another part of the world may forecast large collective farms and tractor stations. We must reject this subjective approach as being unsatisfactory if for no other reason than that the results are so variable.

In the present analysis we will attempt to supplement intuition by a more objective method. We will suppose that the structural changes which have recently taken place in a few Latin American countries and are in process of being planned in several others are indicative of what will happen

more generally at least in the relatively short-run of a decade. For example, Mexico, Puerto Rico, Bolivia, Cuba and Venezuela have all experienced or are experiencing land reforms. Despite ideological differences the emerging tenure patterns show many common traits. In the same way the land reform laws and proposals in several other countries such as Colombia, Ecuador, Peru and Chile call for changes that are more distinguished by their similarities than by their differences.

Land Tenure

In country after country traditional land tenure relationships have proved to be incompatible with rapid development. Where they have not changed prior to accelerated growth they are inevitably modified drastically by the growth process itself. This is asserted as a fact. 1/ A brief look at the present structure shows why.

The traditional Latin American land tenure structure is characterized by the latifundia-minifundia complex. The latifundia are large estates whose exploitation is based upon cheap labour often tied to the land through debts, lack of alternatives and more subtle social and political pressures.

1/ For the reader interested in more detailed discussion of this point see, example, Thomas Carroll, "The Land Reform Issue in Latin America", Latin American Issues, Albert O. Hirshman, ed., Twentieth Century Fund, New York, 1961; E.H. Jacoby, Op. cit.; Solon Barraclough, "What Land Reform Implies", mimeographed, Conference given at the University of Chile's Summer School, 1962; Kenneth Parsons, Raymond Penn and Philip Raup, Land Tenure - Proceedings of the International Conference on Land Tenure and Related Problems in World Agriculture held at Madison, Wisconsin, 1951; The University of Wisconsin Press, Madison, 1956; James Bray, The Agrarian Problem in Chile, Catholic University, Santiago, May, 1961; Edmundo Flores, Tratado de Economía Agraria, Fondo de Cultura Económica, 1961; Doreen Warriner, Op. cit.

Their origin is found generally in the large colonial land grants which were usually worked by forced labour, either conquered Indians or imported Negro slaves. Subsequent legal emancipation has modified the form of these slave based tenure relationships but much of their essence remains..

Thus, we find that the land owners still hold practically all the local economic, social and political power in the rural community, the courts, banks, markets, roads and similar institutions are designed primarily for their convenience. Agricultural wages, on the other hand, are at a near subsistence level with only slight differentials for specialized skills. Collective bargaining and effective political participation are seldom permitted the workers on the large estates. Agricultural operations are channeled through the traditional authoritarian hierarchy of "patrón", "administrador" and "capataz".

In such a system there are few incentives or opportunities for diversification and modernization. Faced with an unwieldy and unskilled labour force and rigid specialized marketing channels the owner is inclined to concentrate on a relatively few lines of production that are easily managed and marketed. Where the labour force lives on the estate and is partially paid in kind or rights to a small plot of land there are serious social and economic obstacles to adopting labour saving machines as displaced labour still has to be supported throughout the year. If, on the contrary, the labour requirements are highly seasonal and most of the work force lives outside the estate mechanization may be economically more advantageous for the owner but it leads to intensified unemployment and other social problems.

The land owners are often partial or full absentees who do not depend much upon the local community for their social and cultural life. Consequently they have few incentives to invest their rent and earnings in development of schools, similar services in the area. If their holdings are large enough to provide a comfortable income many prefer not to strive and sacrifice in developing better techniques and more efficient operations.

Labourers on the other hand have few incentives to develop new skills and increase production. There is little direct connection between yields and workers' remuneration. Paths of social and economic advancement scarcely exist. For the farm people, mechanization means displaced workers while new techniques such as better crop management only mean harder work.

The minifundia or very small farm units complete the picture. These usually have their origins either in the continuous sub-division of larger estates until each heir has only a subsistence plot or in the survival of subsistence farming by Indians and free labourers who were never fully incorporated into the large holdings. These small units are characterized by an overabundance of labour to work small areas with limited capital and primitive methods. Their access to credit, markets and technical assistance has been extremely limited. They provide an ever present reservoir of seasonal labour for the large estates. Not surprisingly there is a tendency for wages and living levels on the small holdings and of the labourers on the latifundia to be roughly equal, just as water in two ponds connected by a channel will find the same level.

