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REPORT OF THE JOINT UNDP/ECLA/FAO MISSION ON THE POSSIBILITIES
OF ESTABLISHING MULTINATIONAL ENTERPRISES FOR PRODUCING
AND/OR MARKETING FERTILIZERS PROJECT RLA/75/014

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/SUMMARY OF

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

I. CONCLUSIONS

1. During the coming years, despite the large-scale increase in production programmed in several countries, Latin America will continue to depend to a large extent on imports of fertilizers.
2. In 1974 regional production of nitrogenous fertilizers covered 61.3 per cent of total consumption in that year, that of phosphatic fertilizers covered 61.8 per cent; but that of potassic fertilizers barely 0.2 per cent.
3. Over the next ten years the region's degree of dependence on fertilizers will vary according to the type of nutrient involved. In the case of nitrogen it is estimated that the deficit in regional production for 1980 vis-à-vis probable demand for that year will decrease substantially. The deficit could amount to around 420,00 tons of nitrogen (12.1 per cent of probable demand) if the production projection which the Mission considers most probable is borne out. In 1985 the deficit could be similar to the 1980 estimate (420,000 tons of nitrogen), calculated according to a projection criterion similar to that used for 1980.
4. The regional deficit in phosphatic fertilizers could reach figures of around 551,000 tons of P_2O_5 in 1980 and 1,683,000 tons of P_2O_5 in 1985 according to what in the Mission's opinion are the most probably estimates. This would be the equivalent of 20.3 per cent of anticipated demand for 1980 and 38.2 per cent of 1985 demand.
5. As for as potassic fertilizers are concerned, although a decrease may be expected in the present regional deficit around 1980 in view of the development plans for known resources in some countries, there are no grounds for a definite assertion that the deficit will continue to decrease significantly in the years following 1980. It is believed, however, that the pressure of demand will increase efforts to detect and develop the resources which very probably exist in the region.

/6. The

6. The relative world scarcity of fertilizers and the high prices recorded in the last three years could last until 1977, at least as far as nitrogenous fertilizers are concerned. There are, however, indications that there might be some let-up in the situation before this date. It should be taken into account that relatively large stocks of fertilizers exist in several countries of the world, and in the last two months there have been transactions in which fertilizers have been purchased at prices considerably lower than those in force in the international market at the end of 1974.
7. During recent years a considerable percentage of the international fertilizer trade has been carried out by export consortia or cartels.
8. According to OAS estimates, the region's imports of fertilizers in 1974 amounted to 721 million dollars while its exports came to 84.6 million dollars.
9. The bigger outflow of foreign exchange due to imports of fertilizers has aggravated balance-of-payments problems in several countries of the region, in particular the relatively less developed countries which consume fertilizers in fairly substantial quantities.
10. Latin America possesses large reserves of natural gas, which is the most suitable raw material for manufacturing ammonia (nitrogen). The countries which possess big enough reserves for this purpose are Argentina, Bolivia, Chile, Colombia, Ecuador, Peru, Trinidad and Tobago and Venezuela.
11. The most important reserves of phosphate rock, a raw material used in the production of phosphoric acid, are to be found in Peru (Sechura). Mexico and Brazil also have substantial reserves.
12. In the light of the estimates made by the Mission on the supply and demand of nitrogenous fertilizers for 1980 and 1985, the installation of either two or four ammonia plants could be justified (depending on whether the production of Trinidad and Tobago is included in regional supply or not). Each would have a capacity of 1,000 TPD and would be programmed to come into operation at the end of the 1970s or in the early 1980s.

13. As regards the production of phosphatic fertilizers, it may be noted that the demand and production figures for 1980 and 1985 indicate that there will be enough unsatisfied demand to justify the installation of several units for the production of phosphoric acid at the rate of 500 tons of P_2O_5 per day.
14. At the present time there are various political, economic and financial factors favouring the establishment of multinational fertilizer enterprises.

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II. RECOMMENDATIONS ON THE FORMULATION OF A REGIONAL CO-OPERATION STRATEGY FOR FERTILIZERS

The conclusions of the study define to a large extent the context in which the strategy should be formulated. The policy objectives and the short- and medium-term measures which the Mission feels should be included in the formulation of the strategy have been defined in terms of these conclusions.

A. SHORT-TERM OBJECTIVE AND MEASURES

1. Objective

To enable the countries of the region, and particularly the relatively less developed countries, to obtain adequate supplies of fertilizers of the quality required and at reasonable prices.

2. Measures which should be applied

It is suggested that a regional marketing body and a regional fund for financing purchases of fertilizers should be set up.

(a) Regional marketing body. Its functions would be:

- (i) To make joint purchases in the international market, on behalf of the member States, of fertilizers for final or intermediate use and of raw materials for manufacturing these products;
- (ii) To help to ensure a timely and adequate supply of fertilizers for the countries of the region at the lowest possible prices;
- (iii) To act as an intermediary in contracting transport, insurance and freight for the fertilizers and/or raw materials acquired by the member countries of the new body;
- (iv) To act as a possible sales agent for the producers of the region and in particular for the multinational enterprises which might be set up in this area of activity, to market possible surpluses of fertilizers internationally; and
- (v) To maintain a specialized service of statistical and commercial information on the international market for fertilizers and raw materials for fertilizer production.

/The regional

The regional marketing body would be a non-profit-making corporation, but would be required to cover its operating costs and would therefore charge commissions for the services rendered.

Participation in the registered stock of this body would be open to all the countries of Latin America which might be interested, in proportion to their share in the regional consumption of fertilizers.

The participation of the interested countries could be effected through their respective State fertilizer production and/or marketing agencies or enterprises. However, it is considered advisable that the body itself should be constituted as a private corporation and should act as such on the international markets.

(b) Regional fund for financing fertilizer purchases. The Fund's objective would be to help to finance imports of fertilizers by countries of the region, especially the relatively less developed countries.

The Fund could be set up with contributions from the countries of the region, plus resources from international, regional or sub-regional financial institutions and other sources.

(c) Other measures. Implementation of specific programmes to improve the operational efficiency of some of the fertilizer plants existing in the region. Technical assistance from UNIDO could be very useful in this respect.

B. MEDIUM- AND LONG-TERM OBJECTIVE AND MEASURES

1. Objective

To make the region self-sufficient in nitrogenous and phosphatic fertilizers within the next ten years.

2. Measures which should be applied

In order to help to achieve the above objective, it is considered desirable to set up Latin American multinational enterprises for the production of fertilizers.

/3. Location,

3. Location, size and number of plants

In principle, subject to verification by means of feasibility studies for specific projects, the Mission sees the possibility of setting up multinational plants in the following countries:

(a) Nitrogenous fertilizers (ammonia-urea)

(i) Venezuela and/or Trinidad and Tobago, with a view to serving basically the markets of Brazil, the Central American countries and the Caribbean.

(ii) Bolivia, with a view to serving basically its own market and the markets of Argentina, Brazil, Paraguay and Uruguay.

(iii) Ecuador, with a view to serving basically the markets of the Pacific coast.

The area of Magallanes, in Chile, is also considered a probable location, using natural gas from Chile and Argentina.

Two or four 1,000 TPD ammonia plants could be installed - depending on whether or not the production of Trinidad and Tobago is included in the regional supply - complemented by urea plants whose capacity would depend on market requirements.

(b) Phosphatic fertilizers

(i) In the first stage, one two-unit plant for phosphoric acid (500 tons per day of P_2O_5) could be set up. Later, other plants could be established in this country, in Brazil or in Mexico. The phosphoric acid units could be complemented by plants for producing final-use fertilizers (diammonium phosphate, triple superphosphate, etc.)

(ii) It is considered desirable that, in view of the relatively slight importance of the economies of scale plants suited to the size of the markets should be set up in the production of diammonium phosphate, triple superphosphate and compound formulas. The intermediate products (ammonia, phosphoric acid) could be provided by the multinational plants.

/4. Investments

4. Investments required

The investment required to set up a standard ammonia plant of 1,000 TPD capacity would be around 53.0 million dollars. If complemented with a urea plant of 800 TPD capacity, the additional investment is estimated at 35.0 million dollars. These figures include the cost of the land, the engineering of the project, the provision and assembly of plant equipment, and the normal ancillary installations.

The investment needed to establish a phosphoric acid plant producing 500 TPD of P_2O_5 is estimated at 19.2 million dollars.

5. Features of the multinational enterprises

The Latin American multinational fertilizer enterprises (EMLF) could be constituted by two or more countries of the region through the participation of the State agencies or enterprises concerned with the marketing or consumption of fertilizers. There would be no restrictions on any country of the region becoming a member of one or more multinational enterprises.

Although they would be made up of State bodies, the EMLF would be of an eminently private nature and would act as such in the market, subject to such restrictions as the associated countries might establish when they were set up. The EMLF would apply strict criteria of efficiency in their administrative and operational management and avoid interference of other kinds.

C. CONSTITUTION OF A HOLDING COMPANY

Once the corresponding feasibility studies have been made, the possibility of establishing a Latin American holding company (on a multinational basis) should be analysed. Such a company would be in control of the fertilizer plants and the regional marketing body, and this would facilitate the programming, co-ordination and supervision of the multinational development of the fertilizer industry in Latin America.

/D. INTERREGIONAL

D. INTERREGIONAL CO-OPERATION

The policy aimed at regional self-sufficiency in fertilizers should be complemented with action aimed at concluding economic and technical co-operation agreements in this area of activity with developing countries from other regions.

I. INTRODUCTION

The Consultative Meeting on the Latin American Economic Situation and the New International Economic Order was held in Caracas, from 29 January-1 February 1975, jointly sponsored by the Government of Venezuela, the Economic Commission for Latin America (ECLA) and the United Nations Development Programme (UNDP).

At this meeting, in view of the high prices reached by fertilizers on world markets and the simultaneous bottleneck in the international supply of these products which was adversely affecting the economies of the Latin American countries, the President of Venezuela suggested, as a means of helping to solve this serious situation, that an urgent exploratory study should be made with a view to analysing the possibilities of setting up multinational production and/or marketing enterprises for fertilizers in the region.

This initiative on the part of the Head of State of Venezuela was received with great interest by Mr. Enrique Iglesias, Executive Secretary of ECLA, and Mr. Gabriel Valdés, UNDP Regional Director for Latin America, who decided to carry out such a study.

As a result, Project RLA/75/014/01/31 on Latin American multinational fertilizer enterprises was formulated, and UNDP took charge of its implementation in association with ECLA and FAO, with the following objectives:

A. LONG-TERM OBJECTIVES

To allow the Latin American governments and regional and sub-regional institutions to mobilize the necessary human and financial resources for implementing a multinational co-operation programme, suited to the requirements of modern and expanding agricultural production and those of possible external markets, for the production supply and marketing of fertilizers. The project should also facilitate the adoption of a long-term plan of action, including the establishment of the corresponding institutional framework.

/B. SHORT-TERM

B. SHORT-TERM OBJECTIVES

The immediate objectives of the project are:

1. To formulate guidelines of a general nature which can serve as a frame of reference for a regional and/or sub-regional strategy for co-operation in the production, supply and distribution of fertilizers, with an indication of the potential economic benefits to be derived from it.
2. To identify priority multinational projects for the production and/or marketing of fertilizers for which the immediate implementation of feasibility studies could be recommended. In particular, special attention should be given to:
 - (a) A multinational company or companies whose business is to acquire fertilizers and/or raw materials for the production of fertilizers;
 - (b) A multinational enterprise or enterprises for the production of nitrogenous fertilizers derived from natural gas, and
 - (c) If possible, similar priority projects for the production of phosphatic fertilizers.
3. To design the system of institutional arrangements (legal, financial, etc.) needed for the implementation of the multinational schemes referred to.

The following persons were designated as members of the Mission entrusted with the study: Dr. D. Mariani, UNDP consultant and Head of the Mission; Mr. C. Salazar (UNIDO), technical co-ordinator; Mr. R. Petitpas (ECLA), chemical engineer with experience on fertilizers; Mr. F.W. Hauck (FAO), agricultural economist; Mr. R.W. Steiner (FAO), general consultant, and Messrs. R. Naranjo, A. Sisto, F. Castillo and E. Badillo (UNDP consultants).

In the final phase of the study, the Mission also enjoyed the collaboration of Mr. C. Matute (UNCTAD).

The present report was prepared on the basis of:

- (a) Data available in studies and publications of UNIDO, FAO, IBRD, ECLA, IDB, OAS, TVA, secretariats of integration agencies, governments and various institutions.

/(b) Consultations

(b) Consultations with high-level government officials and persons connected with the problem of fertilizers in Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Venezuela.

(c) Consultation with officials of IBRD and IDB in Washington on the financing of fertilizer plants in Latin America.

(d) Consultations with officials of the International Fertilizer Development Centre of the TVA in Alabama, United States of America.

It should be mentioned that during the interviews held with high-level government officials of the above-mentioned countries, the Mission not only endeavoured to obtain data on aspects of consumption, present and future production of fertilizers, stocks of raw materials, forms of marketing, state of advancement of new projects, etc., but also (and in particular) endeavoured to explore the interest of the countries in taking part in multinational enterprises to produce and/or market fertilizers.

The following pages contain the report on the present situation and supply and demand of prospects for fertilizers in Latin America, as well as the Mission's recommendations on the formulation of a regional co-operation strategy in this area of activity, which envisage the establishment of multinational enterprises for the marketing and/or production of fertilizers.

/II. THE COUNTRIES

II. THE COUNTRIES OF LATIN AMERICA AND NEW FORMS OF REGIONAL CO-OPERATION. MULTINATIONAL ENTERPRISES.

The serious perturbations and economic and political upsets which have taken place in the world in recent years have generated changes of unimagined importance and magnitude not only in the economies of the advanced market economy countries and the developing countries, but also in the relations between them. These perturbations and upsets, which are of a nature and profundity unparalleled since the end of the Second World War, appear to have caused all the developed and developing countries to become at least partly aware of the high-level of interdependence existing between the members of the international community, but above all they have resulted in the developing countries understanding the advisability and need to undertake common action for the better defence of their interests and aspirations and to strengthen their mutual co-operation as the most efficacious form of activating their economies and surmounting the problems standing in the way of development.

This awareness found its concrete expression at the 2,204th. plenary meeting of the United Nations General Assembly in December 1973, when resolution 3177 (XXVIII) on economic co-operation among developing countries was approved, and later at the Sixth Special Session of the General Assembly, held in 1974, when the Declaration and Programme of Action on the Establishment of a New International Economic Order,^{1/} which stress the need to take measures to intensify co-operation among developing countries were adopted. Subsequently, the General Assembly and other bodies of the United Nations system reiterated on various occasions the need to increase such co-operation.^{2/}

^{1/} See General Assembly resolutions 3201 (S-VI) and 3202 (S-VI).

^{2/} See General Assembly resolutions 3241 (XXIX) and 3251 (XXIX), and Decision 121 (XIV) of the Trade and Development Board.

In November 1974 at the Latin American Industrialization Conference held in Mexico City, the Latin American countries had the opportunity to ratify their decision to intensify mutual co-operation. Part III of the report of this meeting, entitled "Industrialization in Latin America: Principles and Plan of Action", signed by Ministers of Industry and delegates from the countries of the region present at the Conference, proposes among other measures "the harmonization and co-ordination of policies and action in respect of industrial development and investment, and the strengthening and creation of industrial complementation mechanisms, such as Latin American multinational enterprises". The document also mentions the need to strengthen the machinery for financial support, "which should take into account the need to establish Latin American multinational enterprises in the basic sectors of industry and exports".

Still more recently, at the Sixteenth Session of the Economic Commission for Latin America (Trinidad and Tobago, 6-14 May 1975), the document known as the Chaguaramas Appraisal was adopted. Paragraph 121 of this says: "Special importance is attached to the setting-up of multinational Latin American enterprises as a highly useful means of supplementing regional co-operation machinery: by operating within frameworks established by the governments, these could establish regional integration on a sounder and more realistic basis".

It should be mentioned that the importance of joint action and co-operation among the developing countries has been understood in Latin America for many years already. The dates of establishment of the Latin American Free Trade Association (LAFTA), the Central American Common Market (CACM), the Caribbean Free Trade Association (CARIFTA) (now the Caribbean Community (CARICOM)) and the Andean Group represent different stages in a process of growing co-operation among the countries, for although their objectives do not coincide entirely, they all tend towards increased integration in the region. As regards the recommendation to establish multinational enterprises as a specific form of co-operation, there were also earlier

/manifestations of

manifestations of this in the region. Thus, the Cartagena Agreement, signed by the countries of the Andean Pact, conceived the creation of multinational enterprises as one of the means of implementing the sectoral programming of industrial development, which was an absolutely novel instrument in the integration processes. Decision 46 establishes uniform rules for multinational enterprises and for sub-regional capital. These rules are aimed, inter alia, at making possible the implementation of projects of benefit to the sub-region whose cost, magnitude and technological complexity prevent their being implemented by a single member country; making use of the resources of the sub-region in an appropriate and efficient way; strengthening the bargaining capacity of the sub-region for the acquisition of external technology; assisting access to the international capital markets and to the international financial agencies, and strengthening the capacity of the sub-region to compete in the markets of third countries.

