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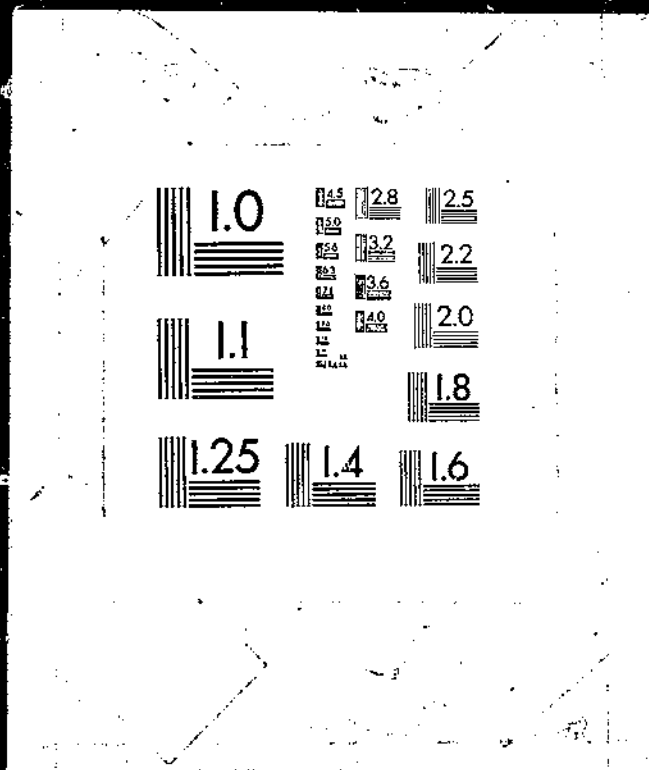
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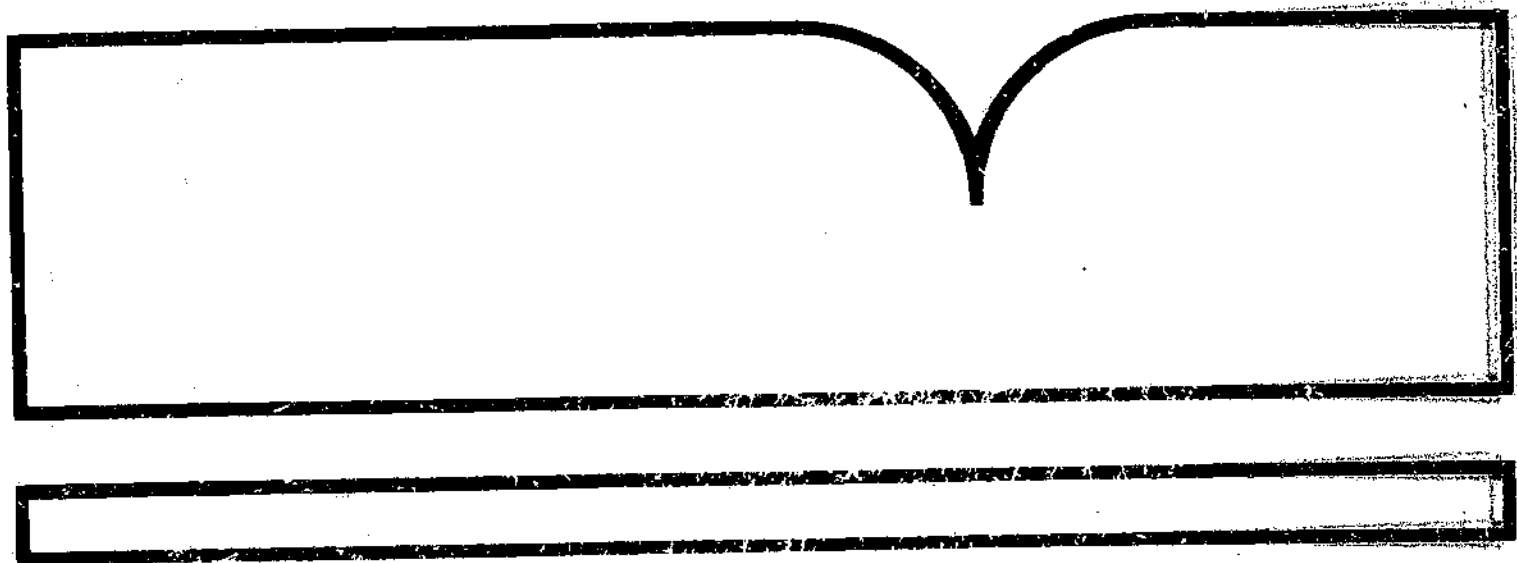


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# Agricultural Progress in Ecuador, 1970-82

Samuel Ruff



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## **Abstract**

The petroleum bonanza that transformed Ecuador's economy after 1970 increased per capita income and funded agricultural development. Higher incomes increased demand for foods which had to be filled by imports, most of which came from the United States. The United States was the major market for expanding agricultural exports. Production of export-oriented crops—cocoa, bananas, and coffee—was stimulated by high world prices and government renovation policies. Imported breeding cattle and growth of a poultry industry sharply increased livestock production. Projects were begun to irrigate the large areas in the coastal plain in the eighties.

**Keywords:** Agriculture, bananas, cattle, cocoa, coffee, Ecuador, imports, irrigation, petroleum, rice, sugar, trade.

**Cover:** Extension agent visiting farmer in Pichincha Province who is taking part in a program to increase production of corn, barley, and other crops.  
**Photo:** *Inter-American Development Bank.*

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## Preface

This report, originally requested by the U.S. Embassy in Quito, documents the changes and progress made in Ecuadorian agriculture. It is intended for use by exporters, members of the farm community, economists, policymakers, and Government officials in the United States and Ecuador.

The reader should be aware of the sources of the estimates. While there are many, the primary source is the U.S. Department of Agriculture (USDA), which maintains an agricultural attache in Quito. The USDA has considerable confidence in the attache's data as the statistics are justified in terms of trade, production, and consumption. However, they often differ from those of the Government of Ecuador.

For the reader who has further interest in Ecuador's agriculture, indispensable Government sources are the annual production statistics of the *Ministerio de Agricultura y Ganaderia* and the trade statistics of the *Anuario de Comercio Exterior*. The statistics of the former are the only source of area and production statistics by Province. They appear to be somewhat higher than those of USDA. The last USDA publication devoted to Ecuador, *Agricultural Production and Trade of Ecuador*, ERS Foreign Report 218, by Ety Leiserson, was published in 1968. The most recent of two World Bank country studies on Ecuador was published in July 1979. Its comprehensive coverage of Government institutions involved in agriculture is especially useful. The Inter-American Development Bank has generously shared its unpublished research; for example, the annual studies by Conrad Gislason and Wayne Ringlien. The Five-Year National Development Plan 1979-1984, prepared under President Osvaldo Hurtado during his tenure as vice president, provided a perspective on the decline of hacienda agriculture since 1950 under the impact of capital and commercial agriculture. Finally, a vivid picture of the competition in the political process among different economic groups before the advent of the petroleum bonanza is provided by L.A. Brownrigg in "Interest Groups in Regime Changes in Ecuador" (*Inter-American Economic Affairs*, Vol. 28, Summer 1974).

**Note.** Additional data on U.S. exports to Ecuador, Ecuador's exports, and production of bananas, livestock, and other principal commodities, developed for this study, are available on request from the Latin America Branch, IED, Economic Research Service, U.S. Department of Agriculture, Washington, D.C. 20250.

## Author's Acknowledgments

I am especially indebted to Milton Anderson of the Foreign Agricultural Service who, as the attache in Quito during the early seventies, was practically a pathfinder. He accompanied me on a field trip through the upper Sierra and arranged a similar trip through the Guayas River basin and reviewed an early draft of this report. I would also like to thank subsequent attaches Lloyd I. Holmes, W. Lynn Abbott, and Leonidas Bill Emerson for their help, especially with trade publications and statistics.

A share of the credit goes to Linda Turner, Norma Giron, Denise Sanchez, and Delores Riley, for secretarial support provided with patience and professionalism through several revisions and publication.



## Contents

	<i>Page</i>
<b>Summary</b> .....	iv
<b>Some Basic Facts About Ecuador</b> .....	vi
<b>Introduction</b> .....	1
<b>Background</b> .....	1
<b>The Development of Agriculture</b> .....	2
Ecuador's Two Agricultural Zones .....	2
Influence of Demand .....	3
Government Role .....	3
<b>Crop Production and Use</b> .....	9
Bananas .....	9
Rice .....	11
Coffee .....	12
Cocoa .....	14
Sugarcane .....	16
Cotton .....	17
Vegetable Oils .....	18
Abaca .....	20
Tobacco .....	21
Fruit .....	21
Plantains and Cassava .....	22
Wheat .....	22
Potatoes .....	23
Corn .....	23
Barley .....	25
<b>Livestock Production and Use</b> .....	26
Cattle and Beef .....	27
Dairy Cows .....	27
Swine .....	27
Sheep .....	28
Poultry .....	28
<b>Agricultural Trade</b> .....	28
Major Agricultural Exports .....	28
Minor Agricultural Exports .....	34
Agricultural Imports .....	36
Trade with the United States .....	38
<b>The Future of Agriculture</b> .....	39

## Summary

Ecuador used oil export earnings to promote rapid development of agriculture in the seventies and to begin long-term irrigation and other rural projects that are likely to bear fruit through the eighties. The United States remained Ecuador's major trading partner for agricultural exports and imports that increased manyfold during the seventies.

Completion of an oil pipeline in 1972 transformed Ecuador's economy, bringing rapid gains in personal incomes, consumption, and exports. Oil exports, valued at \$1.5 billion in 1982, replaced farm products as the leading export.

With better incomes, Ecuadorians increased their consumption of wheat bread, refined sugar, vegetable oils, beef, and poultry, while eating less potatoes, rice, grains, and unrefined sugar. Rapid population growth and urbanization have magnified the effect of these changes on domestic food demand.

The Government has emerged as a far stronger support for agriculture than was possible in 1970, strengthening policies, institutions, and infrastructure favoring agriculture. The Ministry of Agriculture, reorganized several times, became the focal point for development of domestic food production. Other institutions were strengthened or created to provide credit, marketing, storage, research, and irrigation and rural development schemes.

Initial Government policies focused on production credit and minimum farm price assurances to increase output of domestically used food, feed, and fiber crops. Government purchases of part of the harvest help to support minimum prices and to provide better returns for small producers who formerly sold their surplus to local entrepreneurs.

Farmers in Ecuador's two agricultural zones have responded differently to these incentives. The Costa region between the Andes and the Pacific Ocean, endowed with good soils, open land, and abundant water, rapidly increased output of rice, vegetable oil, cotton, and hard (feed) corn. In the Sierra, or high-altitude intermont basins of the Andes, farming is constrained by limited land area, soils, rainfall, and traditional methods. With imported wheat abundant, the Sierra's output of potatoes, wheat, barley, and soft (food) corn fell. Production of some export crops continued to shift from the Sierra to the Costa, which is better suited to mechanization, commercial-scale

farming, and the controlled fertility and water demanded by high-yielding varieties.

With Government support, production of rice, cotton, and hard corn rose fast enough to catch up with rapidly increasing consumption, minimizing need for imports. The upsurge in demand for refined sugar was satisfied by curbing sugar exports. Large vegetable oil imports were required even though production of vegetable oils—primarily palm kernel and soybean oils—tripled.

Ecuador's primary food import is wheat. Wheat imports rose from 65,000 tons in 1970 to 324,000 tons in 1981 as wheat bread, heavily subsidized by the Government, became a favored staple.

Substantial expansion in pasture area enabled Ecuador to undertake an ambitious livestock repopulation and improvement program, importing 30,000 head of improved breeding cattle, as well as desirable breeds of dairy cattle and sheep. In the late seventies, however, drought and increased slaughter reversed earlier gains in cattle numbers. Drought and low prices had a similar effect on milk production. A booming poultry industry developed in the Quito area, and chicken production exceeded that of pork by the decade's end.

When world prices of bananas, coffee, and cocoa shot up in the second half of the seventies, a policy of shifting land from export crops to food crops and pasture was replaced by vigorous efforts to increase production of export crops through renovation of existing plantations, introduction of improved or preferred varieties using seedlings and clones propagated at Government research institutions, and lifting of most export taxes. Subsidies and preferential taxes boosted domestic processing and export of cocoa products, and to a lesser extent, soluble coffee and molasses, although some excess processing capacity was constructed.

Ecuador's agricultural exports rose from \$174 million in 1970 to a record \$737 million in 1979, fueled by expanding production of tropical products and high world prices. Agricultural imports rose from \$19 million to \$154 million during these years to meet demand created by rapid growth in both population and incomes. The United States remained Ecuador's largest trading partner, buying about half of its farm exports and supplying from 60 to 85 percent of its imports during the seventies.

Bananas, coffee, and cocoa are Ecuador's principal farm exports; sugar exports have declined. Low banana production costs, immunity from the storms that sporadically damage bananas of Caribbean competitors, and refusal to impose export taxes make Ecuador a strong residual supplier to world banana markets. With sharp increases in both volume and unit values, coffee and cocoa exports led those of bananas in the late seventies. Planted area of coffee nearly doubled during 1975-81 after the Brazilian freeze triggered high prices. Coffee marketing cooperatives have increased returns for the small growers who predominate in coffee production. Ecuador responded to spiraling world cocoa prices with an extensive program to rejuvenate existing plantations that continues into the eighties. Most cocoa is now ground domestically and exported in product form.

