



# AGRICULTURAL PROSPECTS IN CENTRAL AMERICA

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This report is a brief review of the Projections of Supply and Demand for Agricultural Products in Central America Through 1980, a market development study conducted by the Battelle Memorial Institute of Columbus, Ohio, under contract with the U.S. Department of Agriculture. <sup>1/</sup> The study is one of a series initiated by the USDA and designed to evaluate the long-term potential supply and demand for agricultural products throughout the world. Data used as a basis for projections are in greater part from Central American sources. However, because of the scarcity of statistical material in the region, some extraregional data had to be used. Study results expressed herein do not necessarily reflect the views of the U.S. Department of Agriculture.

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Central America, as defined in this study, comprises Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, British Honduras, and Panama. The first five belong to the Central American Common Market (CACM), which aims at an economic integration of the region through the promotion of intraregional trade and the stimulation of economic development. The other two countries, British Honduras and Panama, are closely associated economically with the CACM countries. Significant progress has been made within the region towards the achievement of the CACM objective. Local production and intraregional trade have increased considerably. However, because of fast-growing population, the region may have to continue to rely on imports to satisfy much of its demand for food.

In 1965 the population of the seven countries was estimated at over 13.9 million, about 63 percent of which resided in rural areas. The people are concentrated heavily

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<sup>1/</sup> The complete study may be obtained on request from the Division of Information, Office of Management Services, U.S. Department of Agriculture, Washington, D.C. 20250

along the Pacific slopes and in the central highlands of Guatemala. The economy of the region is predominantly agricultural because of the limited natural resources for developing manufacturing industries. Modern production practices have been widely applied to the cultivation of export crops, but other crops are grown mostly on subsistence farms that have limited access to the markets. However, the region offers good prospects for diversification of crops and further development of beef production. Corn remains the staple food item in Guatemala, Honduras, El Salvador, and Nicaragua, and rice in Panama, British Honduras, and Costa Rica. Wheat is an important food item in Costa Rica and Panama, but is also consumed in the other countries. In all countries, beans are the second staple food item. Bananas, sugar, coffee, and cotton are the principal exports and sources of foreign exchange, but exports of beef have also become important in the last decade. The region has been and will probably remain an importer of wheat, milk, and eggs. Most of these imports come from the United States.

### Study Highlights

The study shows that rapid population growth and some increase in per capita income will continue to increase the demand for agricultural products. The increasing urbanization may further strengthen this trend. However, the improvement in agricultural production may not be sufficient to compensate for the increased demand.

If the population of the region continues to grow at a rate of about 3.5 percent per year, larger imports may be expected in 1980 for wheat, corn and sorghum, beans, poultry meat, milk, eggs, and tobacco. A growing deficit is also projected for beef and plantains, but this may be due to statistical deficiencies of production data. It is highly unlikely that the region will import either beef or plantains. Production and consumption should balance for vegetables, fruits, and potatoes, and some exportable surpluses of rice, vegetable oils and pork may occur. Increased exports are projected for most traditional export crops.

These projections are based on the analysis of domestic production and demand during the last 2 decades, and of such factors as investments in different economic sectors, total and per capita gross domestic product (GDP), population growth, degree of urbanization, and the influence of the CACM on the economy of the region. High, medium, and low population projections, reflecting the growth rates of 3.9, 3.5, and 3.1 percent per year, respectively, were made. The region's population is expected to increase to over 23.2 million by 1980. As the rate of growth of urban population is much faster than that of rural population, urban population is projected to increase from 37 percent of the total in 1965 to 44 percent in 1980 (table 1). Real GDP is expected to grow between 1965 and 1980 at the rate of 5.6 percent per year, and per capita real GDP at the rate of 2.1 percent, or from \$299 to \$404 (table 2).

### Projected Trade

Imports of wheat into the region are projected to increase from the 1962-64 average of 245,000 metric tons to about 475,000 metric tons in 1980 (table 3). For corn, the situation is not very clear. Medium projections indicate a deficit of 176,000 metric tons. But this deficit could be eliminated and some exportable surplus produced if the population growth slows down or decisive steps are taken to increase the corn area and its yields. Small imports of sorghum in the base period are projected to increase by 1980 to over 100,000 tons.