Naturally, Decision 46 was conceived in terms of a sub-regional integration scheme with special features, and probably many of its measures will not be suitable when its radius of application is extended to the whole region. However, for the countries making up the region, this type of enterprise may not only constitute, subject to the relevant readjustments, a way of pooling efforts to produce and/or market goods while at the same time ensuring a fair distribution of the benefits stemming from the economies of scale and other factors, but may also represent a step forward towards self-determination and the strengthening of the Latin American position in the world economy. At all events, several Latin American countries seem to have understood it in this way and are holding meetings with a view to setting up, among other projects, the Multinational Caribbean Shipping Company.

/The President

The President of Venezuela, Mr. Carlos Andrés Pérez, doubtless had these points in mind when he proposed to UNDP and ECLA that an exploratory study of the situation of the fertilizer industry in the region should be carried out with a view to setting up multinational fertilizer enterprises.

The following pages describe the present situation and the prospects for the production and consumption of fertilizers, and give some conclusions regarding the possibilities of realizing projects for the establishment of multinational enterprises for the production and/or marketing of fertilizers.

III. CONSUMPTION OF FERTILIZERS IN LATIN AMERICA: PRESENT SITUATION AND FUTURE PROSPECTS

1. Present consumption

The consumption of fertilizers in Latin America has increased significantly during the last ten years. In 1964, the use of fertilizers in the region amounted, in terms of nutrients,^{3/} to 1,350,800 tons. In 1974, however, consumption was approximately 4,564,300 tons of NPK, which represents an increase of around 237 per cent during the period 1964-1974.

Despite this big increase in the consumption of fertilizers, Latin America continues to occupy a position very much inferior to that of the more developed regions as far as consumption per hectare cultivated is concerned. In 1964 the average consumption of NPK per hectare was 10.7 kilogrammes, and in 1974 it reached a figure of 36.3 kg/ha, but this was still far below that of the United States (91.5 kg/ha), the Federal Republic of Germany (235.0 kg/ha), Japan (410 kg/ha), and the world average (56.7 kg/ha) for that year.

It can thus be said that the consumption of fertilizers in Latin America continues to be very low. An additional fact which may be mentioned is that according to FAO Latin America's share of world consumption of NPK was scarcely 4.9 per cent in 1973-1974, although it possesses 8.5 per cent of the arable land and land under standing crops at the present time (approximately 125,533,000 hectares) and contains 6.9 per cent of the world population.

^{3/} In the present report, the figures for the consumption of fertilizers are given in terms of nutrients, which express the amounts of N, P₂O₅ and K₂O involved. For reasons of brevity, these are usually expressed simply as NPK.

/Consumption in

Consumption in tons by type of nutrient in the years in question was as follows:

<u>Nutrient</u>	<u>1964</u>	<u>1974</u>
N	641 600	1 863 500
P ₂ O ₅	462 600	1 715 600
K ₂ O	246 600	985 400
Total NPK	1 350 800	4 564 300

It may be observed that there were some changes in the structure of consumption by type of nutrient, tending towards a more balanced NPK ratio. In 1964 this ratio was 1:0.72:0.38, whereas in 1974 it was 1:0.92:0.52.

Although the structure of consumption mainly corresponds to the natural features of the different soils and the requirements of the different crops, the above-mentioned trend is considered normal and even beneficial for the avoidance of disequilibria in the process of restoring nutrients to the soil.

Table 1 gives figures on the consumption of the different types of nutrients in each of the countries of Latin America in 1964-1974. It may be observed that in the latter year Brazil was the biggest consumer of fertilizers in the region (43.3 per cent of the total), followed by Mexico (19.6 per cent), Cuba (6.3 per cent) and Colombia (6.1 per cent). In 1974 these four countries absorbed more than 75 per cent of Latin American fertilizers.

In that same year, the highest levels of nutrient consumption per hectare were to be found in the countries of Central America and the Caribbean. El Salvador reached a figure of 165.6 kg/ha; Trinidad and Tobago 94.9; Jamaica 89.6; Cuba 81.4; Nicaragua 62.4 and Costa Rica 60.7. In South America, Brazil (58.0) and Colombia (55.2) had the highest average consumption per hectare.

Table 1

Table 1

LATIN AMERICA: CONSUMPTION OF FERTILIZERS IN 1964 AND 1974

(Thousands of tons of nutrients)

Country	1964					1974				
	N	P ₂ O ₅	K ₂ O	Total NPK	Kg/ha	N	P ₂ O ₅	K ₂ O	Total NPK	Kg/ha
Costa Rica	21.0	11.2	4.5	36.7	33.7	34.0	10.0	15.0	59.0	60.7
Cuba	63.6	63.6	45.1	172.3	48.4	134.0	55.5	100.5	290.0	81.4
Dominican Republic	6.0	1.0	1.5	8.5	8.7	41.3	15.8	21.4	78.5	80.7
El Salvador	29.4	8.1	8.3	45.8	70.3	68.0	31.8	8.0	107.8	165.6
Guatemala	11.4	5.7	2.4	19.5	13.1	32.0	13.0	4.4	49.4	33.3
Honduras	7.0	0.4	0.2	7.6	9.2	14.0	2.0	8.0	24.0	29.2
Jamaica	7.3	1.7	5.7	14.7	60.9	11.0	3.6	7.0	21.6	89.0
Mexico	221.0	50.0	8.0	279.0	9.5	629.4	229.6	39.2	898.2	28.1
Nicaragua	9.7	0.2	0.1	10.0	11.4	35.0	12.0	7.5	54.5	62.4
Panama	10.0	0.0	0.0	10.0	18.4	16.5	6.8	7.0	30.3	55.4
Trinidad and Tobago	3.0	0.4	2.5	5.9	42.4	7.0	1.4	4.8	13.2	94.9
<u>Subtotal for Central America and the Caribbean</u>	<u>389.4</u>	<u>142.3</u>	<u>78.3</u>	<u>610.0</u>		<u>1 022.2</u>	<u>381.5</u>	<u>222.8</u>	<u>1 626.5</u>	
Argentina	22.1	6.7	5.0	33.8	1.3	51.0	28.0	11.0	90.0	3.5
Bolivia	0.4	0.4	0.3	1.1	0.8	4.8	2.0	1.3	8.1	5.6
Brazil	51.0	134.0	70.0	255.0	7.5	373.0	1 003.0	600.0	1 976.0	58.0
Chile	34.3	55.0	12.6	101.9	22.9	59.3	115.5	13.9	188.7	40.7
Colombia	36.6	58.7	43.4	138.7	27.4	153.8	67.0	58.1	278.9	55.2
Ecuador	7.8	5.9	5.1	18.8	4.9	28.7	15.0	8.7	52.4	13.7
Guyana	5.1	2.0	2.5	9.6	11.5	9.3	0.2	2.3	11.8	14.2
Peru	61.8	22.8	5.5	90.1	31.4	85.0	10.5	8.5	104.0	36.2
Uruguay	7.3	24.5	4.0	35.8	19.3	11.6	39.4	7.1	58.1	31.4
Venezuela	15.0	5.0	6.0	26.0	5.0	45.0	39.5	30.1	114.6	21.9
Others a/	10.8	5.3	13.9	30.0		19.6	14.0	21.6	55.2	
<u>Subtotal for South America</u>	<u>252.2</u>	<u>320.3</u>	<u>168.3</u>	<u>740.8</u>		<u>841.1</u>	<u>1 334.1</u>	<u>762.6</u>	<u>2 937.8</u>	
<u>Total for Latin America</u>	<u>641.6</u>	<u>462.6</u>	<u>246.6</u>	<u>1 350.8</u>	<u>10.7</u>	<u>1 863.3</u>	<u>1 715.6</u>	<u>985.4</u>	<u>4 564.3</u>	<u>36.3</u>

Source: FAO and data provided by Governments.

a/ Barbados, Belize, Guadeloupe, Haiti, Martinique, St. Kitts-Nevis-Anguilla, St. Lucia, St. Vincent, Paraguay and Surinam.

/2. Future

2. Future demand for fertilizers

The Mission made estimates of the demand for the different types of nutrients in the countries of the region for the years 1980 and 1985. These estimates, in accordance with the nature and scope of the study, were based on the consideration of data and other elements largely collected during interviews with government officials and officials from private agencies connected with the use and production of fertilizers in the countries visited. In the case of countries not included in the round of visits, data published by FAO were used.

Among the background elements considered, mention may be made of the development of fertilizer consumption in each of the countries of the region during the period 1964-1974, present government policies for agricultural development and in particular the expansion of the use of fertilizers, probable price levels in the next few years, not only of fertilizers but also of agricultural products, existing and foreseeable conditions for the marketing and distribution of fertilizers (storage, transport), and possibilities for the production and importation of fertilizers in the different countries.

(a) Projection of demand for 1980

The results of the projection of the demand for fertilizers for 1980 in each of the countries are given in Table 2. For Latin America they show an increase in terms of NPK from 456 million to 770 million tons, i.e., a foreseeable growth of 70.6 per cent in the period 1975-1980.

According to these estimates the consumption of each type of nutrient, in millions of tons, appears to be as follows:

N	3.45	Ratio NPK = 1:0.79:0.46
P ₂ O ₅	2.75	
K ₂ O	<u>1.59</u>	
Total NPK	7.79	

/Table 2

Table 2
LATIN AMERICA: PROJECTIONS OF THE DEMAND FOR FERTILIZERS
(Thousands of tons of nutrients)

Country	1980					1985				
	N	P ₂ O ₅	K ₂ O	Total NPK	Kg/ha	N	P ₂ O ₅	K ₂ O	Total NPK	Kg/ha
Costa Rica	54	16	24	94	96	75	20	30	125	129
Cuba	201	83	150	434	122	282	117	211	610	171
Dominican Republic	62	24	32	118	121	87	33	46	166	170
El Salvador	88	43	11	142	217	90	50	25	165	253
Guatemala	56	23	8	87	58	79	44	25	148	99
Honduras	25	6	14	45	51	39	12	23	74	89
Jamaica	16	5	10	31	134	21	7	13	41	171
Mexico	886	309	49	1 244	42	1 200	497	97	1 794	60
Nicaragua	62	21	14	97	110	79	34	22	135	155
Panama	22	10	10	42	78	31	14	15	60	110
Trinidad and Tobago	10	2	7	19	142	15	4	10	29	206
<u>Subtotal for Central America and the Caribbean</u>	<u>1 482</u>	<u>542</u>	<u>329</u>	<u>2 353</u>		<u>1 998</u>	<u>832</u>	<u>517</u>	<u>3 347</u>	
Argentina	125	118	30	273	10	188	236	48	472	18
Bolivia	15	5	3	23	16	22	9	6	37	25
Brazil	1 000	1 500	900	3 400	117	1 350	2 430	1 620	5 400	158
Chile	89	173	21	283	61	124	231	42	397	85
Colombia	272	106	93	471	93	348	149	129	626	123
Ecuador	66	35	20	121	31	107	56	32	195	51
Guyana	17	3	4	24	28	22	6	6	34	40
Peru	149	29	24	202	70	193	52	48	293	102
Uruguay	25	59	14	98	52	40	84	27	151	81
Venezuela	173	152	116	441	84	307	269	205	781	149
Others a/	35	25	39	99		56	40	63	159	
<u>Subtotal for South America</u>	<u>1 966</u>	<u>2 205</u>	<u>1 264</u>	<u>5 435</u>		<u>2 757</u>	<u>3 562</u>	<u>2 226</u>	<u>8 545</u>	
<u>Total for Latin America</u>	<u>3 448</u>	<u>2 747</u>	<u>1 593</u>	<u>7 788</u>	<u>62</u>	<u>4 755</u>	<u>4 394</u>	<u>2 743</u>	<u>11 892</u>	<u>95</u>

a/ Barbados, Belize, Guadeloupe, Haiti, Martinique, St. Kitts-Nevis-Anguilla, St. Lucia, St. Vincent, Paraguay and Surinam.

/On the

On the basis of these data, in 1980 Brazil will consume 44 per cent of the fertilizers used in Latin America, Mexico 16 per cent, and the main consumers together (Brazil, Colombia, Cuba, Mexico and Venezuela) 77 per cent of the total.

According to estimates by the TVA, world consumption of NPK in 1980 is likely to be 117.06 million tons; the region's share would thus account for 6.6 per cent of the total.

Some comments are called for on the consumption projections for some countries:

- In Argentina to date, with very few exceptions, only intensive crop farming outside the wet pampa region uses fertilizers. Recently, the National Institute for Agricultural Technology (INTA) studied the needs and possibilities for the use of fertilizers in this area, estimating them at 320,000 tons of N and 1,076,000 tons of P_2O_5 (including 730,000 tons for pastures). However, it is considered that consumption in 1980 is hardly likely to reach figures of the order indicated, among other reasons because of the relationship between the cost of fertilizers and the price of the agricultural products from the wet pampa region. Rather prudent criteria have, therefore been applied, but even so these have given consumption estimates which are high in relative terms.

- In the case of Brazil, the ambitious targets of the National Fertilizer Plan for 1980 have been slightly readjusted in the light of the discussions held in that country with government officials and experts on the subject.

- In Venezuela, the extraordinary development of fertilizer consumption in recent years (increases of 30 per cent in 1973-1974 and 60 per cent in 1974-1975) is the result of a dynamic policy for the promotion of the use of fertilizers which gives grounds for making projections of an annual growth of 25 per cent up to 1980.

- In Colombia, the estimated consumption for 1980, which shows discrepancies with other recent projections, was based on a study prepared by the Ministry of Agriculture of Colombia (Elementos para un

/diagnóstico de

diagnóstico de los fertilizantes químicos en Colombia), adjusted in the light of the conversations held with officials of this Ministry and other offices.

According to the estimates of table 2, in 1980 Latin America will achieve an average consumption of nutrients of around 62 kilos per hectare cultivated. It may be mentioned in this connexion that some countries (Brazil, Cuba, El Salvador, Jamaica and Trinidad and Tobago) will be close to NPK figures per hectare similar to those of the countries with the highest average consumption of fertilizers.

(b) Projection of demand for 1985

The figures for fertilizer demand in 1985 were estimated in the light of the assumption that in some countries, apart from what was stated above, the high average consumption of NPK per hectare could mean a slowing down in the rate of growth and in some cases the increase in the demand for P and K could be greater than for N owing to the fact that, generally speaking, the increase in the consumption of fertilizers is accompanied by a change in the NPK ratio, which tends to approach 1:1:1.

Table 2 gives the figures for the estimated demand for nutrients in 1985 in the countries of the region. According to these figures, Latin America's consumption of fertilizers, in terms of NPK, will be around 11.89 million tons, which would mean an increase of 52.7 per cent over the figures for 1980. Compared with 1974, the increase would be 160.4 per cent. The projected demands for fertilizers by type of nutrient in 1980 and 1985, in millions of tons, are given below:

	<u>1980</u>	<u>1985</u>
N	3.45	4.76
P ₂ O ₅	2.75	4.39
K ₂ O	<u>1.59</u>	<u>2.74</u>
Total NPK	7.79	11.89

The largest individual consumer will continue to be Brazil, with 45 per cent of Latin American consumption, followed by Mexico with 15 per cent. The group of major consumers would consist of Brazil,

/Colombia, Cuba

Colombia, Cuba, Mexico and Venezuela, with a joint consumption of around 77 per cent of the total. There would also be seven countries with an NPK consumption of between 150,000 and 300,000 tons.

The average consumption of NPK per hectare cultivated in the region would reach a figure of around 95 kilogrammes. The NPK ratio for 1985 would be 1:0.92:0.58.

Latin America's share in world consumption of NPK (145.10 million tons according to the TVA) would be 8.2 per cent in 1985.

(c) Projection of demand beyond 1985

The development of the use of fertilizers in Latin America beyond 1985 will very probably be influenced to a large extent by the world's need to produce larger quantities of foodstuffs. It may thus be assumed that the rates of growth of fertilizer consumption will not be less than between the years 1974 and 1985.

