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# CEPAL Review

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## Trends and recent changes in the Latin American food and agriculture situation

*Luis López Cordovez\**

This paper analyses the chief trends and recent changes in the agriculture and food situation of the Latin American countries and seeks to give a brief overall picture, despite limitations arising from the insufficient and sometimes partial data.

In making the analysis, account was taken of a number of outstanding aspects of the new world agricultural context that have had an impact to varying extents on the performance of national agriculture.

The regional agricultural situation reflects a variety of different types of progress resulting from the sometimes only partial exploitation of its potential and a number of unsolved problems which may be becoming more serious. In any event, the economic progress achieved is obvious, since the dimensions of the sector increased by a factor of 1.4 during the 1970s. The technical progress that has taken place in the region is evident but at the same time presents an uneven picture. These two forms of progress have been based both on stimuli resulting from public policy and on attractive, although selective, conditions in expanding markets. To a great extent the expansion achieved in production was made possible by accelerated capital formation in entrepreneurial-type production units. The coexistence of this material progress with the continuing rural poverty is the most noteworthy negative feature of Latin American agriculture.

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## I

### Agriculture in the overall context\*

The diversity of the current situations in national agriculture presents an obstacle to assessment of a regional scope. Nevertheless, despite the difficulties arising from growing disparities that lead to major differences in the significance of agricultural activities within the framework of the global economy, in agricultural production policy, in the relationship between agricultural activities and internal and external markets, in the size, characteristics, dynamism and economic performance of the various agricultural segments, and in the interrelationships among those segments and between them and the rest of the economic system, there are enough common elements to put together an overall picture of the region showing the orientation and scope of the economic and social changes that Latin American agriculture is undergoing.

Owing to its size and resources, in past decades agriculture was an outstandingly important sector in most national economies, whereas industry was in a relatively early stage of development. For that reason, and because capital resources were scarce at that time (except in those countries with high levels of mineral and petroleum exports), while there was only a low volume of external financial assistance, agriculture had to contribute to the growth of other economic activities. In addition to this situation, there was the widespread conviction that agriculture could be expanded by making more effective use of the resources already applied to the sector, since agriculture's own capital requirements were quite modest.

While there is no doubt that industry has been the most dynamic sector as regards development of the Latin American economic system, agriculture has played an important role by making a major contribution to the industrial sector. It continues to play the same role, but in spite of the fact that its economic dimensions are a good deal larger than in earlier decades it no longer occupies the promi-

\*The author wishes to express his gratitude for the valuable observations and suggestions made by Messrs. Emiliano Ortega and Rolando Chateaneuf.

ment place it once did as a sector whose economic surplus could be transferred to the rest of the economic system.

At the beginning of the 1980s the position is that agriculture is still extremely important in a number of countries, whereas in others it occupies a more modest position. Between 1970 and 1980, at the regional level and on the basis of national accounts, there was an annual increase of 3.5% in the agricultural gross domestic product, compare with an annual growth of 5.6% in the overall gross domestic product. Over the same period agriculture's share in the total product dropped from 14% to 11.4%. In the course of the 1970s the proportion of the total labour force employed in agriculture dropped from 42.1% to 36.2%.<sup>1</sup> Naturally, the agricultural product's growth rates, the share of that product in the total product, and the size of the agricultural population in relation to that of the total population vary from one country to another.

When an economy undergoes change and becomes more diversified the importance of agriculture in relation to the total gradually decreases, which generally leads to misjudgement of the agricultural sector's performance and to a negative assessment of it. In the economic development process it is normal that there should be a drop in agriculture's contribution, measured on the basis of global macro-economic indicators that may be disaggregated at the sectoral level. In itself, such a decrease does not mean that inadequate dynamism is being displayed. The nature and magnitude of the evolution of agriculture should be considered not only in the light of statistical indicators on production and productivity, but also in the light of indicators reflecting socio-economic changes resulting from changes in distribution of income, the scale of extreme poverty and the level of employment of the labour force.

In the 1970s it was observed that in most countries, for some time past and to varying degrees, the socio-economic structures of agriculture and the interrelationships between them had been undergoing substantive

changes. Analyses were carried out and it was shown that the technological modernization of agriculture was not an isolated event, but that it constituted part of a series of events, which made evident its integrated and interdependent character in respect of the development of the other economic sectors. This series of interrelationships and repercussions is extended by, and linked with, the national economies' system of external relations.<sup>2</sup>

The integration of agriculture into global development and its interdependence with such development is therefore a determining factor in the changes that are being noted in it; for a complete understanding of what has happened in agriculture, both from the point of view of production and from the point of view of the social stratification of this sector, particular attention should be given to intersectoral relations, which help to explain events in the light of more comprehensive and complex situations and processes than those linked only to variables in the agricultural sector itself.

Within this framework of integration and interdependence, it has become increasingly difficult to make the goals pursued by the State through its priority programmes and actions—goals which are general in the case of agriculture as a whole and specific in the case of each individual branch of production, or for the benefit of the peasantry at large—fully compatible and coherent among themselves and between them and the goals set for the economic system as a whole. The difficulties, inconsistencies and contradictions involved have been even greater when countries have had to make choices, review goals and objectives, and apply internal adjustment policies in order to cope with the short-term external situation.

The average income of the population depending on agriculture continues to be a good deal lower than that of the non-agricultural population. Despite the progress achieved in production, which is described below, trends in agriculture still do not meet the economic and social demands made on that activity by the Latin American economy and society.

<sup>1</sup>CEPAL, "Projections of Latin American development in the 1980s", April 1981 (E/CEPAL/G.1158).

<sup>2</sup>CEPAL and FAO, "Rural social development in Latin America", CEPAL/FAO Technical Meeting on rural social development in Latin America, Montevideo, Uruguay, 9-11 August 1978 (CEPAL/FAO/78/2).

## II

## Regional agricultural production in the 1970s

The marked changes and uncertainties which have prevailed on a worldwide scale in the economic, social and political spheres in the past decade, and especially in the second half of that decade, have had a strong impact on the international agricultural markets for products, technical inputs and finance, and through those markets they have influenced the agricultural production process of the developed and developing countries in various manners and to varying degrees.

Latin America did not escape this impact. When the proportion of a product exported exceeds one-third of the regional total produced, external market conditions obviously have a great impact on the production process; a brief outline of world agriculture will therefore be given, before developments in regional agricultural production are considered.

1. *Some leading aspects of the new world agricultural context*

In general, the period between the beginning of the 1950s and the early 1970s was one of definite and stable growth in world agricultural production, particularly of food, together with unprecedented growth in food consumption. In 1970/1971 the chief problem confronting world agriculture was how to reconcile the need to increase income from exports of agricultural products with the need to raise the income of agricultural producers in both the developed and the developing countries and, at the same time, maintain a greater degree of stability and firmness in international markets and thus a better equilibrium between supply and demand at the world level.

It may be concluded from FAO figures<sup>3</sup> that the value of world agricultural production grew at an annual rate of 2.9% between 1950

and 1972, whereas the value of international trade in agricultural commodities would appear to have grown at an annual rate of 5%. A characteristic of the period in question was the increase in the developing regions' dependence on food imports. In 1972, owing to simultaneous major production deficits in a number of interrelated commodities, there was a substantial increase in international demand, and it was therefore necessary to draw heavily on reserves in order to close a major portion of the gap between supply and demand. When the reserves were bordering on their lowest levels, in 1973, there was a marked increase in prices. The sharp rise in oil prices and the resulting financial and monetary disturbances had an impact on balances of payments, accelerated inflation and encouraged speculation, introducing additional uncertainties into the situation that generated conflicts between supply and demand in international agricultural markets.

The rise in the price of fertilizers, pesticides, fuels and lubricants gave rise to adjustments in production systems, particularly as regards the location and composition of crops and the selection of energy-saving technical processes.

In 1975/1976 the industrialized countries' economic recovery began, international agricultural prices dropped and stocks accumulated in the importing countries.<sup>4</sup> In 1977 there was an increase in world agricultural production and supply, which coincided with a recovery in demand as a result of an increase in consumer income, and there was even a recovery in stocks to a certain extent. When demand recovered in 1978 prices rose slightly, which coincided with a considerable increase in the prices of exports of manufactures, resulting in a deterioration in the terms of trade. Following

<sup>3</sup>FAO, *Production and Trade Yearbook*, Rome, various years.

<sup>4</sup>FAO, *Commodity Review Outlook, 1975-1976*, Rome, 1976.

two years of substantial expansion in production (1977 and 1978), in 1979 output dropped and the trend was reversed, which in turn generated a further rise in prices.<sup>5</sup> In 1980 world production rose slightly, but in per capita terms it dropped for the second consecutive year. International prices of fertilizers rose by 20% to 30% in comparison with their levels of 1979, which contributed to a further increase in agricultural prices at the beginning of 1981.<sup>6</sup>

FAO selected 21 products representing about 50% of agricultural trade in order to assess the degree of instability in prices and the volume of international trade between 1968 and 1978 (see table 1) and established that the most significant feature was the major and widespread increase in the instability of prices in the mid-1970s, in comparison with the late 1960s and the early 1970s. There was little fluctuation in export volumes. In the period 1974-1978 there was a significant widespread trend towards slightly greater stability.<sup>7</sup>

There are many complex and widely varying reasons for the evident destabilization of such a wide range of agricultural commodity prices. However, it appears that among those reasons fluctuations in the volume of output and of exports played only a subordinate role, and there does not appear to have been a great degree of price inelasticity either. Between 1974 and 1976 changes in trade patterns, the shrinking of residual world markets owing to a greater degree of self-sufficiency of importing countries and the higher level of protection afforded to national producers took on greater importance. The acceleration of world inflation and the higher level of instability in world monetary markets are factors that have made possible a greater level of activity in world trade in agricultural products and contributed to greater fluctuations in their prices.<sup>8</sup>

It would appear that between 1970 and 1978 the value of world agricultural exports grew at an annual rate of 18.3% at current prices and 4.4% in terms of real prices, whereas world

output grew at an annual rate of 2.5%.<sup>9</sup> In the period in question the *United States* maintained its position as the world's leading exporter of grains and oilseeds. Exports of these products, together with exports of livestock products and other non-food products such as cotton and tobacco, meant that United States agricultural exports grew at an annual rate of 9% between 1972 and 1980, compared with the annual rate of 5.5% recorded during the period 1950-1972.<sup>10</sup>

United States production of cereals and oilseeds rose from 147 million tons to approximately 350 million tons between 1950 and 1980. As from 1973, 65 million acres of land previously not used entered into production. Among the chief producers and exporting countries the United States demonstrated that it had a greater production capacity and a greater ability to adapt its policies to changing situations in international markets; it increased its competitiveness in those markets while at the same time raising its production to keep pace with the expansion in world demand. By the early 1980s the United States had put virtually all suitable land, including land that had not been cultivated for over two decades, into export production.<sup>11</sup>

In addition to having turned to international markets more intensively, United States agriculture succeeded in eliminating redundant manpower; the chronic disequilibrium between land and labour force, which lasted until the early 1970s, ceased to be an insoluble problem.

Gradual migration to the cities, residence in rural areas not associated with employment in agriculture, full utilization of available land, a flow of technological innovations that, in addition to freeing manpower, enabled production to grow as rapidly as domestic and, in particular, external, demand, and achievement of an improved ratio between agricultural and non-agricultural productivity, owing to the fact that the rate of return increased appreciably in

<sup>5</sup>*Ibid.*, 1979-1980.

<sup>6</sup>FAO, *The state of food and agriculture*, 1980, Rome, 1981.

<sup>7</sup>FAO, *Commodity Review Outlook, 1979-1980*, Rome, 1980.

<sup>8</sup>*Ibid.*

<sup>9</sup>*Ibid.*

<sup>10</sup>United States Department of Agriculture, *Agricultural-food policy review*, Washington, April 1981.

<sup>11</sup>United States Department of Agriculture, *op. cit.*

Table 1  
 WORLD: VARIATIONS IN EXPORT PRICES AND IN QUANTITIES EXPORTED  
 OF THE PRODUCTS INDICATED, 1968-1979 AND 1974-1978<sup>a</sup>

(Percentages)

	1968-1972		1974-1978		Ratio 1974-1978/ 1968-1979	
	Price	Quantity	Price	Quantity	Price	Quantity
Coffee	9.16	11.09	34.97	17.18	3.82	1.55
Tea	5.56	13.42	24.48	20.47	4.40	1.53
Sugar	19.19	18.27	44.14	16.89	2.30	0.92
Wheat	8.26	17.28	11.70	10.01	1.42	0.58
Rice	10.04	13.55	22.89	14.84	2.28	1.10
Maize	8.22	17.47	12.29	12.93	1.50	0.74
Barley	6.75	20.94	7.01	11.88	1.04	0.57
Butter	25.81	26.54	5.62	12.31	0.22	0.46
Cheese	23.26	8.57	6.15	9.12	0.26	1.06
Soya beans	5.09	24.93	38.18	22.38	7.50	0.90
Soybean oil	13.75	21.76	23.19	22.51	1.69	1.03
Cottonseed oil	14.88	43.34	18.64	26.12	1.25	0.60
Olive oil	9.42	21.59	4.94	29.30	0.52	1.36
Palm oil	15.60	15.26	22.25	15.81	1.43	1.04
Rubber	13.07	6.16	16.61	7.00	1.27	1.14
Cotton	5.65	18.73	14.15	12.64	2.50	0.67
Cocoa	19.51	8.34	25.43	8.66	1.30	1.04

Source: FAO, *Commodity review outlook, 1979-1980*, Rome, 1980.