With refined sugar production now geared to domestic consumers, exports have largely been limited to

fulfillment of the U.S. import quota. Sugar mills, which grow most of their own sugar and are major employers, were plagued by rising labor costs and controlled sugar prices in the late seventies.

As the eighties opened, Ecuador faced lower prices for its farm exports, slower economic growth and faster inflation, mounting external debt, a need to curb imports, and a leveling off of oil revenues.

However, the Government has maintained support for agriculture and work continues on major irrigation and rural development projects that will harness water for intensified, year-round farming and open large areas of potential cropland to cultivation. A 5-year development plan launched in 1980 allocated nearly \$800 million for rural development, including irrigation, direct investment in agriculture, roads, and health and education.

## **Some Basic Facts About Ecuador**

**Location**—Ecuador straddles the equator from which it derives its name. It is bounded on the west by the Pacific Ocean, on the north by Colombia, and on the east and south by Peru.

**Area**—109,481 square miles, including the Galapagos Islands' 3,075 square miles. Ecuador is about the size of Colorado, and is among the smallest countries of South America.

**Population**—Estimated at 8.81 million in 1981, with an average annual growth of 3.43 percent (1971-79).

**Ethnic composition**—40 percent Indian, 40 percent Mestizo (mixed), 10 percent Spanish, and 10 percent African.

**Principal cities**—Quito, the capital (population 807,665), and Guayaquil (1,116,280).

**Literacy**—75 percent (1975).

**Gross national product**—\$13.73 billion (1981).

**Major economic sectors in 1981**—Agriculture (14.4 percent of GNP), manufactures (18.7 percent), trade and hotels (16.2 percent), mining and petroleum (9.9 percent), government services (7.2 percent), finance (11.5 percent), construction (4.6 percent), transport, storage, and communication (6.8 percent), other (10.6 percent).

**Per capita income**—\$1,558 in 1981.

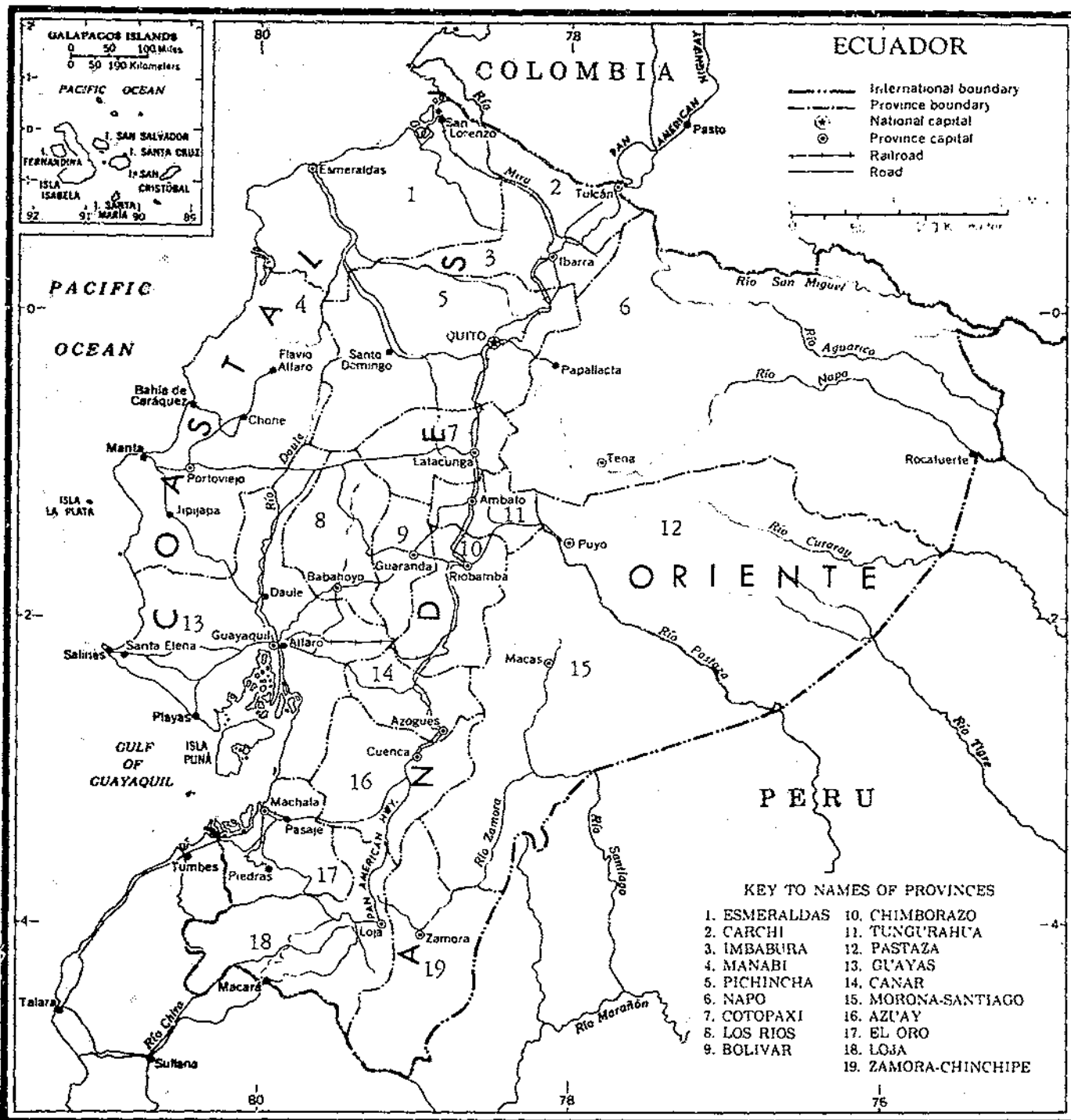
**Inflation**—The 1981 general price index was 371.7 (1970 = 100).

**Official rate of exchange**—1965-69: 1 U.S. dollar = 18 sucres; 1970-81: 1 U.S. dollar = 25 sucres; May 13, 1982: 1 U.S. dollar = 33 sucres.

### **Conversion Factors**

1 hectare = 2.47 acres  
1 kilogram = 2.20 pounds  
1 metric ton = 2,204.6 pounds  
1 hundredweight = 45.36 kilograms

All tons used in this report are metric.



U. S. DEPARTMENT OF AGRICULTURE

NEG ERS 5387-67(10) ECONOMIC RESEARCH SERVICE

# Agricultural Progress in Ecuador, 1970-82

Samuel Ruff

## Introduction

This report reviews the evolution of Ecuador's agriculture under the impact of economic changes since 1970. The two motive forces for change were the influx of petroleum revenue, which altered consumer demand, and the stimulus of soaring world prices for tropical products from the midseventies until the eighties. The Government was able to provide more effective financial backing for its new policies. The successes and failures of Ecuador's agricultural policies provide some insight into the development process and one country's efforts to diversify its agriculture.

The report begins with background on Ecuador's dual agriculture, the sharp changes in consumer demand of the past decade, and the strong role of the Government. Production trends for each major crop and livestock commodity are then discussed. A trade section follows with special emphasis on trade with the United States. The concluding section briefly discusses the future.

## Background

Ecuador, with a gross national product (GNP) in 1983 of \$14 billion, probably has one of the most viable economies in South America. Agriculture plays a vital role by supplying a major part of the food supply and by providing tropical products for an expanding export market. The United States, Ecuador's leading trade partner, has been a growing supplier of Ecuador's farm imports and purchaser of its tropical products.

The discovery of petroleum has had a considerable effect on agriculture. Completion of a pipeline in 1972 began the transformation of Ecuador's economy, raising per capita income from \$249 then to \$1,558 in 1981. Petroleum became the dominant export. Better income accelerated a shift in consumption from pota-

toes, rice, and panela (crude sugar) to more expensive wheat bread, refined sugar, poultry, and beef, and enabled Ecuador to pay cash for growing imports.

The Government, funded by petroleum revenue, reorganized the Ministry of Agriculture (MAG) and increased the funding of its institutions for marketing, research, extension, storage, and irrigation. It also funded the banks to provide agricultural credit. A second pivotal event was the unprecedented rise in prices of cocoa and coffee after 1975, which affected policies for these two crops.

Agricultural development centered on a program for irrigation of the good soils of the Costa region. These projects required heavy capital investment and a long period of gestation. Following an initial period of design, feasibility studies, and application for financing from international lending agencies, at least two large pilot irrigation projects were constructed. Full-scale projects slated for the eighties to irrigate some 27,000 square kilometers of the coastal region would increase the production capacity of the country enormously.

Agricultural exports were stimulated in the seventies by the agricultural development programs, although traditional exports were overshadowed by petroleum. In 1965-70, agriculture accounted for 88 percent of foreign exchange earnings. By 1974, crude petroleum exports reached \$527 million and agricultural products accounted for only 34 percent of total exports of \$1.04 billion. Although agricultural exports grew rapidly to \$734 million by 1982, petroleum exports grew faster to \$1.5 billion.

There is no guarantee that the petroleum resource will last indefinitely; the threat of possible depletion within 20 years makes development of agriculture doubly important. In any event, the upgrading of production capacities by year-round irrigation will be an invaluable investment should Ecuador again have to rely on agriculture for its exports.

Ecuador's exports of petroleum, tropical products, and seafood and growing imports give it a minor but respectable position in the world economy. Although Ecuador is a minor exporter of petroleum, its production of 200,000 barrels per day is roughly equal to that of neighboring Peru, Colombia, and Brazil. The Government scaled down initially ambitious plans in 1976 when the limits of petroleum resources became apparent and again after 1980 during the world recession. Debts of \$6.3 billion contracted by 1981 increased the debt-service ratio to 44 percent. Annual GNP growth, which had ranged between 6 and 9 percent prior to 1979, slacked off to 4-5 percent in 1981, while inflation increased to 15.7 percent.

Ecuador is an important market for U.S. farm products. The value of its imports from the United States grew from \$13 million in 1970 to \$106.5 million in 1982. This was 20 percent of the comparable sales to Brazil. Each of the major Ecuadorian tropical export products, bananas, coffee, cocoa, and sugar, enjoyed a period of high prices on world markets during the seventies.

## The Development of Agriculture

Three major factors underlie Ecuador's agricultural development in the seventies: its resource endowment, strong growth in consumer demand for food, and the role played by the Government.

### Ecuador's Two Agricultural Zones

Agriculture is divided between the high-altitude Sierra and the low-lying tropical Costa. The two areas are vastly different in climate, soils, topography, and crops and hence in productivity.

The Costa, or coastal plain, straddles the equator. It is one of the most fertile lowlands of the Western Hemisphere. Its five provinces (Guayas, Los Rios, El Oro, Manabi, and Esmeraldas) account for the bulk of commercial production and occupy a total area of 7.0 million hectares. The flatlands of the Guayas River Basin provide excellent growing conditions for four of the five major products of Ecuador's agriculture: bananas, sugarcane, cocoa, and rice. The fifth, coffee, is concentrated largely in the water-short upland regions that border the Pacific in Manabi and the Santa Elena peninsula of Guayas. The dry sub-area of Manabi Province also produces cassava, castorbeans, and hard corn; cotton grows in this Province and the adjacent area of Pedro Carbo in Guayas. The slopes of the

Esmeraldas Valley, which drains to the north, support equatorial trees and plants such as African palm and abaca (Manila hemp). Pineapples and honeydew melons grow in the lower Guayas. The diet includes fish from offshore tropical fisheries, plantains fried in oil, rice, cassava, and a coarse semicrystalline sugar called *panela*.

The Costa is Ecuador's major agricultural resource. Water resources are abundant, but need to be redistributed more efficiently. Major projects to irrigate dry areas and for drainage and flood control of delta areas are well underway. Guayaquil, the largest city and marketing center with a population of over 1 million, has been the focal point of much agricultural activity, including increases in nearby sugarcane culture and construction of sugar mills within a 60-mile radius.

The Sierra, Ecuador's high-altitude agricultural zone, occupies 11 intermont basins at altitudes between 7,000 and 10,000 feet and lies between two *cordilleras* of the Andes. Volcanic activity has enriched the soils in these basins with terraces of volcanic ash. Quito, the capital, has a population of 800,000 and is located in the third basin at an altitude of 9,350 feet.

Food production is the main activity of Sierra agriculture. The principal crops are potatoes, soft corn, beans, and vegetables. Small grains do not do well and wheat production declined steadily in the seventies. The Sierra's food production increased slowly during the last decade, although a poultry boom



Threshing wheat in the Sierra. The dense population and limited land, soil, and water resources of this zone are barriers to increasing local food production. Photo: Author.

developed to supply the Quito market and large investments were made in the dairy herds which supplied 77 percent of the country's milk and dairy products.

Sierra agriculture suffers from limitations in area, rainfall, soils, and land tenure. Its organization is traditional and largely subsistence. The supply of usable land is essentially fixed. Population pressure has caused fragmentation of crop areas. Rainfall reaches 55 inches in Pichincha and provinces to the north, but falls off to the south to only 15 inches, which is not enough for high yields. The principal soils are andosols derived from volcanic ash, lithosols which are boundary and occur on steep slopes, and latosols, weathered reddish tropical soils. In the higher altitudes above the basins, called paramos, barley is grown and sheep are herded on the slopes. Quito provides the focal point for commercial agriculture. Its market has stimulated nearby production of vegetables and fruit such as potatoes, plantains, avocados, carrots, cabbage, and onions.

