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NOTES

POPULATION, AGRICULTURE & FOOD SUPPLY IN LATIN AMERICA

Latin America is the fastest growing region on Earth and the consequences in the agricultural sector have great significance not only for the region itself but for the remainder of the underdeveloped world as its rate of growth gradually approaches that of Latin America. Nearly one-half of the population of Latin America's population remains agricultural, however, that sector has been contributing a declining share of the region's gross domestic product. During the post-World War II period it has been the slowest developing segment of the Latin American economy and, as a result, remains one of the major sectorial problems for the region's further economic development.

Latin America is the most advanced, in terms of most criteria of development, of the world's underdeveloped regions. The situation holds true with regard to agriculture as well, assuming that Japan is not included with the Orient. Latin America generally attains the underdeveloped world's highest yields, although admittedly the Orient is very close behind and currently may equal or surpass Latin America at present because of recent developments of the « green revolution » (Table 1). However, the pressure on arable land in Latin America (as in the Middle East), among the underdeveloped regions, is intermediate between the world's greatest pressure in the Orient and the least pressure (of the unterdeveloped world) of Sub-Saharan Africa. The relatively higher yields of Latin America improves that region's position vis-a-vis the other underdeveloped areas if crop yields are taken into account in computing the actual pressure on cultivated land. Further alleviation of the relative pressure (again considering only the underdeveloped world) on arable land occurs because Latin America has the lowest proportion of its population in agriculture compared to any of the other regions.

Agriculture in the Economy

Gross Domestic Product

During the course of the post-World War II period agriculture has contributed a declining share of the region's gross domestic product (GDP) (Table 2). In the immediate post-war period approximately one-third of the GDP was derived from agriculture whereas by 1963 the proportion had

Table 1

WORLD REGIONS : Comparative Agriculture

	Arable Land (th ha)	*1967 Population (th)*	*Inhab/sq km (arable)*	*'66-67 av. Cereal Yield (100 kg/ha)*	*Arable land Yield Density* [a]	*1965 % in Agric.*
Europe	150 000	451 268	300.85	25.16	191.38	23
USSR	242 000	235 543	97.33	12.96	120.31	32
Anglo-America	220 000	219 658	99.84	27.50	58.11	6
Latin America	119 000	259 325	217.92	13.84	252.22	48
Middle East	108 000	213 921	198.08	10.05	315.41	64[b]
Orient	384 000	1 876 611	488.70	14.15	552.83	64[b]
Africa, Sub-Sah.	182 000	225 179	123.72	8.78	225.77	74[c]
Oceania	42 000	18 117	43.14	11.74	58.85	19
World	1 447 000	3 499 622	241.85	16.01	241.85	52

Based on data from *FAO Production Yearbook : 1968.* Food & Agriculture Organization of UN (Rome) Vol. 22, 1969.

[a] Number of inhabitants per square kilometer of arable land divided by the ratio of cereal yields obtained to the average world cereal yields.

[b] Continent of Asia (exc. USSR)

[c] Continent of Africa.

declined to less than one-fifth (18.9 percent).[1] The economic emphasis has, obviously, been placed on the exploitation of mineral deposits and especially the development of industrialization processes. A possible measure of ascertaining how rapidly an economy is evolving is by the degree that agriculture declines in relationship to the other sectors, principally manufacturing. The only two countries to exhibit virtually no overall change between 1950 and the late 1960s in the proportion of the GDP contributed by agriculture are Venezuela and Argentina. In Venezuela, petroleum production had long overshadowed agriculture, whereas in Argentina, the first Latin American country to undergo the process of industrialization, manufacturing had outpaced agriculture. Although there was a resurgence of agriculture in Argentina during the 1950s and early 1690s it did not approach the level of manufacturing output. In both Argentina and Venezuela, as well as Chile, manufacturing ouput had exceeded that of agriculture by the end of World War II. The phenomenon of manufacturing exceeding agriculture in value of production (as measured in the GDP) occurred in Mexico by 1951, in Uruguay a few years later, in Puerto Rico in 1954, in Brazil in the early/mid 1960s, and in Peru in 1967. In all the other Latin American countries agriculture remains the major economic sector in terms of value of production.