<sup>a</sup>FAO calculated the coefficients of variation on the basis of quarterly data concerning export prices and quantities, which is adjusted to take account of trend.

the 1970s, are factors that, taken together, led to the disappearance of the classic land/man disequilibrium.<sup>12</sup>

Unlike in the past, the problems upon which attention was focused in the taking of decisions regarding United States agricultural policy are not related to the handling of excess production capacity, but to the introduction of adjustments in production in order to avoid scarcity, particularly of cereals and oilseeds. The United States supplies almost half of the volume of the products in question traded in international markets, and fluctuations in world demand for, and production of, these products therefore have a considerable impact on United States annual production decisions. The rate of expansion of international demand for United States agricultural products trebled

in the 1970s, and it is clear that it will continue to grow in the course of the current decade.

From 1973 onwards monetary instability had a serious impact on EEC agriculture, which led to the adoption of complex measures and the establishment of monetary compensations in order to avoid the disintegration of the common agricultural market, with the result that the task of setting annual agricultural prices, within the global economic context, was one of the biggest difficulties confronting the Community.

In the 1970s EEC agriculture underwent structural adjustments accompanied by technical advances. The size of agricultural units increased rapidly, and the number of producers dropped; as a result, productivity improved and the annual volume of virtually all products rose steadily. Consumption did not always expand at the same rate; in the case of a number of

<sup>12</sup>*Ibid.*



products it expanded at the same pace as production, in the case of others, specifically dairy products, it increased as a result of a high level of intervention in the form of public agricultural expenditure, and, lastly, in the case of still other products, meat, sugar and dairy products, in which surpluses were formed or maintained, exports were promoted through extremely active specific programmes, together with costly measures to encourage domestic consumption in various ways.

Between 1978 and 1980, intra-Community agricultural trade showed a tendency to stagnate in the case of most products, particularly cereals and meat, in contrast with the considerable increments recorded in the period 1973-1978 following the incorporation of the United Kingdom, Denmark and Ireland into the EEC.<sup>13</sup> This shows that the Community depends increasingly on exports to third countries in order to dispose of some of its surpluses. Exports of sugar and dairy products benefited from the drop in production of the principal producer countries, owing to adverse climatic conditions or to political objectives, which resulted in a fall in supply and high prices in world markets.

The chief problem confronting the EEC in the short and medium-term is that of deciding how it can dispose of expanding production volumes, both on the domestic market and externally, at suitable prices that safeguard the income of producers and at the same time remain within the limits of State intervention determined by the levels of public funds allocated for that purpose.

The EEC occupies second place as a world exporter of agricultural products (10% of the world total), being preceded by the United States (approximately 20%) and followed by Canada (7%). The EEC share of the world total has remained relatively stable in the long term. Its exports fell slightly in the period 1973-1976, but between 1976 and 1979 they recovered. In 1978 48% of EEC agricultural exports went to industrialized countries, 43% to developing countries and 9% to countries with centrally

planned economies. Approximately two-thirds of its exports consisted of processed products.<sup>14</sup> The case of products processed from coffee, tea and cocoa, which the EEC does not grow but exports in great quantities on the basis of imports of primary products from developing countries is worthy of note.

Two years of unsatisfactory world harvests (1979 and 1980) led to a deterioration in the world food situation. Since the 1981 harvest was considerably better than anticipated, the threat of another large-scale food crisis appears to have diminished. However, as a result of the drop in cereal production in 1980 import requirements rose substantially. FAO<sup>15</sup> estimated that in 1980/1981 the developing countries imported 95 million tons of cereals, a figure approximately 7% higher than during the preceding biennium. Demand rose when the smaller availability had caused a net increase in prices. Since the cost of maritime freight also increased, the cost of food imports rose sharply.

## 2. Regional production behaviour

In the case of a number of Latin American countries expansion of domestic markets had a decisive impact on the behaviour of their agricultural production and its composition, while in the case of other countries agriculture has continued to become more international. In both cases national agriculture has been affected not only by the impact of the need for a greater volume of production, but also by the characteristics and composition of the markets upon which it fundamentally depends.

When national agriculture is considered in the light of its scale, —as measured in terms of the agricultural gross domestic product at 1970 prices—<sup>16</sup> in the three-year period 1970-1972 Mexican agriculture was the largest, followed by Brazil, Argentina, Colombia, Peru and Venezuela, in decreasing order of importance. At

<sup>14</sup>*Ibid.*

<sup>15</sup>FAO, *Global information and early warning system on food and agriculture: Food outlook*, Rome, various issues during 1981.

<sup>16</sup>CEPAL, "Projections of Latin American development in the 1980s", April 1981 (E/CEPAL/G. 1158).

<sup>13</sup>Commission of the European Communities, *The agricultural situation in the Community. 1980 Report*, Brussels, December 1980.

the end of the decade (the three-year period 1978-1980) Brazil occupied first place, followed by Mexico and Argentina, with Colombia slightly behind, followed by Peru, which was, in turn, almost equalled by Venezuela.

Four countries (Paraguay, Brazil, Guatemala and Colombia) achieved annual average increases in their agricultural GDP exceeding 4% in the 1970s, while five other countries (Nicaragua, Venezuela, Ecuador, the Dominican Republic and Argentina) achieved an annual rate of agricultural growth of 3% to 4%. The next four countries (Bolivia, El Salvador, Costa Rica and Mexico) had an annual increase of 2% to 3%, while in the last six (Chile, Haiti, Panama, Honduras, Uruguay and Peru) the average annual increase was below 2%.

Analysis of production trends as seen from the growth of the sectoral gross domestic product, on the basis of national accounts, suffers from a number of limitations, including, in particular, the fact that it is impossible to explain what happens in the case of the various production lines and the difficulty of identifying and assessing the factors responsible for dynamism or stagnation. The production performance of agriculture is therefore considered below in terms of the physical volume of products. The growth rate of this volume has been dynamic (an annual rate of 3.3% in terms of the gross value of production) compared with that obtained by the developing regions as a whole (an annual rate of 2.9%) and the developed countries (an annual rate of 2%). When the evolution of the sector is considered in terms of the per capita gross value of Latin American production, it must also be regarded as relatively dynamic, since it rose at an annual rate of 0.8%. However, this rate is inadequate as regards the potential demand for food by Latin American society, which includes approximately 45 million persons suffering from malnutrition; growth in physical volume has not kept pace with effective demand, since it would appear that the latter has risen at an annual rate of 3.6%. It is also inadequate in view of Latin American agricultural production potential, since only a little over one-quarter of the cultivable area is utilized. Furthermore, it is inadequate in view of the amounts of ag-

ricultural products which the Latin American countries need to export in order to correct their trade balances and their balances of payments and to reduce their external indebtedness. Lastly, it is inadequate in view of the level of growth in production required as an essential material basis for raising the quality of life in the rural environment.

Production behaviour has been uneven. Crop farming has grown at a lower rate than livestock production (annual rates of 3.1% and 3.7%, respectively). This trend, for which many complex factors are responsible, became apparent in the 1960s. Here attention should be drawn once again to the impact of unfavourable climatic conditions on the annual volume and composition of production.

Trends in individual lines of production display marked disparities from one group of products to another; there has been dynamic growth in a number of lines, while growth has been slow in others, and some have even shown reductions. Four groups of vegetable products expanded at a more rapid rate than that of the population: oilseeds, green vegetables, fruits and sugar crops. In the case of livestock products the same was true of poultry, pork, eggs and milk. Cereals, stimulating beverages, dry legumes and beef grew at a slightly slower rate than that of the population. Lastly, in the case of roots and tubers and vegetable fibres, excluding cotton, production fell. Table 2 shows what happened in the case of each group of products and each separate principal product.

Among crops, the most dynamic group is that of oilseeds, and within that group soya-beans are particularly prominent. The principal factor responsible for the spectacular increase in oilseeds was expansion of the area harvested, which accounted for 68% of the rise in production. At the same time, however, the increase in yields of these crops, which rose at an annual rate of 2.8% (double that of the growth in average crop yields), should not be underestimated.

Both internal demand for, and exports of, oilseeds have expanded substantially; the former rose by an annual rate of almost 9% between 1969/1971 and 1977/1979, and the latter grew at an annual rate of 17.2% over the

same period. The combined effects of internal and export demand permitted the absorption of regional production that expanded at an annual rate of over 14%.

Table 2

LATIN AMERICA: PRODUCTION, AREA HARVESTED AND AVERAGE PHYSICAL YIELDS,  
1969-1971 TO 1978-1980

(Annual growth rates, percentages)

Crops	Volume produced	Area harvested	Physical yields
<i>Cereals</i>	2.4	0.7	1.6
Wheat	2.6	1.5	1.1
Rice	3.4	2.1	1.2
Maize	1.3	-0.1	1.4
Sorghum	5.5	2.6	2.8
<i>Roots and tubers</i>	-0.7	0.3	-1.0
Potatoes	1.4	-0.3	1.7
Cassava	-1.1	0.7	-1.8
<i>Sugar cane</i>	3.5	2.3	1.1
<i>Dry legumes</i>	0.7	1.1	-0.5
Beans	0.5	1.3	-0.7
<i>Oilseeds</i>	14.2	11.1	2.8
Soya beans	25.9	23.6	1.9
<i>Vegetables</i>	3.2	2.1	1.1
<i>Fruit</i>	3.5	0.3	3.2
Bananas	1.9	0.3	1.3
Citrus fruits	7.5	...	...
Apples	7.1	...	...
<i>Beverages and tobacco</i>	2.5	0.9	1.6
Cocoa	4.2	0.5	3.6
Coffee	1.9	0.8	1.0
Tobacco	4.1	2.3	1.7
<i>Raw cotton</i>	1.4	0.5	0.9
<i>Vegetable fibres</i>	-1.4	-0.2	-1.2
<i>Other crops</i>	5.0	4.0	1.0
<i>Total crops</i>	3.1	1.7	1.4
<i>Livestock products</i>	Volume produced		Animals slaughtered or in production <sup>a</sup>
<i>Meat</i>	3.3		...
Beef	2.1		2.0 b
Pork	3.4		3.3 b
Poultry	9.3		9.3 b
<i>Other livestock products</i>	3.3		...
Milk <sup>c</sup>	3.2		2.6 c
Eggs <sup>d</sup>	5.1		4.5 d
<i>Total livestock products</i>	3.6		2.6
<i>Total agricultural products</i>	3.3		...

Source: Prepared by the CEPAL/FAO Joint Agriculture Division on the basis of FAO figures.

<sup>a</sup>Including improvements in physical yields.

<sup>b</sup>Total animals slaughtered.

<sup>c</sup>Dairy cattle.

<sup>d</sup>Total laying hens.

In the case of fruits, the expansion of production of citrus fruits and apples (by 7.5% and 7.1% per year, respectively) contrasts with the slow increase in bananas (at an annual rate of 1.9%), which was lower than the population growth rate.

At the beginning of the decade, within the branch of poultry production, the level of egg production was higher than that of meat, but the meat/eggs ratio, which was 0.85 in 1970, rose to 1.23 in 1980. The widespread reduction in the price of poultry meat compared with that of beef was achieved as a result of a decrease in production costs, resulting chiefly from greater efficiency and productivity. An additional factor was active intervention by large-scale producers in the marketing process, which has helped to reduce costs and promote demand.

At the same time trends in world trade in beef, together with the relative inelasticity of supply, contributed to higher domestic beef prices. The urbanization process also contributed to the higher level of poultry meat consumption, since the large cities are well supplied by dynamic and efficient poultry enterprises.

The sharp increase in poultry production has not been accompanied by an equally rapid rate of growth in production of secondary cereals. Maize production grew at a slower rate and, at the same time, the proportion produced for human consumption dropped from 38% to 29%, progressively greater volumes being supplied as feedstuffs for poultry and pigs. The relative stability of maize supplies and prices on international markets, particularly from 1976 onwards, have had an impact on domestic price levels; although they did not actually discourage production, they did not promote it either. In addition to this factor, there was competition from sorghum, whose production was thus encouraged and became more dynamic. Although regional production of sorghum is still low compared with that of maize, this may well mark the beginning of a trend that will become more marked in the 1980s.

The drop in consumption of legumes appears to be a definite reality in many countries of the region. It is not clear whether this fall in consumption has been responsible for the drop in the growth rate of production, or whether the

opposite has been the case. Factors responsible for lower consumption of legumes are their relatively high price compared with that of other foods and the fact that they require more fuel and cooking time; at the same time, the urbanization process could be contributing to the drop in per capita consumption. Roots and tubers, for their part, are basic foods chiefly in rural areas. The factor responsible for the slow growth in potato production (an annual rate of 1.7%) could be concentration of demand as a result of changes that have taken place in the relative importance of the urban and rural population. The higher cost of transport and of storage of this type of product may also have played a role in the fall in per capita consumption.