#### Influence of Demand

Improved consumer demand in the seventies made such a decisive impact on the economics of three major farm commodities that a glance at them is essential to a discussion of the agricultural sector. The overall demand for food was driven by a growth in population of just under 3.5 percent per year (table 1). Higher incomes and urbanization changed the economic situation for wheat, sugar, and slaughter cattle: wheat imports tripled, sugar exports were

diverted to consumption, and the cattle inventory was reduced by 15 percent as meat consumption increased.

Wheat imports increased from 106,000 tons in 1973 to 326,000 tons in 1981 (table 2). Strong demand for wheat was stimulated further by subsidies which covered all costs for imported wheat that exceeded \$137 per ton. This cost the Government an average of \$6.6 million per year in the early eighties—about 10 percent of the value of the wheat. The favorable price of wheat bread compared with rice facilitated the consumption shift to wheat in the Costa and a shift from potatoes to wheat bread in the Sierra. The schedule of wheat imports at the end of 1981 was 25,000 tons a month.

Sugar exports were an important source of foreign exchange in the sixties. Growth in consumption, however, was so rapid in the seventies that exports in 1979 were only 15.5 percent of the year's production of 4.5 million tons. Exports stayed within a narrow range of 30,000 to 100,000 tons in the seventies; the exports of nearly 70,000 tons in 1979 barely filled the Country's international quota.

Cattle slaughter increased between 1978 and 1982 largely due to drought, but also because of growing consumer demand. In that period 15 percent of the cattle inventory was slaughtered. This canceled the effect of an ambitious livestock repopulation program in the seventies.

#### Government Role

The Government by 1983 had emerged as a far stronger support for agriculture than was possible in 1970. It had strengthened policies, institutions, and infrastructure favoring agriculture, and had provided sufficient credit to make them effective, at least in those years when credit banks had liquidity.

Table 1--Population in June, 1966-79

Year	Population	Annual rate of growth
	Thousands	Percent
1966	5,226.5	3.28
1967	5,399.1	3.30
1968	5,579.0	3.33
1969	5,766.4	3.36
1970	5,961.7	3.39
1971	6,165.3	3.42
1972	6,377.6	3.44
1973	6,599.0	3.47
1974	6,830.0	3.50
1975	7,063.0	3.41
1976	7,306.0	3.44
1977	7,556.0	3.42
1978	7,814.0	3.41
1979	8,078.8	3.37

Sources: Ecuadorian Center of Demographic Analysis and Central Bank.

Table 2--Wheat imports, 1973-81

Year	Volume	Value
	Tons	1,000 dollars
1973	105,922	15,462
1974	136,894	28,328
1975	220,150	28,405
1976	234,415	38,706
1977	225,683	25,794
1978	254,351	35,642
1979	246,356	38,668
1980	320,260	59,010
1981	326,140	58,535



Initial policy improvements made possible by petroleum revenues were directed primarily at domestic food crops. Farmers were offered the incentives of minimum prices backed up by agricultural credit. High world coffee and cocoa prices precipitated a second major policy change, which was aimed at these two tropical export crops. The diversification policy of the sixties was jettisoned in favor of rehabilitation and renovation. Ecuador's adjustment to world market conditions in bananas had previously involved a shift from a bruise-resistant variety to a disease-resistant variety. This required a shift in location from the uplands to the irrigated Costa.

Government trade policy has aimed at removing export taxes except in cases where world prices are so high that the tax has become a good source of revenue. Ecuador has also favored the export of processed products over primary products as an incentive to industrial development.

To understand the Government's effect on agriculture, it is essential to consider the relationship among policies, institutions, financial agencies, and marketing.

The Ministry of Agriculture (MAG) was reorganized in 1972. In 1983 it emerged after two reorganizations as a centralized structure incorporating several semiautonomous agencies including the Wheat Commission, the Banana Board, and the Rice Commission. The reorganization also consolidated within the Ministry the functions for land reform, research, and marketing. A directorate of planning was added to coordinate all the related activities. The five basic directorates within it are: Agricultural Development, Livestock Development, Rural Development, Forestry Development, and Commercialization and Marketing.

The reorganized MAG is the primary institution concerned with crops produced for domestic consumption. Its main policy instruments are minimum farm prices, production credit, and Government financing to buy part of the harvests at minimum prices. The program applies primarily to domestic foods and raw materials: bananas, coffee, and cocoa, large export crops which have ready access to private credit, are not included. Minimum prices are posted for rice, cotton, hard corn, abaca, wheat, barley, and soybeans. The *Fondos Financieros* (FF) makes the credit available. A marketing agency, *Empresa Nacional de Almacenamiento y Comercialización de Productos Agropecuarios* (ENAC), was set up to purchase crops.

The Government's minimum price policy is associated with the success of rice and soybeans. The Govern-

ment which came to power in 1972 revised an earlier support price system which had failed as an incentive to producers because it had been applied to milled rice, allowing millers to retain most of the incentive. The support price was shifted to paddy rice at the producer level, stimulating subsequent expansion in area and production. Guaranteed prices for paddy rice, wheat, and soybeans are shown in table 3.

The policy has had some success if allowance is made for the problems of a developing country. In general, production has fluctuated with the level of credit, rising from 1974 to 1976 and leveling off with the contraction of credit in 1977 through 1979 when the FF suffered an acute loss of liquidity because of the high rate of unrepaid loans from the preceding 3 years.

From the marketing point of view, the program was never more than partially effective because funding for ENAC crops purchases never exceeded a fraction of total production. Much of the planned infrastructure for ENAC, especially storage, has yet to be constructed. The inevitable hazards of weather to agriculture such as the flooding of 1973 and the droughts of 1977, 1978, and 1979 were complicating factors.

The Costa and the Sierra have responded in a completely different manner to the price and credit policies described above. The Costa responded by increasing area and production for rice, cotton, hard corn, abaca, soybeans, and African oil palm. In the Sierra, on the contrary, farmers failed to respond, and wheat, barley, and soft corn production declined. The successes of the Sierra in livestock and poultry were not related to the program.

For tropical export crops, the Government pursues a policy of renovation and rehabilitation for coffee and

Table 3--Guaranteed prices, 1972-81

Year	Paddy rice	Wheat	Soybeans <sup>1</sup>
Dollars per ton			
1972	71	101	--
1973	91	101	--
1974	132	129	363
1975	159	154-163	370
1976	--	220	370
1977	170	220	370
1978	180	220	370
1979	--	291	370
1980	212-220	291	370
1981	229	--	406

-- = Not available.

<sup>1</sup>Guaranteed prices began in 1974.

cocoa and renovation for bananas. These policies rely on the distribution of seedlings and clones raised at research institutions. This was probably the single most significant contribution of these institutions to agriculture during the past decade.

Another important policy area centers on land reform and irrigation. A revived Planning Board and its auxiliary agencies have emerged since 1970. The reform institution oversees land reform and colonization projects on the eastern slope of the Andes.

**Credit.** Total agricultural credit in 1973 was \$86.3 million. Ecuador created the FF, administered by the Central Bank, to dispense credit to farmers. The principal source was the *Banco Nacional de Fomento* (BNF) (43 percent); the residual sources were private banks (51 percent) and a credit corporation (6 percent).

Private banks specialized in providing short-term credit for marketing, generally at high interest rates. They preferred marketing loans because their offices had developed skills in working with producers of bananas, coffee, cocoa, sugar, and other export crops. The only credit corporation, the *Compania Financiera Ecuatoriana* (COFIEC) in 1973 made loans of \$3.7 million to the tobacco industry and \$2.7 million to other agricultural and livestock producers.

BNF records show how credit was distributed in two typical years, 1973 and 1974. The total loans of \$46 million dispersed in 1973 included \$18.9 million loaned for food-crop production. The largest amounts, however, were made to finance production of rice, wheat, and hard corn (\$5.2 million, \$4.8 million, and \$4.2 million, respectively). In 1974, the BNF had \$57 million at its disposal, including \$17 million for crops, \$19 million for livestock, \$3.2 million for agricultural machinery, and the remainder for other purposes.

In a typical year, 80 percent of BNF funding came from internal sources and 20 percent from external sources such as the World Bank, the Inter-American Development Bank (IDB), and the U.S. Agency for International Development (AID). The World Bank's loans notably supported livestock and irrigation. Its January 1972 livestock loan of \$8.6 million was expanded by local funds to \$15.6 million by December 1976. Of this total, \$9.2 million was dispensed to the dairy sector and \$6.4 million to beef production. Later in the decade another \$5.5 million was provided to be matched by Ecuador, for total livestock funding of \$31 million.

The IDB between 1961 and 1974 directed \$66 million of its \$284 million of loans to Ecuador to agriculture and fisheries. A 1973 AID loan of \$7.2 million was targeted mainly to soybeans, castorbeans, and cocoa.

**Marketing.** In the seventies, two marketing institutions were created in an attempt to cut marketing costs, which had been estimated at 30 percent of production costs in 1973.<sup>1</sup> These marketing agencies were also financed to support minimum prices by making crop purchases. One is a wholesale and import-export institution (ENAC) and the other operates a retail system, *Empresa Nacional de Productos Vitales* (ENPROVIT).

ENAC was created on February 13, 1974, as an agency under MAG. Its roles include farm price support, commodity storage and distribution, and international trade. Using BNF funds, ENAC purchases substantial percentages of the crops each year at official prices. In 1978 it was funded to buy 30,000 tons or 27 percent of the rice, 20 percent of the hard corn, 20 percent of the wheat, and similar amounts of barley and beans. ENAC also purchases any cotton not taken by the textile industry.

ENAC in 1977 let contracts at \$19.5 million for construction of eight silos with a total storage capacity of 61,000 tons in the coastal area. The locations of the contracted silos are Daule, Ventanas, Quevedo, Ponto-viejo, El Carmen, Tosaqua, Esmeraldas, and Machala. In 1982 the only one approaching completion was at Daule.

In addition to handling grain exports, ENAC is responsible for importing wheat. The Government subsidizes the price of imported wheat to mills by paying the difference when prices rise above \$137.74 per ton. The annual subsidy in the late seventies was estimated at \$6.6 million. The favorable price of bread compared with rice facilitated the shift to wheat bread in urban areas. A comparable shift from potatoes to wheat bread in the Sierra was noted earlier.

In 1971, the Government created ENPROVIT as a public corporation to buy basic farm commodities directly from producers for resale to retailers. The crux of the marketing problem was deemed to be that small farmers are so insulated from the marketing

<sup>1</sup>The Current Economic Position and Prospects of Ecuador, International Bank for Reconstruction and Development, October 1973, p. 24.

system that price signals do not reach them. Entrepreneurs take advantage of this, penetrating farm areas in trucks to collect the surplus of small farmers for cash at low prices and reselling it in urban centers at a substantial profit.

ENPROVIT by the end of the seventies was managing a rapidly growing chain of Government retail stores. The Government in a number of years required rice and sugar mills to sell 50 percent of their production to ENPROVIT.

**Export Crop Improvement.** The principal policies for developing export crops are renovation and rehabilitation for coffee and cocoa and renovation and the disease control program for bananas. No minimum price program is applied here because world prices play a decisive role. The Government actually sets prices, but they are based on world prices. In fact, the Government policy since 1970 has been to adjust to world prices for coffee, cocoa, sugar, and bananas. The Government, however, has provided two forms of support, seedlings and clones of improved varieties and lifting of export taxes, except in a few cases.

In the sixties, Ecuador aimed at shifting marginal lands from cash export crops (coffee, cocoa, and bananas), which were a glut on world markets, to food crops and pasture. With the dizzying rise in world prices of these crops in the seventies, diversification policies were abandoned in favor of policies aimed at increasing production through renovation and rehabilitation.

Ecuador's current production capacity for coffee is a result of the policy adopted in 1976. The program was largely in abeyance in 1983 because prices had dropped to a much lower level than those of 1977, but it was not abolished. The Brazilian coffee freeze of July 1975, which caused a worldwide shortage of coffee, raised the value of Ecuador's coffee exports so high that they surpassed banana exports in value for the rest of the decade. The shock waves from the price of \$2.12 per pound in Brazil in December 1976 reverberated in Ecuador in April 1977 at \$1.68 per pound. Ecuador then shelved plans to diversify 3 percent of the coffee area (21,400 hectares) of Manabi Province, the main producer, and decided to renovate the area instead.

Renovation required the selective removal of trees 20 years old or older and replacement with higher yielding strains such as the *caturra* variety. Rehabilitation involved replacing entire plots with new seedlings and their improvement by pruning, shading, fertiliz-

ing, and controlling diseases and insects. This required money and seedlings, the supplies of which fluctuated from time to time. The nurseries at the Pichilingue research center were able to supply only a small fraction of seedlings needed in 1973, but turned out 1.7 million of a planned 2.5 million seedlings in 1976. By 1979 supplies were adequate. The success of coffee exports reinforced the policy; the crop was first in value among agricultural exports in 1976 and 1978, and second only to cocoa in 1977 and in 1979. The increase in area by the end of the decade had not exceeded 10 percent, but the increase in productive capacity was much greater as high-yielding seedlings replaced traditional stock.