3. Some considerations on types of fertilizers, prices and domestic marketing systems

(a) Types of fertilizers

The figures for consumption of the various types of fertilizers in the last few years in all countries of the region show a strong trend towards the use of fertilizers with a greater nutrient content.

As regards nitrogenous fertilizers, urea (46 per cent N) is increasingly replacing ammonium sulphate (20 per cent N) and the low-concentration nitrates.

This process is expected to continue, since synthetic ammonia is now the main source of considerably more than 95 per cent of fertilizer nitrogen.

As regards phosphates, it is worth noting that triple superphosphate (TSP, 46 per cent P_2O_5) has come to be the fertilizer which provides most of the phosphorus, having gradually replaced single superphosphate (18-20 per cent P_2O_5).

Although high-analysis fertilizers offer considerable advantages in terms of transport, storage, handling and use, their lack of sulphur

/is a

is a reason why in many cases ammonium sulphate (23 per cent S) and single superphosphate (12.4 per cent S) continue to be used. In areas where the soil is deficient in sulphur, as occurs in various parts of Latin America, the continued use of ammonium sulphate and single superphosphate is therefore quite justified, but the combination of high-analysis fertilizers and an additional supply of sulphur would nevertheless be much more desirable.

There is also a strong trend towards the employment of NP or NPK fertilizers which are ready for use by the farmer. Diammonium phosphate (18 per cent N, 46 per cent P_2O_5) has already won an important place in the market. Other NP and NPK fertilizers show an increase in their nutrient content (for example: 10-30-10; 10-20-20). The combined use of diammonium phosphate or NPK fertilizers with low nitrogen concentration and additional doses of nitrogen by means of urea is becoming common practice in areas of more intensive agriculture.

The average total content of nutrients for all simple, mixed and complex fertilizers increased by approximately 6 per cent between 1965 and 1974, reaching, for example, 36.8 per cent in Colombia and 37.9 per cent in Venezuela.

As regards the future structure of fertilizer consumption in Latin America, it should be noted that, depending on the requirements of the soil, plants and type of crop, in areas where fertilizers are used intensively there is likely to be a gradual movement towards a more balanced NPK ratio than the present one, which in extreme cases is 18:6:1.

Anhydrous ammonia (82 per cent N) is used directly at present only in Mexico (200,000 tons annually) and Brazil. It is the cheapest source of nitrogen, but special equipment is required for its transport, storage and use. It can be economical if used on a large scale.

Bulk handling, as close to the consumer as possible, not only has economic advantages but also offers the possibility of preparing physical mixtures according to the farmers' specific needs. Brazil has at present 80 to 90 mixing plants, but there is still room for progress in this field in most countries.

/The direct

The direct use of ground phosphorites is very limited in Latin America, with a total of 43,000 tons of P_2O_5 in 1974 distributed among Chile, Colombia, Guyana and Uruguay. Their use could be increased in the future for permanent crops and pastures.

Slow-dissolving nitrogenous fertilizers, though still in the experimental stage, may be expected to enter the market in future years, especially for use in irrigated areas.

(b) Fertilizer prices

The price of fertilizers and its relation to that of agricultural products is one of the factors that most influences farmers' decisions as to whether to initiate or intensify their use. From 1972 to the end of 1974, fertilizer prices rose by proportions ranging from 114 to 390 per cent.

The following examples of changes in retail prices in several Latin American countries over the past two years give an indication of the sharp increases which have taken place:

Brazil	<u>Average for all fertilizers</u>	
	January 1973	334 dollars
	March 1975	1,068 dollars
	Increase	<u>240</u> per cent
Colombia	<u>Urea (imported)</u>	
	January 1973	78 dollars
	June 1974	385 dollars
	Increase	<u>390</u> per cent
	<u>10-30-10 (domestic)</u>	
	January 1973	92 dollars
	June 1974	263 dollars
	Increase	<u>280</u> per cent
Ecuador	<u>Urea</u>	
	May 1973	135 dollars
	January 1975	381 dollars
	Increase	<u>182</u> per cent

/Triple superphosphate

	<u>Triple superphosphate</u>	
	May 1973	142 dollars
	January 1975	304 dollars
	Increase	<u>114</u> per cent
Guatemala	<u>20-20-0</u>	
	1973	120 dollars
	1975	299 dollars
	Increase	<u>149</u> per cent
	<u>Average for all fertilizers</u>	
Honduras	<u>15-15-15</u>	
	1972	160 dollars
	1975	470 dollars
	Increase	<u>194</u> per cent
El Salvador	<u>16-20-0</u>	
	1973	115 dollars
	1975	260 dollars
	Increase	<u>116</u> per cent

A similar situation has arisen in all countries which depend mainly or entirely on imports. Exceptions to the general rule are Mexico and Venezuela. In Mexico, which has attained a high degree of self-sufficiency in the supply of fertilizers, one ton of urea is currently sold to the farmer at 1,510 pesos (120.80 dollars), an appreciably lower price than that paid by farmers in other countries. In Venezuela, the Venezuelan Petrochemical Corporation (IVP) is selling farmers urea at 438 bolívares (101 dollars) per ton, triple superphosphate at 359 bolívares (83 dollars) per ton, and 6-12-18 at 117 dollars per ton. These prices, which are much lower than consumer prices in other countries of the region, indicate the existence of a substantial subsidy.

While it must be recognized that in the last three years the prices of agricultural products have also followed a rising trend, the increases have been smaller than in the case of fertilizers. In Peru, for example, the price paid to the farmer for one kilogramme of rice in the years 1970-1974 was 4.70 soles; in August 1974 it was 6 soles, and in 1975 it was 8.50 soles. In Brazil the index of the average prices /paid to

paid to farmers for all agricultural products was 108 in January 1973 and 183 in February 1975. Prices of fertilizers, however, increased much more, as will be seen from the following table which indicates the units of agricultural products necessary to purchase one ton of fertilizer in São Paulo in the period 1972-1974.

Year	Unmilled rice 60 kg sack	Maize 60 kg sack	Soya 60 kg sack	Cotton seed 15 kg sack	Coffee 60 kg bag
1972	9	26	12	26	2
1973	10	20	9	23	2
1974	16	36	20	31	4

Source: Institute of Agricultural Economics, São Paulo, October 1974.

In most of the Latin American countries the ratio between the value of the increase in agricultural production through the use of fertilizers and the cost of the fertilizers themselves (value/cost ratio) has become very unfavourable for the various crops. For example, today in Ecuador it does not pay to use fertilizers in the case of maize, wheat or barley, and in Peru the same situation arises in the cultivation of maize.

As a result, many farmers cultivating these crops, and particularly the small and economically weak farmers, have reduced or abandoned the use of fertilizers, especially since the second half of 1974. In Ecuador there has been a 40 per cent drop in sales of fertilizers in areas of small farms. In Brazil, too, maize growers have either reduced the consumption of fertilizers in some areas, or have ceased to use them altogether. Taking into account, however, the fact that the small farmer accounts for only a limited share of consumption, the decrease in consumption for the reasons indicated above, is having only a relatively modest effect on this country. Exceptions to this situation, as indicated above, are Mexico and Venezuela where, thanks to the domestic price policy adopted for fertilizers, their use has not diminished but has even increased, especially in Venezuela. As a result of the fall in consumption due to high prices in several countries of the region, sizeable stocks of fertilizers have accumulated.

/Moreover, the

Moreover, the high prices of fertilizers have led to an additional problem, i.e., the availability of credit to enable the farmers to purchase them. It is a well-known fact that the credit available in Brazil, Colombia and Ecuador does not cover the same quantities of fertilizers as in previous years. In Colombia, where 50 to 70 per cent of all fertilizers were usually sold on credit, the proportion has dropped to between 30 and 40 per cent.

In view of this situation, several Latin American countries are also seriously considering the introduction of subsidies in the domestic marketing of fertilizers. Brazil has already done so, according to subsidies of approximately 40 per cent in January 1975.

(c) The domestic marketing of fertilizers

The systems for marketing fertilizers in Latin America differ from country to country. In some countries, domestic marketing, as well as import and export activities, are a State monopoly. In others, marketing is in the hands of private enterprise. There are also countries where private enterprise and State agencies or enterprises operate on a parallel or complementary basis in the marketing of fertilizers.

It is worth noting, however, that in countries where there is no State monopoly, the trend is towards greater participation by the State in all activities connected with fertilizers.

In several countries of the region, farmers' co-operatives or associations play an important role in the domestic marketing of fertilizers. In 1972, there were about 13,000 co-operatives in Latin America, which distributed the following percentages of fertilizers: Argentina, 10 to 12 per cent; Bolivia, 9 to 10 per cent; Brazil, 10 to 12 per cent; Ecuador, 12 to 15 per cent; and Peru, 34 to 40 per cent.

The lack of roads and inadequate transport and storage facilities are factors which seriously hamper the efficient distribution of fertilizers in many countries of the region.

/To attain

To attain the levels of fertilizer consumption estimated for the next decade, the countries will have to make considerable efforts to extend and rationalize their marketing structures. These efforts should be aimed at improving the distribution systems, co-ordinating the role of the Government and the private sector in this field, increasing the storage and transport capacity for fertilizers, revising credit policy, controlling distribution costs which in some countries seem excessively high, and giving support to the co-operatives. This action to improve the distribution of fertilizers could also include standardizing fertilizer types and formulas where this is technically justifiable, so as to take fuller advantage of economies of scale.

IV. SUPPLY OF FERTILIZERS IN LATIN AMERICA: PRESENT SITUATION AND FUTURE PROSPECTS

1. Production of fertilizers in 1974

In spite of the increased production of fertilizers in the region in recent years, the bulk of the fertilizers consumed continue to be of imported origin.

Table 3 shows that in 1974 the region's total production of fertilizers was equal to 46.9 per cent of consumption.

The proportion varies according to the nutrient. In the case of nitrogen, the region's production accounted for 61.3 per cent of consumption, and in that of phosphorus, for 61.8 per cent. As regards potassium, however, it was almost completely dependent upon imports, since the share of regional production was barely 0.2 per cent of the total consumed.

This external dependence in the supply of fertilizers means a fairly significant expenditure of foreign exchange. According to OAS estimates,^{4/} the region's imports of fertilizers in 1974 amounted to around 721 million dollars, and its exports to around 84.6 million dollars, leaving a negative balance of 636.4 million dollars.

(a) Nitrogen

The primary production capacity for nitrogenous fertilizers is currently about 2.33 million tons of nitrogen. This includes the production capacity of Chilean saltpetre (natural nitrate). Argentina, Brazil, Colombia, Cuba, Mexico, Peru, Trinidad and Tobago, and Venezuela possess nitrogenous fertilizer primary manufacturing plants. Table 4 shows the production capacities existing in these countries, together with the 1974 production and an estimate of output in 1975.

^{4/} Situación y perspectivas en materias de alimentos en la América Latina, referred to in the IDB report on fertilizers; the figures do not include Cuba.

Table 3

LATIN AMERICA: PRODUCTION AND CONSUMPTION OF FERTILIZERS, 1974

(Thousands of tons of nutrients)

Nutrient	Consumption	Percentage	Production	Percentage	Difference	Percentage
N	1 863	100.0	1 153	61.3	-710	38.7
P ₂ O ₅	1 716	100.0	1 052	61.8	-664	38.2
K ₂ O	985	100.0	25	0.2	-960	99.8
NPK	4 564	100.0	2 230	46.9	-2 334	53.1

Source: Data supplied by FAO and production estimates prepared by the Mission.

Table 4

LATIN AMERICA: PRODUCTION AND CONSUMPTION OF NITROGENOUS
FERTILIZERS, 1974-1975

(Thousands of tons of nitrogen)

	1974				1975		
	Production	Consumption	Balance	Primary capacity	Expected production	Probable demand	Balance
<u>South America</u>							
Argentina	27	51	-24	54	38	59	-21
Brazil	107	373	-266	196	156	440	-284
Colombia	102 a/	153.8	-51.8	123	100	170	-70
Chile b/	110	59.8	50.2	150	120	64	56
Peru	23	85	-62	112	64	93	-29
Venezuela	203 a/	45	158	649	115	56	59
Other countries	-	54.4	-54.4	-	-	63	-63
<u>Subtotal</u>	<u>572</u>	<u>822.0</u>	<u>-250</u>	<u>1 284</u>	<u>593</u>	<u>945</u>	<u>-352</u>
<u>Central America and the Caribbean</u>							
Cuba	20	134	-114	30	27	143	-116
Mexico	447 c/	629.4	-182.4	750	670	666	4
Trinidad and Tobago	114 d/	7.0	107	270	200	8	192
Central American countries	-	199.5	-199.5	-	-	214	-214
Other Caribbean countries	-	71.9	-71.9	-	-	77	-77
<u>Subtotal</u>	<u>581</u>	<u>1 041.8</u>	<u>-460.8</u>	<u>1 050</u>	<u>897</u>	<u>1 108</u>	<u>-211</u>
<u>Total Latin America</u>	<u>1 153</u>	<u>1 863.8</u>	<u>-710.8</u>	<u>2 334</u>	<u>1 490</u>	<u>2 053</u>	<u>-563</u>

Source: FAO and figures for installed capacity and production estimated by the Mission.

a/ Includes only what is produced in the form of ammonia.

b/ The figures relate to saltpetre (natural nitrates).

c/ If imports of ammonia were included, the figure would be 564 000 tons of nitrogen.

d/ Figure for 1973 (TVA).

/It will

It will be noted that in 1974 Mexico and Venezuela were the main producers (447,000 and 203,000 tons, respectively). In some countries, notwithstanding the unsatisfied demand for fertilizers, the installed capacity is very much under-utilized. This is generally due to a combination of factors, including the existence of technical problems in the producing plants, the operational and administrative shortcomings they usually display, and problems deriving from the irregular supply of electric power, water, transport, etc.

It should be noted, moreover, that there are marked differences in the production costs of the various plants in the region, owing basically to the different raw materials used (natural gas, refinery gas, naphtha, fuel oil) and their size.

(b) Phosphorus

As regards phosphatic fertilizers, the present production capacity is estimated at about 1.62 million tons of P_2O_5 . Production in 1974 amounted to 61.8 per cent of total consumption.

The major producing countries in 1974 were Brazil (568,000 tons) and Mexico (320,000 tons), which together produced nearly 85 per cent of the total output of Latin America.

The figures in table 5 show the situation in 1974 and 1975 with respect to production and consumption of phosphatic fertilizers in the various countries of the region. All the countries producing phosphatic fertilizers import raw materials on a greater or lesser scale (phosphate rock from Florida or Morocco), and in some cases (Colombia, Brazil) phosphoric acid for the production of finished fertilizers. Several countries of the region (Mexico, Colombia, Peru and Brazil) are planning to supply all their own raw material requirements. Peru, which possesses abundant deposits of phosphate rock, has a project under way for extracting 800,000 tons of rock as a first stage in 1976.

Brazil and Mexico have located fairly substantial reserves of phosphate rock and propose to exploit it. Mexico, moreover, has production surpluses of phosphoric acid and is the only exporter of this product in the region.

/Table 5

Table 5

LATIN AMERICA: PRODUCTION AND CONSUMPTION OF PHOSPHATIC FERTILIZERS, 1974-1975

(Thousands of tons of P_2O_5)

	1974			1975			
	Consumption estimated by FAO	Estimated production	Balance	Demand (inter- polated)	Capacity	Expected produc- tion	Balance
<u>South America</u>							
Argentina	28	4	-24	30	35	15	-15
Brazil	1 003	568	-435	900	747	570	-330
Colombia	67	56	-11	100	86	80	-20
Chile	115.5	18	-97.5	120	56	21	-99
Ecuador	15	7	-8	16	36	10	-6
Peru	10.5	5	-5.5	12	10	8	-4
Uruguay	39.4	25	-14.4	43	36	30	-13
Venezuela	39.5	11.4	-28.1	43	140	20	-23
Other countries	3	-	-3	4	-	-	-4
<u>Subtotal</u>	<u>1 320.9</u>	<u>694.4</u>	<u>-626.5</u>	<u>1 268</u>	<u>1 146</u>	<u>754</u>	<u>-514</u>
<u>Central America and the Caribbean</u>							
Cuba	55.5	10	-45.5	58	12	10	-48
Mexico	229.6	320	+90.4	245	393	340	+95
Central American countries	75.6	25	-50.6	82	68	41	-41
Other countries of the Caribbean	34	3	-31	38	-	-	-38
<u>Subtotal</u>	<u>394.7</u>	<u>368</u>	<u>-26.7</u>	<u>423</u>	<u>473</u>	<u>391</u>	<u>-32</u>
<u>Total Latin America</u>	<u>1 715.6</u>	<u>1 052.4</u>	<u>-663.2</u>	<u>1 691</u>	<u>1 619</u>	<u>1 145</u>	<u>-546</u>

/(c) Potassium

(c) Potassium

The position with regard to potassium is truly discouraging. The region is almost completely lacking in this product and there are no grounds for expecting the situation to change in the medium term.