### 3. Basic reasons for this behaviour

Growth in production continues to be based chiefly on an increase in area harvested, but it has already become apparent that productivity is making an increasing contribution to the total produced. In the 1960s the expansion of the area harvested accounted for two-thirds of the increase in the harvest, and the remaining third was accounted for by higher yields. In the following decade this ratio changed significantly. Three-fifths are now accounted for by a more extensive area harvested, and two-fifths are accounted for by higher yields. The area harvested has expanded at an annual rate of 1.7%, whereas yields have risen at an annual rate of 1.4% (see table 2).

It is estimated that only just over one-quarter of the cultivable agricultural area is utilized. The greatest reserve of land—72% of a total of approximately 600 million hectares—<sup>17</sup> is located in the humid tropics, whose soil has a low level of natural fertility and is vulnerable. Approximately 24% is located in the subtropics, and the remaining 4% in the temperate subregion and the temperate sections of the Andean Cordilleras. Somewhat over half (54%) of the cultivable land reserves belong to Brazil, Ar-

<sup>17</sup>CEPAL, *25 años en la agricultura de América Latina: Rasgos principales, 1950-1975*, Cuadernos de la CEPAL series, No. 21 (study prepared by the CEPAL/FAO Joint Agriculture Division, 1978).

gentina and Mexico, and a major proportion of the remainder is concentrated in the countries of the Andean Group. In the past decade, Brazil, Colombia, Argentina, Paraguay, Cuba, the Dominican Republic, Bolivia, Guatemala, Honduras and Costa Rica, have increased their harvested area at a greater pace. The regional area harvested has risen from 85 million hectares to 100 million hectares. Of the 15 million extra hectares, 62% is accounted for by new oilseed crops, chiefly soybeans; 24% by cereals (wheat, rice and sorghum); 8% by sugar cane; 5% by coffee; and the remaining 1% is distributed among various crops, whose harvested area has barely increased.

Unit yields have risen in most national agricultures. A variety of factors were responsible for this, including completion of an organic research project and dissemination of the corresponding results, particularly as regards the genetic improvement of plants, application of new techniques relating to use of fertilizers and pest control, and advanced cultivation methods. In other cases, successful land-preparation programmes and the completion of investment in irrigation have had an impact.

Mention should also be made of the advances resulting from more effective technical and economic organization of entrepreneurial-type production units. However, there are instances where there has been no significant improvement in agricultural yields over the course of the ten years under consideration; although progress has indeed been made in the case of a number of crops, this has had no impact on the average level of productivity of the total area harvested.

The increase in physical production capacity has been made possible by the technical advances applied, which have varied according to the characteristics of each line of production, their requirements as regards technical inputs, and the importance of each technological package adopted, measured in terms of the number of its components and the level of their interdependence. These technical advances have also varied in accordance with the economic agents that introduced and implemented the technological change and according to whether prevailing market conditions encouraged or restricted production.

Seventy-seven per cent of the fertilizers used are concentrated on three crop groups: cereals, sugar crops and oilseeds. In turn, these crops occupy 72% of the area harvested and represent 70% of the foodstuffs consumed. The use of pesticides is more general than that of fertilizers; however, pesticides are used above all in the case of cotton, followed by cereals, fruits, coffee and potatoes, which together absorb almost 90% of the pesticides used and occupy 63% of the area harvested (see table 3).

As regards the scale of average application of fertilizers per hectare, sugar cane is followed in order of importance by soya beans, citrus fruits, bananas, green vegetables, tobacco, cotton, potatoes, sorghum, rice, wheat and maize.

Regional consumption of fertilizers has risen from 3.6 million tons of NPK to 6.8 million tons, representing an annual increase of 8.5% (6.6% for nitrogenous, 10.1% for phosphatic and 9.7% for potassic fertilizers). In the past decade the consumption ratio between phosphorus, potassium and nitrogen has changed. The P/N ratio has risen from 67% to 93%, whereas the K/N ratio has risen from 45% to 60%. The regional average is strongly influenced by the figures recorded in Brazil, where consumption of fertilizers quadrupled in the 1970s (with an annual growth rate of 16%), growth in consumption of phosphorus and potassium being extremely rapid owing to the requirements of certain crops and the nutrient content of the soil. Crops grown in a hot, humid climate, particularly oilseeds and sugar cane, account for the rising use of phosphatic and potassic fertilizers. It is not known to what extent changes in formulas and the possibly more effective use of fertilizers in the case of crops grown in temperate areas may have contributed to this.

When total consumption of fertilizers is linked to the annual area harvested, it is found that the level of fertilizer use has risen from 35 to 67 hectares. At the same time, regional production of fertilizers has expanded, and the share of imports in regional consumption has therefore dropped. The importation/consumption ratio has dropped from 58% to 51% in the case of nitrogen and from 56% to 38% in the case of phosphorus, while it has remained at 99% in the case of potassium. Brazil, Colombia,

Table 3

**LATIN AMERICA: CHANGES IN THE STRUCTURE OF PRODUCTION,  
AREA HARVESTED, AND BREAKDOWN OF CONSUMPTION OF  
FERTILIZERS AND PESTICIDES**  
(Percentages)

Products	Structure of production		Breakdown of area harvested		Breakdown of consumption of technical inputs 1974-1976	
	1969-1971	1978-1980	1969-1971	1978-1980	Fertilizers	Pesticides
<b>I. CROPS</b>						
<i>Cereals</i>	17.8	16.4	55.7	50.0	25.2	18.8
Wheat	3.3	3.1	10.1	9.8	6.7	2.1
Rice	4.0	4.0	7.6	7.7	6.8	2.5
Maize	8.6	7.2	30.7	225.6	5.9	9.7
Sorghum	1.4	1.6	4.2	4.5	5.4	4.5
<i>Roots and tubers</i>	5.2	3.9	5.0	4.3	3.6	8.0
Potatoes	2.1	1.8	1.2	1.1		
Cassava	2.3	1.6	3.1	2.8		
<i>Sugar-crops</i>	7.4	7.4	5.9	6.2	26.7	7.0
Sugar cane	7.2	7.3	5.8	6.2	26.7	7.0
<i>Dry legumes</i>	3.1	2.4	8.7	8.4	1.1	0.6
Beans	2.7	2.1	7.6	7.2	1.0	
<i>Oilseeds</i>	2.9	6.9	7.3	15.8	24.8	1.0
Soya beans	0.8	4.5	1.9	10.6	21.8	...
<i>Green vegetables</i>	4.3	4.6	1.2	1.2	2.0	0.9
<i>Fruits</i>	9.1	9.3	2.2	1.9	7.9	13.9
Bananas	3.5	3.2	1.4	1.2	3.5	3.0
Citrus fruits	1.7	2.4	...	...	3.5	3.1
<i>Beverages and tobacco</i>	8.3	7.7	8.0	7.3	3.2	10.1
Cocoa	0.7	0.8	1.2	1.1	0.2	
Coffee	6.5	5.7	6.2	5.6	1.4	9.6
Tobacco	0.9	1.1	0.6	0.6	...	...
<i>Raw cotton</i>	4.1	3.5	5.1	4.5	4.9	39.6
<i>Total crops</i>	62.7	61.7	100.0	100.0	100.0	100.0
<b>II. LIVESTOCK PRODUCTS</b>						
<i>Meat</i>	23.1	23.7				
Beef	14.7	13.3				
Pork	3.9	4.0				
Poultry	3.5	5.9				
<i>Other</i>	14.2	14.6				
Milk	9.1	9.0				
Eggs	4.1	4.8				
<i>Total livestock production</i>	37.3	38.3				
<i>Total production</i>	100.0	100.0				

Source: Prepared by the CEPAL/FAO Joint Agriculture Division on the basis of FAO figures.

Cuba and Uruguay are the countries in which production of phosphatic fertilizers has increased the most.

Consumption of pesticides rose from 77 million tons of active ingredient to 136 million tons, equivalent to an annual rate of increase of

8.4%. Insecticides represent 49% of pesticide consumption, fungicides 24%, and herbicides the remaining 27%. Herbicides and insecticides have expanded at a faster annual rate (13.9% and 9.1%, respectively) than fungicides (8%). The regional average volume of pesti-

cides applied per hectare is four times greater in the case of cotton than in the case of fruits, coffee, potatoes and sugar cane, these being followed in order of importance by tobacco, green vegetables, sorghum, maize, rice and wheat (see table 3).

With regard to agricultural machinery in service, the number of tractors has risen from 613 000 to 852 000: an annual growth rate of 4.8%. Brazil, Venezuela, Ecuador, Honduras and Bolivia have raised their number of tractors by over 70%; Mexico and Panama by 60%; while the remaining countries have increased

their stock of tractors by 20% to 50%. The average number of hectares harvested by each tractor in the region has dropped from 137 to 113. Mechanization has been a major component of the process of expanding the area cultivated.

The number of combine-harvesters has risen from 95 000 to 117 000, representing an annual increase of 3.1%. In Venezuela, Guatemala, Ecuador and Mexico the number of this type of machine rose by over 50%; while it would appear that in Argentina and Brazil the increase was around 30%.

### III

## Agriculture and the external sector

There has been no substantial change in the characteristics of concentration, dependence and vulnerability of Latin American exports. A limited range of products is exported to a small number of import markets with well-defined seasonal requirements, particularly in the case of fruits and vegetables. The combination of these two situations curbs the region's export dynamism and forms an obstacle to the reduction of the risks inherent in fluctuations in the volume and prices of the products exported. The external demand which Latin America has to try to satisfy is not stable, since it is determined by economic fluctuations in the principal importing countries. This is so particularly in the case of coffee, bananas and sugar, of which Latin America contributes a major proportion of the world supply. As a result, the instability of revenue from agricultural exports continues to have a harmful effect on Latin American agricultural and global development.

#### 1. Exports

In the 1970s, Latin American agricultural export volume rose at an annual rate of approximately 2.8% (between 1950 and 1972 it rose at an annual rate of 2.9%), whereas the annual world rate was almost 5% in the decade under

consideration. The Latin American share of world agricultural exports, which had been dropping in preceding decades, remained relatively constant at approximately 12%, since the rate of increase of African exports dropped and sales of products from the Middle East stagnated. There were changes in the composition and level of diversification of Latin American exports, and a greater degree of efficiency was achieved in the production process, which put the region in a better position to compete in international markets.

Table 4 sets forth the changes that took place in the proportion of the Latin American countries' total production accounted for by exports. This proportion dropped from 18.4% to 17.1% between 1970 and 1980. Exports of oilseeds, wheat, tobacco, tea, citrus fruits and apples expanded most rapidly. In the three-year period 1978-1980 the Latin American countries exported more than 50% of their production of tea, coffee and cocoa; less than 50% of their output of cotton fibre and soya beans; less than 40% in the case of sorghum, sugar, other oilseeds, tobacco and apples; and under 30% of total output in the case of wheat and banana exports. There has been a considerable increase in exports of dry legumes, largely as a result of intra-regional sales.

The changes referred to indicate, on the

Table 4

**LATIN AMERICA: CHANGES IN THE PROPORTION OF PRODUCTION EXPORTED  
AND IN THE IMPORTED PROPORTION OF APPARENT CONSUMPTION<sup>a</sup>**  
(Percentages)

	Exported proportion		Imported proportion	
	1969- 1971	1978- 1980	1969- 1971	1978- 1980
Wheat	18.1	27.6	39.2	47.6
Rice	3.7	5.6	3.9	4.7
Maize	18.1	15.2	3.3	10.7
Sorghum	26.9	37.1	3.9	18.9
Roots and tubers	0.1	0.2	0.4	0.5
Sugar	40.4	35.9	1.7	3.2
Dry legumes	2.4	8.7	4.3	7.0
Oilseeds and vegetable oils	23.5	38.8	17.6	22.1
Soya beans	14.5	45.1	29.9	25.7
Green vegetables	4.1	4.2	0.8	0.7
Fruits	14.6	12.9	4.0	4.2
Bananas and plantains	23.5	22.1	1.7	1.4
Citrus fruits	2.2	2.4	0.1	0.2
Apples	28.2	31.6	20.5	18.7
Beverages and tobacco	70.8	57.0	16.5	9.4
Cocoa	73.6	53.0	24.4	4.3
Coffee	77.1	61.6	8.3	4.9
Tea	67.7	79.8	59.3	62.5
Tobacco	27.8	34.5	3.7	3.3
Cotton (fibre)	60.1	45.0	11.0	7.7
Beef	9.5	6.9	0.9	1.9
Lamb and goat meat	9.6	8.9	3.4	2.0
Pork	0.2	0.4	0.5	0.6
Poultry	0.02	2.3	2.0	3.1
Eggs	0.2	0.1	0.2	0.6
Dairy products	0.4	1.1	8.6	10.7
Total	18.4	17.1	9.7	12.8
Annual increment	1977-1980/1969-1971 = 2.8		1977-1980/1969-1971 = 8.0	

Source: Prepared by the CEPAL/FAO Joint Agriculture Division, on the basis of FAO figures.