Cocoa was Ecuador's specialty crop until it was infected by diseases between 1915 and 1920. However, the nadir of production did not come until 1963 when monilia and witches' broom threatened large areas. As prices climbed from 18 cents per pound in 1970 to \$1.72 per pound in 1979, Ecuador jettisoned its diversification policy to undertake cocoa renovation and rehabilitation. The techniques used to upgrade cocoa production, as well as requirements for money and seedlings, paralleled those for coffee.

The research center at Pichilingue received \$190,000 in 1974 to provide from its nurseries high-yielding, disease-resistant seedlings, but the supply of clones was insufficient to fully implement the program. When nurseries finally had the capacity to produce more seedlings, funds were no longer as plentiful. Even so, good progress was made.

The phytosanitary program for bananas provided spraying for disease prevention in addition to the conversion of banana culture from the Gros Michel variety to the high-yielding Cavendish, which had won growing acceptance on world markets. This program, which began in the sixties, is now complete. At the same time, medium- and long-term loans were provided to marginal areas to phase out the Gros Michel bananas in favor of oilseeds, cattle, hogs, rice, corn, abaca, citrus, cocoa, and rubber.

Ecuador's research institute, *Instituto Nacional de Investigaciones Agropecuarias* (INIAP), played a vital role in development during the seventies. Its most important contribution was in the supply of coffee seedlings and cocoa clones as just described. Five research centers had been established to accommodate the special needs of different ecological areas:

- **Pichilingue** serves the humid tropics and is the investigation center for cocoa, coffee, bananas,

weed control, and hog production. It produces coffee and cocoa seedlings on 50 hectares.

- **Boliche** in the dry area of Guayas basin is supplied with irrigation water for rice, cotton, soybean, and peanut production research.
- **Portoviejo** in Manabi and the Santa Elena peninsula is the research center for the study of cotton, hard corn, and oilseeds, namely soybeans, peanuts, castorbeans, and sunflowers.
- **Santo Domingo** is the center for high-altitude research in cattle, swine, pastures, African oil palm, and plant pathology. Santo Domingo is the site of the sale of bulls for breeding purposes.
- **Santa Catalina**, located 18 miles from Quito, is the research center in the cool Sierra that investigates wheat, potatoes, barley, oats, pastures, swine, and dairy cattle.

**Export Taxes and Subsidies.** The trend of the decade prior to 1983 was the removal of export taxes on agricultural products. Export taxes on bananas, coffee, cocoa, and sugar were an essential part of Government revenue before 1973. The advent of petroleum revenue in that year brightened the fiscal picture, and the Government began to dismantle barriers to export trade by reducing export taxes on bananas and sugar in stages. By 1976, however, petroleum revenue proved to be less abundant than had been expected. Export taxes on coffee and cocoa, which had reached such high prices that they had become valuable sources of revenue, were retained and in some cases, raised.

During much of the seventies the export tax on cocoa beans was around 25 percent and cocoa products were exempt from export taxes. The processing industry grew rapidly, as processors were able to bid away most of the crop from the export market. Cocoa export taxes currently range from 15 percent for values of \$200 or more per hundredweight to zero for values under \$140 per hundredweight. The drop in world price below \$140 per hundredweight since 1981 has eliminated most of the tax for the present.

The Government began to subsidize sugar exports after January 1, 1977, because of the low level of world sugar prices. In 1980, the subsidy ranged from 15 percent when the f.o.b. value is under 8 U.S. cents per pound to 3 percent when the value is over 13 cents.

**Irrigation.** A third policy thrust was to increase the productive capacity of dry areas by providing year-round irrigation. This offers the best opportunities for long-term development because it will bring currently low-producing land into cultivation and provide for more intensive cropping. A high priority has been assigned to this initiative in each of the development plans beginning with that of 1973-77.

Ecuador is endowed with essentials for irrigation development: good quality soils on a semiarid plain and an abundance of water resources. Three promising areas on the Costa are the Guayas River Basin, a desert plain in El Oro Province at the Peruvian border, and three pockets in the semiarid coastal province of Manabi. The area with the greatest potential is the 27,000 square kilometers of the Guayas River Basin. Its alluvial soils are Ecuador's most valuable agricultural endowment. Its flat nature and access to the three rivers that traverse it make it well suited to irrigation.

In 1972, the Planning Board was reactivated and provided with auxiliary responsibilities for funding and making feasibility studies. The planning unit, *Junta Nacional de Planificacion* (JUNAPLA), was redesignated as the *Consejo Nacional de Desarrollo* (CONADE) in 1978. The financing unit, *Fondo Nacional de Desarrollo* (FONADE), is funded by petroleum revenue in excess of \$7.30 per barrel. The *Fondo Nacional de Preinversion* was set up to fund feasibility studies.

JUNAPLA prepared the 1973-77 agricultural plan entitled *El Plan Integral de Transformacion y Desarrollo*. FONADE funding responsibilities include agricultural mechanization, irrigation, telecommunications, road building, port facilities, and health. In 1979, CONADE prepared "Strategic Guidelines for the National Development Plan 1980-1984." President Jaime Roldos signed the decree promulgating the 5-Year Plan on March 8, 1980. It proposed the allocation of \$794 million for rural development over the 5-year period. Of this, \$148 million was programmed for the improvement of irrigation and drainage, \$126 million for roads, \$112 million for the upgrading of education and health, and \$124 million for direct investment in agriculture.

Total area under irrigation in 1972 was 177,500 hectares; plans for 898,169 hectares are on the drawing-boards. Bananas, rice, and sugarcane are the principal irrigated crops. The aim is to irrigate the fertile lands of the Guayas River Basin and to channel

water for the same purpose to the dry lands of the Santa Elena Peninsula in Manabi Province.

The *Comision de Estudios Para el Desarrollo de la Cuenca del Rio Guayas* (CEDEGE), originally set up in 1965, was converted in 1972 into a Guayas River Valley Authority and assigned broad powers to install primary engineering works and to coordinate public efforts in the Valley. Canada provided \$1.26 million for the initial study of the Basin in 1967 and granted an additional loan of \$2.80 million for studies of the Babahoyo and Daule-Peripa multipurpose projects. Completion of the Canadian study led to a 1973 World Bank loan of \$20.8 million for Babahoyo project. CEDEGE has an inventory of irrigation projects which includes the Daule-Peripa project for 200,000 hectares in the Guayas Basin and the Portoviejo project for 100,000 hectares in Manabi Province.

The *Instituto Ecuatoriano de Recursos Hidraulicos* (INERHI), created in 1966, has the authority for irrigation and water development in areas outside the Guayas Basin. Its projects are small compared with those on the Costa. However, two projects for which it has authority in the southern part of the Costa are Jubones, near Port Bolivar, and the binational Peru-Ecuador project, Puyango-Tumbes, discussed below.

Ecuador's work in irrigation during the seventies was largely preparatory: conducting feasibility studies, securing loans from international lending agencies that were to be matched by the Government, and constructing irrigation works that were essentially pilot projects for major works of the eighties (table 4).

- **Babahoyo.** Babahoyo was a pilot project designed for the irrigation of 11,500 hectares to produce 64,000 tons of rice annually in two 5-month cycles from year-round irrigation. It is also an experiment in agricultural development. Ecuador's share of the

cost is being spent for inputs that can be provided within the country: distribution of expropriated land, agricultural credit (BNF), and applied research (INIAP). Other inputs include technical assistance, mechanization, provision of rice cooperatives, and machinery for drying rice. The World Bank provided \$20.8 million in funding. Irrigation works were completed by December 1981.

- **Milagro.** An irrigated area of 7,000 hectares was developed in the sugarcane area of the Costa. The project included a package of inputs similar to the Babahoyo scheme. Total cost was \$10.2 million, of which \$5.5 million was funded by the World Bank.
- **Puyango-Tumbes.** This binational irrigation project, straddling the border with Peru, will provide irrigation for 50,000 hectares in Ecuador and 20,000 hectares in Peru. The irrigation zone in Ecuador is a dry plain in the southern part of El Oro province. IDB-financed feasibility studies were completed in 1981.
- **Daule-Peripa.** The major project of the Costa, Daule-Peripa will irrigate 193,000 hectares and provide flood control and drainage for another 200,000 hectares (figure 1). This project will cost an estimated \$395 million and completion will be after 1990. This multipurpose project includes a large dam and hydroelectric power system. The package of social investments will be similar to that of Babahoyo.

**Land Reform.** The first Agrarian Reform Law on July 23, 1964, created the *Instituto Ecuatoriano de Reforma Agraria y Colonizacion* (IERAC), the Institute of Agrarian Reform and Colonization. The law authorized IERAC to subdivide Government estates for resettlement, to colonize part of the public domain, to abolish the *hausipungo* system of Indian labor, and to expropriate unoccupied private lands. Under *hausipungo*, the Indian laborer had the right to cultivate a small parcel of land, generally about 2 hectares, in exchange for 4 to 6 days of work per week on the estate. IERAC largely abolished *hausipungo* in the sixties; by 1969 it had given land titles to 17,000 of the 19,000 Indian families in the system. Land for redistribution came from haciendas owned by the Government, from the Catholic church, and private owners. By 1970 IERAC had distributed, through direct-sale mechanisms that reimbursed the owners, land on 26 Government, 2 church, and 8 private haciendas.

Table 4--Irrigation projects, seventies and eighties

Project and period	Province	Area	Total cost
		Hectares	Million dollars
Seventies:			
Babahoyo	Los Rios	11,000	29.8
Milagro	Guayas	7,000	10.2
Eighties:			
Puyango-Tumbes	El Oro	50,000	
Daule-Peripa	Guayas		
	Los Rios	193,000	395.0

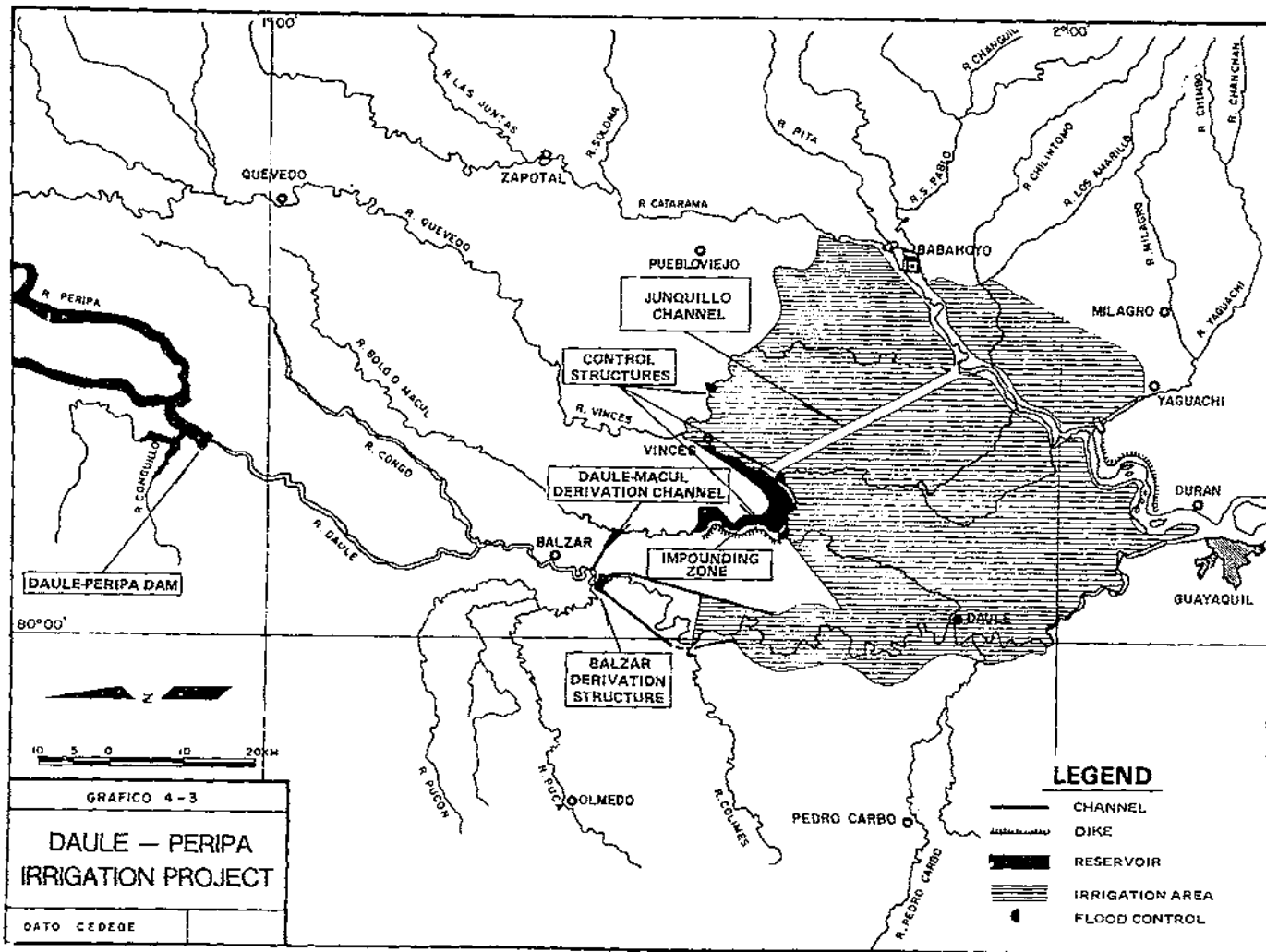


Figure 1. The Daule-Peripa project will substantially increase Ecuador's irrigated cropland. *Los Obras Hidraulicas y la Supervivencia del Ecuador*, Luis de la Torre, 1972, p. 159.