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[1] Based on data from *Yearbook of National Accounts Statistics : 1969,* Vol. II International Tables, UN Dept. of Economic & Social Affairs, 1970, Tables 3, 6B.

Table 2

LATIN AMERICA : Agriculture in the Economy

	Agric. : % of GDP [1]		(1965) [2]	Agric. Commodities :	Agric. Commodities :
	1950	c1966/68	Agric. : % of Econ. Active	% of Exports [3] (c1967/68)	% of Imports [3] (c1967/68)
Mexico	23	16	52	57.3	5.6
Guatemala	29 ('58)	29	64	74.8	13.1
Salvador	37 ('58)	27	59	65.3	17.6
Honduras	56	38	65	75.7	12.7
Nicaragua	34 ('60)	30	59	84.7	11.0
Costa Rica	43	24	48	79.6	12.8
Panama	27	24	43	77.1	9.8
Cuba			35	92.2	32.2
Dominican Rep.	27	22	57	88.3	16.0
Haïti	53	49	79		
Puerto Rico	23	5			
Venezuela	8	8	29	1.3	12.7
Colombia	38	31	47	79.4	9.1
Ecuador	39	32	52	92.1	6.9
Peru	35	17	47	45.7	13.1
Bolivia	33	19	65	2.1	13.6
Paraguay	42	32	51	67.2	18.3
Chile	14	9	26	3.8	15.6
Argentina	14	14	18	86.3	7.0
Uruguay	18	14	17	77.1	12.0
Brazil	27	19	48	78.6	17.0
Latin America	31 [1]	23 [1]	48	77	12.8
Canada	13	6 (1965)	11	13.2	9.1

[1] Yearbook of *National Accounts Statistics : 1969,* Vol II, International Tables, UN Dept. of Econ. & Soc. Affairs : 1970, Table 3.

[2] *FAO Production Yearbook : 1969,* UN Dept. of Econ. & Soc. Affairs, 1970, Tables 5, 6.

[3] Based on data from *Yearbook of International Trade Statistics : 1968,* UN Dept. of Econ. & Soc. Affairs : 1970.

Labor Force

A decline in the agriculture labor force, in proportion to the total economically active, has also been occurring in Latin America during the post-World War II period (Table 2). In 1950, 58 per cent of the labor force was engaged in agriculture and by 1965 the proportion had declined 10 percentage points to 48 per cent. Of all the Latin American countries only in Argentina and Uruguay were more persons engaged in manufacturing enterprises than in agriculture during the 1960s. Proportions approaching or exceeding three-fifths of the population in agriculture still occur in parts of Central America, Hispaniola, and Bolivia.

The depressing rural conditions over much of Latin America combined with the relative attractiveness of the urban centers has resulted in a mass exodus from the countryside into the cities, especially the large centers. Despite the massive internal migrations, the rural population in Latin America during the 1960s still increased at about 1.5 per cent annually. The rural population will double in less than half a century at this rate and is almost equal to the world rate of population increase during the 1950s. In two countries, Costa Rica and Nicaragua, the rate of growth is twice the regional average and in an additional half dozen countries (Guatemala, Honduras, Paraguay, Salvador, Dominican Republic & Ecuador) the rural population was increasing at least as fast as the present rate of world total increase (2 per cent annually). These countries are all relatively small and generally similar to those indicated in the previous section as being relatively more underdeveloped. However, in all countries the rate of urban population growth easily exceeds that of the rural population. Recently in Uruguay, Argentina, and Puerto Rico the rural population actually has been declining absolutely in numbers.