Tenure structure is commonly described by indices of ownerships,

the sizes of holdings and their legal classifications. As the above description should make abundantly clear these are not the key factors; the real issue is the pattern of economic and social relations between the large landholders and the labourers and small farmers. The sizes and titles of land holdings are merely statistical manifestations of structure which can easily be measured and are usually associated with the more fundamental tenure relationships. Combinations of very large and small holdings are sometimes found, however, in very different tenure contexts such as the industrial farming regions in parts of the United States and the cooperative farming areas in Israel.

Tables 1 and 2 summarize some of the available information on farm sizes, tenure and agricultural work force in Latin America. The data are at best indicative. Their basic accuracy leaves much to be desired. Conditions of soil, climate and markets are highly variable; something the figures do not take into account. And finally, as we have just explained, size alone is a very imperfect indicator of tenure structure. Nonetheless, the general picture is one which indicates prevalence of the latifundia-minifundia complex.

The last column of Table 2 deserves special attention. It estimates the percentage of the agricultural work force that owns no land or owns plots of less than 5 Has. ^{1/} This is the group that in large measure lacks the incentives, means and opportunity to take much part in a

^{1/} See T. Lynn Smith, The Sociology of Rural Life, Harpers Bros., New York, 1957, page 287.

more rapidly developing agriculture without reforms in land tenure. The estimates are very crude and subject to wide error as the data are not very reliable and in many respects not comparable from one country to another. Also, they take no account of communal holdings which are very important in Mexico, Peru and some other Andean countries. Still, the percentages in Column 2 do indicate where the severest tenure problems exist.

Typically in Latin America, about four-fifths (80%) of the persons gainfully employed in agriculture are landless farm labourers or own only a very small subsistence parcel. (The comparable figure for the United States would be nearer 35%.) The majority of these landless or practically landless peasants are enmeshed in the latifundia-minifundia system. A few escape its worst consequences by renting land, but with some exceptions rental agreements for the small sharecropper and renter are only another way of the latifundia obtaining labour at the near subsistence level. Others are outside the traditional system because agriculture in a few areas has truly industrialized. Possibly a few farms are even introducing wage differentials, opening new opportunities for individual advancement, permitting unions, collective bargaining and effective local political participation on the part of the workers. But these, if they exist at all, are few and far between.

Education and Tenure Structure

The sociologists have commented at length about the undesirable social consequences of plantation agriculture (latifundia). T. Lynn Smith notes with magnificent understatement: "Large scale agriculture always fails

to develop well rounded personalities in its workers". He adds, perhaps too sweepingly, that in Latin America the latifundia is largely responsible for the extreme social stratification, poor living conditions, low levels of rural education and lack of agricultural progress, concluding that the latifundia system "has kept the mass of workers on a level little advanced over slavery". 1/

Despite the deficiencies of the statistical data available there appears to be a trend corroborating Smith's statement. The countries with the highest portion of their rural population illiterate are also often those with the biggest concentrations of landless workers and minifundia. But perhaps more striking is the difference between urban and rural illiteracy evident from table 3.

A similar pattern is seen in Chile. In the agriculturally rich Central Valley the illiteracy problem is far worse than in Chiloe where small farm ownership is much more prevalent than in the rest of Chile. (See table 4.)

The high rural illiteracy rates, however, tell only a small part of the story about the low levels of rural education. School facilities in farm areas are generally much less adequate than in urban districts. Supplies and equipment do not arrive in many cases. The teachers have little preparation in many rural schools, some barely knowing more than how to read themselves. Not surprisingly, compared with their city cousins, fewer rural

1/ T. Lynn Smith, Op. cit., p. 317.

children start school and many more drop out during the first two years without really learning anything. UNESCO data for example indicate that only 20% of the Mexican rural children who started school were still enrolled for the third year and only 2% for the sixth year; while for Cuba 37% were enrolled for the third year and 7% for the sixth. 1/

The situation existing in regard to secondary and university education in agriculture is discussed in the FAO background paper submitted to this Conference. Suffice to repeat here that agricultural education at the intermediate level is an unexplored field in Latin America. "We know neither the number of these secondary schools nor their objectives and characteristics". 2/ In any event, much more important than creating more vocational schools to train agricultural technicians at the secondary level is to provide rural as well as urban districts with secondary schools giving good basic training in the sciences, including an appreciation of agriculture. At present, there are practically no rural secondary schools.