The second Agrarian Reform Law, signed October 9, 1973, provided for the expropriation of lands left unused that could be cultivated. It empowered IERAC to award expropriated and unused land to *campesinos* organized in cooperatives. IERAC's major activity in the seventies was colonization on the eastern slope of the Andes in the Oriente.

### Crop Production and Use

Progress in crop production has been mixed. Production of some crops showed substantial improvement between 1970 and 1980, but the successes were par-

tially offset by some failures. The growth in productive capacity of the four principal tropical products, bananas (Cavendish only), cocoa, coffee, and sugarcane, resulted from replanting programs and increased area. The production of food crops other than rice made little progress. Wheat, barley, and potatoes actually declined. A gratifying response to the poultry boom was the increase in hard corn as the complementary feed grain.

## Bananas

Bananas became the most important foreign exchange earner after World War II. Annual earnings exceeded

\$100 million throughout the 1967-76 decade and exceeded the combined figure for all other agricultural exports until 1973, when higher prices boosted the value of sugar, cocoa, and coffee exports. Earnings from bananas were \$113.5 million in 1974 (according to the Central Bank) but expanded to an annual level of \$137-140 million in 1975-77 and to \$232 million in 1980 and \$207 million in 1981. One million people are estimated to be directly or indirectly dependent upon the banana industry.

Ecuador throughout the seventies produced an abundance of bananas at low cost. Low wage rates, ideal

climate and soils, and immunity from high winds were ideal conditions for producing exportable surpluses. During this same period repeated destructive storms had crippled banana production in Caribbean countries and so provided Ecuador with the stimulus for pursuing export markets.

An improvement in transportation made possible an increase in area from 18,000 hectares in 1948 to 105,000 hectares in 1954 (table 5). The construction of a road network through the Costa opened up lands for planting and trucks replaced the slow river flatboats that had previously been used. When Panama disease decimated many Caribbean plantations during the sixties, Ecuador made the shift from the susceptible Gros Michel to the resistant Cavendish variety. Ecuador rejected the export tax proposed in 1975 by the International Union of Banana Exporting Coun-



Dusting bananas in Esmeraldas Province in the coastal zone. During the late sixties and seventies, introduction of the Cavendish variety caused a shift in commercial banana cultivation from higher elevations to the Costa. Photo: Servicio Cooperativo Interamericano de Agricultura.

Table 5--Banana production and exports, 1954-81

Year	Area 1,000 hectares	Production 1,000 tons		Exports
		Total	Commercial	
1954	105	881	--	585
1955	--	1,273	--	717
1956	--	1,428	--	688
1957	--	1,897	--	794
1958	--	2,024	--	829
1959	--	2,304	--	1,051
1960	--	2,224	--	1,176
1961	--	2,204	--	1,058
1962	--	2,109	--	1,113
1963	--	2,098	--	1,325
1964	--	3,300	--	1,345
1965	--	3,304	--	1,200
1966	187	2,956	1,965	1,265
1967	203	3,163	1,812	1,263
1968	180	2,693	2,068	1,251
1969	190	2,800	2,260	1,190
1970	190	2,700	2,098	1,364
1971	181	3,512	2,093	1,350
1972	171	3,286	2,088	1,377
1973	162	3,203	2,188	1,370
1974	152	3,397	2,295	1,358
1975	150	2,544	2,130	1,362
1976	110	2,571	2,546	1,200
1977	110	2,451	2,185	1,260
1978	110	3,375	2,150	1,363
1979	100	2,180	2,085	1,386
1980	75	2,269	2,240	1,318
1981	72	2,275	2,275	--

-- = Not available.

Sources: FAO, National Banana Program, *Anuario de Comercio Exterior*, and ERS.



tries (UPEB) to protect its position as a supplier, realizing that higher prices could bring other competitors into the market.

The most reliable statistics on area come from the National Banana Program (NBP) Office, MAG, and apply to the areas planted to bananas of export quality. They indicate a 61-percent decline in area between 1967 and 1981.

Prior to 1964, Gros Michel was the only variety of banana grown for export. Because of bruise resistance it would withstand transportation over long distances before packing at shipside. To be more competitive, Ecuador's producers began to shift to the higher yielding Cavendish varieties. The appearance of the Panama disease speeded conversion to the Cavendish variety which offered greater disease resistance in addition to superior yields. On experimental areas it produced up to 30 tons per hectare compared with Gros Michel yields of only 10 tons per hectare. Production of Cavendish, however, entails higher costs per hectare because it needs to be grown under more controlled moisture and nutrient conditions and it requires on-farm boxing for shipment to prevent bruising in transit.

Export demand and Government policies speeded the varietal transition. The Banana Directorate provided credit to farmers who qualified for the planting of Cavendish. Cultivation of Cavendish in eastern sectors of Los Rios and Guayas Provinces increased from 14,000 to 57,500 hectares between 1967 and 1978 (table 6). At the same time, the Gros Michel growing

area centered in Quevedo contracted from 146,000 hectares to 5,000 hectares for reasons mentioned earlier.

As banana production grew to surplus proportions, policies began to be directed towards phasing out Gros Michel production in favor of import substitutes, livestock, and new exports—abaca, cashew nuts, and tropical fruits. Development of the livestock industry is complementary because surplus bananas can be fed to hogs. Marginal banana areas can also be diverted to rice, corn, and oilseed crops desirable for self-sufficiency or export purposes.

#### Rice

The rice story is central to an understanding of Ecuadorian agriculture in the seventies. As the main staple of the Ecuadorian diet, rice exceeds all other grains in production volume and value. Its culture dominates visitors' impressions of the coastal plain in Guayas and Los Rios Provinces: flooded paddies succeed one another, and flat, white platforms of small rice mills (*molinos*) dot the landscape.

Rice was the Government's major success story in agriculture for the seventies. Rice responded promptly to economic incentives as well as the new technology of the "green" revolution. The upward surge in production reflected effective price supports and the availability of agricultural credit. Production in 1981 was nearly 350,000 tons of paddy from an area of 126,000 hectares (table 7). This is almost twice the level of production in the early seventies with only a 50-percent increase of area. The actual area of rice land was probably about 80,000 hectares because of double cropping that is possible at that latitude.

The Government announced its first support price in 1972, making it effective with a base price paid for paddy at local mills. Production credit was offered to back up this incentive. But harvested area seemed to fluctuate with the availability of credit, rising to higher levels in 1974-76 when credit was abundant and shrinking in 1977-79, when it contracted. Weather also played a part. Heavy rains prevented harvesting in 1973, good weather brought in the larger harvests of 1974, 1975, and 1976, and drought cut yields in 1977, 1978, and 1979. Consumption outstripped production during the later period, making imports necessary. To reduce import costs, the Government increased incentives in 1980. Production shot up by nearly 50 percent in 1980 and rose even further in 1981.

Table 6--Area in bananas qualifying for disease control, 1967-80

Year	Area in Gross Michel	Area in Cavendish	Total area in bananas	Portion in Cavendish
	<i>Hectares</i>			<i>Percent</i>
1967	146,233	13,995	160,228	8.7
1968	131,898	24,978	156,876	15.9
1969	108,280	39,249	147,529	26.6
1970	74,045	50,200	124,245	40.4
1971	59,665	54,921	114,586	47.9
1972	47,067	53,927	100,994	53.4
1973	42,399	50,107	92,506	54.2
1974	35,546	54,955	90,501	60.7
1975	33,465	53,938	87,403	61.7
1976	23,432	62,472	85,904	73.3
1977	10,374	56,020	66,394	78.0
1978	4,879	54,879	59,758	91.8
1979	3,424	57,764	61,188	94.4
1980	2,667	59,553	62,220	95.7

Source: National Banana Program.



Table 7--Paddy rice area, production, and yield, 1960-81

Year	Area	Production	Yield
	1,000 hectares	1,000 tons	Tons per hectare
1960	--	209	--
1961	--	203	--
1962	--	175	--
1963	110	211	1.9
1964	110	164	1.5
1965	90	173	1.9
1966	100	204	2.0
1967	105	182	1.7
1968	60	127	2.1
1969	109	233	2.1
1970	85	184	2.2
1971	85	175	2.1
1972	80	189	2.4
1973	83	228	2.7
1974	101	242	2.4
1975	125	321	2.6
1976	125	300	2.4
1977	95	244	2.6
1978	85	182	2.1
1979	103	225	2.2
1980	127	330	2.6
1981	126	346	2.7

-- = Not available.

Sources: *Indices of Agricultural Production for the Western Hemisphere Excluding the United States and Cuba, 1963-72*, ERS-Foreign 264; various agricultural attache reports.

The 21-percent increase in harvested area in 1974 followed directly upon a \$5.2 million credit to the sector and a support price announcement of \$6.00 per hundredweight. Much of the increase resulted from double cropping in summer as better irrigation and water control through the use of hand pumps made possible a second harvest in the drier months. The quantum jump in production, however, occurred in 1975 when the support price for the summer crop was increased by one-fourth to \$7.20-\$7.60 per hundredweight. The area increased 24 percent and production rose 33 percent. The 1976 harvest was almost as good, with production of 300,000 tons from a harvested area of 125,000 hectares. Surplus rice was exported because of a lack of storage. Since then contracts have been let for a new storage facility at Daule—9,000 tons in silos and 6,000 tons in warehouses.

Credit was tighter during the last 3 years of the decade because the Development Bank suffered a temporary loss of liquidity from unpaid loans. The coincidence of drought in these years caused a sharp drop in harvested area and production. Better weath-

er, available credit, and an expected price increase enabled farmers to bring in a harvest of 347,000 tons of paddy in 1981.

In 1979, when consumption reached 168,000 tons of milled rice against a harvest of 135,000 tons, Ecuador had to import 25,000 tons from Colombia to cover the shortage. Another 10,000 tons moved clandestinely from Colombia in the last quarter of 1979. These movements prompted emergency rice plantings for harvest in early 1980 (table 8).

A review of the rice harvest of 1980 shows the base from which the larger harvests of the eighties, which will follow completion of irrigation works, have been projected. With the rice harvest of 1980, Ecuador reached the level of self sufficiency that the National Rice Program (PNAM) had planned. Weather aside, the prevailing price of \$18.40 per 100 pounds provided an incentive for thorough harvesting of the winter crop in August, and the planting of the summer crop that followed. Total production in 1980 was 330,000 tons of paddy (198,000 tons of milled rice) from a total area of 128,000 hectares.

### Coffee

After 1920, coffee replaced cocoa as Ecuador's principal cash crop. Fluctuation in world prices caused periodic expansion and contraction of areas in coffee



Rice cultivation in the Guayas River plain. With production credit and price supports, rice production increased, reaching a level of self-sufficiency by 1980. Photo: Inter-American Development Bank.

Table 8--Rice area, yield, and production from three crops harvested in 1980

Crop	Harvested area	Paddy yield	Milled rice production
	Hectares	Tons per hectare	Tons
Emergency planting, harvested February-March	7,870	3.0	14,041
Winter crop, harvested May-August	75,200	2.7	122,797
Summer crop, harvested December	44,800	2.3	60,962
Total	127,870	2.6	197,800

since then. The stimulus of high prices during World War II caused expansion in area but the prevailing low prices of the sixties led to stagnation. An important increase in area that began in 1968 and persisted through the seventies corresponded to strong world demand and high prices.

The status of coffee in the Ecuadorian economy was upgraded sharply during the seventies. Generally second in value among exports, it took first place in 1976 and in 1978. After the 1975 coffee freeze in Brazil, prices rose rapidly to reach \$1.68 per pound in April 1977. When the Government shelved the diversification policy for one of renovation and rehabilitation, growers responded with improved management and better harvesting practices. Planted area increased from 145,000 hectares in 1967 to 276,000 hectares in 1981. Tree population in 1981 was 236 million, of which 203 million were bearing.

Coffee production reached a record of 89,000 tons in 1978 from 251,000 hectares (table 9). After several years of lower production due to persistent drought and insect damage, production recovered in 1981 to 88,000 tons from 261,000 hectares harvested. Drought reduced the estimated 1982 harvest to 72,000 tons.

Coffee cultivation is concentrated in the hilly and relatively dry Manabi Peninsula (table 10). Small farms dominate; in 1974, 70 percent of the 56,000 growers cultivated less than 5 hectares. In the sixties, Arabica coffee accounted for 80-90 percent of production, but by 1978, production had increased to 30 percent Robusta. Much of the planting of Robusta is in the higher elevations of the Oriente, on the eastern slopes of the Andes.

Weather played an important role in two harvests of the last 15 years. The smallest harvest of the period

occurred in 1969, following the severe drought which affected the whole west coast of South America. The heavy rains of 1972 cut the harvest of 1973 to 52,200 tons. The better weather in 1974, 1975, and 1976 produced above-average harvests.

Coffee provides a good example of the marketing problems of small farmers. Intermediaries, offering cash, assume the marketing role by collecting small amounts from many farmers and selling to exporters in Guayaquil, creaming off what some believe to be a disproportionate share of the receipts. One response to the problem has been the formation of cooperatives

Table 9--Coffee area and production, 1965-82

Year	Harvested area	Production
	Hectares	Tons
1965	--	62,100
1966	--	58,500
1967	<sup>1</sup> 145,000	70,500
1968	--	64,800
1969	--	34,420
1970	--	78,000
1971	--	66,000
1972	100,000	66,000
1973	191,800	52,200
1974	231,000	70,604
1975	230,665	70,080
1976	246,680	83,357
1977	249,500	88,464
1978	250,900	88,990
1979	256,700	85,060
1980	256,400	85,027
1981	261,400	88,250
1982	272,110	72,000

-- = Not available.