<sup>a</sup>The quantities exported were assessed and aggregated at 1969/1971 producer prices. The imported quantities were assessed and aggregated at CIF prices.

one hand, that in the case of traditional crops the share of total production exported has fallen, as in the case of coffee, cocoa, cotton, sugar, maize and beef, for which the domestic market is becoming increasingly important. In contrast, the exported proportion of other crops (wheat, oilseeds, sorghum, apples, tea, tobacco and poultry meat) has risen, which would appear to be an indication of a greater degree of diversification of exports and, therefore, of a

greater link between national agriculture and external agricultural markets. This greater link constitutes an important part of the growing interdependence among nations.

Nine products (coffee, sugar, soya beans, oilseed meal and oil-cake, cotton, cocoa, bananas, beef and live cattle, maize and wheat, in order of importance) accounted for 80% of agricultural exports in the early 1980s. Despite the level of diversification of exports achieved,



58% of national revenue from agricultural exports came from three products — coffee, sugar and oilseeds, including oilseed derivatives.

Exports continue to be destined basically for the developed countries: approximately 75% go to the United States, the EEC and other industrialized countries, 15% to developing countries and countries with centrally planned economies, and the remaining 10% is made up by intra-regional trade.

### 2. Imports

The volume of agricultural products imported by the Latin American countries increased at an annual rate of 8% in the 1970s (5.3% annually between 1965 and 1976 and 10% between 1975 and 1980). The acceleration in the rate of increase was due to a higher volume of purchases of wheat, maize, sorghum, vegetable oils, dairy products, beans and sugar.

Table 4 shows the changes recorded in the past decade in the proportion of imports with respect to apparent consumption. Wheat is by far the most important imported product, followed by oilseeds, cereals for animal feedstuffs (maize and sorghum), dairy products, meat, coffee, sugar, legumes, fruits and cocoa.

Agricultural imports represent 12% of regional supply. One-third of the agricultural products imported by the Latin American countries come from the region itself, but somewhat over 60% come from developed countries: a state of dependence that is further aggravated by the fact that the products in question are handled by a small number of large export enterprises, with the result that supply is concentrated, particularly in the case of cereals.

The extent to which the individual countries depend on imports in order to meet their domestic requirements varies widely. Argentina, Brazil, Colombia, Guatemala, Nicaragua, Paraguay and Uruguay import under 5% of their domestic supplies, while Ecuador, El

Salvador, Haiti, Bolivia, Costa Rica, Honduras, Mexico and Panama are close to the regional average of 10%. The figure is between 20% and 30% in the case of Cuba, Chile and Jamaica, while it rises to almost 50% in the case of Trinidad and Tobago and Barbados, and reaches almost 75% in the case of Grenada.

### 3. The agricultural trade balance

The value in current dollars of the Latin American countries' agricultural exports is estimated to have risen from US\$ 6.8 billion to US\$ 23.1 billion between 1969/1971 and 1977/1979. Over the same period the value of imports would appear to have risen from US\$ 1.7 billion to US\$ 6.7 billion, so that the balance in the region's favour rose from US\$ 5.1 billion to US\$ 16.4 billion.

The ALADI countries account for two-thirds of this favourable balance; the Andean countries' agricultural trade balance continues to be favourable, although to a decreasing extent. The CACM countries have an increasingly favourable balance, whereas the CARICOM countries face successive deficits in their external agricultural trade balance.

Table 4 shows trends in, and the scale of, the principal exportable surplus products and the deficit products that give rise to the greatest volume of imports. In addition, it illustrates the parallel flows in the case of a number of products entering and leaving the region in the form of exports and imports by the various countries, constituting a major point of convergence for a greater volume of interregional trade.

It is worth stressing the gradual increase in the trend towards deficits in the case of products which may be described as critical (wheat, oilseeds, secondary cereals, dairy products and meat). Here, the region could increase its degree of self-sufficiency through a drastic reorganization of its production and trade.

## IV

### Development of productive forces

Major changes took place in the agricultural productive forces in the course of the 1970s. Some changes were obvious, but others were concealed by the agricultural sector's characteristics, while still others went unnoticed because they were blurred by sectoral-level production behaviour. Perception, although sometimes incomplete, of the changes in question makes it possible, on the one hand, to see how differentiation of production and social differentiation among the economic agents directly involved in the production process has gradually become more marked.

As is well known, Latin American agricultural production forces (in other words, the agrarian structure) are disparate, this being a fundamental and decisive characteristic of the way in which the region's agriculture functions. The profound and varied disparities within the sector determine the way in which it operates and give diversity to the economic, social and political processes that occur in agriculture.

In order to simplify the analysis, attention is focused on the two most important segments: the entrepreneurs and the peasantry. The processes relating to agrarian reform and other action aimed at redistributing land and water have had an impact on the clear process of de-concentration of land ownership and the consequent expansion of the intermediate segment, which is reflected in the increased number of small to medium-sized economic units. The importance and functional character of this intermediate group is increasing within the overall context of farmers in general.

The entrepreneurial segment covers those forms of agriculture that are normally identified as modern commercial agriculture, plantations and large farms; in other words, capitalist forms that have reached varying levels of development with regard to the way in which they are organized and the technical level of their operational machinery.

The peasant segment also covers ex-

remely diverse production situations, such as well-to-do small farmers, small producers of a family nature, poor peasant farmers in long-standing agricultural areas, settlers in areas where the agricultural frontier is expanding, share-croppers and others. Features shared by all these types of farmers are the use of family labour and the small size of their economic units.

#### 1. *The entrepreneurial segment*

Latin American agricultural entrepreneurs are a continuing class characterized by clear differences throughout the history of each country. Although they are not a new phenomenon, they are different from the entrepreneurs of earlier years. In addition to the normal changes that take place as a result of the passage of time there are new characteristics, particularly in the case of the most advanced entrepreneurs, relating to their greater degree of homogeneity as a production sector; the medium to large economic scale of their enterprises and of the extent to which they control production resources; the size of their capital and composition of their investment; the complexity and even sophistication of the technological systems they adopt; the level of specialization regarding the lines of production in which they engage; the level of efficiency introduced with regard to the technical and administrative organization of their production activity; their methods of handling labour in order to avoid social conflicts; the profusion of interrelationships with non-agricultural sectors, particularly the financial, industrial and commercial sectors, and with the communications media; and, lastly, the strengthening of the relations linking them to groups close to the centres of power and decision-making, with a view to maintaining a vigilant presence in the official circles responsible for agricultural and rural development.

They are selective as regards the location

of their land, both in terms of natural fertility and favourable topography, and as regards market proximity. The technological patterns adopted have led them to carry out an internal social restructuring of their production units: they require small numbers of skilled workers, who are complemented by unskilled, preferably temporary, labour. They have succeeded in obtaining commitments from the State when it adopts various policy measures concerning, *inter alia*, issues relating to foreign exchange, external trade, credit, market regulation, the cost of money, wages and regulations governing the hiring of labour, which have strengthened their position.

An indirect way of assessing the development of the modern entrepreneurial segment is to consider the level of capital formation in agriculture and the degree of accentuation, or

change, if any, in the pattern of mechanization adopted earlier.

As a way of endeavouring to make an approximate analysis of the scale and composition of investment being made by the entrepreneurial sector, a situation illustrating the average regional expenditure of medium and large-scale mixed farms (crops and livestock) has been established on the basis of national agriculture censuses and additional data available in the case of a number of countries.

Table 5 shows the changes estimated to have taken place in the past two decades in the breakdown of total expenditure, and illustrates the trends resulting from the changes in question. Firstly, the proportion of expenditure destined for investment would appear to have grown more rapidly than the proportion devoted to operational costs, rising from one-fifth

Table 5

LATIN AMERICA: CHANGES IN THE BREAKDOWN OF EXPENDITURE OF MEDIUM AND LARGE-SIZED CROP-RAISING AND LIVESTOCK-RAISING FARMS, 1960-1980  
(Percentages)

	Breakdown of expenditure			Rates of increment of expenditure	
	1960	1970	1980	1960-1970	1970-1980
<i>I. Capital expenditure</i>					
Buildings, irrigation works and soil preparation	5.4	6.3	6.7	4.6	5.0
Plantations, market gardens and vineyards	2.6	2.9	3.0	4.2	5.2
Machinery, equipment, implements, means of transport	6.2	8.2	11.4	6.5	7.9
Breeding livestock and draught animals	6.8	5.6	4.9	2.3	2.9
<i>Subtotal</i>	<i>21.0</i>	<i>23.0</i>	<i>26.0</i>	<i>4.5</i>	<i>5.7</i>
<i>II. Operating costs</i>					
Wages	31.6	24.6	18.1	1.0	1.2
Seeds, fertilizers, pesticides	19.4	21.6	23.0	4.7	5.1
Fuels, lubricants and hire of machinery	5.1	7.1	9.5	7.0	7.5
Leasing of land, water and working animals	3.3	3.9	3.8	5.3	4.2
Animal feedstuffs, vaccinations and medicines	12.8	13.1	13.0	3.8	4.4
Interest and other financial costs	3.8	3.8	3.5	3.6	3.8
Other expenditure	3.0	3.2	3.1	3.2	4.2
<i>Subtotal</i>	<i>79.0</i>	<i>77.0</i>	<i>74.0</i>	<i>3.2</i>	<i>4.0</i>
<i>Total</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>	<i>3.5</i>	<i>4.4</i>

Source: Prepared on the basis of national agricultural censuses, plus additional data for a number of countries.

to a quarter of total expenditure. The resulting increase coincides with the qualitative indicators pointing towards accelerated capital formation on medium and large-scale farms. As regards operational costs, for their part, those relating to seeds, fertilizers, pesticides and fuels would appear to have risen more rapidly than the rest, which is in keeping with the higher level of acquisition and utilization of machinery, equipment, implements and means of transport. In other words, expenditure on capital formation and operational expenditure has been heavily influenced by, and associated with, the adoption of mechanical, chemical and biological innovations.

In the 1960s the purchase of machinery and equipment, the construction of buildings and preparation of land would appear to have represented approximately 55% of capital formation, and this proportion is estimated to have risen to 63% in the early 1970s and to 70% in the early 1980s. The most marked and obvious change has therefore been the increase in mechanization, in terms of incorporation of machinery, equipment and installations, and means of transport, which is a form of growth that has called for the construction of appropriate buildings and facilitated the execution of new and more complex territorial improvements and irrigation projects. There was evidence in the 1960s of a renewed emphasis on investment to render the agricultural production process more technical, in response to three groups of policy measures: (i) those relating to the reduction in the cost of capital through credit at highly subsidized rates of interest, preferential tariff cuts applicable to imports of machinery and agro-chemical inputs, or their sale by the State at subsidized prices; (ii) the construction, extension and diversification of the extrapredial infrastructure; and (iii) technical assistance programmes for production, domestic marketing and the export trade, and the promotion of certain crops regarded as being of particular importance for developing agro-industry and expanding the agricultural frontier.

In these circumstances, the process of capital formation in agriculture has been promoted by the expansion of markets and facilities for access to them; by the price levels

of products and factors of production; by the physical infrastructure available or the certainty of its expansion within set periods of time; by the availability of technical innovations and the breadth of dissemination of their results in the agronomic and economic spheres; by the availability of soft loans; by lower prices for capital goods and inputs for the agricultural production process; by progress in the linkage of agriculture with industry and with trade in agricultural products; and by the availability of ideas and studies regarding agricultural projects and their subsequent adaptation to governmental criteria for the selective promotion of lines of production. Conversely, unclear or unfavourable situations with regard to these driving forces have aggravated the restrictions under which agricultural production activities are carried out.

The agricultural entrepreneurs that make up this production sector invest in accordance with the returns they anticipate. They therefore display sensitive and selective economic behaviour with regard to policy measures and machinery adopted precisely in order to prevent the deterioration of agricultural profitability. The dynamism of these entrepreneurs, as reflected in production and in the technical sphere, is obvious, above all in the most developed agricultural areas and in the most profitable branches of production. They possess knowledge and resources of their own which enable them to exploit the favourable conditions created by the State for carrying out investment in agriculture and for making rational and rapid use of bio-chemical and mechanical technology that has been tested and is ready to be utilized.

At the beginning of the 1960s the operational costs associated with the process of rendering agriculture more technical, such as improved seeds, fertilizers, pesticides, concentrated feedstuffs for cattle, vaccinations and medicines, fuels, lubricants and the hire of machinery are estimated to have represented 31% of total costs: a figure estimated to have risen to 37% in 1970 and 44% in 1980. As the pattern of rendering the production process more technical became more pronounced there was a consequent reduction in wage costs, which are estimated to have dropped from 32%

to 18% over the course of the twenty years under consideration. It should be noted that in the 1970s wages rose more rapidly than in the preceding decade, but owing to the marked difference in the rate of growth attained by the remaining types of operational costs, their share dropped considerably.