Consumption in 1974 totalled some 986,000 tons, Brazil being the main consumer (600,000 tons). Production amounted to 25,000 tons and the only producer in the region is Chile.

2. Estimated future production of fertilizers in Latin America

(a) Factors considered

The estimates of fertilizer production in the region in 1980 and 1985 were prepared in the light of the present installed capacity and that deriving from the operation of new plants included in national fertilizer production plans, whose characteristics, progress and expected dates of entry into operation were especially analysed.

The projects for new plants were classified in four categories:

First category: projects in the process of physical execution;

Second category: projects already approved for which there are signed commitments and/or financing arranged;

Third category: publicly-announced definite projects;

Fourth category: projects not yet well defined or projects under study.

In this way, it was possible to estimate on a fairly sound basis the production increases likely to result from the entry into operation of the new plants.

In calculating the expected production, a margin was left between theoretical capacity and probable production to allow for the normal shortfalls in production due to various factors already referred to, and also for the small production volumes not destined for fertilizers but for other industrial uses.

In the case of Mexico, there was sufficient information to estimate the volumes destined for other uses. In other cases (Brazil), small captive ammonia plants feeding other lines of chemical production were excluded.

(b) Projected

(b) Projected production in 1980

Two hypotheses were considered in estimating the probable production of the various types of fertilizers in 1980:

Hypothesis A (minimum)

This hypothesis assumes that in 1980 there will be in operation, in addition to the plants existing at present, only those new plants for which at the time of preparing this study there are projects in process of physical execution in the strictest sense of the term (first category). In addition, the plants which are expected to be in operation that year included as special cases the projects in the second category aimed at expanding the ammonia production capacity already existing in Cuba and Mexico, whose completion by 1980, according to the information available, would seem to be assumed. For the same reasons, new and expanded plants for the production of phosphatic fertilizers, the projects for which are already approved or in course of execution in Argentina, Brazil and Mexico, were also included as being in operation in 1980.

Hypothesis B (maximum)

This hypothesis assumes that in 1980 there will be in operation, in addition to the fertilizer plants existing at present, all those plants corresponding to the projects included in the first and second categories, i.e., those in process of physical execution and those already approved for which there are signed commitments or financing arranged.

The probable production of fertilizers in 1980 has been calculated on the basis of the above assumptions, and the details are as follows:

(i) Nitrogenous fertilizers. In 1980 the production of nitrogen in the region will be about 3,028,000 tons on the basis of hypothesis A (minimum) or 3,406,000 tons on the basis of hypothesis B (maximum). Demand for nitrogenous fertilizers in that year is likely to be approximately 3,448,000 tons of nitrogen, leaving a regional deficit ranging from 420,000 to only 42,000 tons of nitrogen, according to which of the two hypotheses is fulfilled.

/The situation

The situation of the individual countries presented in table 6 shows that the biggest deficits are likely to be in Brazil, Colombia and the Central American countries as a whole.

It is estimated that by 1980 the installed nitrogen production capacity will be 4.07 or 4.61 million tons, according to whether hypothesis A or B is considered. Table 7 shows the expected trend of the installed capacity for nitrogen on the basis of the aforementioned classification of projects.

(ii) Phosphatic fertilizers. In 1980 the production of phosphatic fertilizers will also continue to fall short of demand, whichever hypothesis materializes.

In the case of hypothesis A, production would amount to 2,197,000 tons of P_2O_5 and the region would be dependent on imports of phosphatic fertilizers equivalent to about 551,000 tons of P_2O_5 .

If the maximum production hypothesis (2,384,000 tons of P_2O_5) were fulfilled, the deficit would amount to around 364,000 tons of P_2O_5 (see table 8).

As regards the estimated production of the individual countries, Brazil and Mexico are expected to continue as the main producers (1,100,000 and 666,000 tons of P_2O_5 , respectively).

The former, however, would still have a deficit of approximately 400,000 tons of P_2O_5 .

Installed capacity for the production of phosphatic fertilizers in 1980 will be somewhere between 2.5 and 2.83 million tons of P_2O_5 (average and maximum hypotheses, respectively). This increased capacity will derive from the installation of new plants or expansions which are at present planned:

In Brazil: 536,000 tons distributed among three projects: triple superphosphate, 170,000 tons; diammonium phosphate, 47,000 tons; monoammonium phosphate (247,000 tons); and single superphosphate (72,000 tons).

In Chile: 60,000 tons of diammonium phosphate.

In Peru: 280,000 additional tons of triple superphosphate and diammonium phosphate (first stage of the Sechura project).

/Table 6

Table 6

LATIN AMERICA: PROJECTIONS FOR NITROGENOUS FERTILIZERS IN 1980
(Thousands of tons of nitrogen)

	Demand	Capacity		Production		Balance	
		Minimum	Maximum	Minimum	Maximum		
<u>South America</u>							
Argentina	125	73	73	65	65	-60	-60
Brazil	1 000	439	977	360	738	-640	-262
Colombia	272	123	123	105	105	-167	-167
Chile	89	160	160	140	140	51	51
Peru	149	112	112	95	95	-54	-54
Venezuela	173	649	649	300	300	127	127
Other countries	123	-	-	-	-	-123	-123
<u>Subtotal</u>	<u>1 931</u>	<u>1 556</u>	<u>2 094</u>	<u>1 065</u>	<u>1 443</u>	<u>-866</u>	<u>-488</u>
<u>Central America and the Caribbean</u>							
Cuba	201	584	584	338	338	137	137
Mexico	886	1 358	1 358	1 195	1 195	309	309
Trinidad and Tobago	10	572	572	430	430	420	420
Central American countries	307	-	-	-	-	-307	-307
Other countries of the Caribbean	113	-	-	-	-	-113	-113
<u>Subtotal</u>	<u>1 517</u>	<u>2 514</u>	<u>2 514</u>	<u>1 963</u>	<u>1 963</u>	<u>+446</u>	<u>+446</u>
<u>Total Latin America</u>	<u>3 448</u>	<u>4 070</u>	<u>4 608</u>	<u>3 028</u>	<u>3 406</u>	<u>-420</u>	<u>-42</u>

/Table 7

Table 7

LATIN AMERICA: EVOLUTION OF NITROGENOUS FERTILIZER PRODUCTION CAPACITY IN SOME COUNTRIES
(Thousands of tons of nitrogen)

Country	Existing capacity 1975	New projects			Flow projects announced	Total in 1980	Projects under study	Total in 1985	
		Under construction	Contracted or approved					Minimum	Maximum
Argentina	54	-	19 a/	-	-	73	251	324	324
Brazil	196	243	-	538 (1978/80)	-	439 (977)	365	977	1 300 b/
Colombia	123	-	-	-	-	123	270	123	370 c/
Chile	150	-	10 a/	-	-	160	270	160	430
Peru	112	-	-	-	-	112	270	112	382
Venezuela	649	-	-	-	-	649	...	649	649
<u>Subtotal</u>	<u>1 284</u>	<u>243</u>	<u>22</u>	<u>538</u>	<u>1 556 (2 094)</u>	<u>1 426</u>	<u>1 426</u>	<u>2 345</u>	<u>3 455</u>
Cuba	30	190 (1975/76) 94 (1976/77)	270	-	-	584	271	584	855
Mexico	750	243 (1976)	365 (1978/79) 365 (1981/82)	-	-	1 358	...	1 723	1 723
Trinidad and Tobago	270 d/	302 (1977)	...	240 (1981/85) 268 (1981/85)	-	572	...	572	1 080
<u>Subtotal</u>	<u>1 050</u>	<u>822</u>	<u>1 000</u>	<u>508</u>	<u>2 514</u>	<u>2 514</u>	<u>271</u>	<u>2 879</u>	<u>3 658</u>
<u>Total Latin America</u>	<u>2 334</u>	<u>1 072</u>	<u>1 022</u>	<u>1 046</u>	<u>4 070 (4 608)</u>	<u>1 697</u>	<u>1 697</u>	<u>5 224</u>	<u>7 113</u>

a/ Expansions.

b/ Assuming the closing down of the old Cubatoo unit and the installation of a plant producing 1 350 tons per day (NH₃).

c/ Assuming the installation of a 270 000 tons plant and the closing down of a 23 000 tons unit.

d/ Assuming the closing down of older plants.

Table 8

LATIN AMERICA: PROJECTIONS FOR PHOSPHATIC FERTILIZERS IN 1980

(Thousands of tons of P₂O₅)

	Demand	Capacity		Production		Balance	
		Minimum	Maximum	Minimum	Maximum		
<u>South America</u>							
Argentina	118	60 a/	60	48	48	-70	-70
Brazil	1 500	1 280	1 280	1 100	1 100	-400	-400
Colombia	106	86	86	80	80	-26	-26
Chile	173	56 a/	116	50	100	-123	-73
Ecuador	35	36	36	30	30	-5	-5
Peru	29	10 a/	280	8	140	-21	+111
Uruguay	60	36 a/	40	30	35	-30	-25
Venezuela	152	140	140	110	110	-42	-42
Other countries	8	-	-	-	-	-8	-8
<u>Subtotal</u>	<u>2 181</u>	<u>1 704</u>	<u>2 038</u>	<u>1 456</u>	<u>1 643</u>	<u>-725</u>	<u>-538</u>
<u>Central America and the Caribbean</u>							
Cuba	83	20	-	15	15	-68	-68
Mexico	909	707	707	666	666	+357	+357
Central American countries	119	68	68	60	60	-59	-59
Other countries of the Caribbean	86	-	-	-	-	-56	-56
<u>Subtotal</u>	<u>567</u>	<u>795</u>	<u>795</u>	<u>741</u>	<u>741</u>	<u>+174</u>	<u>+174</u>
<u>Total Latin America</u>	<u>2 748</u>	<u>2 499</u>	<u>2 833</u>	<u>2 197</u>	<u>2 384</u>	<u>-551</u>	<u>-364</u>

a/ Mainly single phosphates: ground phosphate, simple superphosphate, guanos and dephosphorization slag. Assumes a relative increase in the direct use of ground phosphorites by 1980-1985, mainly in Argentina and Uruguay.

/In Mexico:

In Mexico: 314,000 tons, with new phosphoric acid, NPK and diammonium phosphate plants.

In other countries: 41,000 tons, due to expansions and the greater use of ground phosphorite.

(iii) Potassic fertilizers. There are very few economically exploitable potassium resources in Latin America, which accounts for the region's high degree of dependence on imported potassic fertilizers.

Projects for increasing the production of potassic fertilizers are likely to be in operation by 1980 in Chile (approximately 140,000 tons of K_2O), Peru (30,000 tons of K_2O obtained from brine) and Brazil (500,000 tons of K_2O to be obtained from deposits of carnallite and sylvite in the State of Sergipe).

Even with the projects indicated above, the absolute deficit is likely to remain at about the same figure in view of the expected increase in consumption. Estimates of production and demand in 1980 are as follows (in thousands of tons of K_2O):

	<u>Production</u>	<u>Demand</u>	<u>Difference</u>
Chile	140.0	20.3	129.2
Peru	30.0	23.8	6.2
Brazil	500.0	900.0	(400.0)
Latin America	670.0	1 593.0	(923.0)

(c) Projected fertilizer production in 1985

Two hypotheses were also considered here:

Hypothesis A (minimum)

The production figures were estimated on the basis of the additional capacity deriving from the entry into operation of the definite projects already announced (third category) which are highly likely to be executed before 1985.

Hypothesis B (maximum)

The production figures correspond to the hypothesis A values plus the start-up of plants for which the projects are currently under study or not completely defined (fourth category), so that it would be impossible to determine how far they are actually feasible.

/The probable

The probable production figures for the various types of fertilizers in 1985 were calculated on the basis of these assumptions.

(i) Nitrogenous fertilizers. In 1985 the region's output of nitrogenous fertilizers may reach a figure somewhere between 4.33 and 5.75 million tons of nitrogen, according to the extent to which the above hypotheses are fulfilled. Since consumption is expected to amount to 4.76 million tons of nitrogen in that year, the region will show a deficit of 0.42 million or a surplus of 1 million tons, according to the hypothesis used.

The share of the various countries of the region in the production increase estimated for 1985 is shown in table 9. The production deficit (hypothesis A) will be in the South American countries, since Central America and the Caribbean will have a surplus of at least 0.43 million tons of nitrogen. In real terms, the probable deficit according to hypothesis A may be twice as much if Trinidad and Tobago's output continues to be sent to countries outside the region.

(ii) Phosphatic fertilizers. In 1985 it is estimated that the Latin American countries will produce between 2.71 and 3.61 million tons of P_2O_5 . These figures are very far from covering the demand for phosphatic fertilizers, estimated for that year at 4.39 million tons of P_2O_5 (see table 10).

Installed production capacity is likely to be between 3 and 4.2 million tons of P_2O_5 . The maximum estimate is based on the installation of the following additional plants:

Argentina: 144,000 tons, a project linked to the installation of a fertilizer complex;

Brazil: 400,000 additional tons, not defined in detail but considered as probable in view of the urgent need arising from the increase in domestic demand;

Chile: 60,000 tons, second stage of the DAP project (1980-1982);

Colombia: 132,000 tons in the form of phosphoric acid;

Peru: 420,000 additional tons, a project linked to the second stage of Peru's phosphate development plans.

/Table 9

Table 9

LATIN AMERICA: PROJECTIONS FOR NITROGENOUS FERTILIZERS IN 1985

(Thousands of tons of nitrogen)

	Demand	Primary capacity		Production		Balance	
		Minimum	Maximum	Minimum	Maximum		
<u>South America</u>							
Argentina	188	324	324	260	260	72	72
Brazil	1 350	977	1 300	790	1 070	-560	-280
Colombia	348	123	370	105	310	-243	-38
Chile	124	160	430	150	340	26	216
Peru	193	112	382	100	270	-93	77
Venezuela	307	649	649	450	450	143	143
Other countries	191	-	...	-	...	-191	-191
<u>Subtotal</u>	<u>2 701</u>	<u>2 345</u>	<u>3 455</u>	<u>1 850</u>	<u>2 700</u>	<u>-846</u>	<u>-1</u>
<u>Central America and the Caribbean</u>							
Cuba	282	584	855	484	645	202	363
Mexico	1 200	1 723	1 723	1 508	1 508	308	308
Trinidad and Tobago	15	572	1 080	490	900	475	885
Central American countries	393	-	...	-	...	-393	-393
Other countries of the Caribbean	164	-	...	-	...	-164	-164
<u>Subtotal</u>	<u>2 054</u>	<u>2 879</u>	<u>3 658</u>	<u>2 482</u>	<u>3 053</u>	<u>+428</u>	<u>+292</u>
<u>Total Latin America</u>	<u>4 755</u>	<u>5 224</u>	<u>7 113</u>	<u>4 332</u>	<u>5 753</u>	<u>-418</u>	<u>+298</u>

/Table 10

Table 10

LATIN AMERICA: PROJECTIONS FOR PHOSPHATIC FERTILIZERS IN 1985

(Thousands of tons of P_2O_5)

	Demand	Capacity		Production		Balance	
		Minimum	Maximum	Minimum	Maximum		
<u>South America</u>							
Argentina	236	60	204	55	170	-181	-66
Brazil	2 430	1 400	(1 800)	1 330	-1 500	-1 100	-930
Colombia	149	100	(215)	95	200	-54	+51
Chile	231	116	176	100	160	-131	-71
Ecuador	56	36	36	30	32	-26	-24
Peru	52	280	(700)	200	550	+148	+498
Uruguay	84	40	80	35	70	-49	-14
Venezuela	269	140	140	120	120	-149	-149
Other countries	15	-	-	-	-	-15	-15
<u>Subtotal</u>	<u>3 522</u>	<u>2 172</u>	<u>3 351</u>	<u>1 965</u>	<u>2 802</u>	<u>-1 557</u>	<u>-720</u>
<u>Central America and the Caribbean</u>							
Cuba	117	(20)	(100)	20	80	-97	-37
Mexico	497	707	707	666	666	+169	+169
Central American countries	174	68	68	60	60	-114	-114
Other countries of the Caribbean	84	-	-	-	-	-84	-84
<u>Subtotal</u>	<u>872</u>	<u>795</u>	<u>875</u>	<u>746</u>	<u>806</u>	<u>-126</u>	<u>-66</u>
<u>Total Latin America</u>	<u>4 394</u>	<u>2 967</u>	<u>4 226</u>	<u>2 711</u>	<u>3 608</u>	<u>-1 683</u>	<u>-786</u>

Note: The amounts in brackets include increases in capacity which are considered probable even though there are no specific projects at present.