Obviously the various diverse endeavors at improving agriculture and the rural environment, (land reform, rural credit facilities, dissemination of education, medical/health and other social services) have been grossly inadequate to stem the rising tide of the rural exodus to the cities during the 1960s. Despite a decline share of both the GDP and labor force, an increasing number of inhabitants will continue to reside in rural areas and depend upon agriculture as a livelihood in most of the countries of Latin America during the present decade at least.

Export Trade

Although agriculture has a declining share of both the GDP and labor force it still retains dominance in the export trade of most of the countries of Latin America (Table 2). In three countries (Venezuela, Chile, and Bolivia) agricultural commodities comprise only a few percentage points of the total national exports. These, incidentally, are the only three Latin American

countries whose export merchandise trade is dominated by minerals.[2] In only one other country, Peru, did agriculture provide less than one-half (45.7 percent) of the total exports in 1968. In most of the remaining countries at least three-quarters of all exports are agricultural products and in two nations (Cuba and Ecuador) they accounted for more than nine-tenths of the total.

In most of the countries in which agricultural commodities dominate the export trade, only one or two commodities usually account for about one-half or more of the total value of all exports. In the case of the three mineral-exporting countries, one mineral clearly dominates the national economy and export trade. This orientation of agriculture (and mineral production) renders the Latin American countries very vulnerable to serious dislocations when world price market fluctuations occur (usually to the detriment of the raw-material producing underdeveloped world) or when serious damage (drought, flood, frost, storms, pests & diseases) reduces crop and livestock production. The relatively uncontrolled nature of the agriculture against hazards in Latin America is a serious deficiency that can aggravate a nation's balance-of-payments problems. However, there does seem to be a trend toward increasing diversification of the agriculture and somewhat less dependence on monocultural production than in the past.

Latin American agricultural extra-regional exports during the 1960s, although having increased by about one-third between the beginning of the decade and 1966-67, did not quite keep pace with the overall increase in total extra-regional trade. Latin American countries, despite their large agricultural exports, also import agricultural commodities. The import median for agricultural commodities would be about one-eight of total exported merchandise. Some of these goods consist of staples that could be produced locally and one purpose of agricultural diversification is for import substitution. Approximately one-third of Cuba's imports are agricultural commodities and in addition to the major mineral exporting countries, the other important agricultural importers are Brazil, El Salvador, and Paraguay in each of which agricultural goods comprise more than one-sixth of total imports. Despite this the only three *net* importers of agricultural commodities (for food products) in Latin America are the mineral-dominant economies, viz., Venezuela, Bolivia, and Chile. Latin America, therefore, actually constitutes an agricultural and food surplus region of the world, despite its relatively low per capita food consumption (discussed later on).

Agricultural Development & Population Growth

Agricultural production during the 1950s and 1960s has increased at the rate of about 3 per cent annually or slightly greater. During the latter

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[2] Based on data from *Yearbook of International Trade Statistics: 1968,* UN Dept. of Economic & Social Affairs, 1970.

Agricultural commodities : includes livestock husbandry and fisheries but *not* forestry products.

decade the rate of growth overall was very slightly less than the 1950s.[3] In the 1950s the rate of total overal agricultural production increment exceeded that for food production but the reverse situation occurred in the 1960s. The pressure of population growth has resulted in an increasing shift to food staples and to a relative decline in the output of the non-food agricultural products (viz., coffee, industrial oilseeds, fibers and tobacco). The rate of population growth in Latin America increased from approximately 2.7 per cent in the 1950s to 2.9 per cent in the 1960s (Table 3). Consequently, there was an increasing necessity for agriculture to expand even faster in the past decade than before. Furthermore, a level of population increase of about 3 per cent annually will probably be maintained through the present decade.

Latin America's overall agricultural productivity gains are about on a par with those of the underdeveloped world generally and the world overall. In fact, agricultural production and population growth are both expanding at comparable rates and, consequently, there is relatively little (if any) real improvement in output per capita, especially in the 1960s.