The aim of investment in agriculture by the State has generally been to promote, orient and facilitate private investment, and it has had a decisive and active impact on the behaviour and composition of production, although it has not in itself generated greater harvests. Estimates by the International Food Policy Research Institute (IFPRI)<sup>18</sup> indicate that approximately 10% of the growth in Latin American agricultural production recorded between 1950 and 1978 resulted from the impact of stimuli of various types generated by public investment in agriculture. Public investment has been concentrated simultaneously and consistently on irrigation projects, soil upgrading, improvement of agricultural storage and marketing facilities, and the acquisition of the machinery and equipment required by research and technical assistance departments. It has been incorporated into State programmes to promote production, as well as into programmes relating to agrarian reform and settlement, training, research and extension and formation of co-operatives.<sup>19</sup>

The level and breakdown of investment and, in general, of private expenditure in agriculture has been influenced by the level of inflation with which national economies have had to cope. In cases where interest rates are negative or substantially lower than those prevailing on the market inflation usually prompts the purchase in bulk of machinery and equipment and the construction of buildings that would otherwise not have been purchased or constructed so soon. It has been maintained that the current cost of investment must be advantageous as compared with the future, undoubtedly higher, cost, and this has resulted

in speculative investment. Thus, demand for tractors and agricultural equipment rose, and, as a result, mechanical labour capacity increased, which in turn led to the expansion of the proportion of land under cultivation with respect to the total land held by agricultural entrepreneurs and to the acquisition, by various means, of further tracts of land to absorb this excess mechanical capacity, sometimes at the expense of peasant agricultural land or, in other cases, as a result of the integration of new land into the production process.

Greater use of more costly technical inputs and agricultural equipment has led to greater credit requirements. It has been noted that the amount of agricultural credit has risen substantially in absolute terms.<sup>20</sup> In a number of countries agricultural credit is five times greater than it was in the early 1960s; in other countries, although growth has not been so spectacular, such credit has at least doubled. If the coefficient indicating the ratio between the level of agricultural credit and the regional product generated by the agricultural sector is considered, it may be noted that the former has risen steadily, increasing from approximately 35% in 1965 to 40% in 1970, and exceeding 60% in the early 1980s.

Moreover, available information indicates that in certain countries the ratio between agricultural credit and total credit has risen, although it would appear that in other countries this ratio has remained stable and that in still others it has fallen. As far as the regional average is concerned, it is estimated that the ratio in question was around 13% in 1965, and after rising to 16% in 1970 it has been close to 20% in recent years. This means that allocation of resources to agriculture has been expanding moderately through institutional credit.

The accentuation of the more costly pattern of adoption of technical advances and the greater credit requirements have resulted in an increase in the debt/revenue ratio of medium and, in particular, large-scale agricultural enterprises. Servicing this debt is having an impact on the financial situation of enterprises

<sup>18</sup>IFPRI, *Government expenditures in agriculture in Latin America, Research Report No. 23*, Victor Elias, May 1981.

<sup>19</sup>Public investment in agriculture has represented approximately 5% of total public investment; this figure is in keeping with the analyses carried out by the CEPAL/FAO Joint Agriculture Division and by IFPRI.

<sup>20</sup>J.C. Abbot, "Agricultural Credit Institutions in Asia and Latin America", in *Monthly Bulletin of Agricultural Economics and Statistics*, FAO, Rome, Vol. 22, No. 12, 1974.

and may have led to the deterioration of the cost/benefit ratio, with the result that farmers' net income may have dropped in real, and in certain cases, nominal, terms. These circumstances have forced farmers to make intensive efforts to reschedule their debt and have led to an increase in their cash requirements in order to cover cash movements, which could depress the level of future investment. All this has generated greater pressures for substantial increases in the volume of agricultural credit, and this has occurred at the same time as a greater demand for loans financed from resources from widely varying sources, particularly non-agricultural and overseas sources, resulting in the extension and further ramification of agricultural financial markets.

This latter factor is resulting in the initiation of a trend towards the increasing establishment of limited companies to own agricultural enterprises, with a corresponding gradual decrease in agricultural property held by individuals. Moreover, in agriculture there has been expansion and diversification of the mosaic of interests of non-agricultural groups; urban, industrial, trade and financial interest groups are advocating, calling and pressing for changes in certain policy measures and instruments, thus opposing and/or reducing the influence of agricultural groups proper on the most important decisions relating to national agricultural policies.

## 2. Peasant agriculture

The significance and importance of peasant agriculture as a force in agricultural production are beyond question. Various case studies, some of them completed and others still under way, explain the dynamics of its operation and show how it is articulated within the accumulation model of the overall economic system.<sup>21</sup>

The hallmark of peasant agriculture is that its economic activity is basically aimed at keeping family income at a level which will allow for the reproduction of its labour force and the replacement of farm tools and equipment. Labour performed by the family consti-

tutes the organizational base for the productive work, through which the simple or extended reproduction of the family unit is sought.<sup>22</sup>

The pattern followed by peasant agriculture over the past decade has thrown light on its capacity to change to withstand the individual or combined impact of phenomena and processes of various kinds and intensities. In this connexion, attention should be drawn to population dynamics and migratory movements; the interaction of urban life with rural life, which has increased to such a degree that it has modified the aspirations, economic activity and social relations of peasant farmers; the progress achieved with regard to physical integration and development of the corresponding infrastructure, which have facilitated interchange and shifts and made it possible for peasant agriculture to function in larger spaces and view its own possibilities and difficulties in a new perspective; the expansion and organization of markets, which has affected traditional lines of production, stimulated new ones and altered, sometimes dramatically, the peasant's productive and commercial links; and, finally, the government interventions designed to change agrarian structures through processes of land reform and the action taken by State agricultural support services, which, in one way or another, have brought about changes in peasant agriculture.

Technological change reserves special mention. In spite of the difficulties due to the characteristics of the technological packages offered by the markets or promoted by public policies, which are not the most appropriate in terms of the conditions and needs of peasant agriculture, some of the components of those packages have been used selectively by the peasantry, which employs one or more technological inputs, thus establishing, on the basis of their own experience, simple technological packages adapted to their economic and ecological conditions. There is ample evidence that this is true, thus disproving the assumption that the peasantry is indifferent to the adoption of new technologies; what happens is that those

<sup>21</sup>FAO, *Agriculture toward 2000: Latin America's problems and options*, Rome, February 1981.

<sup>22</sup>See the studies on peasant agriculture presented in this issue of the *CEPAL Review*, especially those by E. Ortega, R. Brignol and J. Crispi, and K. Heynig.

developed have been limited by comparison with the supply available to the entrepreneurial sector.

Table 6 represents an attempt to estimate the dimensions of peasant agriculture. Despite the statistical weaknesses of the basic data on which this table is based, the results obtained concur with qualitative appraisals contained in many country studies and reports.

On the basis of the national agricultural censuses, it has been estimated that in Latin America at the beginning of the 1980s, nearly four-fifths of the economic units in the agricultural sector corresponded to small holdings and covered approximately one-fifth of the land associated with all such economic units; in terms of land under cultivation, they are estimated to account for slightly more than one third of the total number of holdings, representing over two-fifths of the total area harvested. The contribution of their production to domestic

consumption is significant; it is estimated to amount to two-fifths of the total produced for that purpose and to one third of the production for export. Their production is of fundamental importance in the supply of mass consumption products such as beans, potatoes and maize. Their contribution to the production of coffee and rice is by no means insignificant and they provide over two-thirds of the pork produced.

The production of small family-operated farms, which are units of small economic scale, is often overshadowed by the marked advances in the production of entrepreneurial agriculture, to the point where their share in the functioning and dynamics of the sector as such is often completely overlooked. The increasing monetarization of small producers is, however, well enough documented in almost all the countries of the region, as are the ramifications of their ties with farm markets. On the other hand, there is also evidence that the differenti-

Table 6

LATIN AMERICA: PROVISIONAL ESTIMATES OF DIMENSIONS OF ENTREPRENEURIAL AND SMALL-PRODUCER AGRICULTURE AT THE BEGINNING OF THE 1980s

(Percentages)

Indicators	Entrepreneurial agriculture	Small producer <sup>a</sup>
Number of economic units	22	78
Total area covered by the units	82	18
Cultivable area covered by the units	63	37
Area utilized by the units <sup>b</sup>	56	44
Production for domestic consumption	59	41
Production for export	68	32
Production of permanent crops	59	41
Production of short-cycle crops	47	53
Production of maize	49	51
Production of beans	23	77
Production of potatoes	39	61
Production of rice	68	32
Production of coffee	59	41
Production of sugar cane	79	21
Number of cattle	76	24
Number of pigs	22	78

Source: Prepared on the basis of national agricultural census data.

<sup>a</sup>The 'small producer' column covers family-type units. To differentiate between them and the entrepreneurial units, criteria of size were used. The percentages provide some indication as to what happens in rural agriculture, but they do not show its real dimensions or the contribution made by it in its strict sense.

<sup>b</sup>Includes area used for crops; does not include pastureland.

ation of production between the entrepreneurial and peasant sectors is partly responsible for the increase, inequality of income distribution within the agricultural sector. This, in turn, is connected with what is happening in the overall economic system.

According to CEPAL, recent calculations concerning seven countries (Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela) which together account for nearly 80% of the population and slightly more than 90% of the product of Latin America indicate that in 1975 the richest 10% of the households received slightly more than 47% of the total income, while the poorest 40% did not even receive 8% of the total. The high degree of inequality becomes even more evident when the average income of the two groups is compared; that same year the income of the wealthy section of the population amounted to over 24 times that of the poor section.<sup>23</sup>

These calculations indicate that between 1960 and 1975 the inequality was by no means attenuated but instead worsened, in that the income of the poorest 40% dropped slightly while the share of the richest 10% rose (also slightly), as did that of the 20% of the households in the bracket immediately below the top.

According to FAO, in 1973 some 85 million persons —70% of the Latin American farm population— were living in bare subsistence conditions. Of this number, some 45 million were wage-earning farm workers and some 40 million were smallholders. They received about 35% of total agricultural income, with an estimated per capita income of US\$ 115 at 1970 prices. Medium-sized farmers represented 28% of the agricultural population and obtained 43% of total farm income. Large landowners (2% of the farm population) accounted for 22% of the income, with an average per capita income of US\$ 2 560 at 1970 prices; 47% of the land under cultivation was in their hands, while the peasant farmers possessed only 2.5%.<sup>24</sup>

In its report for 1971 —ten years after the Punta del Este Meeting— the FAO Special Committee on Agrarian Reform came to the conclusion that in Latin America the expropriation of land had extended to barely 15% of the land which was potentially liable for expropriation and that only 22% of the possible beneficiaries had been brought into agrarian reform programmes and activities. This situation seems to have lasted until the end of the 1970s. Some countries promoted agrarian reform activities which modified —substantially in some cases, such as Peru— the previous system of land tenure. The results of the agrarian reform programmes and activities undertaken in Latin America have not been evaluated since then, and the contradictory arguments and value judgements expressed and contained in various publications revive the old questions on this point.

The increase in agricultural production did not succeed in alleviating poverty. Very little progress has been made towards solving the problems of hundreds of thousands of peasant smallholders and landless labourers. There are indications that the absolute number of persons subsisting in the countryside in precarious and even miserable living conditions has continued to increase as the farm population has grown, despite the intense migration to the cities and the larger dimensions assumed by the regional agricultural economy. The spontaneous division of land, caused by many factors, has notably increased the number of small and sometimes excessively tiny agricultural units, so that the situation can be expected to grow worse in the future.

The style of development in general and of agricultural development in particular has not made it possible for job opportunities and income to be distributed more appropriately. The old problems related to land tenure and the new ones resulting from the concentration not only of land but basically also of capital, production and income which characterize the modernization of agriculture may be aggravating the position of the rural population in terms of

<sup>23</sup>CEPAL, *Latin American development in the 1980s*, E/CEPAL/C.1150, February 1981.

<sup>24</sup>FAO, *Review and analysis of agrarian reform and rural development in developing countries since the mid-1960s*, World

Conference on Agrarian Reform and Rural Development (CMRADR/INF.3), Rome, July 1979.



employment and income; at all events, no positive changes are to be glimpsed.

There are doubts as to the effects of the expansion of entrepreneurial agriculture on employment and the nature of employment. The question of whether the total number of work days increases or decreases as modern technological patterns are adopted has long been under discussion. Although this matter has not been adequately appraised, what does seem clear is that the nature of employment has tended to change with the adoption of capital-intensive technologies; this change is reflected in a reduction in the number of workers with permanent jobs and an increase in the temporary hiring of manpower for some jobs which are not easily mechanized; this temporary labour comes from the minifundios or neighbouring small towns and even includes migrants from the cities.

According to PREALC,<sup>25</sup> in 1980 close to 35% of the regional farm labour force worked in entrepreneurial agriculture (which includes both modern entrepreneurs and those associated with traditional forms of farming), while the remaining 65% was engaged in peasant agriculture. It was estimated that in Bolivia entrepreneurial agriculture employed less than 10% of the labour force, while the corresponding figure fluctuated between 20% and 30% in Brazil, Ecuador, Panama, Peru and Venezuela; was 40% in Guatemala and between 40% and 50% in Colombia, El Salvador and Mexico, and exceeded 50% in Argentina, Costa Rica, Chile and Uruguay. According to the same source, the farm labour force was declining in absolute terms in Argentina and Uruguay, was showing virtually no growth in Chile and Venezuela, was rising less than the regional average (0.9% a year) in Bolivia, Mexico and Peru but was still showing substantial growth in Guatemala and El Salvador.