The university teaching of agriculture has been investigated and reported on by Mr. Chaparro. 3/ Three important facts become evident as a result of this study. First, the number of agricultural graduates "ingenieros agrónomos" being turned out each year in all Latin America has

1/ UNESCO, La Situación Educativa en América Latina, Paris, 1960, p. 207.

2/ Conferencia sobre la Educación y el Desarrollo Económico y Social en América Latina, FAO, Rome, 1962.

3/ Un estudio de la Educación Agrícola Universitaria en América Latina, Alvaro Chaparro, FAO, N° 48, Rome, 1959.

recently amounted to only a little over one thousand per year and is expected to reach only 1,530 annually by 1965. Second, the ratio of agricultural technicians to the number of families is low, as shown in table 5, averaging only one "ingeniero agrónomo" per 1,774 persons gainfully employed in agriculture or one "ingeniero agrónomo" for about 850 farm families. Third, despite the manifest need for more university-trained agriculturists the existing facilities of Latin America's agricultural faculties are being used at only 57% of capacity.

We have touched on the present status of agrarian structure and agricultural education in Latin America; this explains little of the relation between them. Actually, the association between the two could largely be explained to a statistician's satisfaction by correlations with other variables such as industrial development or national income. The nature of the relationship can only be understood by going into the dynamics of the latifundia system.

In discussing the failure of many educational programs in the Far East, Dr. Jacoby writes "... agricultural education can not be applied in a social vacuum but by necessity will have to be integrated into a program of social and agrarian reconstruction." ^{1/}

While the term social vacuum is somewhat ambiguous at first glance, it adequately indicates the latifundia situation where neither the landlords nor the peasants have the slightest incentives to begin a real educational

^{1/} Erich H. Jacoby, Agrarian Unrest in Southeast Asia, Asia Publishing House, London, 1961.

program.

The latifundia do not depend for their successful operation upon an educated work force supplemented by large numbers of extension agents, credit supervisors and home agents. In fact, such a development would destroy the system in short order. The traditional work relationships and social stratifications are based upon manipulating an uneducated, inarticulate and largely uninterested work force. The few special skills demanded such as herdsmen or even tractor drivers can easily be learned on the job without providing much general education first. Decisions come from above and workers are not expected to think. A not uncommon experience for anyone who has worked much with plantations or other latifundia is to hear the "administrador" vigorously damning the "uppity" manners and disruptive independence of any worker who has achieved and dares to show more than the average education of his co-workers.

The landowners have no need or desire for large public extension and credit agents working directly with their labourers. Credit for the "hands" or tenants is a function of the landowner and often an essential source both of his profits and social control. His own credit can be obtained directly from banks and commercial outfits in the cities where landowners probably live and have commercial, social and political influence. Technical information, to the extent that it is desired, can be provided by the owner himself or through hiring a trained farm manager. Often, progressive minded owners are alert to pick up foreign innovations and will even employ professional advisers either directly or through their agricultural

associations. Unfortunately often little of this kind of technical aid sifts down from the owner's mansion and the farm manager's office, horse or truck to the people actually working the land. In any event, technical aid of this type is almost never aimed at the "comprehensive rehabilitation of the rural population", which is as necessary for dynamic agricultural development. Even when socially-minded owners build schools and provide similar services (as they occasionally do) for their tenants, the "social vacuum" of the system nullifies these efforts or so greatly dilutes them that the effects are negligible.

To understand why, one must also take into consideration the worker's position in the system. Within the latifundia there is almost no possibility of escape from his socially subservient and economically dependent status. A very few may eventually rise to become foremen or mechanics but the road to advancement is generally blocked. The result is that the rural family sees little value in sending their children to school at all and no value at all in learning more than a bare minimum of reading and arithmetic. This fact helps to explain the high drop out rate in rural schools as well as the lack of drive to build adequate facilities.