/It will

It will be noted from table 10 that Brazil will continue to register a sizeable deficit (at least 900,000 tons of P_2O_5), while Peru, Mexico and Colombia will have surpluses.

(iii) Potassic fertilizers. Since there are very few known economically exploitable potassium resources in Latin America, it is deemed too risky for the time being to present production projections for 1985. It is however, considered that the various countries (particularly Brazil, which has a high consumption) will strive to intensify their geological surveys and feasibility studies with a view to developing the existing deposits. The size of the deficit will undoubtedly exert considerable pressure to that effect. Accordingly, the production assumptions presented for 1980 have been maintained, so that the region is likely to present a deficit of 1.86 million tons of K_2O .

3. International marketing of fertilizers

The marketing of fertilizers is often effected directly between large producing and purchasing companies which are generally State bodies or agricultural co-operatives. In other cases, it is done through intermediaries who, under a variety of titles (commission agents, brokers, traders), provide services for the purchase and sale of fertilizers, including transport and the financing of operations.

It is difficult to quantify what proportion of the international trade in fertilizers is carried out through intermediaries and how much of it is negotiated directly between producers and final clients. In the case of Latin America no information has been gathered on the subject, but it is supposed that the majority of fertilizer imports of the region are made through international intermediaries.

This presumption stems from the overall observation of the form and organization of the main producer-exporters, of how the distribution channels operate, and generally of how the main purchases of fertilizers are made.

/The producers

The producers are concentrated in a few industrialized countries situated in Western Europe (Federal Republic of Germany, Belgium, France, the Netherlands, Italy and the United Kingdom), Eastern Europe (Soviet Union, Poland and Romania), Asia (Japan and China) Oceania (Australia and New Zealand), and North America (United States and Canada).

Some developing countries which produce fertilizers also export them, but only sporadically and in volumes of little consequence. Among them, mention may be made of the Persian Gulf countries and South Korea, in Asia; Algeria and Morocco in Africa; and Mexico, Venezuela, Costa Rica and Chile in America.

The most important exporters of nitrogenous products among the European producer countries are the Federal Republic of Germany, the Netherlands, Romania and Poland, which the biggest exporters of compound fertilizers are the Federal Republic of Germany, the Netherlands and Italy, since although the other countries mentioned are also large producers, most of their production is used to satisfy domestic demand, and their exports are consequently smaller.

In Asia, the most important producer and one of the largest suppliers in the world is Japan; the countries of the Persian Gulf and South Korea produce on a much smaller scale.

The producers in Oceania cannot be considered exporters, since both Australia and New Zealand consume practically all they produce, and export sporadically whenever they have a production surplus because of special circumstances.

There are a number of producer countries in Africa, but there are really only two which have been increasing considerably their production and have big medium-term projects; Algeria, in nitrogenous products, and Morocco in phosphate products.

In America the United States is the most important producer country, but although a few years ago it was the largest exporter in the world, today it only exports small quantities of finished products and raw materials such as phosphate rock and potassium. In contrast, it has become a considerable importer of urea, ammonia and NPK.

/Chile stands

Chile stands out only by its importance in the production and export of natural nitrates: in no way can it be considered a basically exporter country.

Mexico is one of the most important producers of fertilizers in Latin America, but its participation in exports is nevertheless relatively small. It only exports urea and phosphoric acid. Costa Rica and El Salvador are producers of NPK and of ammonium nitrate, but only for local consumption. Trinidad and Tobago exports ammonia, chiefly to the United States. Venezuela could become an important exporter of ammonia and urea within a short period.

In the last ten years, export consortia and cartels have become very important and have revolutionized the structure of world fertilizer markets.

The influence and direct responsibility of some of these consortia with regard to the behaviour of international fertilizer markets and especially prices is very great.

Europe has two entities which handle the exports of the principal producers of the continent. They are: the European Nitrogen Consortium (NITREX AG) and Complex Fertilizers.

The European Nitrogen Consortium (NITREX AG) is made up of the nine biggest producers of nitrogenous fertilizers in Europe, which sell all their surpluses solely and exclusively through it.

Complex Fertilizers groups together the main European producers of compound fertilizers, and unlike NITREX operates outside the European continent through agencies in every country.

There is also an organization which is not exclusively European, since it includes producers from other continents: the International Superphosphate and Compound Manufacturers' Association (ISMA), which does not operate as a cartel proper, but co-ordinates certain production and international sales policies among its members.

Japan, the biggest producer and exporter of the Asian continent in recent years, has formed two consortia which include all the producers in the country without exception. This cartel is known as
/the Japan

the Japan Ammonium Sulphate and Urea Export Association (AMMOSUL), and it has a subsidiary called the Japan NPK Export Association.

In the particular case of Japan it should be pointed out that, because of the general structure of its foreign trade, there are countless Japanese import and export companies with branches throughout the world, but with unified representation.

4. Investment in fertilizer plants

In recent years there have been, as is well known, big rises in the cost of industrial equipment and installations. The figures for fixed investment in fertilizer plants have therefore risen considerably.

Some approximate overall values, obtained on the basis of recent price quotations for the supply and installation of equipment and specific assumptions as to plant location are given below in order to provide an indication of current investment costs for plants producing different types of fertilizers.

It has been estimated that fixed investment for an ammonia plant of 1,000 TPD installed next to a Caribbean or an Atlantic port would be in the region of 53 million dollars. This figure would include the cost of the land, project engineering and the supply and assembly of the equipment and normal ancillary installations. If a urea plant of 800 TPD were added to the ammonia plant, the additional investment would be of the order of 35 million dollars.

The investment cost for a phosphoric acid plant with a production capacity of 500 TPD of P_2O_5 has been estimated at 19.5 million dollars, on similar bases to those indicated for the ammonia plant.

The installation of a sulphuric acid plant of 1,500 TPD capacity would call for an investment of nearly 14 million dollars. The installation of plants to manufacture diammonium phosphate and triple superphosphate, each with a capacity of 1,000 TPD, would call for investments of the order of 8.9 and 6.5 million dollars, respectively.

/Once again

Once again, it should be recalled that the amounts mentioned can only be considered as a rough indication of the likely cost of investment in fertilizer plants.^{5/} These amounts may vary appreciably according, amongst other factors, to the location of the plant, the characteristics of the project and the system of contracting the execution of the work.

5. Fertilizer production costs

Ammonia may be produced, of course, from various raw materials. In Latin America there are plants which use naphtha, refinery gas, fuel oil or natural gas. The effect of the raw materials used on the cost of the ammonia is considerable. Table 11, which sets forth the production costs of ammonia using natural gas, naphtha, and fuel oil with different unit prices, has been prepared in order to give an idea of the differences in costs stemming from the type of raw material used.

The calculations were made on the basis of plants of equal capacity (1,000 TPD).

Three price variants were considered for natural gas: 0.15, 0.40 and 0.80 dollars per thousand cubic feet of gas at the plant. The price of 0.80 dollars per cubic foot was fixed purely for purposes of comparison, since it would be extremely high for a Latin American plant. Similarly, three prices were chosen for naphtha and fuel oil, according to the prices which it was estimated might obtain for those purposes.

By looking at the table it is possible to appreciate the great importance of the cost of the raw material on the cost of production and consequently the desirability of using natural gas, whose cost is considerably lower than that of naphtha and fuel oil.

^{5/} According to other estimates, current investment costs in fertilizer plants could be notably higher than those indicated in this report, particularly those relating to ammonia plants, which would be about 50 per cent higher than those given.

Table 11

PRODUCTION COSTS PER TON OF AMMONIA IN A PLANT WITH A CAPACITY OF ONE
THOUSAND METRIC TONS PER DAY, ACCORDING TO THE RAW
MATERIAL USED AND ITS PRICE
(Dollars)

	Raw material used and price at the plant								
	Natural gas			Naphtha			Fuel oil		
	0.15 ^{a/}	0.40 ^{a/}	0.80 ^{a/}	60 ^{b/}	80 ^{b/}	100 ^{b/}	6 ^{c/}	8 ^{c/}	10 ^{c/}
1. Investment in millions of dollars <u>d/</u>	53.00	53.00	53.00	61.00	61.00	61.00	69.00	69.00	69.00
2. Cost of raw material	5.78	15.40	30.80	52.80	70.40	88.00	37.60	50.51	62.70
3. Cost of processing <u>e/</u>	38.90	38.90	38.90	44.12	44.12	44.12	49.63	49.63	49.63
4. Cost of manufacture (2+3)	44.68	54.30	69.70	96.92	114.52	132.12	87.23	99.78	112.33
5. Return on investment (ROI) of 10 per cent	16.00	16.00	16.00	18.56	18.56	18.56	20.90	20.90	20.90
6. Total cost	60.68	70.30	85.70	115.48	133.08	150.68	108.13	120.68	133.23

a/ Per 1 000 cubic feet.

b/ Per ton.

c/ Per barrel.

d/ Includes cost of land, project engineering and assembly of plant and normal ancillary installations for a plant located next to a Caribbean or Atlantic port.

e/ Including direct labour, supervision, water, electricity, steam, laboratory, maintenance, miscellaneous costs, interest, insurance and depreciation.

/It may

It may also be seen that more investment is necessary when the raw material is naphtha or fuel oil. In other words, when natural gas is used to produce ammonia, not only is the cost of the raw material lower, but also that of processing.

It may therefore be asserted that while the use of raw materials other than natural gas might be justified in domestic plants producing ammonia intended for domestic consumption, for various reasons, in no case would it be justified for a multinational enterprise whose production has to be exported at competitive prices.

It was also judged useful to show the structure of production costs of other types of fertilizers. These are shown in table 12.

It should be pointed out that tables 11 and 12 only include figures for fixed investment. Operating capital needs may vary according to specific factors of each project, such as the terms of purchase of raw materials and marketing of production; in general, however, they are of relatively little importance, which is why they have not been included in the approximate calculations of fertilizer costs which appear in those tables.

Table 12

ESTIMATED PRODUCTION COSTS OF SOME FERTILIZERS
(Dollars per ton of product)

	Urea	Phosphoric acid	Triplesuper-phosphate	Diammonium phosphate
Capacity	800 t/day	500 t/day of P ₂ O ₅	1 000 t/day	1 000 t/day
Investment in millions of dollars a/	35.00	19.20	6.50	8.90
Raw materials used and price (in dollars/ton)	Ammonia (100) CO ₂	Phosphate rock (55) Sulphuric acid (27)	Phosphate rock (55) Sulphuric acid (27)	Ammonia (100) Sulphuric acid (27) Phosphoric acid (29)
Costs				
Raw materials	60.00	148.81	130.91	159.68
Direct labour and supervision	1.24	1.76	0.85	
Services b/	11.09	13.77	4.98	4.50 (includes manpower and services)
Interest, insurance and depreciation	15.34	16.82	2.84	3.80
Cost of production	87.62	30.59	139.45	167.98
10 per cent return on investment	10.60	11.65	1.97	2.62
Total cost	98.22	291.05	141.42	170.60

a/ Includes cost of land, engineering, supply and assembly of equipment and normal ancillary installations for a plant situated next to a Caribbean or Atlantic port.

b/ Water, steam, electricity, laboratory, maintenance, inputs, direct and indirect expenditure.

/V. AVAILABILITY

V. AVAILABILITY IN THE REGION ON SUITABLE RAW MATERIALS
FOR THE MANUFACTURE OF FERTILIZERS

1. Natural gas

Latin America has large reserves of natural gas, which is the most suitable raw material for the production of ammonia (nitrogen). Table 13 indicates proven reserves as of January 1973 and annual production in 1972. It should be added that since that date new deposits of natural gas have been discovered or deposits already known have been quantified in various countries, with the result that the figures for known reserves have risen considerably.

The most important of the newly discovered deposits seem to be those in Colombia (La Guajira) and in Ecuador (Gulf of Guayaquil). Deposits of gas which have not yet been quantified were also discovered in Brazil (Northeast coast). In Bolivia, proven reserves appear to have increased.

It may be seen from the table that, with the exception of Brazil, the rest of the countries which appear in the table have gas reserves of a considerable size.

Since some 450 million cubic metres of natural gas per year are needed to feed a typical ammonia plant with a capacity of 1,000 TPD, one or more plants could operate in any of those countries for a long period. In this connexion, a TVA study ^{6/} indicates that Argentina, Bolivia, Chile, Colombia, Ecuador, Peru, Trinidad and Tobago and Venezuela have sufficient reserves for supporting a 1,000 TPD ammonia plant using 10 per cent of their gas reserves for 15 years at least.

The country with the largest reserves of natural gas is Venezuela, which possesses almost 50 per cent of the total for the region.

^{6/} TVA, "Review and Analysis of the Fertilizer Situation in Latin America" (June 1974).

Table 13

NATURAL GAS RESERVES AND PRODUCTION IN COUNTRIES OF LATIN AMERICA
(Thousand of millions of cubic metres)

Country	Reserves December 1973	Production 1972
Argentina	280	8.00
Bolivia	353	3.80
Brazil	33	1.45
Colombia	88	4.15
Chile	120	10.27
Ecuador	176	0.14 (0.82 a/)
Mexico	305 b/	18.70 b/
Peru	123	0.04 (0.64 c/)
Trinidad and Tobago	176	4.42
Venezuela	1 480 (1 084 d/)	58.90

Source: Oil and Gas Journal, December 1973 and information from countries.

a/ According to CEPE.

b/ 1972 data from the United Nations Statistical Yearbook 1973.

c/ Availability in Talara, according to PETROPERU.

d/ According to official figures, described as conservative.

/It should

It should be pointed out that Argentina uses 75 per cent of its gas production as domestic or industrial fuel, for which purpose large gas pipelines have been built from the gas extraction centres to the consumption centres in the province of Buenos Aires.

2. Phosphates

The most important deposits of phosphate rock known in the region are shown in table 14.

It may be seen that the largest reserves are in Peru (Sechura). The table does not include the deposits discovered in Mexico (Baja California), which have not yet been quantified, or the most recent discoveries in Brazil.

It is only in Brazil that mines of any size are worked on a regular basis. In Mexico, Venezuela and Colombia smaller amounts are extracted for the production of fertilizers. Production in Curaçao is not intended for the manufacture of fertilizers, but for other uses (feed concentrate and the food industry), because of its low fluorine content.

If the current prices of phosphate rock on the international market continue (60 dollars per metric ton FOB), the exploitation of a number of deposits which are not currently in production would become economical. In almost all the deposits of the region it would be necessary to install processing plants to raise the concentration from the 8 to 24 per cent of P_2O_5 of the natural product to a minimum of 30 to 32 per cent.

The probable production capacity of Brazil in 1976/1977 should reach 1,030,000 tons of P_2O_5 (Jacupiranga, Serrote and Araxá); the other resources under study, particularly those of Tapirá, would add large amounts, currently estimated at an extra 1 million tons of P_2O_5 , so that Brazil could reach a production of 2 million tons by 1985, in comparison with a demand for 2,430,000 tons.

In Peru it is expected, as a result of the Sechura Project, that some 800,000 tons of concentrates (250,000 to 260,000 tons of P_2O_5) will be available each year by 1976/1977, while in a second stage the amount could rise to 2 million tons of concentrates per year (640,000 tons of P_2O_5).

/Table 14

Table 14

PHOSPHATE ROCK RESERVES IN COUNTRIES OF LATIN AMERICA

(Millions of tons)

Deposits	Estimated reserves	Proven reserves	Concentrate (% P ₂ O ₅)	Operations (exploitation)	Production
Curaçao	1 to 20	-	33	Yes	
Peru					
Sechura	600-10 000	-	32 (by flotation)	Being developed	800
Brazil					
Jacupiranga	150 (6.5%)	-	35 (by flotation)	Yes	340
Araxá	91	-	20-35 (by flotation)	1976 project	1 800
Travirá	50	-	20	Under study	
Olinda	300 (16%)	-	28-30 (by flotation)	Under study	
Ipanema	-	-	35	Project	700
Tapiró	-	-	-	Under study	2 500
Serrote	-	-	24	(1976)	700
Colombia					
Sardinata	-	9	28	Under study	-
Conejera	40	12	20	Under study	-
Yaguará	30	-	24	Under study	-
Venezuela					
Riocito	-	20	32	Yes	110
Lamdina	1	0.3	29	-	-
Nicaragua	-	-	27	-	-
Chile	0.5-1	-	26	(closed)	-

Sources: TVA; ANDA - Associação Nacional para difusão de adubos (Brazil).