The shrinkage of the share of the regional farm labour force in the total labour force (it dropped from 42.1% to 35.6% between 1970 and 1980) means that there is a constant shift to

the big cities of some of the social problems inherent in rural poverty. According to CEPAL,<sup>26</sup> the industrial sector (including manufacturing, construction, electricity and transport) employed 22% of the economically active population in 1950 and 27% in 1980. The industrial labour force grew at the rate of 2.7% between 1950 and 1970 and at the rate of 3.8% between 1970 and 1980. If the large number of indirect effects exerted by industry on the other economic activities are taken into consideration, then industrialization affected over 35% of the labour force in 1950, a figure which climbed to 47% by 1980. In other words, nearly half of regional employment is related to the process of industrialization of the national economies.

### 3. *The work of the State*

The development of the forces of agricultural production has been influenced by the expansion of the markets (product, factor and technology markets) with which these forces are linked, by the degree of openness to the exterior of the national economies (in the economic, technical and financial realms), by the direction and intensity of the flows of resources transferred intersectorally, and by State action. If we focus our attention on the latter, without however taking part in the discussion relating to the degree of efficiency of the State as a mechanism for organizing agricultural development, we can see that the State has played an important part in the expansion of agricultural productivity. In recent decades, its responsibility for and participation in the economic and social sectors of agriculture has been growing in most of the countries of the region.

In some countries questions have been raised concerning the efficiency of the provision of direct assistance by the State and, as an alternative, these tasks have been transferred to the private sector, which has received the financial support needed to carry them out. In addition, there has been strong criticism of State intervention in agricultural markets. Attention has been drawn, among other things, to

<sup>25</sup>Regional Employment Programme for Latin America and the Caribbean, PREALC, *El subempleo en América Latina: Evolución histórica y requerimientos futuros*, Santiago, April 1981.

<sup>26</sup>CEPAL, *Latin American development in the 1980s*, E/CEPAL/G.1150, February 1981.

the arbitrary nature of such intervention, its high cost and the distortions which have resulted. In contrast, it has been advocated that the State should withdraw almost completely from such areas, leaving it to the market forces to redress and overcome the imbalances between supply and demand and to attenuate the price fluctuations. Such adjustments are expected to make production more efficient and raise the degree of competitiveness among producers.

The spheres in which the State has been participating and which have had repercussions on the development of the forces of production are related to the tendency to look at the development of agriculture within a more organic framework, involving the formulation of agricultural development strategies and plans, and there are few countries which have not formulated such documents. Despite the limitations which such plans may have had and the limited success actually achieved, their formulation has at least made it possible to gain a better awareness of the resources and their potential, to identify the possibilities and limitations of the available technologies, and to study the behaviour of domestic and external markets, all of which analyses have provided elements of judgement and made it easier to perceive the conflicts and difficulties of agriculture, as well as its prospects.

Generally speaking, the Latin American countries have strengthened their ability to formulate and implement agricultural projects, both as a result of the initiation of agricultural planning processes and as a reaction to the requirements and rules laid down by the international funding agencies. The State agencies have made progress in formulating projects in respect of the development both of the basic infrastructure which supports and promotes sectoral production and of individual lines of production.

The governments have met with varying degrees of success in their efforts at the institutional level, using different legal formulas which enabled them to establish agencies for the basic purpose of making State action at the rural level more flexible and efficient. Unfortunately, such attempts have frequently been hampered by excessive bureaucracy and too

much concentration at operational level, and in order to avoid such impediments many countries have created independent agencies or regional development corporations with different functions and results.

The bodies responsible for agricultural research and the financing of sectoral development appear to be those which have made the most progress with regard both to the quality of their technical cadres and to the simplification of operational procedures. Nevertheless, they are still under fire concerning the scope of their functions and the results obtained, which are usually biased in favour of the entrepreneurial sector. There is a notable lack of technologies geared to the needs and possibilities of peasant agriculture and incorporating the know-how and experience which peasants have in respect of their farm systems, including the way in which they relate to the ecosystems of which they are part.

A fourth area in which State action has acquired greater significance than before is that of the financing of agricultural activities. The budgetary formulations have led to a certain ordering of public expenditure on the basis of sectoral objectives, even though some rigidities remain between current and capital expenditure. The requirements for keeping the public apparatus in expansion come into conflict with the need to finance the investments envisaged in connexion with the activities for the provision of effective support for producers.

Numerous circumstances have made it appropriate and obligatory for the State to contribute to the national agricultural sector in an increasingly complex way. These circumstances have involved both reactions to specific international economic situations and the search for ways of exerting an accelerated and multiple influence on the economic and social development of this vital though backward sector. The increase in and diversification of State activity with regard to agriculture (except in countries which apply policies deliberately aimed at reducing such activity) has resulted much more from a pragmatic attitude towards the solution of specific problems over a period of time than from a concrete approach derived from agricultural planning. In these conditions

it has not been easy to anticipate and give continuity to agricultural policy or to give it an appropriate place in national development strategies.

Policy measures and instruments and government action in agriculture have had the following aims (although the order of priority and emphasis have differed according to the development style of each country): (i) to influence the volume produced, with attention given to changing situations in domestic and external markets and to variations in the prices of agricultural commodities and the inputs required to produce them; (ii) to increase food supplies and improve systems for marketing and distributing food among the poorest and most vulnerable groups; (iii) to modify the functions of production and promote technological change; (iv) to promote or restrict agricultural exports and imports in a selective manner; (v) to try to incorporate peasant agriculture more rapidly into national life, at the social as well as the economic and political levels; (vi) to facilitate the physical integration of those geographical spaces which are least effectively articulated with the national economy; (vii) to conserve natural resources and preserve the environment; and (viii) to produce liquid fuels which can serve as partial substitutes for petroleum products.

These policy decisions have been reflected in the resources allocated, i.e., in the volume of actual public expenditure and the dimensions of institutional credit. At different times, different priorities have been assigned to each of these areas of government intervention and/or participation. When there have been indications that national agricultural production might be insufficient to make as large a contribution as usual to the food supply, however, resources have been mobilized and the public apparatus has intensified its efforts to ensure that harvests are increased, generally not by depriving other economic sectors of allocations but by using those intended for action of social content in the agricultural sector. It is difficult to isolate and make a quantitative assessment of the repercussions which each political decision or each attempt by government to support and service agriculture has had on production and on social matters. At all events, it is obvious that they have made some contribution to the increases in the volume produced; the changes in priority and emphasis have had a decided effect on the changes observed in capital formation at the farm level, on the adoption of technological changes and on the increased use of agro-chemical inputs and the accelerated purchase of machinery and equipment.

## V

### The nutritional position and food production

In general, domestic food production continues to be the main component of national food supply. National agricultural sectors have gradually been articulated with and integrated into the domestic markets, and the features of these markets have therefore affected them. One such feature is that the growth of demand is relatively steady—contrary to what may happen in international markets—so that price fluctuations are less intense, and when they occur they tend to be softened by government intervention, which has an influence on production and tends to make it more organized

and orderly. The evolution of the lines of production mainly intended for the domestic market has therefore become adjusted to the behaviour of domestic demand, which itself is influenced by the increase in average income and the progress made in the urbanization process.

Between 1970 and 1980, per capita food production in the region grew at a rate of 0.9% a year, while the growth rate for total per capita agricultural production was 0.8% a year. The apparent per capita consumption of food, valued in monetary terms, has grown at the rate

of 1.1% a year, which is slightly higher than the growth rate of production and was possible due to the contribution of imports to the supply.

The total apparent food consumption of the region, valued in monetary terms, is estimated to have grown by 3.6% a year during the same period. The consumption of crop-farming products is estimated to have increased by 3.5% a year, while that of livestock products grew by nearly 4% a year. If apparent consumption is considered in terms of food energy, it rose by only 3.2% a year. The different growth rate of apparent consumption when measured in monetary and caloric terms is due to the different amounts contributed by livestock products, which are of high monetary value and low caloric content, although they provide proteins of high nutritional value.

#### 1. *The nutritional position, satisfaction of calorie requirements, and diet*

In studying the nutritional problems of Latin America, it is necessary to distinguish between diseases caused by food deficits and those caused by too much food. Among those caused by food deficits, a distinction may be drawn between those due to specific deficiencies—nutritional anemias, endemic goitre, and vitamin A deficiency—and calorie-protein malnutrition resulting from undernourishment and failure to make proper use of food.

Calorie-protein malnutrition mainly affects children under 5 years old; it is estimated that close to 15% of the region's children suffer from medium to high-level malnutrition. The situation by countries and subregions varies: the most serious problems are found in the Central American and Caribbean countries, followed by the Andean countries. During the 1960s, a slight overall improvement in the nutritional state of Latin American children was observed.

The rise in average income and the increasing availability of food have not been sufficient, however, to offset other factors determining malnutrition such as defective dietary habits, deficient health and hygiene conditions, and lack of education in the field of diet and nutrition. Rural and urban poverty is accompanied by the most marked forms of malnu-

trition, and to overcome this it is necessary to attack the causes of poverty, striking at its very roots.

By studying the relationship between the availability of food energy and the recommendations concerning the intake of calories, or the degree to which calorie requirements are satisfied, it is possible to see the changes which have occurred in the course of time in the nutritional position of the population.<sup>27</sup> The most recent figure for regional average calorie requirement satisfaction stands at 107%.

The levels of calorie requirement satisfaction naturally differ from country to country. It is well known that within each country various strata of population with different levels of calorie requirement satisfaction may be distinguished. Seven countries—Argentina, Costa Rica, Cuba, Jamaica, Mexico, Paraguay and Uruguay—are in the top layer in this respect, with satisfaction rates higher than 110%, the highest figures being for Argentina and Paraguay (127 and 120%, respectively). The second layer, with satisfaction rates of between 100% and 110%, is made up of six countries (Brazil, Chile, Guyana, Nicaragua, Panama and Venezuela), the highest rates being recorded by Chile, Nicaragua and Brazil. The third layer (under 100%), is made up of the remaining countries, with Bolivia and Haiti at the bottom with levels of 89% and 90%, respectively. In general, nearly all the countries raised their calorie requirement satisfaction rates during the 1970s, and those which were initially in the least favoured position made the most progress in this regard.

Table 7 shows the increase in per capita food energy availability in Latin America, by groups of commodities and for certain commodities taken separately. Attention is drawn to the high increase in the availability of chicken meat, followed well behind by the increased availability of oils, sugar, eggs, milk, green vegetables and fruit. The availability of rice and beef has grown slightly, but wheat consumption has not increased and that of maize,

<sup>27</sup>The average recommended calorie intake for Latin America is 2 400 calories a day; the recommended intake for Argentina and Uruguay is close to 2 660 calories, while for some Central American and Caribbean countries it is only 2 250 calories.

potatoes, cassava, pulses, mutton and goat meat has fallen.

The different growth rates of the availability of food energy have resulted in changes in the average diet in the region. The increase in the calorie contribution of sugar is related to the growing consumption of processed beverages and foods of high cost per unit of food energy. The growth in the consumption of oils, chicken meat, eggs and milk points, generally speaking, to an improvement in the average diet of the region. The marked decline in the calorie contribution made by cereals and pulses may, however, be a matter of concern inasmuch as it affects the lower-income sectors. An appropriate combination of cereals and pulses (two-thirds of the former to one-third of the latter) provides a balanced intake

Table 7

LATIN AMERICA: GROWTH IN THE  
AVAILABILITY OF FOOD ENERGY, BY  
INDIVIDUAL PRODUCTS, 1970-1974 TO  
1978-1980

(Percentages)

	Total annual growth rate	Per capita annual growth rate
1. Wheat	2.5	0.0
2. Rice	3.4	0.8
3. Maize	-1.3	-3.6
4. Roots and tubers	-0.2	-2.7
5. Centrifugal raw sugar	5.5	2.9
6. Pulses	0.6	-1.9
7. Oils	7.1	4.4
8. Green vegetables and fruit	3.7	1.2
9. Beef	3.2	0.7
10. Pork, mutton and goat meat	3.5	1.0
11. Poultry meat	2.7	-5.1
12. Eggs	12.2	9.5
13. Milk	5.0	2.4
Others <sup>a</sup>	4.0	1.4
Others <sup>a</sup>	2.9	0.4
Calorie total	3.1	0.6

Source: Prepared by the CEPAL/FAO Joint Agriculture Division on the basis of information provided by FAO and CELADE (population).

<sup>a</sup>Not including fish.

of essential aminoacids whose nutritional value is similar to that of proteins of animal origin, which cost more.

Table 8 makes it possible to assess the average dietary changes which have occurred. Calories devoid of or low in proteins have increased, those obtained from a balanced vege-

Table 8

VARIATIONS IN THE COMPOSITION OF THE  
CALORIE CONTRIBUTION OF THE  
APPARENT PER CAPITA CONSUMPTION  
OF THE REGION

	1971- 1974	1978- 1980
I. Food of vegetable origin		
1. Empty calories or calories low in protein content	33	37
Sugar	17	20
Oils	8	11
Roots and tubers	8	6
2. Balanced foods of vegetable origin	43	38
Wheat	14	13
Rice	10	10
Maize	14	11
Pulses	5	4
3. Foods containing salts, minerals and vitamins		
Fruits and green vegetables	6	6
Total contribution by food of vegetable origin	82	81
II. Food of animal origin		
1. Beef	4	4
2. Mutton	4	3
3. Pork	1	1
4. Poultry meat	1	2
5. Eggs	1	1
6. Milk	6	6
Total share of food of animal origin	16	17
Others <sup>a</sup>	2	2
Total	100	100

Source: Prepared by the CEPAL/FAO Joint Agriculture Division on the basis of FAO production and consumption data and CELADE population data.