Food Consumption

The relatively rapid rate of agricultural expansion during the post-World War II period has been equalled, especially in the past decade, by the world's fastest rate of population growth in Latin America. There has been relatively little improvement in nutrition overall in the Latin American countries during the past decade or so. By 1966 there were still 10 Latin American countries where daily per capita food consumption was below the level recommended (2 400 calories) by the US Dept of Agriculture as a minimum requirement (Table 3). Since 1960 only one country (Venezuela) that had been below that level was able to exceed it, probably little overall change has occurred since 1966 except that perhaps Cuba is now a food-deficit country.

The per capita daily food consumption in Latin America is probably very close to 2 500 calories (developed countries : 3 000 and is significantly above the levels prevailing in the other underdeveloped regions. The median daily protein consumption among Latin American countries is slightly less than 60 or still significantly below the developed World figure of perhaps 90+ but appreciably greater than that consumed in most of the other underdeveloped countries. Therefore, in both quantity and quality the food consumption of virtually all Latin American countries, save Argentina and Uruguay, is deficient when contrasted to that of the developed countries. Futhermore, the situation is not significantly improving overall in Latin America.

Pressure on Arable Land

The population pressure on arable land is greater in Latin America than in any other world region except the Orient and Europe (the latter two are

[3] Based on data from the *FAO Production Yearbooks, op. cit.*

Table 3

LATIN AMERICA : Population, Agriculture Production & Food Supply

	Population (m) [1] 1970	Current % Annual [1] Pop. Increase	Agric. Production : 1967-69 [2] (1957-59=100) Total	Per Capita	Calories Daily Per Capita [3] (c1966)	Proteins Daily per capita [4] (Grams) (c1966)
Mexico	50.7	3.4	147	105	2 600	66.8
Guatemala	5.1	2.9	159	116	2 220	56.8
Salvador	3.4	3.4	139	101	1 840	44.2
Honduras	2.7	3.4	143	103	2 010	51.0
Nicaragua	2.0	3.0	182	134	2 350	59.0
Costa Rica	1.8	3.8	146	103	2 610	57.9
Panama	1.5	3.3	148	108	2 420	62.3
Cuba	8.4	1.9	98 [a]	81 [a]	2 730	43.6
Dominican Rep.	4.3	3.4	104	74	2 000	46.3
Haïti	5.2	2.5	81	64	1 780	63.3
Puerto Rico	2.8	1.4			2 460	
Venezuela	10.8	3.4	170	120	2 490	65.9
Colombia	21.4	3.4	127	93	2 280	53.3
Ecuador	6.1	3.4	145	105	2 020	50.3
Peru	13.6	3.1	120	90	2 300	55.4
Bolivia	4.6	2.4	111	89	2 060	51.8
Paraguay	2.4	3.4	123	92	2 520	63.3 (60-62)
Chile	9.8	2.3	115	92	2 720	77.8
Argentina	24.3	1.5	115	97	3 130	87.6
Uruguay	2.9	1.2	107	94	3 140	111.7
Brazil	93.0	2.8	137	102	2 700	66.5
Latin America	283	2.9	134 [b]	100 [b]	2 420	58.0
Canada	21.4 [c]	1.5 [c]	138 [a]	115 [a]	3 180	95.4

1 *World Population Data Sheet : 1970.* Population Reference Bureau, 1970.
2 Based on data from *The Agricultural Situation in the Western Hemisphere : Review of 1969 & Outlook for 1970.* U.S. Dept. of Agriculture. Economic Research Service. Washington, D.C. : 1970. Table 2.
3 *FAO Production Yearbook : 1969, op. cit.,* Table 136.
4 *Ibid.,* Table 137.
a 1966-68. (1957-59 = 100) Based on data from *FAO Production Yearbook : 1969* Tables 10, 12.
b Except Cuba.
c Computed from Demographic Yearbook : 1969. UN Dept of Economic and Social Affairs : 1970. Table 4.

the most intensively utilized world regions). Generally in the post-World War II period the expansion of cultivated land in Latin America has kept pace with population growth as relentless population increments have necessitated the exploitation of new lands and the more intensive utilization of already occupied districts. This process has undoubtedly had deleterious effects as more marginal land is being placed under cultivation or more intensively utilized. Conservation measures that are applied are not of a high order and subsequently a serious danger results as a consequence of land and soil damage that may be irreparable.