Those who for some reason do achieve a better than average primary education will most probably move to town after a few years. It is only there that they have any opportunity of using education to better their position. The very few lower class rural youths who attend secondary schools are even more certain to leave agriculture. There is no place for them in the existing rural structure; but in the government services in the

capital cities there is always a possibility of improving their status slightly.

Thus we see that neither the landowners nor the landless really feel the need for raising educational levels in latifundia dominated areas. Not surprisingly in view of this reality, efforts to raise the level of education and especially of agricultural education for farm children in Latin America have been plagued by frustration and failure.

At the university level there are other problems. Chaparro found that a very few of the university agricultural students had rural backgrounds. None at all came from families of landless farm labourers and only a small proportion come from families depending upon agriculture for their livelihood. He found that the vast majority of the university agricultural students were of urban middle or upper class origin. 1/

This, of course, is to be expected. The sons of large farm owners will not as a rule study agriculture as they will expect to leave actual farm administration to managers and foremen. On the other hand, the sons of farm labourers, tenants or very small farm owners can hardly expect to reach the university level when the obstacles to even finishing primary school are so great.

The attitudes towards education we have briefly described are typical of the latifundia system but not peculiar to it. Popular education has never been achieved easily and without resistance. Like all rights it

1/ Chaparro, Op. cit.

has to be fought for. The following quotation from a speech made by a distinguished British Peer and politician during the debate on the Whitbread Education Bill in 1807 expresses the view of many of his class at that time towards schooling for the urban poor. It is not very different than what one might hear from a conservative landlord today in most any South American country. Interestingly enough, once the English working class achieved full political rights through true universal suffrage and some degree of economic rights and participation through their unions, popular education soon followed.

"However spacious in theory the project of giving education to the labouring classes of the poor, it would be prejudicial to their morals and happiness; it would teach them to despise their lot in life, instead of making them good servants in agriculture and other laborious employments. Instead of teaching them subordination it would render them factious and refractory ... it would enable them to read seditious pamphlets, vicious books and publications against Christianity; ... it would render them insolent to their superiors; and in a few years the legislature would find it necessary to direct the strong arm of power towards them." 1/

Land Reform and Education

In order to say anything about the change in educational requirements arising from land reforms in Latin America we must first think a little about the probable scope and nature of these reforms. Moreover, the reforms and

1/ A.K.C. Ottaway, Education and Society, p. 61.

their educational requirements must be consistent with the more than 5% yearly increase in agricultural output which we have assumed to be the minimum necessary to achieve the goals of the Alliance for Progress.

The land reforms to be expected during the next decade in Latin America are primarily tenure reforms. We should not look for large-scale breaking up of existing big operating units or consolidation of very small operating units. There will, however, probably be wide-spread changes in the rights and obligations of land owners, tenants and labourers accompanied by a great deal of intervention and direction from government agencies. Colonization, resettlement, and consolidation programs will continue and often be accelerated but they will not be the heart of Latin American land reform.

The reason for not expecting massive colonization or consolidation programs is simple. In the first place they are always expensive per unit and Latin America cannot afford to embark on huge ventures of this type at this stage in its development. Secondly, where the present operating units, be they latifundia or minifundia, are even moderately productive, breaking them up to form new units is very likely to decrease output at least for the first two or three years unless the transition is extremely smooth. In the third place, where population pressure is very high both subdivision and consolidation are likely to be politically unacceptable. In such areas, if every family is given a farm each is too small to support a minimum level of welfare or to adopt necessary technological advances such as adequate rotations. On the other hand, if only a few of the landless are given new

units the political problem may remain as explosive as it was before the reform unless the excess can be immediately absorbed in industry - a most unlikely eventuality.

For these reasons Latin American land reforms have been forced into similar patterns. The large estates have generally been broken up only to the extent that they were previously cultivated by operators of smaller operating units such as share croppers, squatters and renters. Thus, in Cuba the sugar centrales were not divided but the ownership and management was transferred to the workers, unions and to the State. Similarly, in Puerto Rico most of the expropriated sugar plantations were made into state administered proportional profit farms while in Mexico the collective 'ejido' was sometimes adopted as a solution. Most of land reform proposals now being debated in other countries all contain provisions for expropriations of latifundia but at the same time allow for State or cooperative operation of at least some types of large units. These land reform proposals often modify ownership rights in other ways than by expropriation, such as control of rental and living conditions, minimum wages, profit sharing, progressive taxation and the like.