For animal products, the biggest import is projected for milk-- from over 100,000 metric tons in the 1962-64 period to about 466,000 metric tons in 1980. However, recent improvements in milk production indicate that this projected deficit may be too high. Also, the small imports of eggs in the base period will increase to some 33,000

Table 1.--Population in Central America, 1965 estimates and medium projections to 1970 and 1980

Country	1965	1970	1980	Annual growth rate 1965-1980
	-Thousands-			Percent
British Honduras:				
Urban. . . . .	60	74	113	4.3
Rural. . . . .	48	56	77	3.2
Total . . . . .	<u>108</u>	<u>130</u>	<u>190</u>	<u>3.8</u>
Costa Rica:				
Urban. . . . .	502	621	941	4.3
Rural. . . . .	944	1,140	1,650	3.8
Total . . . . .	<u>1,446</u>	<u>1,761</u>	<u>2,591</u>	<u>4.0</u>
El Salvador:				
Urban. . . . .	1,160	1,450	2,125	4.1
Rural. . . . .	1,761	2,074	2,707	2.9
Total . . . . .	<u>2,921</u>	<u>3,524</u>	<u>4,832</u>	<u>3.4</u>
Guatemala:				
Urban. . . . .	1,512	1,932	3,141	5.0
Rural. . . . .	2,904	3,209	3,910	2.0
Total . . . . .	<u>4,416</u>	<u>5,141</u>	<u>7,051</u>	<u>3.2</u>
Honduras:				
Urban. . . . .	684	859	1,367	4.8
Rural. . . . .	1,479	1,724	2,357	3.1
Total . . . . .	<u>2,163</u>	<u>2,583</u>	<u>3,724</u>	<u>3.7</u>
Nicaragua:				
Urban. . . . .	699	901	1,438	4.9
Rural. . . . .	964	1,110	1,417	2.6
Total . . . . .	<u>1,663</u>	<u>2,011</u>	<u>2,856</u>	<u>3.7</u>
Panama:				
Urban. . . . .	559	700	1,090	4.6
Rural. . . . .	634	708	875	2.2
Total . . . . .	<u>1,193</u>	<u>1,408</u>	<u>1,965</u>	<u>3.4</u>
Central America:				
Urban. . . . .	5,176	6,537	10,215	4.8
Rural. . . . .	8,734	10,021	12,993	2.7
Total . . . . .	<u>13,910</u>	<u>16,558</u>	<u>23,209</u>	<u>3.5</u>

Source: Tables 3, 5, and 6. Projections of Supply and Demand for Agricultural Products in Central America Through 1980.

metric tons in 1980. Some imports of poultry meat and probably of animal fats and tobacco may also be expected. For beef, medium projections show the export of 10,000 metric tons in the base year turning into a possible deficit of 19,000 tons in 1980. Actually, however, 1962-64 exports were almost 30,000 tons. It appears more likely that the region will maintain this level of exports through 1980 since the domestic consumption of beef is not expected to increase significantly.

Table 2.--Gross domestic product in Central America at 1963 market prices, 1965 and projections to 1970 and 1980

Country	Total			Annual	Per capita <u>1/</u>			Annual
	1965	1970	1980	rate of growth <u>2/</u>	1965	1970	1980	rate of growth <u>2/</u>
	: Million US dollars			: Percent	: US dollars			: Percent
British Honduras. . . . .	40	57	159	9.3	370	438	837	5.2
Costa Rica. . . . .	541	664	969	4.2	374	377	374	0.3
El Salvador . . . . .	760	1,048	2,001	6.7	260	297	414	3.1
Guatemala . . . . .	1,286	1,619	2,579	4.7	291	315	366	1.6
Honduras. . . . .	477	612	1,182	6.0	221	237	317	2.3
Nicaragua . . . . .	491	617	1,203	5.8	295	307	421	2.0
Panama. . . . .	569	746	1,288	5.6	472	530	655	2.1
Central America total . . . . .	4,164	5,363	9,381	5.6	299	324	404	2.1

1/ Based on medium population projections. 2/ Between the average of the last 3 years available and 1980.

Source: Tables 10 and 11. Projections of Supply and Demand for Agricultural Products in Central America Through 1980.