/Taking into

Taking into account existing projects under way and under study in Brazil and the Sechura Project in Peru, the probable availability of raw materials for phosphate fertilizers by 1985 should reach an approximate figure of 2,650,000 tons of P_2O_5 . With the inclusion of the expectations of Mexico (600,000 tons of P_2O_5) and Colombia (160,000), the raw materials available would be the equivalent of 3,400,000 tons of P_2O_5 . In any event, however, the phosphate rock available will be less than the estimated demand for 1985, which is approximately 4,400,000 tons of P_2O_5 . In 1980 production should reach 1,400,000 tons of P_2O_5 and demand should be of the order of 2,750,000 tons.

It is clear that development plans for phosphate rock deposits are insufficient to meet the growing demand for phosphate fertilizers.

It is therefore urgent to develop the exploitation projects for the new deposits in Mexico, Colombia and Brazil, while expanding the Peruvian projects to 3 million tons (930,000 tons of P_2O_5) by 1985.

The fact that the manufacture of phosphate fertilizers requires large amounts of sulphuric acid, in addition to phosphate rock, means that the availability of sulphur in the region must also be studied. In this connexion, it should be pointed out that there are large sulphur deposits in Mexico and sulphuric acid - a by-product of the copper industry - is available in Chile and Peru.

3. Potassium

Apart from the deposits of carnallite (16.9 per cent K_2O) and sylvite (63.2 per cent K_2O) identified in the state of Sergipe (Brazil), no resources of any size are known in the region. Present and planned production of natural nitrates in Chile (25,000 and 140,000 tons of K_2O respectively) and Peruvian projects for recovering potassium from brine (30,000 tons of K_2O) do not amount to a significant contribution from the regional point of view.

In Brazil, projects are under study for the exploitation of the above-mentioned carnallite deposits which are still being defined and whose initial production (1977) has been estimated at 500,000 tons per

/year; this

year; this will be insufficient to satisfy completely domestic demand, but it will at any rate make a significant contribution to reducing the regional deficit.

Clearly, Latin America will continue to depend to a large extent on imports to satisfy most of the demand for potassium in 1980, estimated at 1.6 million tons of K_2O .

The size of this deficit makes it urgent to intensify geological research and feasibility studies to develop known reserves. By 1985 the demand will be around 2,740,000 tons, with a deficit (including the probable contributions of Chile, Peru and Brazil) of the order of 2 million tons of K_2O .

VI. WORLD FERTILIZER SUPPLY AND DEMAND: PRESENT SITUATION
AND FUTURE PROSPECTS

There seems to be a good deal of agreement, among the different international bodies and institutions which have studied the problem recently, on the short-term outlook for the fertilizer industry.

The prevailing opinion is that the situation of relative scarcity and high prices of the last three years could continue until 1976/1977, for nitrogenous fertilizers at least. However, there are some signs that the world supply situation should improve to some extent.

The following should be mentioned in this connexion: (a) in recent months fertilizers purchase operations have taken place at notably lower prices than those obtaining in the world market at the end of 1974; (b) there are relatively large fertilizer stocks in various countries: in May of the present year Brazil, Colombia and Ecuador possessed much larger fertilizer stocks than usual for that time of the year. India, Pakistan and Turkey also had relatively larger stocks at that date, and the Philippines is said to have prohibited fertilizer imports recently for the same reason; (c) it is thought that in the United States fertilizer consumption will increase much less in 1975/1976 than in earlier years, and while fertilizer producers' stocks in that country may continue to be lower than usual, they will increase over the low level of the previous year.

It is believed that these circumstances will have some influence on the world supply of fertilizers and ultimately on price levels.

In any event, however, it should be recognized that the situation remains uncertain and that there are still no grounds for asserting categorically that the fertilizer crisis will be settled in a very short period.

On the other hand, according to the forecast of real supply and demand of fertilizers ^{7/} prepared by the FAO/UNIDO/IBRD working

^{7/} FAO, Committee on Fertilizers, Examen de la situación actual y de las perspectivas a corto plazo (AGS: F/75/2) and Situación a más largo plazo de la oferta y la demanda de fertilizantes y elementos de una política mundial de feritilizantes (AGS: F/75/7).

group on fertilizers, the long-term outlook to 1980/1981 is reasonably favourable because there will be considerable investment to expand existing production capacity. The real world demand in 1980/1981 for all three primary nutrients (N, P_2O_5 , K_2O) is estimated at 123 million tons and the supply at 126 million tons, on the basis of the investments planned as of the end of March 1975.

However, there are considerable differences between the three nutrients as regards their distribution in the world and regional totals (see tables 15 and 16).^{8/} It is expected that nitrogen (N) will represent 49 per cent of total demand, phosphate (P_2O_5) 27 per cent and potash (K_2O) 24 per cent.

1. Nitrogen

World demand for nitrogenous fertilizers in 1980/1981 is forecast at 60.6 million tons of N: and increase of 47 per cent over 1974/1975 (see table 15). The world supply of nitrogen in 1980/1981 is expected to reach 62.3 million tons, i.e., an increase of 50 per cent over the level of 1974/1975. While there are plans to build many new plants in the next biennium which will make some contribution to sustaining the supply of nitrogenous fertilizers, the present critical situation may be expected to continue until 1976/1977.

Synthetic ammonia is the primary source of over 95 per cent of the nitrogen in fertilizers. According to existing plans, world capacity to synthesize ammonia is expected to increase by 41.6 million tons of N (63 per cent) between 1974/1975 and 1980/1981. In the countries with centrally planned economies capacity will rise by about 60 per cent, to 35.3 million tons of N; in the developing countries by over 200 per cent, to 25.4 million tons of N; and in the developed countries by 32 per cent, to 46.4 million tons of N. Thus in the period until 1980/1981 the distribution of capacity to synthesize ammonia will shift sharply in favour of the developing countries and the countries with centrally planned economies.

^{8/} The figures for Latin America which appear in tables 15 and 16 prepared by the FAO Committee on Fertilizers, on the basis of data collected in March 1975, differ to some extent from the estimates of the Mission, which were based on information received from countries in May and June 1975.

Table 15

WORLD SUPPLY, DEMAND AND BALANCE OF NITROGENOUS FERTILIZERS, BY REGIONS, 1974/1975 - 1980/1981
(Millions of metric tons of N)

	Developed market economies					Developing market economies					Centrally planned economies			
	Total	North America	Western Europe	Oceania	Others	Total	Africa	Latin America	Near East	Far East	Total	Asia	Europe and the USSR	World total
1974/1975														
Supply	22.1	9.3	9.9	0.2	2.7	4.3	0.2	1.1	0.9	2.1	15.1	3.4	11.7	41.5
Demand	18.8	9.3	8.1	0.2	1.2	7.6	0.5	2.0	1.1	4.0	14.9	4.2	10.7	41.3
Balance	+3.3	-	+1.8	-	+1.5	-3.3	-0.3	-0.9	-0.2	-1.9	+0.2	-0.8	+1.0	+0.2
1975/1976														
Supply	22.9	9.8	10.2	0.2	2.7	5.2	0.2	1.4	1.0	2.6	16.0	3.6	12.4	44.1
Demand	19.4	9.6	8.4	0.2	1.2	8.5	0.5	2.2	1.3	4.5	16.0	4.5	11.5	43.9
Balance	+3.5	+0.2	+1.8	-	+1.5	-3.3	-0.3	-0.8	-0.3	-1.9	-	-0.9	+0.9	+0.2
1976/1977														
Supply	24.1	10.6	10.6	0.2	2.7	6.5	0.2	1.7	1.2	3.4	17.3	4.1	13.2	47.9
Demand	20.3	10.1	8.8	0.2	1.2	9.6	0.6	2.4	1.4	5.2	17.2	5.0	12.2	47.1
Balance	+3.8	+0.5	+1.8	-	+1.5	-3.1	-0.4	-0.7	-0.2	-1.8	+0.1	-0.9	+1.0	+0.8
1977/1978														
Supply	26.1	12.2	10.9	0.2	2.8	7.8	0.3	1.9	1.4	4.2	18.4	4.8	13.6	52.3
Demand	21.4	10.6	9.2	0.3	1.3	10.7	0.7	2.6	1.7	5.8	18.4	5.5	12.9	50.5
Balance	+4.7	+1.6	+1.7	-0.1	+1.5	-2.9	-0.4	-0.7	-0.3	-1.6	-	-0.7	+0.7	+1.8
1978/1979														
Supply	27.0	12.7	11.3	0.3	2.7	9.6	0.4	2.1	1.9	5.2	19.5	5.5	14.0	56.1
Demand	22.4	11.2	9.6	0.3	1.3	11.9	0.7	2.8	1.9	6.5	19.7	6.1	13.6	54.0
Balance	+4.6	+1.5	+1.7	-	+1.4	-2.3	-0.3	-0.7	-	-1.3	-0.2	-0.6	+0.4	+2.1
1979/1980														
Supply	27.6	12.9	11.7	0.3	2.7	11.2	0.5	2.2	2.4	6.1	20.4	6.0	14.4	59.2
Demand	23.3	11.7	10.0	0.3	1.3	13.1	0.8	3.0	2.1	7.2	20.9	6.6	14.3	57.3
Balance	+4.3	+1.2	+1.7	-	+1.4	-1.9	-0.3	-0.8	+0.3	-1.1	-0.5	-0.6	+0.1	+1.9
1980/1981														
Supply	28.1	13.1	12.1	0.3	2.6	12.2	0.6	2.3	2.6	6.7	22.0	6.5	15.5	62.3
Demand	24.3	12.2	10.4	0.3	1.4	14.1	0.9	3.2	2.2	7.8	22.2	7.1	15.1	60.6
Balance	+3.8	+0.9	+1.7	-	+1.2	-1.9	-0.3	-0.9	+0.4	-1.1	-0.2	-0.6	+0.4	+1.7

Source: FAO, Committee on Fertilizers, Situación a más largo plazo de la oferta y la demanda de fertilizantes y elementos de una política mundial de fertilizantes (AGS:7/75/7).

Table 16

WORLD SUPPLY, DEMAND AND BALANCE OF PHOSPHATE FERTILIZERS, BY REGIONS, 1974/1975 - 1980/1981
(Millions of metric tons of P₂O₅)

	1974/1975					1975/1976					1976/1977					1977/1978				
	PA	OP	TP	D	B	PA	OP	TP	D	B	PA	OP	TP	D	B	PA	OP	TP	D	B
<u>Developed market economies</u>	10.25	5.40	16.25	14.10	+2.25	11.86	5.20	17.06	14.60	+2.46	12.86	5.20	18.06	15.10	+2.96	13.50	5.10	18.60	15.60	+3.00
North America	5.90	1.00	6.90	5.10	+1.80	6.31	1.00	7.31	5.40	+1.91	6.90	0.90	7.80	5.70	+2.10	7.17	0.90	8.07	6.00	+2.07
Western Europe	3.80	2.80	6.60	6.20	+0.40	4.29	2.70	6.99	6.40	+0.59	4.59	2.70	7.29	6.60	+0.69	4.84	2.60	7.44	6.70	+0.74
Oceania	0.18	1.40	1.58	1.60	-0.20	0.18	1.30	1.48	1.60	-0.12	0.18	1.40	1.58	1.60	-0.02	0.18	1.40	1.58	1.60	-0.02
Others	1.07	0.20	1.27	1.20	+0.07	1.08	0.20	1.28	1.20	+0.08	1.19	0.20	1.39	1.20	+0.19	1.31	0.20	1.51	1.30	+0.21
<u>Developing market economies</u>	1.80	1.00	2.80	3.78	-0.98	2.52	0.90	3.42	4.05	-0.63	3.18	0.90	4.08	4.32	-0.24	4.00	0.90	4.90	4.66	+0.24
Africa	0.50	0.30	0.80	0.33	+0.47	0.78	0.30	1.08	0.35	+0.73	1.11	0.30	1.41	0.37	+1.04	1.57	0.30	1.87	0.40	+1.47
Latin America	0.50	0.40	0.90	1.50	-0.60	0.63	0.30	0.93	1.60	-0.67	0.75	0.30	1.05	1.70	-0.65	1.04	0.30	1.34	1.80	-0.46
Near East	0.30	0.20	0.50	0.60	-0.10	0.42	0.20	0.62	0.65	-0.03	0.61	0.20	0.81	0.70	+0.11	0.62	0.20	0.82	0.80	+0.02
Far East	0.50	0.10	0.60	1.35	-0.75	0.69	0.10	0.79	1.45	-0.66	0.71	0.10	0.81	1.55	-0.74	0.77	0.10	0.87	1.66	-0.79
<u>Centrally planned economies</u>	4.00	2.82	7.82	7.30	+0.52	4.37	4.06	8.43	7.85	+0.58	4.53	4.10	8.63	8.30	+0.33	4.52	4.10	8.62	8.70	-0.02
Asia	0.04	0.92	0.96	1.60	-0.64	0.04	1.16	1.20	1.75	-0.55	0.07	1.30	1.37	1.90	-0.53	0.09	1.30	1.39	2.00	-0.61
Europe and USSR	3.96	2.90	6.86	5.70	+1.16	4.33	2.90	7.23	6.10	+1.13	4.46	2.80	7.26	6.40	+0.86	4.50	2.80	7.30	6.70	+0.60
<u>World total</u>	16.75	10.22	26.97	25.18	+1.79	18.75	10.16	28.91	26.50	+2.41	20.57	10.20	30.77	27.72	+3.05	22.09	10.10	32.19	28.96	+3.23

	1978/1979					1979/1980					1980/1981				
	PA	OP	TP	D	B	PA	OP	TP	D	B	PA	OP	TP	D	B
<u>Developed market economies</u>	13.82	4.90	18.72	16.10	+2.62	14.06	4.80	18.86	16.60	+2.26	14.15	4.80	18.95	17.10	+1.85
North America	7.37	0.80	8.17	6.30	+1.87	7.61	0.80	8.41	6.60	+1.81	7.70	0.80	8.50	6.80	+1.70
Western Europe	4.85	2.50	7.35	6.80	+0.55	4.85	2.40	7.25	7.00	+0.25	4.85	2.40	7.25	7.10	+0.15
Oceania	0.18	1.40	1.58	1.70	-0.12	0.18	1.40	1.58	1.70	-0.12	0.18	1.40	1.58	1.80	-0.22
Others	1.42	0.20	1.62	1.30	+0.32	1.42	0.20	1.62	1.30	+0.32	1.42	0.20	1.62	1.40	+0.22
<u>Developing market economies</u>	4.52	0.90	5.42	4.98	+0.44	4.76	0.90	5.66	5.47	+0.19	4.96	0.90	5.86	5.86	-
Africa	1.80	0.30	2.10	0.43	+1.67	1.94	0.30	2.24	0.47	+1.77	1.94	0.30	2.24	0.51	+1.73
Latin America	1.14	0.30	1.44	1.90	-0.46	1.18	0.30	1.48	2.10	-0.62	1.27	0.30	1.57	2.20	-0.63
Near East	0.71	0.20	0.91	0.85	+0.06	0.71	0.20	0.91	0.90	+0.01	0.71	0.20	0.91	0.95	-0.04
Far East	0.87	0.10	0.97	1.80	-0.83	0.93	0.10	1.03	2.00	-0.97	1.04	0.10	1.14	2.20	-1.06
<u>Centrally planned economies</u>	4.64	4.00	8.64	9.30	-0.66	4.64	3.90	8.54	9.70	-1.16	4.64	3.80	8.44	10.10	-1.66
Asia	0.11	1.30	1.41	2.10	-0.69	0.11	1.30	1.41	2.20	-0.79	0.11	1.30	1.41	2.30	-0.89
Europe and USSR	4.53	2.70	7.23	7.20	+0.03	4.53	2.60	7.13	7.50	-0.37	4.53	2.50	7.03	7.80	-0.77
<u>World total</u>	22.98	2.80	32.78	30.38	+2.40	23.46	2.60	33.06	31.77	+1.29	23.75	2.50	33.25	33.06	+0.19

Source: FAO, Committee on Fertilizers, Situación a más largo plazo de la oferta y la demanda de fertilizantes y elementos de una política mundial de fertilizantes (AUS:7/75/77).
(PA = phosphoric acid; OP = other phosphates; TP = total phosphates; D = demand; B = balance)

Of the increase of 20.8 million tons in world supply the developing countries' share will be 7.9 million tons and that of the countries with centrally planned economies 6.9 million tons (see table 15). In 1980/1981 these two groups of countries will have shares of 20 per cent and 35 per cent of world supply, respectively. It is therefore clear that the deficit situation of the developing countries will improve, and that in 1980/1981 the deficit will fall by about 1.4 million tons.