The only alternative to expropriation or partial expropriation and strict state regulation of latifundia that has received serious consideration is for the landowning elite themselves to initiate the necessary tenure reforms thus destroying the traditional system. Skeptics, however, may be pardoned for wondering if this elite will do voluntarily in the next decade what it has failed to do in the past century.

Just as latifundia have not been widely broken up in Latin American land reforms, neither have the minifundia been consolidated, and for the very same reason. Instead, efforts have been made to bring the small agriculturists some of the benefits of scale through cooperatives, state marketing services, credit, extension and similar measures. In Cuba, there is INRA, in Puerto Rico a whole galaxy of new services for small farmers and in Mexico government programs are channeled through numerous individual 'ejidos' some of which in many aspects are merely groups of minifundia. Even in Bolivia the size of operating units - as opposed to ownership units - have not been greatly influenced by the land reforms.

If land reform in Latin America is not going to mean the complete restructuration of the scale of operations in agriculture, where is the relationship with education? The answer is that land tenure reform in itself does not require numerous experts 1/, nor a great educational preparation but it is a necessary precondition for successful dynamic programs of rural and agricultural education. Also, land reform will not be consistent with rising farm production in the short-run unless it is accompanied by immediate massive efforts of technical assistance and supervision and general education.

How big must this effort be? No one can say with certainty, but we do have a basis for approximation.

If output is to increase by 5% per year, this means that roughly

1/ Doreen Warriner, Land Reform and Development in the Middle East, London, 1957, observes quite rightly "Land reform in its initial and crucial stages is emphatically not a question for experts".

during the next decade workers on the average farm must increase their production by 50%, or stated differently 50% of the workers must double their production. This is not at all impossible. Numerous studies from regions as diverse as the United States, India, the Near East and Latin America show that the application of a few more advanced technical practices and the reorganization of the farm organization combined with very modest credits and improved marketing can double the output of low income farms within two or three years. Once the initial reorganization is made future gains will be less spectacular but continued technical assistance and other aids will suffice to keep output on these farms expanding as rapidly as the economy requires.

Note that the emphasis here is placed on rehabilitating farm families and not on inert resources such as land or capital. As Dr. Jacoby observes "...a development program is more a program of the development of the people than of the area". 1/

The importance of the land tenure reform is that it enables this development of the human agent to proceed by removing some of the elements of the latifundia structure which until now have frustrated and stifled it.

On the basis of our supposition that a successful Latin American agrarian reform must thoroughly rehabilitate one half of the farm population in the first decade we can make some estimates of the numbers of technicians required. Such an educational program would each year have to take in an

1/ E.H. Jacoby, Op. cit.

additional 5% of the actively employed farm population; this means reaching some 700,000 new families annually. This supposes a static farm population which is not unreasonable as the Latin American development program calls for rapid industrialization and an increasing flow of labour to the cities.

Experience in the advanced countries such as the United States indicates that at a high level of agricultural development there are about 50 farm families to every professional working in agricultural extension, teaching, research and services. ^{1/} Only about one half of these professionals have any direct contact with farmers but this still leaves us with a professional agriculturist performing some on-farm educational activities for each 100 families.

Of course, such a ratio is beyond the reach and the absorptive capacities of a poor country. But it does set an upper limit to our estimate.

In Italy about one professional was employed for each 100 families rehabilitated by the recent land reform. In Egypt the relation was nearer to one professional to every 150 families affected if we count the cooperative managers as professionals. The ratio of technicians to land reform families in Japan and Formosa where substantial production increases have also been obtained, was likewise high.

In Latin America the technicians required cannot all be college graduates or truly professionals. A great deal can be done by the so-called

^{1/} Statistical Abstract of the United States, U.S. Government Printing Office, 1961

"prácticos", men with some general education and special training or simply intelligent "campesinos" with valuable experience and skills which can be taught to others. Perhaps a reasonable first approximation would be that the rehabilitation necessary in Latin American land reforms will require about one professional and four "prácticos" for every 200 families receiving intensive aid. These are all in addition to the technicians already available with a few exceptions where there are many unemployed or poorly used trained personnel available.