<sup>1</sup>Coffee Production, Latin America, Foreign Agricultural Service, M-288, May 1979.

Table 10--Coffee area by Province, 1974, 1975, and 1982

Province	Harvested		Planted 1982
	1974	1975	
	Hectares		
Manabi	120,970	121,000	138,431
Los Rios	17,195	18,000	48,520
Guayas	22,669	22,700	31,681
El Oro	13,000	13,000	15,176
Loja	31,250	28,000	22,570
Bolivar	7,500	7,600	13,200
Pichincha	12,000	12,500	29,420
Others	7,225	7,855	23,212
Total	231,809	230,665	322,210

that allow small producers more leverage in selling to intermediaries and exporters.

Today all but one of the 18 cooperatives in Manabi Province do their own exporting. They also provide credit and technical assistance to farmers. Their role was not large in the late sixties when they received \$3.2 million from the Government to assist them in marketing. Since then the cooperatives have successfully campaigned for credit, a larger market share, and higher minimum prices.

The prices quoted by exporters are those they pay to intermediaries or producers on delivery (table 11). A major rise in prices occurred in 1973 in conformity with world prices. The price drop of 20 percent after May 1974 was wiped out by the price rises of 1975 that followed the July 1975 freeze in Brazil, and the resulting very high prices of 1976 and 1977.

## Cocoa

Five developments during the decade describe the trends affecting cocoa and its role in the economy:

- The production record of the decade is inversely related to wet weather because cocoa thrives in dry weather and suffers in wet.
- An upward spiral in prices in the late seventies provided record prices to growers.
- Delays resulting from shortages of credit and the supply of clones for planting were overcome by the end of the decade.
- Conversion of exports from cocoa beans to cocoa products proceeded.
- Cocoa exports, normally third in importance among agricultural exports, achieved the exceptional status in 1977 and 1978 of first and second, respectively.

The four coastal Provinces of Los Rios, Guayas, Manabi, and El Oro accounted for 90 percent of the total area in 1978 (table 12). The main or winter harvest runs from February to June; the *epoca* or summer harvest, from June through October; the small *navidad* (Christmas) harvest spans the season from November to January.

As mentioned above, Ecuador was a leading world producer of cocoa until about 1920 when Brazil and Ghana relegated it to third place. Production had grown from 5,000 tons in 1840 to 23,000 tons in 1900 and peaked at 47,000 tons in 1914. The spread of two

fungus diseases, monilia and witches' broom, from then on caused a steady decline until after World War II when the introduction of high-yielding, disease-resistant clonal material from Trinidad helped to encourage a trend to recovery.

Ecuador's distinction lies in the production of *arriba*, a flavorful type of cocoa that commands a premium because of its aromatic quality. The designation *arriba*, literally "above," refers to the cocoa-producing areas upstream from Guayaquil. The annual percentage of aromatic cocoa, however, dropped during the seventies to vary between 10 and 35 percent. This resulted from the introduction of high-yielding and clonal cocoas that have increased volume at the expense of quality aromatic cocoa.

A record cocoa harvest of 95,000 tons of beans in 1979 resulted from a combination of favorable weather and improved cultural practices. The weather is a decisive factor in determining cocoa production, which seems to be inversely related to rainfall. In years of normal rainfall, such as in 1969 and 1973 when heavy rains sharply reduced the harvest (table 13), Ecuador can lose up to one-half of the harvest as dampness spreads the infection of monilia pod rot and witches' broom. Dry weather, on the other hand, reduces the incidence of disease and increases the yield. For example, the 1968 drought, which was the most severe of the decade, brought in a 70,000-ton harvest, then a record. Two years of dry weather in 1974 and 1975 similarly benefited production by

Table 11--Coffee prices paid for washed coffee by exporters at Guayaquil, 1971-82

Year and month	Arabica	Robusta
Dollars per 100 pounds		
1971 September	17.90	--
1972 September	21.40	--
1973 September	36.00	--
1974 May	53.00	41.80
1974 August	32.00	31.24
1975 May	26.00	21.00
1975 September	49.00	41.00
1976 April	74.00	59.00
1976 August	92.00	70.00
1976 October	103.00	95.00
1976 December	136.00	136.00
1977 March	272.00	257.60
1978 August	115.15	112.65
1979 June	123.04	114.80
1980 June	105.06	97.62
1981 June	63.97	56.71
1982 January	64.13	36.47

-- = Not available.

Table 12--Cocoa area by Province, 1971-79

Year	Los Rios	Guayas	Manabi	El Oro	Others	Total
1,000 hectares						
1971	90	58	40	19	12	219
1972	90	55	40	20	13	217
1973	84	49	40	27	14	213
1974	82	48	42	35	15	232
1975	90	55	37	32	15	230
1976	--	--	--	--	--	--
1977	92	61	32	15	<sup>1</sup> 22	224
1978	97	65	32	17	<sup>1</sup> 23	234
1979	100	67	33	18	<sup>1</sup> 24	241

-- = Not available.

<sup>1</sup>Principally Esmeraldas, whose areas were: 1979, 9,893 hectares; 1980, 10,118 hectares; 1981, 10,618 hectares, respectively.

Source: National Cocoa Program.

curbing pod rot, and the prolonged drought of 1978 and 1979 produced production records.

The rapid rise in cocoa prices in the seventies enhanced interest in production, research, and development. The producer price of cocoa beans, which was only 18 cents a pound in Guayaquil in January 1971, was \$1.24 a pound in December 1978. The high international market price was a persistent incentive. The New York price per pound averaged \$1.72 for all of 1977 and only somewhat lower at \$1.52 for all of 1978. Producer prices followed this trend but at a somewhat lower level, considering transport costs and export taxes.

The renovation and rehabilitation program focused on cleaning cocoa plantations and selectively replacing individual trees. The Pichilingue experiment station since 1960 had developed seedlings that are disease resistant, high yielding, and capable of maturing in a shorter 3 or 4 years. These were provided to growers. The Government did not stress an increase in area although some of the surplus banana area shifted to cocoa production. The 5-Year Plan for 1973-77 called for the replacement of 31,000 hectares of existing cocoa trees by 1980.<sup>2</sup> Until 1979, a limited supply of either clones or of credit prevented full implementation. But even so, more than 15,000 hectares were improved by that date (table 14).

The 5-Year Plan has been extended along the same lines into the eighties as larger supplies of clones

become available. Improvement of more than 16,000 hectares was planned for 1980 and 1981.

The domestic grind of cocoa increased from 9,000 tons in 1971 to 48,000 tons in 1978. The 1970 decision to subsidize the processing industry at the expense of cocoa bean exports is discussed in the trade section. The 30-percent tax advantage to processors in 1980 consisted of a 5-percent subsidy on cocoa-product exports and a 25-percent ad valorem tax on those of cocoa beans. The industry has grown rapidly, with an increase in annual grinding capacity from 17,400 tons to 146,400 tons.

Table 13--Cocoa bean area and production, 1966-82

Year	Area	Production
	1,000 hectares	1,000 tons
1966	--	36
1967	--	53
1968	228	70
1969	228	53
1970	228	65
1971	219	58
1972	217	43
1973	213	43
1974	221	72
1975	229	75
1976	225	64
1977	232	72
1978	247	78
1979	265	85
1980	270	95
1981	275	87
1982	275	85

-- = Not available.

<sup>2</sup>Plan Quinquenal 1973/1977, Program de Cacao, Banco Interamericano de Desarrollo. Document 14 on Agricultural Development, August 1973.

The three plants processing cocoa in 1974 operated at 85 percent of their 17,400-ton grinding capacity. By January 1979, 11 firms were in production and at least 3 others were authorized. The Government has

Table 14--Cocoa area, renovation and rehabilitation, 1974-81

Year	Renovation	Rehabilitation	Total improved
		Hectares	
1974	548	1,005	1,553
1975	528	1,843	2,371
1976	1,125	1,582	2,687
1977	1,366	1,295	2,661
1978	1,950	4,100	6,050
1979	--	--	--
1980 <sup>1</sup>	2,750	4,750	7,500
1981 <sup>1</sup>	3,500	5,500	9,000

-- = Not available.

<sup>1</sup>Planned.



Sugarcane in Los Rios Province. Rising refined sugar consumption in the seventies kept pace with increasing production. Sugarcane also yields *panela* (crude sugar), *aguardiente* (cane alcohol), and molasses. Photo: Author.

strongly favored processed cocoa exports. As a result, plant capacity has expanded to about double the annual cocoa bean production. The removal in 1981 of the 25-percent export tax on beans will undoubtedly aggravate the excess capacity situation.

### Sugarcane

The most visible equatorial crop in the lower Guayas Basin of the coastal plain is sugarcane. Harvested area nearly doubled between 1969 and 1979. Growth of exports, however, has been minimal since consumption has grown as rapidly as production.

Total sugarcane production in 1979 was 4.5 million tons from an area of 109,000 hectares. Aggregate production is divided between three products: centrifugal sugar, *panela*, and *aguardiente* (cane alcohol). A breakdown of area planted shows allotments of about one-third to each type of product. Most of the sugarcane grown for centrifugal sugar is in the flatlands of the Guayas Basin near to the three large sugar mills at Guayaquil. Two small mills operate in the Sierra where most of the cane goes into the manufacture of *panela* and alcohol. In 1975, the price advantage was enjoyed by the latter because small and medium producers received 170 sucres per ton for sugarcane used by mills compared with up to 400 sucres per ton for sugarcane used for *aguardiente*.

Production of centrifugal sugar in 1981 was nearly 344,000 tons from an area of about 48,000 hectares (table 15). During the seventies production increased steadily from 191,000 tons in 1969 to 375,000 tons in 1979. The increase in area for the same period was from 24,300 to 47,000 hectares.

Consumption in 1981 was 337,000 tons, having increased at a rate of 7-8 percent annually for over a decade. Consumption absorbed most of the increase in production, limiting exports to between 30,000 and 100,000 tons.

Industrial use has increased rapidly since the petroleum bonanza raised per capita incomes. About 35 percent of total consumption is estimated to be used for soft drinks, pastries, candy, and sweetened cocoa.

The sugar industry is one of the largest industrial employers. Ten mills produce regularly for export and provide most of the domestic needs, while three produce only occasionally. The MAG contracted with a Dutch consortium for feasibility studies for new mills with a capacity of 50,000 tons per year. Milling

capacity in 1980 was 27,000-32,000 tons of cane per 24-hour day (table 16). Mills grow 65 to 75 percent of the cane processed and buy the remainder from independent producers. Irrigated cane in the mill areas of the Costa matures rapidly because the water supply can be controlled.

Since 1978 the industry has been caught in a squeeze between the controlled selling price of \$12.00 per hundredweight and production costs of \$10.50 to \$11.00 per hundredweight.

In 1972, the industry employed 14,500 workers. By 1978, off-season employment dropped to 6,500 as mechanization became more common. To some degree this was prompted by a rise in labor costs. Mechanical cutters and mechanical loaders were in general use in the Costa by 1976. Acute labor problems and strikes plagued the industry in 1977 and 1978. In 1979 the Government granted a subsidy in the form of Tax Exemption Certificates. The new Government under Jaime Roldos, however, decreed a 100-percent wage increase, effective January 1, 1980, which could raise production costs by 30 percent. Sugar prices were raised in October 1981 from \$17.60 per 100 pounds to \$26 per 100 pounds to ease the financial strain on the industry.

Table 15--Sugar area, production, and consumption 1967-82

Year ending April 30	Area harvested	Sugar production	Domestic sugar consumption
	1,000 hectares	1,000 tons	
1967	17.8	175.9	--
1968	22.3	189.1	117.0
1969	24.3	214.6	127.0
1970	24.3	208.7	136.0
1971	25.1	234.7	147.0
1972	28.0	249.4	150.0
1973	30.1	249.4	170.0
1974	32.0	244.9	190.0
1975	34.4	267.9	205.0
1976	36.1	287.6	223.0
1977	38.0	301.1	251.1
1978	35.6	281.4	271.5
1979	42.9	353.1	293.2
1980	47.2	357.6	276.3
1981	46.2	368.2	303.7
1982	48.2	343.9	312.8

-- = Not available.

Sources: Sugar Production and Trade, 1966-72; EU3016 of 6/7/73 and EU6016 of 5/11/76 by Milton Anderson.

Production of molasses was 157,000 tons (23.6 million gallons) in 1980; it dropped to 118,000 tons in 1981. The new policy placed priority on internal needs, leaving the residual for export. To encourage molasses usage for livestock, distribution centers have been built throughout the country. Utilization in 1981 was as follows:

	Tons	Percent
Livestock	30,267	25.6
Alcohol production	25,283	21.3
Other industries	10,050	8.5
Exportable surplus	52,730	44.6
Total	118,230	100.0

### Cotton

Cotton responded well in the decade to efforts to achieve self-sufficiency. The 5-Year Plan for 1973-77 set a production goal of 12,000 tons of cotton fiber to cover national needs. In 1974, \$9.8 million in credit was provided through the National Federation of Cotton Producers (FEDALE) from the National Development Bank. Farmers more than doubled the area in cotton, and set a production record of 12,000 tons, which was more than double the 1973 harvest. In subsequent years production declined when credit was not widely available. However, in 1980 and 1981 when credit was liberalized, production responded to rise above the 1973 level.