Agricultural densities are greatest in Latin America especially in the Caribbean and the Andean countries (Table 4). In certain major countries, e.g., Peru and Colombia, densities are fairly comparable to those prevailing in the Orient, the region with greatest population pressure on the arable land. When yields are taken in account when computing agricultural densities (e.g., arable land-yield density) many Latin American countries improve relative to other underdeveloped regions because of the former's somewhat higher present productivity.

Trends in Agricultural Productivity

As indicated previously, Latin American agricultural production has been increasing at a rate approximating the population increment (3 per cent annually). Although agricultural expansion has been sporadic, nevertheless the overall rate of growth is impressive on an absolute basis. Cereals comprise approximately 56 per cent of Latin America's cultivated land (excluding mid-latitude & citrus fruits, and palms) and, therefore (as in all world regions) comprise easily the most important category of cultivated plants. In the period between 1948/52 and 1966/67 the area harvested in cereals increased by nearly three-fifths (almost identical to the region's population growth) while production was augmented by nearly two-thirds. This was a result of an increase of about one-quarter in the overall cereal yields in that decade and a half. The consequence is that in Latin America more than half (57 per cent) of the increment in production was the result of the expansion of the cultivated area rather than increase in yields. Only the Middle East in the same period relied to a greater degree on augmenting cultivated area as a solution to the demand for increased agricultural output. On the other hand, the developed regions have been relying almost exclusively on improving yields as the major factor in expanding agricultural production. Despite an increase in yields in Latin America, the region, like the other underdeveloped areas, has been falling progressively behind that of the developed regions in agricultural yields. In the case of maize, easily Latin America's leading crop by acreage (32 per cent of the total), yields in 1948/52 amounted to two-thirds of the world's average but by 1966/67 maize yields had declined by 11 percentage points to 57 per cent of the world average.

At present perhaps only one-twentieth of Latin America's arable land is under irrigation (Table 4). Some of the arid and subhumid countries (Peru,

Table 4

LATIN AMERICA : Agriculture Characteristics

	Arable Land (th ha)	*Cereal Yields (1967-68) (100 kg/ha)*	*Arable Land-Yield Density a*	*Irrigation (clate 1960s) (% of Arable Land)*	*Tractors/1000 Km Arable Land*	*Kg/ha) (1968)* [3] *(Kg/ha) (1968)*
Mexico	23 817	14.0	177.2	14.8	261.9	21
Guatemala	1 498	8.9	529.3	2.1	1.2	28
Salvador	648	12.6	507.8	n.a.	212.1	80
Honduras	823	9.2	441.8	8.0	48	27
Nicaragua	873	10.5	275.8	3.3	93.3	36
Costa Rica	622	18.1	202.6	4.2	1 585.1	115
Panama	564	10.3	308.9	2.5	61.5	23
Cuba	2 044	13.0	395.5	24.1	455.	214
Dominican Rep.	1 067	20.3	229.8	10.3	281.5	22
Haiti	370	7.4	1 864.9	11.4	75.9	7
Puerto Rico	244	9.2	1 989.3	16.0	1 743.0	
Venezuela	5 214	12.3	195.5	4.2	573.6	11
Colombia	5 047	14.5	345.1	4.5	466.4	130
Ecuador	2 596	7.8	460.9	17.8	66.8	26
Peru	2 625	15.7	478.2	41.1	279.3	30
Bolivia	3 091	10.0	160.1	2.1	5.8	1.1
Paraguay	947	11.9	314.3	n.a.	144.8	1.5
Chile	4 511	19.5	162.4	24.5	404.6	30
Argentina	33 007	14.6	80.4	5.0	500.0	1.9
Uruguay	1 957	8.4	274.4	2.1	1 236.9	25
Brazil	29 760	13.18	291.7	1.6	345.0	18
LATIN AMERICA	122 000	13.7	262.9	5.0	432.3	20
Canada	43 404	16.2	46.8	0.8	1 313.9	23