2. Phosphate

World demand for phosphate fertilizer in 1980/1981 is forecast at 33 million tons of P_2O_5 ; in other words, it is expected to rise by 31 per cent over 1974/1975 (see table 17). The supply of P_2O_5 for phosphate fertilizers is made up of products derived from the production of wet-process phosphoric acid and other phosphates such as nitrophosphates, superphosphates, basic slag, condensed phosphates and dicalcium phosphate. Of the increase of 7 million tons in world supply, the developing countries will account for 3 million, the developed countries for a little over 3 million, and the countries with centrally planned economies for the remainder. By 1980/1981 the developing countries and the countries with centrally planned economies will represent 21 and 20 per cent respectively of world supply. The developing countries are expected to pass from a deficit situation to a surplus in 1977/1978, while supply and demand will be in balance in 1980/1981.

3. Phosphate rock

In 1972/1973 approximately 80 per cent (some 76.5 million tons) of phosphate rock production was accounted for by only 3 countries: the United States of America, the Soviet Union and Morocco. It is estimated that in 1973/1974 production in these countries increased to about 83 million tons, maintaining roughly the same share of the world total. About 50 per cent of the world consumption of phosphate rock has to be imported.

/Table 17

Table 17

PROJECTION OF FERTILIZER DEMAND AND PRODUCTION IN LATIN AMERICA
FOR 1980 AND 1985

(In thousands tons of nutrients)

	1980					1985				
	Demand	Production (hypothesis)		Difference (hypothesis)		Demand	Production (hypothesis)		Difference (hypothesis)	
		A	B	A	B		A	B	A	B
N	3 448	3 028	3 406	-420	-42	4 755	4 332	5 753	-418	998
P ₂ O ₅	2 748	2 197	2 384	-551	-364	4 394	2 711	3 608	-1 683	-786
K ₂ O	1 593	670a/	670a/	-923	-923	2 739	670b/	670b/	-2 069	-2 069
NPK	7 789	5 895	6 460	-1 894	-1 329	11 888	7 713	10 031	-4 170	-1 857

a/ Only one production hypothesis considered.

b/ No estimates made for production in 1985, which is why the 1980 figures are repeated.

/In 1972/1973

In 1972/1973 the balance between supply and demand was very shaky, since accumulated stocks, which until then had made good the difference between the rates of growth of supply and demand, were exhausted. In 1973/1974 extraction capacity grew to some extent, but consumption during the year was restricted by inadequate production. It is expected that in 1980 world extraction capacity for phosphate rock will expand to 180 million tons.

4. Potash

World demand for potash is expected to reach a figure close to 30 million tons in 1980/1981, which represents an increase of 34.6 per cent over 1974/1975. The countries of North America and Europe which are self-sufficient in potash will represent almost 60 per cent of the total rise in demand for potash in that period. While a number of developing countries are beginning to recognize the need to provide themselves with potash, it is calculated that in all they will only represent about 13 per cent, or 3 million tons, of total demand in 1980/1981. Almost all this volume (2.8 million tons) will have to be imported owing to the fact that the known deposits in developing countries are limited. It is estimated that between 1974/1975 and 1980/1981 the world supply of potash will rise by 8.2 million tons of K_2O to a total of 30.3 million tons. The expansion of capacity will occur mainly in the Soviet Union and Canada.

5. Sulphur

By 1973/1974 sulphur production had risen to about 51.3 million tons and consumption to 44.9 million tons, of which 24.2 million tons were intended for fertilizers and the rest for industrial use. At the moment the supply of sulphur seems amply capable of meeting the expected short-term demand, although it is estimated that demand will rise more rapidly than production and the long-term outlook points to a narrower balance between supply and demand towards the end of the present decade.

/VII. FUTURE

VII. FUTURE FERTILIZER SUPPLY AND DEMAND AND THE POSSIBILITIES
OF SETTING UP MULTINATIONAL PLANTS

1. Future fertilizer supply and demand in Latin America

According to estimates of the demand and production of fertilizers in Latin America in 1980 and 1985, the region will continue to depend to a large extent on imports of nutrients.

It is estimated that to meet demand in 1980, recourse will have to be had to fertilizers from outside the region for between 1.33 and 1.89 million tons of NPK, according to the degree of fulfilment of either of the hypotheses on which the fertilizer production projections for that year were based.

The greatest deficit will occur in potassic fertilizers, in which, for the reasons given above, no possibility is seen in the medium term of increasing production sufficiently to satisfy demand.

The situation with regard to nitrogenous fertilizers will vary according to whether hypothesis A (minimum) or hypothesis B (maximum) for production increases is fulfilled. In the first case there would be a shortfall in nitrogenous fertilizers of about 420,000 of N. In the second, supply would practically equal demand, since the deficit would be reduced to 42,000 tons of N.

With regard to phosphate fertilizers, it should be noted that there is likely to be a large regional deficit whatever production hypothesis is fulfilled. This deficit would be of the order of 551,000 tons of P_2O_5 if hypothesis A (minimum) for the calculation of the 1980 production figures were fulfilled, and of 364,000 tons of P_2O_5 if hypothesis B (maximum) were fulfilled.

In 1985 the nitrogenous fertilizer picture would change substantially if production hypothesis B (maximum) were fulfilled, but this is a possibility which the Mission considers very remote, since it is based on projects under study, some of which have not been completely defined and whose viability has not been proved. If it were fulfilled, however, there would be a production surplus

/of nitrogenous

of nitrogenous fertilizers of about one million tons of nitrogen. In contrast, if hypothesis A were fulfilled, the existing deficit of 420,000 tons of N would continue in 1980.

In the case of phosphate fertilizers, the region would have a large deficit under both production expansion hypotheses (1,683,000 and 786,000 tons of P_2O_5).

There does not appear to be any chance of a significant rise in production of potassic fertilizers by 1985 because of the lack of known resources to be exploited. It has been assumed that the deficit will continue to increase, but that at the same time the pressure of demand will bring about efforts to discover and exploit resources in the region. Estimates for 1980 and 1985 regional fertilizer production, demand and surpluses or deficits are given in table 17.

2. Possibilities of setting up multinational enterprises to produce fertilizers

According to the 1980 and 1985 demand estimates for nitrogenous fertilizers, the ammonium production projections for those two years, and the most likely hypothesis in the Mission's opinion (hypothesis A), the difference between regional demand and production will be approximately 420,000 tons of nitrogen in both years.

If Trinidad and Tobago continues to export its output to countries outside the region, the real nitrogenous fertilizer deficit will be doubled. It should be added that the NITROVEN plant in Venezuela was set up mainly to export outside the region, so that the shortfall in the region could be still greater. This would mean that, from the regional market standpoint, it would be possible to justify the installation of two or four ammonia plants ^{9/} each with a capacity of 1,000 TPD, which could enter into production at the end of the present decade or at the beginning of the next.

^{9/} Depending on whether Trinidad and Tobago's output is included in the regional supply.

/These ammonia

These ammonia plants could be complemented with urea plants having a capacity of between 800 and 1,300 TPD according to market needs.

The demand and production figures for phosphate fertilizers in 1980 and 1985 (hypothesis A) indicate that at the regional level there will be unsatisfied demand for about 550,000 and 1,680,000 tons of P_2O_5 respectively. These figures would justify the establishment of several phosphoric acid plants producing 500 TPD of P_2O_5 (approximately 165,000 tons per year), as well as that of a number of plants to manufacture complex fertilizers (diammonium phosphate and monoammonium phosphate) and triple superphosphates which contain high percentages of P_2O_5 .

The units producing complex fertilizers could be situated next to the phosphoric acid plants or, better still, in the consumer countries, since economies of scale are limited and there would be some justification for setting up small units to manufacture these products, in keeping with the size of the markets.

If it is desired, as is advisable, to use raw materials (phosphate rock) from the region, measures would have to be taken to ensure that the exploitation plans of the existing deposits are fulfilled so as to be able to satisfy the growing demand for phosphate fertilizers. It should be borne in mind that 3.3 tons of phosphate rock concentrate are needed for each ton of P_2O_5 .

/VIII. CONSIDERATIONS

VIII. CONSIDERATIONS ON THE VIABILITY OF LATIN AMERICAN MULTINATIONAL FERTILIZER ENTERPRISES

The establishment of multinational enterprises for marketing and/or producing fertilizers is undoubtedly a most difficult task since it involves the harmonization of the interests and aspirations of the countries and, in a few cases, the overcoming of certain prejudices.

However, it is the opinion of the Mission that current circumstances are propitious for the implementation of projects of this kind. In the following paragraphs attention is drawn to some political, economic and financial factors which, under the circumstances, favour the objectives in question.

1. Political factors

The changes which have taken place in international economic relations have shown the developing countries the need for and advisability of increasing mutual co-operation as a means both of mitigating the damages stemming from the distortions in the international economic order and of promoting their own economic and social development.

The declarations and resolutions approved at various conferences by different international agencies have brought out the developing countries' awareness of the need for increased co-operation among them. In this connexion, mention may be made of, among others, the resolutions of the United Nations General Assembly on the Establishment of a New International Order; the Declaration of Lima during the Second General Conference of UNIDO; and in the Latin American context, the Declaration made by the Ministers of Industry and representatives of the countries of the region at the Conference on Industrialization organized by ECLA in Mexico in November 1974, and the Chaguaramas Appraisal (ECLA resolution 347 (XVI)).

The establishment of multinational enterprises is given special consideration, in several of these declarations, as one of the forms of making co-operation among developing countries more effective.

/The fact

The fact that there are various proposals for setting up multinational enterprises in the Latin American context is evidence of the growing interest of the countries of the region in this form of co-operation.

The Latin American Economic System (SELA), the formation of which is supported in principle by several countries of the region, will direct its efforts to helping to create the framework and the machinery for formulating and putting into practice new formulas for co-operation and economic integration among its member countries and, in particular, to giving an impulse to the establishment and strengthening of Latin American multinational enterprises.

The statements made by high Government officials of the countries visited by the Mission were all in agreement in that they firmly supported projects of this kind.

The establishment of multinational enterprises would constitute a means of contributing to the economic integration process aimed at by the sub-regional agreements.

The fact that both the production and the marketing of fertilizers is in the hands of the public sector in many countries of the region, favours the possibility of reaching agreements in this field.

2. Economic factors

Among the economic factors that favour the establishment of multinational enterprises, the most important are:

- The recent fertilizer crisis, whose effects still appear to be persisting, which has had a highly detrimental effect on a number of the countries of the region on account of the high prices and scarcity of fertilizers.
- The need of the countries to increase their production of food considerably, to which end many countries have prepared plans for expanding agricultural production in which fertilizers play an important part.
- The serious negative impact of imports of fertilizers during the last two years on the balance of payments of the countries, which has

/been greatest

been greatest in the case of those countries which make intensive use of fertilizers and whose principal source of income is their exports of agricultural products (a category which includes the majority of the countries of Central America and the Caribbean).

- The fact that there are several countries in the region which have sources of raw materials for the production of fertilizers of the quantity and quality suited to joint exploitation.

- The high cost of the fertilizers produced in the region in small plants or in those that use raw materials with more valuable alternative uses.

- The narrowness of the national markets of the majority of the countries of the region, which in many cases prevents the installation of fertilizer industries big enough to use adequate technology.

- The need of the countries to secure fertilizers at reasonable prices so that farmers can use them in suitable quantities and on a regular basis.

- The considerable increase recorded in the past three years in the prices of the equipment and machinery needed for the installation of fertilizer plants, which has raised investment costs enormously.

- The economic advantages which would go hand in hand with the setting-up of multinational fertilizer enterprises, among which mention may be made of: the use of economies of scale and of suitable modern technology, which would result in an appreciable drop in costs, cheaper fertilizers and guaranteed supplies.

- The desirability of increasing co-operation between the countries of the region in the field of fertilizer marketing in order to improve their bargaining strength for the purchase or sale of fertilizers and/or raw materials for their manufacture.

- The increased possibilities of specialization and complementation in the production of fertilizers and the improved use of natural resources which could stem from the setting-up of enterprises of this type.

3. Financial factors

In view of the serious food problem existing in the world, a number of international agencies have established new financing policies providing that special attention be given to the promotion of projects aimed at increasing the production of fertilizers. In this connexion, attention should be drawn to the intense activity being undertaken by the World Bank and IDB in respect of the analysis of the fertilizer problem with a view to guiding and intensifying their measures to provide funds.

New conditions are now available for financing projects. Thus, it is possible to obtain, in addition to the usual project funds, loans from the Trust Fund set up by IDB with resources from the Venezuela Investment Fund for the acquisition by members of shares in a multinational enterprise. This would eliminate one of the main obstacles to the participation of poorer countries in enterprises of this kind.

Developing countries which have suitable surpluses from the sale of their export products could participate in the financing of projects of this kind.

IX. CONCLUSIONS

In the light of the objectives of the study and the contents of the previous chapters, the following conclusions may be drawn:

In the years ahead, Latin America will continue to depend on imports of fertilizers to a large extent, in spite of the major increases in production planned in several countries.

In 1974 the region's production of nitrogenous fertilizers amounted to 61.3 per cent of the total consumption of that year, the production of phosphatic fertilizers provided 61.8 per cent of consumption, but that of potassic fertilizers provided barely 0.2 per cent.

In the coming 10 years the degree of dependence of the region will vary depending on the type of nutrient involved. In the case of nitrogen it is estimated that by 1980 the deficit in regional production will drop substantially with respect to the probable demand for that year. The regional deficit is likely to amount to something like 420,000 tons of nitrogen (12.1 per cent of the demand forecast) if hypothesis A (minimum) holds good, while if hypothesis B (maximum) proves valid the deficit in production in 1980 is likely to be very small, approximately 42,000 tons of nitrogen. In 1985 the overall picture as regards nitrogenous fertilizers will change radically if the latter hypothesis proves valid, since there will be a surplus production of approximately one million tons of nitrogen. However, the Mission thinks it highly unlikely that this will occur and opts for hypothesis A, according to which the regional deficit in nitrogenous fertilizers in 1985 will be similar to that suggested for 1980, that is to say, around 420,000 tons of nitrogen.

As regards phosphatic fertilizers, a regional deficit of 551,000 or 364,000 tons of P_2O_5 has been estimated for 1980, depending on the production hypothesis adopted: these figures correspond to 20.3 per cent and 13.2 per cent respectively of the demand projected for that year. In 1985, it is estimated that there would continue to be

/considerable regional

considerable regional deficits in the production of phosphate fertilizers, amounting in absolute terms to 1,683,000 or 786,000 tons of P_2O_5 on the basis of hypothesis A or B, respectively. The corresponding percentage deficits with respect to demand would be 38.2 per cent or 17.85 per cent of the two hypothesis.

As regards potassic fertilizers, although a reduction in the current regional deficit can be expected around 1980 as a result of the plans for the development of existing resources in some countries, there are no grounds for affirming with any certainty that the deficit will continue to fall significantly from that year onwards. In any event, it is believed that the pressure of demand will increase efforts to discover and exploit the resources which most probably exist in the region.

During the period 1975-1985 the increase in fertilizer production capacity resulting from the implementation of expansion plans and new projects under way in the countries of the region will be as follows, depending on the production hypothesis adopted:

	<u>Hypothesis A</u> (Minimum)	<u>Hypothesis B</u> (Maximum)
N	2,890,000 tons	4,779,000 tons
P_2O_5	1,348,000 tons	2,607,000 tons

The world-wide relative scarcity of fertilizers and the high prices recorded in the last three years could continue until 1977. However, there are signs that before this date the situation could improve to some extent. In this connexion, it should be borne in mind that there are relatively big stocks of fertilizers in several countries of the world and that in recent months fertilizers have been purchased at prices markedly lower than those which obtained in the international market towards the end of 1974.

During recent years a significant percentage of the international trade in fertilizers has been carried out by enterprises connected with consortia or export cartels.

/According to

According to OAS estimates, in 1974 the region imported fertilizers to the value of 721 million dollars and exported fertilizers to the value of 84.6 million dollars.

The increased outflow of foreign exchange in respect of imports of fertilizers has worsened the balance-of-payments problems of several countries of the region, especially in the case of the less-developed countries which use fertilizers in large quantities.

In several countries of the region, owing to the high prices of fertilizers, their use has been limited to those crops whose prices were sufficiently remunerative to cover the higher costs of fertilizing.

Latin America has large reserves of natural gas, which is the most suitable raw material for the manufacture of ammonia (nitrogen). The countries which have considerable reserves suitable for such a purpose are Argentina, Bolivia, Chile, Colombia, Ecuador, Peru, Trinidad and Tobago and Venezuela.