Taking this estimate we arrive at the startling conclusion of requirements during the coming decade of some 3,500 additional professionals and 14,000 assistants or "prácticos" per year if the farm output production increases called for are to be met. The schools of agronomy are now graduating less than 1,500 yearly and only part of these men will be available for the new program. Obviously, the needs for technicians can only be met by greatly accelerated efforts and special training schools by the countries concerned.

As economists, however, we must ask ourselves if the additional costs will be balanced by the expected gains. The answer is yes if our assumptions are sound. Suppose the cost of a professional is 8 times, and the salary of a "práctico" is 4 times, the average productivity of a typical "campesino". Then for each 200 families (or 400 persons actively engaged in agriculture) the annual cost of the program amounts to 24 times the production of one farm worker $[8 + (4 \times 4)]$. Production of these 400 workers should double in 10 years as a result of the program so the

total benefit will be 400 or perhaps a little less assuming that there would have been a small productivity increase without the program. The ten year salary cost on the other hand would be only 240. This is a handsome return on the investment in education, and even leaves a margin for interest on credits and other program costs.

The problem of primary rural education is of a different nature. There must be high quality primary education for all if the social, political and economic objectives of land reform are to be fulfilled.

As we have seen the farm population is now largely illiterate or only semi-literate and with the quasi-feudal latifundia structure "campesinos" are discouraged from making even the smallest decisions on their own. With land reform they will suddenly be expected to begin taking responsibilities and making important decisions. This will be true no matter whether the family is given a small holding or is expected to participate in the management of a cooperative farm or to take an active part in farm workers' unions and associations. Also the "campesinos" should after the reform be able to play a much more active political role. Continuing education is essential if the rural population is to fill these new roles successfully. But while land reform will remove a great obstacle to effective education, the education will not come automatically as a result of the reform.

Universal elementary education for the farm population in addition to being socially desirable is economically efficient. The work force cannot be expected to adopt readily the new techniques necessary for a developing economy without the basic skills of reading, writing and arithmetic and

the social discipline which comes with school attendance.

Also we must remember that one out of every two farm children should expect to find employment in industry or other urban activities if our population assumptions are met. It is much cheaper and socially more desirable to educate these migrants in the farm areas first. Social overhead costs are much less in rural districts. Housing, such as it is, already exists. Food is cheaper. Buildings such as the mansions of the latifundia which are now usually not fully used and may be completely unused following a land reform can be pressed into service as schools.

In this paper we cannot try to estimate total costs of the massive educational programs required to carry out successful land reform and agricultural development during the next decade.

Singer estimates that in advancing economies 7 to 8 percent of gross national income should be spent on education, about 2 percent more should be spent on research and development and another $\frac{1}{2}$ percent of national income should be devoted to training scientific personnel. ^{1/} It would be interesting to see if our projections of needs in agriculture would fit into this framework.

Those who recoil at the high costs of the educational programs we have outlined should reflect on the still higher costs of not making this effort. The costs of education are unique in that they require use of few resources that a poor country does not have in abundance. Foreign

^{1/} Hans Singer, Education and Economic Development, Conference of African States on development of education in Africa, Addis Ababa, 1961.

exchange or scarce capital is not dissipated by using partially employed people to teach other partially employed people in unused buildings. The principal cost of education is organized human effort. But after all this is what development is about.