1 Based on data from *FAO Production Yearbook : 1969, op. cit.*, Tables 1, 2; 24, 25, 140, 142, 144, 145.

a Number of inhabitants per square kilometer of arable land divided by the ratio of cereal yields obtained to the average world cereal yields.

Chile, Mexico) have proportions about three times greater but also some humid countries have also a relatively large share of arable land under irrigation, e.g., Cuba, Ecuador, Puerto Rico, and Hispaniola. Increasing areas are being brought under irrigation but considerable increases in the future will be necessary in order to obtain the high yields inherent in the newer crop varieties.

The increasing use of fertilizer and the mechanization of agriculture are proceeding at a rapid pace in Latin America. Latin America already uses about as much fertilizer per unit of cropland as does Canada but much less than is typical of either the USA of Europe. In mechanization (i.e. tractors as a basic unit of measure) there are still more tractors in Canada despite Latin America having about three times the arable land. However, tractors are an increasing element in the rural countryside of much of Latin America.

The « Green Revolution »

A great potential and a reservoir of hope for the afflictions of the underdeveloped agricultural societies are the prospects of the *green revolution.* During the past decade or so rapid progress in plant genetics has resulted in the development of high-yielding cereal varieties and the application of the new agricultural technology on an increasing scale in the underdeveloped world during the past 3 years. Mexico, where much of the basic research and experimentation was performed has clearly shown the most dramatic improvement in agricultural yields in Latin America especially since the early 1950s. Mexico's yield of wheat (the first cereal to undergo rapid transformation) tripled in the period between 1948/52 and 1968 while rice and maize increased, respectively by 50-60 per cent. Mexico in recent years has not only become self-sufficient in maize, wheat, and rice, but has actually begun the exportation of these cereals. Except for wheat, these rates of increase were more than equalled in the USA in the same period. However, this does represent a major breakthrough for the underdeveloped countries.

There are truly great advantages that the « green revolution » heralds, viz., increased yields and farm income (sometimes a several-fold increment per hectare), shorter growing season and prospects of double cropping, resolution of the problem of food scarcity and all at a cost only marginally greater than with conventional seeds. However, equally important is that the new seed varieties require greater amounts of water and fertilizer to reap the added benefits. [4] Nevertheless, net income will still be significantly higher but larger capital outlays and improvements (which could be beyond the means of many farmers) will be necessary. Furthermore improvement in marketing facilities and transportation and mechanization are necessary to

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[4] BROWN, Lester R., *Seeds of Change : The Green Revolution & Development in the 1970's,* Praeger Publishers, 1970, 205 pp.

BORLAUGH, Norman E., « The Green Revolution, Peace & Humanity », *PRB Selection,* No. 35, Jan. 1971, 8 pp.

handle the larger volume of production. In addition, acceptance of these changes (as with the changes wrought by the medical/health revolution) may certainly stimulate changes in attitudes and policies toward education, political participation, pressure for land and agrarian reforms, and family planning.

At the time of rapidly increasing population in Europe during the 19th century, the solution, although a temporary one, was emigration which permitted European societies to bring in fertility control after the dramatic decline of mortality. It appears that perhaps the « green revolution » (so far a dramatic breakthrough primarily in the cereals) will provide Latin America and the other underdeveloped regions with the time lag they need between implementation of death control and that of birth control.

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