<sup>a</sup>Not including fish.

table diet haven fallen, the intake of salts, minerals and vitamins has remained the same, while the intake of calories of animal origin has increased slightly. These changes fail to reflect the deterioration which has taken place in the nutritional conditions of poor groups, which have certainly increased their consumption of empty calories while their consumption of pulses has fallen more rapidly.

## 2. *Inflation and food prices*

One of the most serious problems of international scope in recent years is that of inflation, and in Latin America the intensity of the inflationary phenomenon has been greater than in the industrialized countries. While consumer prices rose on average by 8.2% annually between 1969 and 1979 in the OECD member countries, the average increase in Latin America was 37.5%. There are differences in the rates of inflation for the two five-year periods. During the first, the OECD countries had an average annual inflation of 7.4% while that of Latin America as a whole was 24.3%; in the period 1975-1979 on the other hand, the OECD countries had only slightly higher inflation (9% annually) whereas Latin America suffered a substantial increase in its rate of inflation to 51.9% per annum. During the past decade, not a single Latin American country has had an annual average rate of less than 5%, whereas between 1965 and 1970 there were 15 countries with an inflation rate under that figure.

It is particularly interesting to examine the relationship between inflation and food price

levels because of the influence which the latter may have on the generation, intensification or moderation of the inflationary pressures and also because the inflationary process influences the diet of the population and, in particular, that of the lowest income sectors, which, as is well known, spend a greater share of their income on food.

Table 9 shows the relationship between the increase in the nominal food price index and the increase in the cost of living. Between 1970 and 1975 food prices rose more rapidly than the cost of living in 15 of the 16 countries examined with the highest rates of inflation; between 1975 and 1979, food prices grew faster in over half of these countries, while in the others, the rise in the cost of living was just barely higher than the rise in food prices. Moreover, the rise in real food prices (over the 1970 level) was more intense during the first five-year period, except in Argentina. Between 1975 and 1979, real food prices fell in 8 countries, while in the other countries such prices were slightly higher than in 1975. In 18 of the 21 countries studied, real food prices were higher in 1979 than in 1970.

It may be said that, in general, food prices rise more rapidly than overall inflation when the inflationary process is gathering momentum, whereas when the process slackens, food prices increase at slower rates than inflation. As for real food prices, it may be stated that they rise in periods of greater inflation. The real food prices of almost all the countries were higher in 1980 than in 1970.

Table 9  
LATIN AMERICA: INFLATION AND FOOD PRICES, 1970-1979

Countries	Ratio of food price index to cost of living index		Real food price index 1970 = 100	
	1970-1975	1975-1979	1975	1979
Argentina	1.00	1.01	99.7	103.1
Barbados	1.15	0.93	111.9	97.8
Bolivia	1.14	0.92	112.2	97.1
Brazil	1.11	1.01	109.8	101.1
Chile	1.07	0.95	126.8	91.9
Colombia	1.20	1.00	117.5	100.3
Costa Rica	1.02	1.19	101.3	104.2
Ecuador	1.29	0.99	118.4	99.6
Haiti	1.10	0.95	106.3	98.9
Jamaica	1.13	1.03	108.6	102.3
Mexico	1.13	0.95	107.4	96.4
Paraguay	1.20	1.10	110.7	104.7
Peru	1.17	1.04	110.2	105.8
Dominican Republic	1.21	0.53	110.3	86.4
Trinidad and Tobago	1.23	0.79	114.0	70.7
Uruguay	1.02	1.02	104.2	103.1

Source: CEPAL/FAO Joint Agriculture Division, on the basis of CEPAL, *Statistical Yearbook for Latin America, 1979*.

## VI

### Agriculture and energy

#### 1. Agriculture as a user of energy

The use of energy by the agricultural sector may be examined in the light of the contribution made by human effort, the energy provided by draught animals, the power generated by agricultural machinery, the energy incorporated in modern inputs (fertilizers and pesticides in particular), and that used in the transportation, processing and distribution of food. If the analysis is concentrated exclusively on the commercial energy used in the farm production process, the provisional finding is that Latin American agriculture consumes nearly 2% of the region's total consumption of com-

mercial energy and close to 3% of its consumption of liquid fossil fuels.<sup>28</sup>

In the course of the process of their manufacturing, packaging, transport and distribution, fertilizers absorb close to 49% of the commercial energy applied to Latin American agriculture and pesticides about 3%, the remaining 48% being accounted for by agricultural machinery. It has been estimated that in the developed countries the food system absorbs close to one-fifth of the total commercial energy, a large portion of it being consumed in the

<sup>28</sup>CEPAL, *Latin American development in the 1980s*, E/CEPAL/G.1150, February 1981.

manufacture and distribution of processed foods, especially in canning, artificial drying, refrigeration, freezing and the reconstitution of highly processed concentrates.<sup>29</sup>

The energy component of the regional consumption of fertilizers rose by 12% per year between 1969/1970 and 1979/1980, leaping from 2.4 million to 7.4 million tons of petroleum equivalent. If the analysis is focused exclusively on fertilizers produced in Latin America, the share is considerably lower since regional production—which is showing a tendency to increase—now accounts for 42% of the fertilizers used in the region. Among fertilizers, the nitrogenous ones absorb by far the most energy (82%) owing both to the requirements of their manufacturing and distribution and to their extensive use as fertilizers. They are followed by phosphate fertilizers (13%), with potassium fertilizers accounting for the remaining 5%. In the 1970s, the region's farm machinery and equipment consumed a growing amount of liquid fossil fuels. Between 1971 and 1976 this consumption grew by 5.2% a year, a rate which is estimated to have risen to 6.7% a year between 1976 and 1980, giving an average of 6% a year for the decade. This rate, which is similar to the growth rate of total regional consumption of petroleum and petroleum products, reflects an estimated increase in consumption from 2.1 to 3.5 million tons of petroleum equivalent.

The information available indicates that mechanical motive power is used as the exclusive source of power on no more than 10% of the economic units of the region's agricultural sector (covering close to 28% of the area under cultivation), while 34% (representing approximately 52% of the area under cultivation) use a combination of mechanical power and animal traction and draught animals are used exclusively on the remaining 56% of holdings, representing around 20% of the land area under cultivation. This explains why agriculture in the region has only about a 3% share in the region's

total consumption of liquid fossil fuels, as already noted. The indicators on the kinds of machinery used in cultivation work and on the characteristics of the process of expansion of the cultivated area support the assertions that draught animals and human labour still predominate in the agricultural production process in the region.

Mechanization and full use of the progress made in biochemistry have more than doubled the physical yield per hectare in various countries and cases, but such high productivity has involved an increase of several hundred per cent in the consumption of commercial energy (fuels, fertilizers and pesticides).

In 1980, the international price of petroleum was 12 times higher than in 1970. With rare exceptions, the domestic price pattern in the Latin American countries is closely related to that at world level. International fertilizer prices have shown considerably less growth than those of petroleum, but here too the price of nitrogenous fertilizers has trebled and that of phosphate fertilizers has doubled. National policies aimed at lowering the price of the technical inputs used in agriculture have enabled farmers to buy their fertilizers at prices lower than the international prices.

The rise in the price of petroleum and petroleum products is the main component of the higher production costs of the entrepreneurial sector, and has therefore borne some responsibility for the subsequent rise in food prices.

Up to the end of 1973, the ratio of agricultural prices to the prices of liquid fossil fuels tended to favour the farmer. Since then, however, in the Latin American countries (with few exceptions and some differences in intensity) the purchasing power of farmers, expressed in terms of petroleum, has deteriorated. Between 1970 and the middle of 1973, agricultural purchasing power, measured by the ratio of agricultural prices to petroleum prices, rose from 1.11 to 1.37, but subsequently, between the end of 1973 and 1977, this ratio fell from 1.02 to 0.68, and this loss was further accentuated by

<sup>29</sup>World Bank, *Energy and agriculture: An overview*. Alfredo Sefir-Younis, August 1981. Document prepared for the Seminar entitled "Technical change in Latin American agriculture: Situation and prospects in the 1980s", organiz-

ed by IICA/UNDP and held at San José, Costa Rica, 1 to 3 September 1981.



the evolution of petroleum prices between 1977 and 1980.

## 2. *Agriculture as a source of energy*

The sustained increase in the prices of liquid fossil fuels and its repercussions on the balance of payments has resulted in agriculture being considered as an alternative source of liquid fuels. Much progress has been made in research aimed at identifying raw materials which can generate such fuels, and the corresponding conversion processes have been identified. Sugar cane, cassava or manioc and sweet sorghum (classified as energy crops) have attracted the most attention. In the case of a number of countries and in the short term, ethanol (ethyl alcohol) derived from the distillation of sugar cane must and cassava starch appears as a supplementary source of liquid fuels. Vegetable oils are appropriate fuels for diesel engines, but for technical and economic reasons they are thought of as being medium-term options; methanol (methyl alcohol) from cellulose also seems to provide a medium-term solution, depending on the evolution of petroleum prices.

For now, sugar cane is the most important energy crop. Manioc or cassava has attracted attention because of the significant advantages it might offer as a crop which, unlike sugar cane, is not very demanding in terms of soil and climate. Moreover, the cultivation of cassava generates more employment than that of sugar cane, thereby furthering a more equitable distribution of income. When sugar cane is grown on small farms associated with mini-distilleries (20 000 litres of alcohol) instead of on large plantations associated with large distilleries, however, its disadvantages with respect to cassava are undoubtedly reduced.

In a number of countries research is being carried out and trials performed on cassava starch. The problems encountered (now practically solved) are related to the most appropriate seeds for crops to be used in the production of alcohol, and the steps which must be taken to convert the production of a traditionally family crop into another kind of commercial crop requiring the cultivation of plots of 100 hectares or more. In this respect, questions

have arisen concerning the preparation of the soil, the distance between the plants, the control of plant diseases, appropriate harvesting practices and the mechanization of harvesting. On top of these problems, which can in time be solved, there are problems related to the distilleries, since the distillation of alcohol from cassava starch is a slower and more complicated process than that based on sugar cane. The starch must first be turned into sugar and then fermented and distilled.

The National Alcohol Programme (PRO-ALCOOL) of Brazil, initiated at the end of 1975, represents the greatest Latin American, and indeed world, energy-crop effort. The Brazilian production of alcohol has grown greatly during recent years, rising from 664 million litres to 3.4 billion litres between 1966/1977 and 1979/1980, and it is estimated that as much as 4.2 billion litres was produced in 1981. So far, a total of 384 projects for the installation of distilleries have been approved, which represents distillation capacity equivalent to 8 billion litres a year in addition to the 900 million litres of capacity already existing before the programme, giving a total amounting to 84% of the target of 10.7 billion litres per year set for 1985.

The system of mixing anhydrous alcohol and gasoline introduced throughout the country made it possible to replace 17% of the gasoline consumed in 1980. In that year, PRO-ALCOOL introduced the distribution of hydrated alcohol on a commercial scale as the exclusive fuel for some 350 000 vehicles produced for that purpose or with modified engines.

Some other countries in the region have also embarked upon efforts to produce liquid fuels from energy crops. The use of vegetable wastes to produce biogas (methane gas) is also attracting interest, and research is being conducted on different kinds of digestors for expanding the production of this gas. Wood and charcoal have also acquired renewed importance in the search for commercial energy based on biomass.

Having recourse to agriculture for the production of food and energy crops raises questions in respect of the future composition of agricultural production, variations in relative

prices, and the degree of technical modification to which the national agricultural sectors can be subjected. On the other hand, the expansion of agricultural production is highly dependent on the availability and price of liquid

fossil fuels. It is therefore a question of complex and difficult options whose relative merits may be very different in the different countries of the region.

## VII

### The industrialization of agriculture

In the majority of Latin American countries the industrialization of agriculture is gathering momentum. To the extent to which the linkages<sup>30</sup> of the agro-industrial chain have been established and/or consolidated, the production bases of the agricultural sector have been brought into this process and at times transformed. Agro-industry has been actively considered and furthered as a way of solving some of the economic and social problems relating to agriculture, since it involves technical innovations and modernization of the production process, standardization of agricultural commodities, promotion of the production of non-traditional crops, the introduction of improvements in the marketing and distribution of raw and processed foods, the provision of reliable markets and the stabilization of agricultural prices and incomes.

The large number of branches which make up Latin American agro-industry, the dynamism and diversification of production, the different sizes of the individual agro-industries, the differences in technology and the variety of its sources, and the lack of up-to-date statistics are factors which make it difficult to prepare a detailed analysis of the regional evolution of this heterogeneous and complex production activity. In any case, the study of specific individual aspects would exceed the limits of this article.