The largest reserves of phosphate rock, which is the raw material used in the production of phosphoric acid are located in Peru (Sechura). Brazil and Mexico also have substantial reserves. However, current plans for the exploitation of the deposits of phosphate rock existing in the region are considered insufficient to meet the growing demand for phosphate fertilizers.

In the light of the estimates for the supply and demand of fertilizers in 1985 which were made by the Mission, the installation of two or four plants for the production of ammonia could be justified, depending on whether the production of Trinidad and Tobago is included in the regional supply or not. Each plant would have a capacity of 1,000 TPD, and they would be programmed to become operational between the end of the current decade and the early years of the next.

As regards the production of phosphate fertilizers, it may be pointed out that the figures for production and demand for the years 1980 and 1985 indicate that a portion of the demand will not be met, and this would justify the installation of several units for the production of phosphoric acid, each with a capacity of 500 TPD of P_2O_5 .

/At present

At present, there are various political, economic and financial factors which favour the establishment of multinational fertilizer enterprises.

One factor which could influence the decisions taken by the countries of the region as regards their participation in multinational enterprises is likely to be the new conditions for financing projects which have arisen as a result of the existence of the Trust Fund set up by IDB with resources from the Venezuela Investment Fund.

/X. RECOMMENDATIONS

X. RECOMMENDATIONS REGARDING THE FORMULATION OF A REGIONAL
CO-OPERATION STRATEGY IN THE FIELD OF FERTILIZERS

The basic guidelines of a regional co-operation strategy on fertilizers should be established in the light of short-, medium- and long-term quantitative and qualitative objectives, taking as a frame of reference the historical trends observed, the current situation, and future prospects for a reasonably foreseeable period.

The conclusions mentioned in the previous paragraphs define, to a large extent, the framework within which such a strategy should be formulated. In the light of these conclusions policy objectives and short- and medium-term measures have been defined, which, in the opinion of the Mission, should be taken into account in formulating the strategy.

1. Policies and measures which should be
adopted in the short term

The relative scarcity and high prices of fertilizers already mentioned could persist at least until 1977. Attention has also been drawn to the negative effects of this situation on agricultural production and the economy as a whole in the majority of Latin American countries and to the fact that if such a situation persists for a period such as the one mentioned, the countries will suffer considerable damage, particularly in the case of the relatively less developed ones.

It is therefore a matter of some urgency to define the means whereby the countries of the region could dispose, as soon as possible, of a suitable supply of fertilizers of the required quality and at reasonable prices. Regional co-operation could make an important contribution to the achievement of this objective.

/Co-operation along

Co-operation along these lines could take the form of agreements between countries of the region to purchase fertilizers and/or inputs for their manufacture jointly in the international market.^{10/} This could result in a marked improvement in the bargaining power of the countries of the region, which could mean the acquisition of fertilizers or inputs at prices lower than those which the countries would pay if they acted separately.

Furthermore, such joint action could make it easier to reach long-term agreements with producer countries for the supply of fertilizers for final or intermediate use and raw materials, and for obtaining financing on more favourable terms as regards rates of interest and repayment periods. As far as possible, efforts should be made to repay the credits obtained with exports of food products, raw materials, or other products originating in the region.

In this connexion, it is felt that such agreements could be of interest to other developing countries which produce fertilizers or inputs for their manufacture.

Another form of co-operation could be the intensification of trade in fertilizers between countries of the region, which would contribute to the improved use of existing production capacity and the creation of conditions for greater complementarity between the countries in this field.

Similarly, the negotiation of technical assistance agreements between countries of the region with different degrees of experience in the running of plants for the manufacture of fertilizers would help to solve problems in some plants which are running at extremely low levels of production, owing to the lack of technical or operational know-how.

^{10/} The Central American Economic Co-operation Committee decided at its tenth meeting, held in Tegucigalpa, Honduras, in May 1975, "to deem a matter of great interest to the region in the drafting of a plan for the joint acquisition of fertilizers needed to give continuity to government agricultural programmes". (E/CEPAL/CCE/369/Rev.1).

A specialized statistical and trade information service on world fertilizer markets could also be of the highest utility to the countries in their negotiations for the purchase or sale of such products.

(a) Short-term machinery

It is obvious that the application of the short-term measures referred to above calls for the existence of suitable machinery. The mainstay of such machinery could be provided by two basic instruments: a regional marketing body and a regional financing fund.

(i) Regional marketing body for fertilizers, to perform the following functions:

- To make joint purchases on the international market of fertilizers for final or intermediate use and raw materials for their manufacture, on behalf of its member States.
- To help to guarantee the countries of the region timely supplies of fertilizers at the lowest possible prices.
- To act as an intermediary in contracting transport, insurance and freight for fertilizers or raw materials bought by the member countries of the new body.
- To act as a possible selling agent for regional fertilizer producers for the disposal on the international market of possible surpluses, particularly those of the multinational enterprises established in this field.
- To assist the countries of the region in matters relating to the production and marketing of fertilizers.
- To maintain a specialized statistical and trade information service on the international market for fertilizers and raw materials suitable for the manufacture of fertilizers.

The regional marketing body would be a non-profit-making trading company, but it would have to cover its operating costs, so it would charge a commission for the operations undertaken. The capital required would be very small because of the nature of its activity. Participation in the capital of the body would be open to all interested Latin American countries and could be proportional to their share of the total amount of fertilizers consumed in the region.

/The countries

The countries concerned could participate through their respective State fertilizer production or marketing bodies or enterprises. It is considered advisable, however, that the marketing body should be set up as a company under private laws and should operate as such on the international markets.

The marketing body should function initially with a small but highly-qualified staff familiar with the fertilizer trade at the international level.

The headquarters of the body should be located in a country of easy access offering excellent communications with the most important centres of the world fertilizer market.

As a matter of general policy, the proposed marketing body should give priority to regional producers in purchasing fertilizers.

The body could also assume responsibility for the distribution of fertilizers to the poorest Latin American countries under the FAO international plan for the supply of fertilizers (FIP), and the distribution of the fertilizers which may eventually be supplied by plants to be set up in the OPEC countries for providing low-cost nitrogeous fertilizers to developing countries.

The body could also help the countries in the co-ordination of fertilizer production, procurement, and sales policies. Furthermore, the experience which is likely to be accumulated by the body in its marketing operations will prove useful to the countries interested in participating in multinational fertilizer enterprises.

(ii) Regional fund for financing the purchase of fertilizers

The objective of this fund would be to assist in the financing of imports of fertilizers and raw materials for their manufacture by the countries of the region, particularly the relatively less developed ones. It would also help with the cost of transport, the building up of stocks, and the distribution of fertilizers.

/The fund

The fund could be made up of contributions by the countries of the region and resources from international, regional or sub-regional financing institutions and other sources.^{11/} Suppliers' credits or credit provided by countries exporting fertilizers or raw materials could supplement such financing.

The resources of the fund could be channelled to the member countries through national financing institutions so that these, in turn, could grant similar credit facilities to fertilizer users.

The fund could possibly be used to finance working capital needs and sub-regional, regional or extra-regional exports from existing plants or from the multinational plants which are to be established under the proposed new scheme.

(b) Other measures

In view of the low level of utilization of the production capacity of existing fertilizer plants in the region it is considered advisable that specific programmes be undertaken to improve the operational efficiency of these plants, and the assistance that UNIDO could offer in this field is considered to be very valuable.

2. Medium and long-term policies and measures

The basic objective of the medium and long-term strategy would be to make the region self-sufficient in respect of nitrogenous and phosphate fertilizers within the next ten years.

This will require a major effort to bring about a considerable increase in the installed capacity for the production of such fertilizers.

The establishment of multinational fertilizer manufacturing enterprises with the participation of all or several countries of

^{11/} It could also include possible voluntary contributions from developed countries and developing countries which have financial surpluses owing to the high prices of their export products.

the region would constitute, in the opinion of the Mission, a rational and effective way of covering the deficits forecast and achieving the objective of the strategy.

(a) Number, size and location of manufacturing plants

According to the consumption and supply projections prepared by the Mission, the estimated deficits for the year 1985 would justify the establishment of two or four 1,000 TPD plants - depending on whether the regional supply is assumed to include the production of Trinidad and Tobago or not - for the manufacture of nitrogenous fertilizers (ammonia), at least four plants for the manufacture of phosphoric acid with a capacity of 500 tons of P_2O_5 per day which could be programmed to come into operation towards the end of the present decade or in the early years of the next.

The location of these plants would be subject to two basic criteria: the availability and accessibility of natural resources for economic production and the proximity and accessibility of major consumer markets.

In accordance with these criteria, the Mission considers that the countries which have large enough supplies of natural gas for possible transformation into nitrogenous fertilizers would be Bolivia, Chile, Colombia, Ecuador, Mexico, Trinidad and Tobago and Venezuela.

For economic reasons the use of other raw materials such as naphtha or fuel oil for the production of nitrogenous fertilizers should be rejected.

For the manufacture of phosphate fertilizers, sizeable deposits of phosphate rock - the basic raw material for the production of phosphoric acid - are known to exist in Peru (Sechura), Mexico (Baja California) and Brazil.

However, if nitrogenous and phosphate fertilizers are to be produced at prices which are economic and competitive on international markets, three other major factors must be taken into account:

/- The

- The will of the government of the country in which the raw materials are located to facilitate the supply of these materials in the volume and quality required and at reasonable prices;
- The need for the plants to be located near to a port (Bolivia would constitute an exception if production is destined for neighbouring countries) in order to facilitate the handling and despatch of products to the centres of consumption, and
- The need for a basic infrastructure to be already in existence in order to reduce additional investment requirements.

In principle, subject to confirmation through specific feasibility studies, the Misson envisages the possibility of establishing the following plants of a multinational nature in the following countries:

(i) Nitrogenous fertilizers (ammonia/urea)

Venezuela or Trinidad and Tobago, mainly with a view to supplying the markets of Brazil, the Central American countries, Panama, and the countries and territories of the Caribbean; Bolivia, mainly with a view to supplying its own market and those of Argentina, Brazil, Paraguay and Uruguay; and Ecuador, mainly with a view to supplying the markets of the countries on the Pacific coast. The Magallanes area of Chile is also considered a probable location, using natural gas from that country and Argentina.

(ii) Phosphate fertilizers

Peru: one plant with two units having a capacity of 500 tons of P_2O_5 per day in the first stage.

In a second stage, new phosphoric acid plants should be set up in Brazil, Mexico or Peru, depending largely on the implementation of plans for mining phosphate rock. Alternatively, this raw material could be imported from other areas, in line with the current practice of the phosphoric acid producing countries of the region.

The enormous differences in ammonia manufacturing costs, depending of the type of raw material used, could justify the review

/by some

by some countries of their projects ^{12/} for the production of ammonia from naphtha or fuel oil, in view of the possibility of participating as partners in a multinational enterprise for manufacturing this product under more advantageous conditions from natural gas.

For such a review to be carried out, there must be other supporting factors, which could be considered prerequisites, namely:

- the technical and economic viability of the new multinational projects;
- evidence of the benefits accruing to each country from their possible participation in the project;
- the financial facilities available for the implementation of the project, including the possible financing of the capital contribution to be made by the participating countries;
- the confidence inspired by the persons and enterprises responsible for the material implementation of the project.

(b) Investments required

The required investments may be calculated bearing in mind that it costs some 53.0 million dollars to set up an ammonia plant with a capacity of 1,000 TPD. If this is supplemented by an urea plant with a capacity of 800 TPD, the additional investment would be in the neighbourhood of 35 million dollars.

These figures cover the cost of land, the engineering of the project, the provision and setting up of equipment, and normal ancillary installations.

The investment needed to establish a phosphoric acid plant with a daily capacity of 500 tons of P_2O_5 is currently estimated at 19.2 million dollars.

As regards the financing of these investments, it should be remembered that as part of their general policy for promoting agricultural development, both the Inter-American Development Bank

^{12/} The Brazilian national plan for fertilizers and lime, for example, provides for the construction of four ammonia and urea plants which will use naphtha or fuel oil as raw materials.

/and the

and the International Bank for Reconstruction and Development have been authorized to give priority treatment to requests for credits for setting up fertilizer plants. Moreover, there is the possibility that the capital contributions of some countries which are members of the multinational enterprises to be set up may be financed by IDB, using the Trust Fund set up with resources which the Venezuelan Investment Fund transferred to this institution for the purpose of contributing to the development of the countries of the region.

(c) Final-use fertilizer producing units

Since there are no major economies of scale to be gained in the manufacture of final-use fertilizers (triple superphosphate, NPK compounds, diammonium phosphate) it is considered advisable that manufacturing plants of sizes suitable to the respective markets should be set up in the consumer countries of the region.

The raw materials (ammonia, phosphoric acid) could be provided by the multinational primary fertilizer plants located in countries which have ample natural resources, so as to facilitate the development of industrial complementarity schemes. Alternatively, consideration could be given to the possibility of setting up multinational plants to meet sub-regional final-use fertilizer needs.

(d) Characteristics of Latin American multinational fertilizer enterprises

Latin American multinational fertilizer enterprises could be made up of any two or more countries of the region participating through their State agencies or enterprises concerned with the marketing or consumption of fertilizers in each country.

Any country could participate in the share capital of any one or more multinational enterprises, without any form of restriction.

These enterprises would be absolutely private, even though they would be composed of State entities, and would act as private enterprises in the market, subject to the limits imposed by the member countries at the time of their formation or subsequently. Strict efficiency criteria would be applied in their administrative and operational management, and outside interference would be avoided.

3. Co-ordinated action of the proposed institutional machinery

It seems superfluous to state that the proposed institutional machinery should function in a co-ordinated and supplementary manner. For example, in order to facilitate the regional supply of fertilizers and the economic operation of multinational plants it would be advisable for the regional marketing body to enter into long-term contracts with the multinational manufacturing plants for the purchase and supply of fertilizers on behalf of the countries. Furthermore, the regional marketing body could enter into contracts with the multinational manufacturing enterprises to sell possible fertilizer surpluses on international markets.

But perhaps it would be best, in preparing the respective feasibility studies for the establishment of multinational manufacturing plants and the regional marketing body, to look carefully into the possibility of establishing a Latin American holding company to control the manufacturing plants and the marketing body, since this would facilitate enormously the programming, co-ordination and supervision of the development of the industry at the multinational level and the marketing of fertilizers in Latin America.

This holding company could be responsible, among other things, for the following:

(a) Acting as a clearing house for the collection and distribution of statistical, economic and financial information on the fertilizer industry.

(b) Co-ordinating the policies and programmes for the integrated development of the fertilizer industry in Latin America.

(c) Co-ordinating technical and financial assistance from the various specialized agencies and foreign Governments.

(d) Negotiating, on the most favourable terms possible, loans from international agencies to finance the multinational fertilizer manufacturing enterprises, and

(e) Negotiating the acquisition of technology and management services for the plants in question, if necessary.

/4. Interregional

4. Interregional co-operation

The policy of achieving selfsufficiency in respect of fertilizers should be complemented with action aimed at reaching economic and technical co-operation agreements in this field with developing countries in other regions. A recent study ^{13/} carried out by UNIDO on the fertilizer industry points to the possibilities of complementarity in this field between developing countries from different regions and the advantages which this would bring in principle.

5. Procedure for putting the proposed recommendations into practice

The following procedure is recommended for putting the proposed machinery into effect:

(a) After the present report has been approved by UNDP, the latter should distribute it for comment to the Governments of the countries of the region, particularly in order to ascertain the interest of each Government in participating in the regional co-operation machinery whose establishment is recommended in this report.

(b) On the basis of the comments and answers received, UNDP would request UNCTAD to undertake a feasibility study for the establishment of a multinational marketing body and would request that UNIDO prepare feasibility studies for specific projects for setting up multinational fertilizer manufacturing enterprises in Latin America. In the light of the conclusions and recommendations made in the studies referred to, both agencies would carry out a joint study of the possibility of establishing the holding company referred to.

^{13/} A Preliminary Case Study of the Fertilizer Industry in Developing Countries: The Present Situation, Prospects for Development and International Co-operation (UNIDO, ID/B/C.3/35).

(c) On the basis of the results of the feasibility studies mentioned, UNDP would evaluate the possibility of convening a meeting of Ministers of Economic Affairs or their representatives to discuss the establishment of the proposed multinational machinery.

Possible participants in the financing of the feasibility studies could include UNDP, the Inter-American Development Bank, the International Bank for Reconstruction and Development, and possibly the Latin American Economic System (SELA).

In this connexion account should be taken of the fact that the installation of new plants generally requires a lead time of 4 years. Therefore, should the Mission's proposal awaken interest, rapid steps should be taken to prepare the relevant feasibility studies.

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