Cotton had been imported regularly prior to 1974. Imports, which had been 2,450 tons in 1973, dropped to 40 tons in 1974 and practically disappeared thereafter. Exports of 3,620 tons in 1979 were made from the stocks of 1977, 1978, and 1979 harvests. Ecuador's cotton harvest is relatively small compared

Table 16--Sugar milling capacity and output, 1975-79

Mill	Capacity			Production 1979
	1975	1976	1979	
	Tons of cane per day			Tons
San Carlos	6,200	8,400	12,000	133,992
Valdez	6,500	5,000	10,000	85,933
Aztra	7,040	7,000	7,000	114,632
Tababuela	900	900	900	17,004
Monterrey	550	440	700	11,941
Isabel Maria	600	700	700	9,075
Luz Maria	800	800	800	8,263
San Jose	--	150	200	1,911
Total	22,590	23,350	32,300	392,751

-- = Not available.

to that of its cotton-producing neighbors, Peru, Colombia, and Bolivia.

Production in 1981 of 12,500 tons included 11,800 tons from a cultivated area of 17,000 hectares and 800 tons of *Criollo* cotton from an area estimated at 6,000 hectares (table 17). Cultivated cotton, including Coker and Del Cerro varieties of medium and long staple fiber, is harvested between May and September. *Criollo* is a short-staple, uncultivated cotton which grows on large bushes and is harvested between October and December. Officials would like to stop production of this cotton because they believe it is the main purveyor of insect pests, but they do not because it is a permanent cash crop for many of the lowest income rural families.

Two Costa Provinces, Guayas and Manabi, account for 98 percent of the planted area with 8,700 and 7,800 hectares, respectively. The expansion in area that followed the Government's credit program in 1974 occurred in the Pedro Carbo area of Guayas and the adjacent area of Manabi Province. Liberalized credit made possible a big increase in area in 1979-80. The use of high-yielding seed increased yields 17 percent to 1.92 tons per hectare in 1980.

Besides the agricultural credit mentioned above, progress has been made through improved seeds and

cultural practices. The National Cotton Program office provides stocks of certified seed. The Portoviejo experiment station began development of an irrigated long-staple variety for growth in dry areas.

### Vegetable Oils

Ecuador's production of edible vegetable oils more than tripled during the seventies, but consumption growth outstripped production gains. The cost of imports of vegetable oils and animal fats was second only to that of wheat imports. Ecuador's program of encouraging production of African palm kernels and soybeans was an exercise in import substitution. Although the program began in the seventies, major growth is reserved for the eighties or later.

Ecuador's greatest developmental interests are in oil palms and soybeans. In 1972, AID authorized a \$7.2 million loan for development and diversification projects. A portion of this money was committed to expanding the area in short-cycle oilseed crops including sesame, soybeans, and peanuts. A plan to grow 50,000 hectares of oil palms in the Oriente is under consideration.

African palm, soybeans, and cottonseed accounted for 91 percent of the 77,800 hectares devoted to edible oilseeds in 1979. The addition of three minor crops,

Table 17--Cotton area and production, 1965-80

Year	Cultivated area 1,000 hectares	Production <sup>1</sup>			Yield, cultivated only Kilograms per hectare
		Medium and long staple	Short staple	Total	
1965	--	--	--	5.5	--
1966	--	--	--	4.8	--
1967	--	--	--	4.6	--
1968	--	--	--	7.1	--
1969	--	--	--	4.6	--
1970	9.0	3.2	1.4	4.6	358
1971	8.2	2.5	1.3	3.8	464
1972	13.8	4.0	1.0	5.1	371
1973	14.9	4.7	.9	5.7	381
1974	34.8	11.2	.9	12.1	321
1975	24.8	9.4	.2	9.6	378
1976	17.2	8.8	1.4	7.3	513
1977	13.5	9.0	1.3	10.3	666
1978	13.5	7.9	1.2	9.2	581
1979	16.5	11.4	.8	12.2	693
1980	17.1	12.8	1.0	13.7	750

-- = Not available.

<sup>1</sup>Excludes *Criollo* cotton.

Source: Attache's reports, Quito.

native oil palm, sesame, and peanuts, brought total edible vegetable oil production to 40,900 tons in 1979 (table 18). The estimate for 1981 was 54,100 tons.

African oil palm is the most important vegetable oil source. In 1981 it provided 39,500 tons of oil from 88,200 tons of kernels, or 71 percent of domestic edible oil production (table 18). Planted area in 1981 was 35,700 hectares, of which 27,500 were in production (table 19). An estimated 9-percent increase in production to 43,100 tons was expected in 1982.

An expansion campaign for African palms began in 1953 and by 1967, 1,000 hectares a year were being added. Palm plantations and cattle raising complement each other in the north-coastal areas of Esmeraldas. Palm plantations have also replaced bananas on marginal banana lands around Quevedo. The research institute reported that 58,000 hectares could be planted to palm trees in the Santo Domingo-Quevedo-Quinde area. By 1980, 1,000 hectares had been planted in the Oriente and another project was planned there. Government support included high prices, liberal credit, and technical assistance.

Soybeans are the second most important oilseed, and have the greatest potential for expansion. Like

African oil palm, soybean production has developed especially in the upland banana zone around Quevedo as a result of the banana diversification program. Production was almost negligible before 1973, when generous credit became available (table 20). Planted area increased from 1,200 hectares in 1973 to an estimated 27,500 hectares in 1982. Following record production of 39,000 tons of soybeans in 1981, heavy rains reduced 1982 production to an estimated 20,000 tons.

Native oil palms produced a total of 4,700 tons in 1981, which yielded 3,000 tons of oil (table 18). These palms grow wild in the rain forest of northwest Ecuador in an area of 10,000-14,000 square kilometers. Production from wild palms has declined in recent years while that from African palms has grown. Although production from wild palms declined when prices were low in the early seventies, higher prices in 1978 and beyond had the opposite effect.

Other oilseeds include peanuts, of which 2,600 tons were crushed for oil in 1981 with a yield of 1,000 tons of oil. Some 25,500 tons of cottonseed produced 3,700 tons of oil in that same year, little changed from the preceding 3 years. Sesame seed production dropped from 1,300 tons in 1976 to 700 tons in 1981, yielding 300 tons of oil. Small quantities of rapeseed and colza

Table 18--Oilseed and crude oil production, 1972-81

Products	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
1,000 tons										
Oilseed production:										
African oil palm	14.2	17.5	23.6	34.4	45.0	48.0	56.6	64.5	79.7	88.2
Native palm kernel	6.0	5.0	2.7	6.2	2.9	4.0	4.2	4.7	4.7	4.7
Cottonseed	8.0	8.2	14.5	11.6	12.0	16.0	15.2	15.2	21.5	25.5
Sesame	2.1	1.5	1.7	3.5	1.3	.7	.5	.5	.7	.7
Peanuts for oil	.8	.5	1.5	.7	2.3	2.8	2.9	2.6	2.7	2.6
Soybeans	.5	3.7	3.1	13.8	13.5	19.0	23.3	28.9	31.2	39.0
Other	1.0	1.5	1.0	1.0	.8	.7	.8	.9	.9	.9
Total	32.6	37.9	48.1	71.2	77.8	91.2	113.6	128.8	141.4	160.7
Crude oil production:										
African palm oil	6.3	7.8	11.0	16.0	20.0	22.0	25.4	29.1	35.3	39.3
Native palm oil	2.7	2.2	1.3	3.0	1.8	2.5	2.5	2.8	2.9	3.0
Cottonseed	1.3	1.4	2.5	2.0	1.8	2.4	2.3	2.3	3.1	3.7
Sesame	1.0	.7	.6	1.0	.6	.3	.2	.2	.3	.3
Peanut	.4	.2	.5	.3	.9	1.1	1.2	1.0	1.1	1.0
Soybean	.1	.8	1.8	2.5	2.4	3.4	4.2	5.4	6.6	6.7
Other	.4	.7	.5	.5	.1	.1	.1	.1	.1	.1
Total	13.2	14.5	18.2	25.3	27.6	31.8	35.9	40.9	49.4	54.1



and native oilseeds such as kapole and pinon are harvested for oil when prices are favorable.

Government policy in the sixties encouraged the diversion of marginal coffee land to castorbeans because Ecuador had difficulty exporting its surplus coffee. But when coffee prices soared in the late seventies and those of castorbeans dropped, farmers switched rapidly to coffee. In 1981 only 10,900 tons of castorbeans were produced from 13,500 hectares. The total area of around 20,000 hectares reported in the early seventies undoubtedly included both wild and commercial plantings (see table 41). Seventy percent of beans harvested were from volunteer plants that lined fields or were interplanted with cassava, coffee, peanuts, and corn. Most of the castorbeans are native varieties which grow to heights of up to 15 feet.

Castorbean exports began to shift from beans to oil in 1976. A joint venture corporation in that year completed a castorbean crushing plant with an annual capacity of 15,000 tons at Manta, Manabi Province. The facility crushed 5,200 tons of beans in 1976 and 10,000 tons in 1977. The corporation's efforts to increase area and yield had only limited success

Table 19--Area in African oil palm and palm oil production, 1953-82

Year	Total area	Area harvested	Oil production
	Hectares		Tons
1953	50	0	0
1959	112	50	35
1960	256	50	47
1961	386	50	59
1962	544	50	72
1963	760	112	100
1964	1,387	256	165
1965	1,965	580	260
1966	2,638	544	400
1967	3,634	760	650
1968	4,687	1,387	1,000
1969	5,925	2,965	2,300
1970	7,084	2,368	3,500
1971	8,142	3,634	4,600
1972	10,138	4,687	6,300
1973	11,245	5,925	7,600
1974	13,255	7,084	11,000
1975	14,755	8,142	13,000
1976	18,755	10,138	22,000
1977	23,155	11,245	25,000
1978	26,155	13,255	28,000
1979	30,400	23,200	29,700
1980	31,100	25,000	36,300
1981	35,700	27,500	39,500
1982	37,500	30,000	43,100

because most of the crop was wild. The corporation's offer to buy all production from farmers who would expand production attracted only a fraction of its goal in 1979.

#### Abaca

Abaca (Manila fiber) production started on an experimental basis in the sixties and became economically important in 1970 when exports reached 1,200 tons. A Japanese firm in 1964 started the first abaca plantation with the planting of 400 hectares. Private companies exported abaca during the late sixties.

The Government provided credit in the early seventies and progressively increased authorizations for new areas up to 15,000 hectares. The rapid rise in prices during 1974 from 35 cents per pound in September to 54 cents per pound in November provided additional incentive to increase planted area the next year.

Production expanded rapidly under the impetus of favorable prices and Government credit from 2,000 hectares in 1970 to 10,000 in 1977 (table 21). Production increased from 1,700 tons in 1970 to a peak of 13,200 tons in 1976, but stagnated after that date, because prices dropped and the Government provided no credit for new plantings after December 1975. Growers were slow in repaying loans. When extensions of time were requested in the late seventies, the Government encouraged farmers to replace abaca with oil palms. One source estimated that this action affected as much as 4,000 hectares of abaca.

Table 20--Soybean area and production, 1970-82

Year	Planted <sup>1</sup>	Harvested	Production
	1,000 hectares		1,000 metric tons
1970	--	0.6	0.6
1971	--	.9	1.0
1972	--	.7	.8
1973	1.2	1.2	1.5
1974	2.3	2.2	3.1
1975	8.2	7.3	8.0
1976	10.9	10.0	13.5
1977	14.8	14.8	19.0
1978	17.1	17.1	23.0
1979	21.4	21.4	29.9
1980	20.8	20.8	31.2
1981	26.0	26.0	32.0
1982	27.5	21.0	20.0

-- = Not available.

<sup>1</sup>Planting occurs from April until July and harvesting from August until November.

Ecuador meets the production requirements for abaca, which is best grown within 10 degrees of the equator, at an elevation of 2,000 feet in a tropical environment with year-long rainfall. Production is located on transitional slopes of the Andes west of Santo Domingo de los Colorados. Yield reaches a maximum 4 to 5 years after planting on the second and third year of harvests. Harvested area of 9,600 hectares in 1976 produced 13,000 tons, with a fiber yield of 1,377 kilograms per hectare. Yields were lower in the succeeding years because of drought and because most of the plantations had passed their maximum period of production and needed renovation. Production dropped in 1978 to 11,000 tons and in 1979 to 9,800 tons from an earlier peak of 13,200 tons. In 1981 10,200 tons were harvested from 12,000 hectares, giving a yield of only 850 kilograms per hectare.

Table 21--Abaca area and production, 1970-81

Year	Planted	Harvested	Production
	1,000 hectares		1,000 tons
1970	2.8	1.4	1.7
1971	3.2	1.7	2.0
1972	3.9	1.8	2.5
1973	5.6	3.8	5.5
1974	7.5	5.6	6.5
1975	9.5	7.3	9.3
1976	11.2	9.6	13.2
1977	12.6	12.5	12.5
1978	12.3	12.0	11.0
1979	12.3	12.2	9.8
1980	12.3	12.0	10.2
1981	--	12.0	10.2

-- = Not available.