TABLE 1

Size and Tenure of Farm Units
 in Latin America 1/

Country	Agricultural area (1.000 Hs.)	N° of farm units (thousands)	N° of farm units of over 1.000 Hs.	Percentage of agricultural land in farm units of over 1.000 Hs.	N° of farm units of less than 5 Hs.	Percentage of agricultural land in farm units of less than 5 Hs.	Percentage of farm units worked by renters, sharecroppers & squatters
Argentina	143,151	564.9	28,834	74.9	81,175	0.1	40.6
Bolivia 2/	14,414	86.4	5,412	91.9	51,228	0.2	74.6
Brazil	126,728	2,064.6	32,628	50.9	458,676	0.5	19.1
Colombia	18,116	919.0	3,178	26.7	503,566	3.3	----
Costa Rica	1,003	82.8	160	34.7	51,681	1.5	----
Cuba 2/	5,867	160.0	894	35.9	32,195	1.0	62.4
Chile	21,636	151.0	3,250	73.2	55,761	0.3	10.1
Ecuador	3,320	344.2	705	37.4	251,686	7.2	14.6
El Salvador	1,248	174.2	145	19.9	140,473	12.4	38.1
Guatemala	2,055	348.7	158	40.8	265,629	9.0	39.4
Haiti	870	----	----	----	----	----	----
Honduras	2,997	156.1	194	20.6	89,011	8.1	50.6
Mexico	87,307	1,365.6	10,519	76.0	1,004,835	1.3	2.2
Nicaragua	1,493	51.6	362	32.8	10,214	0.8	----
Panama	1,002	85.5	61	12.7	44,442	8.3	76.6
Paraguay	1,222	149.5	----	----	----	----	51.2
Peru	13,730	85.6	1,404	76.2	50,910	0.9	----
Rep.Dom.	1,260	276.9	185	24.3	209,407	13.7	27.1
Uruguay	14,590	85.3	3,602	56.5	10,953	0.2	37.9
Venezuela	20,724	397.8	6,759	74.5	266,287	2.2	74.9
Latin America	482,733	----	----	----	----	----	----

Source: Cuadros Estadísticos, La Creación de Nuevas Unidades Agrícolas, Informe del Segundo Seminario Latinoamericano sobre Problemas de la Tierra, FAO, Santiago, 1961.

1/ The data are not strictly comparable between countries and in addition apply to distinct years from 1950 to 1960

2/ Pre-reform.

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TABLE 2

Some Tenure Characteristics of the
 Agricultural Population in
 Latin America 1/

Country	Rural Population (thousands)	Rural Percentage of Total Population	Population Gainfully Employed in Agriculture (thousands)	Landowners and Independent Workers (thousands)	Salaried Agricultural Workers (thousands)	Percentage of Families Gainfully Employed in Agriculture Who Own no Land or Units of less than 5 Ha
Argentina	6,795	32.4	1,622	531	958	64.6
Bolivia 2/	2,328	62.8	836	75	73	97.9
Brazil	41,728	63.4	10,334	4,048	3,552	74.9
Colombia	7,705	52.2	2,023	823	847	--
Costa Rica	729	63.7	149	36	89	--
Cuba 2/	3,088	45.3	819	237	512	88.3
Ecuador	2,627	34.4	648	173	439	73.4
El Salvador	2,819	65.8	641	382	359	75.4
Guatemala	1,567	65.4	413	128	204	89.9
Honduras	2,598	69.2	660	---	---	84.7
Nicaragua	3,093	83.0	1,454	661	87	--
Panama	1,440	74.5	538	190	174	87.7
Paraguay	17,203	49.7	4,824	3,181	1,795	85.4
Peru	929	63.4	223	97	107	--
Uruguay	561	53.2	132	80	13	85.4
Venezuela	1,060	65.3	235	---	---	--
Latin America	6,439	59.3	1,546	733	507	--
Latin America	2,039	71.6	466	---	---	78.9
Latin America	514	18.6	288	---	---	67.9
Latin America	2,674	38.6	705	331	248	90.6
Latin America	107,936	54.2	28,556			

Source: Cuadros Estadísticos, La Creación de Nuevas Unidades Agrícolas, Informe del Segundos Seminario Latinoamericano sobre Problemas de la Tierra, FAO, Santiago, 1961.

1/ The data are not strictly comparable between countries and in addition apply to distinct years from 1950 to 1960.

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TABLE 3

Illiteracy and Percentage of Families Gainfully
 Employed in Agriculture Who Own no Land or only
 Very Small Parcels in 9 Countries of Latin America

Country	Percentage of Illiteracy in Population of 15 years of age or more		Percentage of Families Gainfully Employed in Agriculture Who Own no Land or Units of less than 5 Has. ^{3/}
	Urban ^{1/}	Rural ^{2/}	
Nicaragua	29.8	80.4	---
El Salvador	34.7	77.0	89.9
Venezuela	29.5	72.0	90.6
Dom. Rep.	29.5	67.3	78.9
Brazil	26.6	66.9	74.9
Panama	7.9	46.5	85.4
Paraguay	14.4	37.0	---
Chile	11.2	36.7	73.4
Costa Rica	8.1	27.9	---

Sources: ^{1/} and ^{2/} UNESCO, *La Situación Educativa en América Latina*, Paris, 1960.