In other commodities, the region will probably be self-sufficient or produce a small exportable surplus of rice, vegetable oils, and potatoes.

The list of principal exports is expected to remain the same throughout the projection period. But sugar exports are projected to increase from the average of 178,000 tons during the 1962-64 period to 437,000 tons in 1980; coffee bean exports from 291,000 tons to 384,000 tons, and cotton lint exports from 214,000 tons to 365,000 tons. The exportable surplus of bananas will probably remain at the level of over one million tons.

The study does not analyze the potential U.S. trade or the probable U.S. share of the Central American foreign trade. However, the development of CACM and the program for strengthening ties with the Latin American Free Trade Area (LAFTA) will tend to restrict the entry of some U.S. exports into the region. This trend has already affected adversely imports of cotton from the United States and in the future may affect grain imports.

#### Projected Demand

For each of the projected years 1970, 1975, and 1980, two sets of demand projections were made from the established base year of 1962. One set of three projections assumed constant per capita consumption and high, medium, and low population rate of growth. The second set of three projections was based on the three population projections and per capita consumption taking into account the effect of rising incomes. Thus, for most commodities there are six demand projections. Total demands for each commodity arrived at in this way include human consumption, feed, seed, and waste. This summary concentrates on the effects of projections based on medium rate of population growth and per capita consumption changing with rising incomes. For all projections, prices were assumed to remain constant (tables 3 and 4).

Table 3.--Production, consumption, and trade balance of selected agricultural products in Central America, 1962-64 and projections to 1970 and 1980

Products	1962-64			1970			1980		
	Production	Consumption <u>1/</u>	Balance <u>2/</u>	Production	Consumption <u>3/</u>	Balance <u>4/</u>	Production	Consumption <u>3/</u>	Balance <u>4/</u>
-----1,000 metric tons-----									
Cereals and other starchy products:									
Wheat <u>5/</u> . . . . .	28	273	-245	36	347	-311	49	524	-475
Rice (milled). . . . .	177	188	-11	229	224	+5	336	324	+12
Corn . . . . .	1,407	1,425	-18	1,776	1,839	-63	2,528	2,704	-176
Sorghum grains . . . . .	213	214	-1	239	265	-26	287	390	-103
Beans . . . . .	149	152	-3	186	194	-8	280	287	-7
Potatoes . . . . .	41	39	+2	52	48	+4	75	70	+5
Plantains . . . . .	223	223	--	<u>6/</u> 302	400	+98	<u>6/</u> 465	590	-125
Vegetable oils <u>7/</u> . . . . .	<u>8/</u> 74	<u>8/</u> 76	-2	94	50	+29	114	79	+35
Meats and other animal products:									
Beef . . . . .	<u>9/</u> 131	<u>9/</u> 121	<u>9/</u> +10	172	179	-7	269	288	-19
Pork . . . . .	<u>9/</u> 39	<u>9/</u> 39	...	45	35	+10	62	55	+7
Poultry meat <u>10/</u> . . . . .	<u>11/</u> 21	<u>11/</u> 22	<u>11/</u> -1	32	30	+2	39	50	-11
Milk <u>12/</u> . . . . .	<u>9/</u> 1,101	<u>11/</u> 976	...	1,262	1,341	-79	1,584	2,050	-466
Eggs . . . . .	<u>13/</u> 45	<u>11/</u> 45	...	53	70	-17	73	106	-33
Animal fats and oils . . . . .	<u>11/</u> 16	<u>11/</u> 22	<u>11/</u> -6	...	31	...	...	48	...
Export products:									
Sugar . . . . .	507	329	+178	696	536	+160	1,248	811	+437
Bananas . . . . .	1,943	903	+1,040	2,500	1,212	1,288	2,800	1,781	+1,019
Coffee beans . . . . .	332	41	+291	416	54	+362	470	86	+384
Cotton lint . . . . .	255	41	+214	343	53	+290	439	74	+365
Tobacco (unmanufactured). . . . .	12	13	-1	14	17	-3	17	24	-7

1/ Actual disappearance. 2/ Net trade: plus (+) indicates net exports and minus (-) indicates net imports. 3/ Projected on the basis of medium population projections and per capita consumption taking into account income effects. 4/ Plus (+) indicates export availability and minus (-) indicates import requirements. 5/ Includes wheat flour in wheat equivalent. 6/ Costa Rica and Honduras only. 7/ Include cottonseed, African palm, sesame seed, soybean, coconut, and olive oils. 8/ Probably overestimated. 9/ 1963-65. 10/ Chicken only. 11/ 1962 only. 12/ Evaporated, condensed, dried, and fresh in fluid equivalent. 13/ 1964-65. -- Nil or less than 500 tons. ... Not available.