The food sector is the largest one in regional agro-industry. The food branches related to sugar refining and cereal milling are, in general, slow growing since both sugar and

wheat are products which suffer from slow-growing demand and have in general been subjected to some form of consumer price fixing. The secondary food industry (noodles, pasta and other prepared foodstuffs made from wheat) has a more dynamic growth rate owing to the constant expansion of urban and rural demand for its products. The manufacture of vegetable oils and fats, cocoa and coffee preparations and confectionery, shows high growth rates, since these commodities are aimed at expanding domestic and external markets. The branches associated with cattle slaughtering, meat preparation and canning, the manufacture of dairy products and the packaging and canning of fruits and vegetables, show moderate but in some countries rapid growth, depending on the competition from imports they usually face. In general, the branches which produce goods for mass consumption tend to grow more slowly than those which produce prepared foods for sale to medium- and high-income groups.

In its expansion, agro-industry is supported by the entrepreneurial sector of agriculture, whose organizational and productive characteristics foster the articulation of its output with the activities of agro-business. The latter for its part, gears its production to medium and high-income urban consumers and to those rural consumers with enough income to enable them to purchase its products. Thus, agro-industry by-passes peasant agriculture (except in a few cases where peasants have united in co-operatives) and the very poor urban and rural consumers, who are not in a position to buy foodstuffs with high value added.

National diagnostic studies agree on the marked growth of agro-industries; they also record increases in the number of transnational

<sup>30</sup>Backward linkages, involving the production of inputs for agriculture, and forward linkages, involving the processing of inputs from agriculture in the various phases of their transformation.

corporations within local agro-industry. Many of these corporations are of worldwide importance because of the volume of their annual sales and their ramifications. In general, they are vertically integrated and diversified traits which are all the more obvious if the firm is a large one.

Transnational corporations, establish themselves in the most important branches of the national agro-industrial system and constitute dominant nuclei which are concentrated centres of capital and gear the larger share of their production to the domestic market, their participation in foreign trade in processed products being only limited. They tend to generate a certain amount of specialization in production for reasons of climate, soil, land tenure, infrastructure and facilities for access to large national urban markets.<sup>31</sup>

Foreign private investors prefer to finance the production of prepared foods and of basic technological inputs used in the production and related marketing process. They take the place of national capital in the installation of production units which are articulated, on the most favourable terms, with import substitution or export promotion processes based primarily on the exploitation of natural resources.

The transnational agro-industrial production units established in Latin America have grown in a different way. Much of their expansion and diversification has been achieved through the purchase and absorption of existing national enterprises and their fusion with other new enterprises, thereby saving some of the cost of setting up new enterprises and heightening the degree of concentration. This has made it possible for them to become larger in size and to acquire networks of subsidiaries, to adopt and select a wide variety of techno-

logy, to use highly-qualified staff and to strengthen their operational capacity and presence in the markets.

The links of transnational corporations and other foreign private investors with Latin American agriculture date back a long way. They have branched out into the exploitation of land, taken advantage of cheap labour and controlled the manufacture and marketing of many products: fruits and vegetables, sugar, cotton, cocoa, meat, dairy products, fishery products, edible oils, wheat, tobacco, timber, leather, non-alcoholic beverages and confectionery, alcoholic beverages and tropical drinks. They have gradually taken on new branches of activity: to the production of basic food preparations they have added that of foods for high-income urban markets sold in chains of supermarkets or in restaurants ('sophisticated' foods based on meat and milk, prepared dishes, fine confectionery, etc.). In addition they have supported the production under contract of fresh fruits, pulses, green vegetables and flowers for markets in developed countries.

The foreign investment in Latin American agro-industry (in the widest sense of the term) goes back a long way. In the 1970s, however, it was perhaps more intense than in the past, particularly in the branches manufacturing agricultural machinery, agrochemical products (fertilizers, insecticides, fungicides and herbicides) and veterinary products. Almost all the transnational corporations operating within these fields have established themselves in Latin American countries, either as manufacturers or as commercial representatives, so that they penetrate and, in general, dominate the national markets and have a decided effect on their evolution and characteristics.

## Conclusions

Specific conclusions could be drawn in connexion with each of the topics analysed. We feel, however, that the most relevant conclusions are those which emerge when we com-

pare the expansion in production and the changes registered during the past decade with the degree of achievement of the basic objectives pursued by the Latin American society and economy —the elimination of hunger and of nutritional deficiencies and the eradication of poverty and want. They may also be viewed

<sup>31</sup>CEPAL, *Las empresas transnacionales en la agroindustria mexicana*, CEPAL/MEX/1049, May 1981.

in the light of the progress made in connexion with two complementary objectives —the expansion of agricultural exports and the attempt to keep the search for short-run economic efficiency from altering the ecosystems and causing the deterioration of extensive areas of land.

The expansion of production for the domestic market has simply been a response to the stimulus and movement of demand, both of which have resulted from the increase in the urban population and the changes which have occurred in the diets of the different income groups. For this reason, the increase in production has had an equivocal effect on nutrition. On the one hand, it has helped to achieve greater average availability of food of high nutritional value, which has been purchased by middle and high-income consumers, while on the other hand, it has resulted in a growing supply of foods with 'empty' calories —sugar, oils, tubers, etc.— for mass consumption and in a decrease in other foods which contain balanced nutrients (cereals and pulses); this is bound to have increased the nutritional deficiencies of the poorest groups. Consequently, the results of the production process have not, strictly speaking, been oriented towards the elimination of hunger and malnutrition.

The rise of real food prices above their levels of the early 1970s has been a factor in the accentuation of food problems. Among other things, it has caused the inflationary processes to intensify, which has worsened the nutritional state of the underprivileged, who have been forced to modify their diet and eat foods which are cheap and filling but of little nutritional value.

With regard to the eradication of rural poverty, although considerable progress has been made in the expansion of production, there is still a long way to go to obtain the material base needed in order to narrow the gap between average farm income and average income in the economy as a whole. Faster expansion of agricultural production, resulting in the doubling or trebling of the present dimensions of agriculture in the medium term is necessary, but it is not enough to ensure the eradication of rural poverty. It is necessary also to apply distributive or redistributive measures (depending on the individual characteristics of each country)

if the benefits of the production process are to filter down more evenly to the different strata of the population.

The development of the forces of agricultural production has not helped to clear up the most glaring inconsistency in Latin American agriculture —the simultaneous existence of abundant land, which is not fully used, and a growing number of underemployed peasant families. On the contrary, because of the changes which have occurred within its two main components (the entrepreneurial group and the peasant group), it would seem that this age-old imbalance is worsening. This polarization has naturally influenced the strategies followed by both sectors: those favoured by the entrepreneurs in order to reap greater benefits for themselves, and those followed by the peasants to face up and adapt themselves to changing situations and to seek to maintain or raise their standard of living. Permanent or temporary migrations to the urban industrial areas or to areas of new land settlement where they can establish new family units are one way in which the peasantry combats underemployment and seeks to ensure at least a minimum level of income.

Although the land tenure situation in many countries of the region differs from that which prevailed twenty years ago, since varying degrees of progress have been made, the need to continue modifying the conditions governing access to the land is still of strategic importance for multiplying the successes achieved through agrarian reform measures undertaken in the past and also as an important way of achieving the aims of the strategies for overcoming structural disequilibria and achieving the harmonious development of society.

The gradual concentration both of agricultural production and income and of the opportunities derived from markets (commodity markets, factor markets and financial markets), as a result both of the nature of the entrepreneurial sector and of public policies, which tend to favour this sector most, together with the effects of this sector's increasingly close links with agro-business, are situations different from the characteristics displayed by Latin American agriculture in the past, when its basic foundation was the latifundium-minifundium

complex. The vigour of entrepreneurial agriculture, which is functionally linked with the continuous decomposition and recomposition of the peasantry, is a reality which is still not satisfactorily grasped or seen in the light of its true scope and consequences.

The ability of the low-income groups to increase their incomes is closely related to the quantity and quality of their work and to the payment of fair wages for their production efforts. The work they do, for its part, depends on the conditions of access to productive resources and to land in particular. The intensified search for ample new job opportunities for the rural population was and will be an important part of the struggle to vanquish rural poverty. Depending on national and local realities, the widest variety of means could have been used to facilitate greater access to the land.

An important aspect of the measures relating to access to the land has been the full settlement of the national territory, together with the expansion of the agricultural frontier. More or less successful forms of settlement, together with the opening-up of land to irrigation, have relieved the demographic pressure typical of certain areas where rural poverty is found and at the same time have contributed to the growth of production and the creation of new jobs.

Policies aimed at making capital less expensive and providing incentives for the use of technical inputs in the agricultural production process have had a negative impact on farm employment. Their purpose was to ensure capital formation on the farms and the introduction of technology into farming, but they have actually reduced the role played by the labour force—an abundant resource in the aggregate production function. On the other hand, in some cases regulations introduced in labour markets have made labour expensive and furthered a tendency to do without a permanent labour force and make growing use of temporary manpower.

Integrated or integral rural development programmes have come into being as ways of concentrating resources for use by peasantry, promoting their incorporation into the markets, making them receptive to technical progress and providing them with government support and assistance services as a way of improving

their living and working conditions. Since programmes of this kind do not get to the roots of rural poverty, however, their results have failed to go beyond the limited confines of their own action, which did not pretend to provide increased access to productive resources.

Due to a lack or shortage of technological innovations designed to fit in with the economic and social conditions of the mass of producers of each country, the technology most readily available is that offered on the international markets; this has frequently been a contributing factor in the adoption of technological patterns out of keeping with national requirements for balanced agricultural development. In spite of the progress made in Latin America in the organization of research and the training of research workers, there is still a persistent lack of familiarity with the needs of the peasantry and an absence of research which gives due attention to the special way in which peasants organize their economic activities and use the soil. There is a need for research into crops which are important for peasant agriculture and into systems of production based on associated or multiple crops.

The predominant approach to development is one which tends to increase the degree of openness of economies and to bring about more interdependence among the nations. The trade in agricultural commodities of the Latin American countries with the rest of the world reflects those tendencies. Exports have been diversified, and hence national agricultural sectors have been brought into closer co-ordination with external demand. Although there has not been much diversification with respect to imports, there has been an increase in dependence and hence in the vulnerability of food stocks in the face of unexpected changes in world market conditions both as regards security of supply and price variations. The issues of effective storage facilities in ports, the availability and efficiency of modes of transport, and the degree of fluctuation in freight rates have assumed much greater importance.

The environment of instability and insecurity characteristic of the international agricultural markets has had a sharp impact on the evolution of the national agricultural sectors which depend on exports and, by extension,

has caused disturbances of various kinds in the pattern of growth of national economies. On the other hand, high levels of protectionism have reduced the opportunities of the countries of the region whose favourable conditions of production would otherwise enable them to be very competitive in some of the world agricultural commodity markets.

For the region as a whole (although not for all the individual countries) the value of imports in dollars at current prices grew more rapidly than that of exports between 1969/1971 and 1977/1979, the respective growth rates being 18.7% and 16.5% per year. There is less of a gap between these rates than between those relating to the growth in terms of volume, which, as indicated above, were 8.0% and 2.8% per year respectively. The larger rise in the prices of agricultural exports explains why exports have performed better than had been expected and have played a more important role in clearing up or reducing trade deficits.

The technological policies adopted have been affected in varying degrees by the technological model created by the so-called "green revolution". Without overlooking the notable scientific progress achieved since that event, reflected in complex technological packages which have facilitated the expansion of the agricultural frontier and resulted in an as yet modest rise in average unit yields, it may be noted that there is a lack of technological initiatives which do not tend to foster the uniformity of ecosystems and hence the alteration and/or loss of their special attributes. The quest for economic efficiency in the short term has meant that extensive stretches of land are unused in Latin America, especially in tropical areas. Nor has there been any notable progress in respect of reclaiming areas where there has been ecological deterioration or in the establishment of which are less dependent on the consumption of fossil energy.

A varied set of causes and factors have interacted and worked together to produce the changes which have occurred in rural Latin American society and have promoted the greater economic and social differentiation now seen in regional agriculture. Outstanding in this complex combination of causes and factors are the new urban and industrial structures

and the resultant modifications in the direction and depth of urban-rural relations; the different degrees to which technical progress has penetrated and the emphasis on efficiency and profitability which accompanies such progress; the political decisions aimed at lowering the cost of capital and of the technical facilities required by the production process, with the consequent acceleration of capital formation in entrepreneurial units and the pattern of mechanization and the accompanying increase in the use of technological inputs; the selective and sometimes distorting role of the external sector; the dynamism of working in association with transnational corporations; the execution of big physical infrastructure and communications works; the review and updating of the aims, means of action and beneficiaries of various governmental programmes and activities designed to further agriculture; the results (still not fully known or evaluated) of the processes and activities related to agrarian reform and changes in the systems of land tenure; the modifications introduced in labour relations, and the temporary or longer-term intersectoral transfers for the benefit of agriculture. In addition to this long list of factors, there are others which appear to be less important.

Thus, there are many complicated causes and factors which must be taken into consideration both individually and collectively in order to achieve the conditions needed for agriculture to be able to perform all its essential functions and forcefully display its true potential. Similarly, there must be many other measures and activities which need to be embarked upon if agriculture is to be able to make an appropriate contribution to overall development while at the same time coping with its own problems. Issues which are complex and difficult because of the number of their components and the way in which those components interact cannot be tackled and overcome with simple solutions. The great challenge for Latin American agriculture is that of reconciling technical and economic efficiency with the urgent need for social betterment, while at the same time forming a sector which will have a dynamic and stabilizing effect on the overall economy.