^{3/} Cuadros Estadísticos, *La Creación de Nuevas Unidades Agrícolas*, Op. cit.

All these figures correspond to 1950 with the exception of those for Chile which are for the year 1952.

Section 1: Introduction

Section 2: Methodology

Section 3: Results

Section 4: Discussion

Section 5: Conclusion

Section 6: References

Section 7: Appendix A

Section 8: Appendix B

Section 9: Appendix C

Section 10: Appendix D

Section 11: Appendix E

Section 12: Appendix F

Section 13: Appendix G

Section 14: Appendix H

Section 15: Appendix I

Section 16: Appendix J

Section 17: Appendix K

Section 18: Appendix L

Section 19: Appendix M

Section 20: Appendix N

Section 21: Appendix O

Section 22: Appendix P

Section 23: Appendix Q

Section 24: Appendix R

TABLE 4

Illiteracy and Percentage of Agricultural Workers in
 Chile Who Own no Land or Only Very Small Parcels, by
 Provinces

Province	Percentage of Illiteracy, 1952 <u>1/</u>		Total Percentage of Agricultural Workers who own no Land or units of less than 5 Has., 1955 <u>2/</u>
	Urban Population	Rural Population	
Tarapacá	8.0	21.8	67.9
Antofagasta	11.6	27.8	76.7
Atacama	14.8	30.1	83.6
Coquimbo	15.3	43.0	71.4
Aconcagua	16.0	36.0	89.5
Valparaíso	10.4	34.3	90.1
Santiago	11.5	36.1	89.4
O'Higgins	18.6	41.0	91.2
Colchagua	20.5	49.2	86.0
Curicó	18.6	49.2	80.0
Talca	17.7	47.8	86.0
Maule	19.3	45.7	55.3
Linares	19.9	44.5	79.0
Ñuble	21.2	47.0	63.9
Concepción	18.2	43.3	56.7
Arauco	27.1	47.0	47.8
Bio-Bio	21.5	47.0	60.2
Malleco	21.6	52.4	44.3
Cautín	16.3	43.4	27.4
Valdivia	17.0	40.3	59.2
Osorno	16.7	36.4	59.4
Llanquihue	16.1	35.1	34.6
Chiloé	14.4	30.8	26.4
Aysén	18.2	37.0	35.9
Magallanes	9.0	11.1	86.9

Sources: 1/ XII Censo General de Población y I de Vivienda, April, 1952, Servicio Nacional de Estadística y Censos, Chile.

2/ III Censo Nacional Agrícola Ganadero, April, 1955, Servicio Nacional de Estadística y Censos, Chile.

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TABLE 5

Number of Professional Agricultural Workers (Ingenieros Agrónomos) in Relation with the Population Gainfully Employed in Agriculture in Latin America

Country	Number of Professionals	Number Gainfully Employed in Agriculture	Gainfully Employed per Professional
Costa Rica	550	14,9,000	271
Chile	1,700	648,000	381
Uruguay	500	288,000	576
Argentina	2,500	1,622,000	649
Mexico	3,600	4,824,000	1,340
Cuba	700	819,000	1,170
Brazil	4,500	10,334,000	2,296
Haití	222	1,454,000	6,550
Colombia	700	2,023,000	2,890
Perú	500	1,546,000	3,092
Venezuela	300	705,000	2,350
Bolivia	120	836,000	6,967
Ecuador	104	641,000	6,163
Panama	24	132,000	5,500
Nicaragua	27	223,000	8,259
Honduras	11	538,000	48,909
El Salvador	13	413,000	31,769
Paraguay	5	235,000	47,000
Guatemala	9	660,000	73,333
Dom. Rep.	3	466,000	155,333
Latin America	16,088	28,556,000	1,774

Sources: Cuadros Estadísticos, La Creación de Nuevas Unidades Agrícolas, Op. cit.
 Chaparro, F.A.O Bulletin N° 48, Op. cit.

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