Sources: Tables 16-22, 25-29, 31-34, 37, 39, 41, 43-45, 48-50, 51, 53, 58-76, C-2, F-1, F-2. Projections of Supply and Demand for Agricultural Products in Central America Through 1980.

Table 4.--Income demand elasticities and rates of growth of demand and supply of selected agricultural products in Central America

Product	Demand elasticity coefficient <sup>1/</sup>	Annual compound rates of growth	
		Demand <sup>2/</sup> 1962-1980	Supply <sup>3/</sup> 1962/64-1980
Wheat. . . . .	.29	4.1	3.3
Rice . . . . .	.13	3.8	3.9
Corn . . . . .	.18	4.0	3.5
Sorghum grains . . . . .	.18	3.8	1.8
Beans. . . . .	.18	3.5	3.8
Potatoes . . . . .	.05	3.3	3.7
Plantains. . . . .	.18	3.9	4.4
Vegetable oils . . . . .	.51	4.5	2.3
Beef . . . . .	.59	4.7	4.6
Pork . . . . .	.47	4.3	2.9
Poultry meat <sup>4/</sup> . . . . .	.77	4.7	3.7
Milk . . . . .	.34	4.2	2.3
Eggs . . . . .	.69	5.1	3.0
Animal fats and oils . . . . .	.40	4.4	...
Sugar. . . . .	.29	4.1	5.4
Bananas. . . . .	.18	3.9	2.2
Coffee beans . . . . .	.48	4.0	1.2
Cotton . . . . .	...	3.5	3.3
Tobacco. . . . .	...	3.7	2.4

<sup>1/</sup> Elasticities used in the study and taken from "Agricultural Commodities--Projections for 1975 and 1980," Vol. II, Food and Agriculture Organization of the United Nations, Rome, 1967. <sup>2/</sup> Calculated on the basis of medium population projections and per capita consumption taking into account income effects. <sup>3/</sup> Used in the study. <sup>4/</sup> Chicken only. ... Not available.

Source: Tables 16-22, 24-28, 31-34, 37, 39, 41, 43-46, 48-51, and 58. Projections of Supply and Demand for Agricultural Products in Central America Through 1980.

The changes in demand that were projected through 1980 for the commodities included in the study are expected to be influenced by population growth and to a lesser extent by changes in incomes and progressing urbanization. The total demand is expected to increase substantially. Per capita demand will also increase for most commodities. The fastest rate of increase is expected for all animal products, vegetable oils, wheat, sugar, and vegetables. However, corn and beans are likely to remain the basic diet items. The projected overall changes are expected to remain relatively modest and not affect seriously the present pattern of demand. Even under the most favorable assumption of low population growth and increased per capita consumption due to increased incomes, dietary deficiencies among most of the region's population are unlikely to be eliminated during the projected period.

#### Projected Supply

Supply projections for crops were based on the analysis of production, area, and yields and for animal products on historical data on inventory numbers, slaughter rate,

and yields. These trends were then modified by the analysis of potential markets for the commodities and Government plans. An analysis of available croplands and pastures and projections of cultivable and harvested lands to 1980 were also made.

Table 5.--Area harvested and yields of principal crops in Central America, 1962-64 and projections to 1970 and 1980

Crops	Area harvested			Annual	Yields			Annual
	1962-64	1970	1980	rate of	1962-64	1970	1980	rate of
	1,000 hectares			Percent	Kilograms per hectare			Percent
Wheat. . . . .	37	38	41	0.6	738	924	201	2.7
Rice <u>1/</u> . . . . .	220	262	335	2.5	1,239	1,350	1,541	1.3
Corn . . . . .	1,569	1,658	1,855	1.0	896	1,072	1,363	2.5
Sorghum grains : . . . . .	225	244	275	1.2	949	978	1,052	0.6
Beans. . . . .	301	348	428	2.1	494	534	653	1.7
Sugar <u>2/</u> . . . . .	131	149	178	1.8	49,600	56,100	70,000	2.1
Coffee . . . . .	<u>3/</u> 645	731	742	.1	500	569	634	1.2
Cotton <u>4/</u> . . . . .	323	425	500	2.6	787	807	878	.7
Tobacco. . . . .	16	18	20	1.3	725	813	886	1.2

1/ Rice yields in unhusked form. 2/ Cane yields. 3/ Estimated. 4/ Lint yields.

Source: Tables 31-34, 37, 39, 41, and 44. Projections of Supply and Demand for Agricultural Products in Central America Through 1980.

Table 6.--Livestock numbers and yields of livestock products in Central America, 1963-65 and projections to 1970 and 1980

Livestock	1963-65	1970	1980	Annual rate of growth
<b>Beef cattle:</b>				
Number of cattle (1,000 head). . . . .	7,274	8,436	11,101	2.7
Number slaughtered (1,000 head). . . . .	900	1,148	1,711	4.1
Yield (kg. beef per animal slaughtered). . . . .	145.4	149.5	157.2	0.5
<b>Pork:</b>				
Number of hogs (1,000 head). . . . .	2,224	2,460	2,912	1.7
Number slaughtered (1,000 head). . . . .	763	852	1,133	2.5
Yield <u>1/</u> (kg. meat per animal slaughtered). . . . .	51.6	52.5	54.5	.4
<b>Chickens:</b>				
Number of chickens (1,000 head). . . . .	<u>2/</u> 18,700	20,939	25,861	2.1
Number of laying hens <u>3/</u> (1,000 head). . . . .	11,781	13,192	16,292	2.1
Yield <u>3/</u> (eggs per laying hen) . . . . .	65	68	75	.9

1/ Estimated on the projected increase in live animal weights from 79.4 kg. in 1963-65 to 80.7 kgs. in 1970 and 83.9 kgs. in 1980. Edible pork production was taken as 65 percent of live animal weight. 2/ 1964 only. 3/ Estimated at 63 percent of the total number of chickens.

Source: Tables 46, 49, and 50. Projections of Supply and Demand for Agricultural Products in Central America Through 1980.



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The greatest increases in production were projected for sugar, plantains, beef, poultry meat, beans, rice, and corn. For sugar and beans the increase is expected to be due to the expansion of area and the increase in yields (table 5). Rice is expected to benefit from the expansion of cultivated area and corn from substantial improvement of yields due to the application of fertilizers. The increase in cotton production from 255,000 metric tons in 1962-64 to 439,000 tons in 1980 (table 3) or at 3.3 percent per year seems unrealistically high. Current production is below the 1962-64 average and while yields may follow a modest uptrend, projected area expansion of 2.6 percent per year (table 5) may be difficult to achieve. The increase in beef production will be due to improving quality of herds and higher output of meat per head. Some improvement in the production of chicken meat and eggs is also expected through gains in production efficiency (table 6). Thus, some improvement in the supply position is expected, but demand will tend to outrun the supply of most commodities unless the rate of population growth declines or farming techniques improve radically.

#### Some Study Implications

Supply and demand projections for Central America indicate that the region possibly can become self-sufficient in agricultural production, except for wheat. It also has a potential of producing agricultural surpluses for export in addition to beef and the traditional export commodities. However, this seems unlikely to happen throughout the projected period. The chief obstacles to self-sufficiency are the relatively high rate of population growth and antiquated farming practices in many agricultural sectors. At the same time, the modernization of the agricultural sector is hampered by limited markets due to low incomes and limited transport facilities.

Some improvements have been introduced in the marketing situation through CACM agreements as they promote intraregional trade and coordinate investment policies. This trend is expected to be further strengthened. At the same time, however, it will be increasingly difficult for other countries to export into the region those commodities that can be produced locally. Still, the region will remain a market for such U.S. exports as milk, and, to a decreasing rate, wheat, corn and sorghum, and eggs. On the side of regional exports, no significant changes are expected.

In general, as newer and better data on the rates of population growth become available, the study will probably be most useful as a background for formulating future regional agricultural policies.