Most of the fiber harvested is now exported; only about 1,500 tons are processed in the country.

### Tobacco

Tobacco is produced in several Provinces on about 3,200 hectares (table 22). During the early seventies, native black tobacco was the predominant type. Since then the increase has been largely in flue-cured and burley varieties (table 23). The two cigarette manufacturers brought this about by contracting for larger quantities of the latter to reduce imports. Cigar leaf is the only variety exported. Total tobacco production plunged in 1971 and 1972 because manufacturers reduced contract acreage, but since has increased in most years.

### Fruit

The type of fruit produced varies with altitude. The economically most important products in the seventies were pineapples, oranges, and melons. Pineapples and honeydew melons were especially developed for export.

On the Pacific Coast, the Santa Elena Peninsula produces honeydew melons, mangoes, watermelons, oranges, grapefruit, and lemons. Pineapple production has also developed in the Guayas Basin around Milagro. The principal production area for oranges is Bolivar Province, in a transitional zone between the Costa and the Sierra. Avocado production cultivation centers around the Quito market of Pichincha. The cold, high altitudes of Tungurahua produce apples and pears.

Table 22--Tobacco area, production, and prices, 1970-81

Year	Area	Production	Grower prices		
			Flue-cured	Burley	Black
	Hectares	Tons	U.S. cents per pound		
1970	2,354	2,140	--	--	--
1971	1,171	791	33	26	14
1972	871	635	33	26	14
1973	1,422	1,713	33	26	14
1974	2,200	1,448	33	26	14
1975	1,646	1,468	54	33	20
1976	984	1,273	58	34	24
1977	1,153	1,557	68	58	28
1978	1,681	2,137	75	58	35
1979	1,497	2,172	78	58	35
1980	1,453	2,871	93	79	36
1981	1,601	3,198	96	88	37

-- = Not available.

Pineapples developed as an export in the 1965-80 period. Statistics for 1975, the last year available, showed production of 233,000 tons from 7,400 hectares (table 24). This was concentrated in Guayas Province and over half of the harvest came from the Milagro area. The harvest season is December-March.

Although sources discount the accuracy of Government production statistics in the light of exports, the figures nevertheless suggest growth. Ecuador consumed 10-12 percent of the 1974 harvest as fresh fruit and processed the rest for export. Canned slices were exported in bulk containers to the United States, and juice to Chile and Argentina.

The Santa Elena Provinces of Guayas and Manabi developed honeydew melons as an export to the United States. Total area in 1975 was 500 hectares and production was 7,300 tons.

#### Plantains and Cassava

Plantains are a leading staple. Data on production are not generally available; however, production of 821,000 tons was reported for 1975, considerably greater than potato production of 499,000 tons. Sixty percent of the 75,000 hectares of plantains were in Manabi and Pichincha Provinces.

Cassava production in 1975 was 597,000 tons from 43,000 hectares (table 25). Although as a food crop it ranked in volume with rice, potatoes, and plantains, cassava has been ignored in most studies of Ecuador's agriculture because it is a subsistence crop that seldom gets into commercial channels.

The dry western Province of Manabi accounted for two-thirds of production and half of the area in 1975, the last recorded year. The Oriente zone provided most of the rest.

#### Wheat

Production and area of wheat, formerly an important cereal in the Sierra, declined steadily during the

seventies (table 26). Production of 22,000 tons from 23,000 hectares in 1981 was only 6.6 percent of national consumption of 334,500 tons. In the sixties, higher support prices seem to have had considerable effect in raising production. However, in the seventies further measures to stimulate wheat production had little effect.

In 1973, the National Wheat Program undertook measures to stimulate production by providing credit, and by raising the support prices (table 27). Although the support price was raised again to \$250 per ton from 1975 through 1979, supply response was weak, essentially because Ecuador has a limited supply of land suitable for expansion. In 1980 the support price was raised to \$291 per ton. Credit included funds for seeds, fertilizer, and herbicides. The program provided bonus coupons for seed and fertilizer. Government policy in 1980 was to guarantee producers a domestic wheat price at least equal to that of imported wheat.

An explanation sometimes offered for the precipitous drop in wheat cultivation is that the land reform of 1969 involved the distribution of 36 large haciendas on which much of the wheat had been produced. Distributed parcels are deemed too small for profitable wheat growing. Wheat farms in the Sierra in 1974 were so small that 85 percent of all plantings were on plots that averaged less than 1 hectare. The Sierra Provinces of Chimborazo, Bolivar, and Pichincha accounted for 60 percent of 1974 production.

Ministry of Agriculture estimates of production, area, and yield in 1974 reveal the small scale of wheat plantings in the Sierra (table 28). Large units showed higher yields because of greater use of certified seed and fertilizer and use of farm machinery for seeding, harvesting, and threshing. Since 1974, larger farms have been hesitant to invest because of the threat of agrarian reform.

Wheat consumption climbed from 120,000 tons in 1965 to 293,000 tons in 1980. Ecuador began

Table 23--Tobacco production by type, 1974-81

Type	1974	1977	1978	1979	1980	1981
Tons dry weight						
Flue-cured	156	683	864	884	1,313	1,325
Burley	372	511	686	701	1,120	1,220
Black	816	220	467	467	500	520
Cigar leaf	102	141	119	120	120	133
Total	1,447	1,557	2,137	2,172	2,971	3,198

subsidizing wheat imports in 1973 in order to maintain the wholesale flour price at \$10.12 per hundredweight. Flour consumption since then has increased steadily in part because bread prices have remained stable while prices for other foods have risen rapidly. The subsidy for wheat imports covered all costs above \$129 per ton at Guayaquil. The 1979 subsidy averaged \$53 per ton and cost the

Table 24--Pineapple area and production, 1971-75

Year	Area	Production
	Hectares	Tons
1971	3,256	55,950
1972	3,250	73,068
1973	2,443	44,595
1974	5,478	97,648
1975	7,355	233,461

Table 25--Cassava area and production, 1973-75

Year	Area	Production
	Hectares	Tons
1973	54,111	741,265
1974	48,895	837,665
1975	43,456	597,184

Table 26--Wheat area, production, yield, and consumption, 1965-82

Year	Area	Production	Yield	Consumption
	1,000 hectares	1,000 metric tons	1,000 kilograms	1,000 Metric tons
1965	63.0	55.0	873	120.0
1966	65.0	57.0	877	126.0
1967	65.0	60.0	923	130.0
1968	70.0	68.0	971	145.0
1969	80.0	70.0	875	155.0
1970	75.0	66.0	880	159.0
1971	70.0	60.0	857	165.0
1972	60.0	50.0	833	180.0
1973	45.3	43.6	962	191.0
1974	56.0	54.7	976	214.0
1975	59.2	50.9	860	246.0
1976	51.9	46.0	886	270.0
1977	22.0	20.4	927	280.0
1978	35.0	33.6	960	291.4
1979	25.0	24.0	960	292.0
1980	22.0	21.1	959	306.5
1981	23.0	22.0	957	334.5
1982 estimate	21.0	20.0	952	330.0

Source: Foreign Agricultural Service attache's report.

Government \$15.4 million. In 1980 the subsidy fluctuated between \$75 and \$85 per ton.

### Potatoes

The most important food crop in the highlands is potatoes, which are indigenous. Along with soft corn and barley, potatoes are one of the basic staples of the Indian population. A characteristic scene in May along the Pan-American Highway north of Quito is one of Indians sacking potatoes in the fields. Potato production responds quickly to prices when shortages appear.

Increased population caused a steady rise in consumption in the early seventies. Average annual production in 1970-74 of 548,000 tons was more than double that for 1961-65. However, subsequent shifts to bread resulted in a considerable drop in potato area, yield, and production. By 1980, production had dropped to 323,000 tons (table 29). Potatoes are produced principally in Carchi, Cotopaxi, Pichincha, and Canar Provinces. The agricultural survey of 1968 indicated that potato cultivations averaged less than 1 hectare. Since 1969, farmers have shifted to the high-yielding Catalina variety now used throughout the Country.

### Corn

Soft corn is a traditional subsistence staple in the Sierra; hard corn is produced in the Costa, largely for poultry feeding.

Hard corn production in 1981 was 232,000 tons from 137,000 hectares, giving a yield of 1.69 tons per hectare. Growth has been rapid from a base of 20,000 tons in 1960. The poultry boom has been the basic

Table 27--Average producer wheat price per hundredweight at mills, 1966-79

Period	Suces	Dollars
1966-70 avg.	110	6.11
1971	115	4.60
1972	120	4.80
1973	140	5.60
1974	<sup>1</sup> 200	<sup>1</sup> 8.00
1975	<sup>2</sup> 250	<sup>2</sup> 10.00
1976	250	10.00
1977	250	10.00
1978	250	10.00
1979	250	10.00

<sup>1</sup>Includes 20-sucres seed bonus.

<sup>2</sup>Includes seed and fertilizer bonus.

Sources: Attaches and Gislason.

Table 28--Wheat farms, plantings, yield, and estimated production, 1974

Size of farms	Units planted	Area planted	Area per farm	Estimated production <sup>1</sup>	Yield
Hectares	Number	Hectares		Tons	Kilograms per hectare
Total	31,606	58,084	1.78	54,760	976
10 or less	28,730	25,914	.97	20,623	795
11-20	2,724	7,050	2.59	6,542	928
21-50	1,526	7,479	4.90	8,211	830
51-100	271	3,584	13.22	4,784	1,335
101-500	27	6,657	246.55	9,083	1,364
501-1,000	53	2,428	45.80	3,496	1,440
1,001 and more	31	2,972	96.87	4,021	1,353

<sup>1</sup>Ministry of Agriculture; reported by attache.

reason for growth of hard corn production and the feed industry.

After 1974, the Government provided credit and supported prices through the marketing agency ENAC. In 1979, the development bank (BNF) made \$10.7 million of credit available for financing 60,000 hectares. ENAC was funded to support production with the purchase of 20,000 tons at the official support price of \$179 per ton. All corn purchased by ENAC was sold to the feed industry at official prices. The support price was raised for 1980 to \$247 per ton and continued at that level in 1981. Market prices in 1980 ranged between \$247 and \$273 per ton.

Although Ecuador was close to self-sufficiency in the seventies, occasional minor corn imports were necessary for the feed industry requirements. Ecuador met the pressing problem of storage in December 1977 by signing contracts for the construction of warehouses and silos.

Sources of information failed to agree on corn production but consumption by the feed industry gave a reasonable check. Production of mixed feeds in 1979 was estimated at 162,000 tons. Assuming that 65 percent of prepared feed was corn (105,000 tons) and adding 30,000 tons reportedly consumed on farms indicates total consumption of 135,000 tons—approximating the official production figure for that year. The margin to meet industrial needs, however, was so close that nominal imports were allowed on several occasions and mills made up shortages with supplies of sorghum, barley, and oats.

Soft corn has been a subsistence crop in the highlands since the days of the Incas. Recently production of 81,000 tons was reported from 95,000 hectares. Production increased through much of the decade. The National Grain Program reported 1974 production of only 7,000 tons from 62,000 hectares (table 30).

Table 29--Potato area, yield, and production, 1970-80

Year	Area	Production	Yield
	Hectares	Tons	Tons per hectare
1970	47,280	541,794	11.46
1971	53,452	680,740	12.73
1972	37,729	473,348	12.54
1973	43,576	539,198	12.37
1974	39,138	503,340	12.86
1975	39,499	499,371	12.64
1976	41,223	549,799	13.34
1977	36,000	417,000	11.58
1978	29,843	343,194	11.50
1979	26,894	254,507	9.46
1980	30,380	323,222	10.64

Table 30--Soft corn producers, area, production, and yield by Province, 1974

Province	Producers	Area	Production	Yield per hectare
	Number	Hectares	Hundredweight	
Carchi	2,741	3,121	70,836	22.69
Imbabura	6,858	12,699	212,477	16.23
Pichincha	5,455	11,842	152,545	12.88
Cotopaxi	1,716	946	10,448	11.08
Tungurahua	1,330	985	15,196	15.44
Chimborazo	3,536	3,231	34,289	10.61
Bolivar	2,563	8,250	1,056	12.80
Canar	5,467	4,179	32,944	7.88
Azuay	21,399	13,945	150,844	10.83
Loja	4,433	2,762	28,927	10.47
Total	55,488	61,660	814,278	13.14

The Government is encouraging soft corn production. In 1979, credit of \$3.62 million was provided by the BNF for 15,400 hectares at an average of \$235 a hectare.

### Barley

Barley is grown in the Sierra for food and is used as a raw material for brewing. Campesinos plant it on steep mountain slopes in the high altitudes of the Sierra where it thrives in cool weather. The principal producing Provinces are Chimborazo and Cotopaxi. Production in 1981 was 31,000 tons from 35,500 hectares (table 31). A harvest of 35,700 tons was expected in 1982 because of increased credit and high support prices. Credit of \$3.63 million has been allocated for the planting of 15,000 hectares at production costs of \$242 per hectare. Although support prices for food and malting barley were raised in 1980 to promote national self-sufficiency, farmers have not responded (table 32). In the Sierra, wheat

Table 32--Minimum barley support price, 1976-80

Type	1976	1977	1979	1980
Dollars per hundredweight				
Nonmalting barley	7.40	7.40	9.20	11.60
Malting barley	8.60	9.00	10.00	12.80

products, mainly bread, were increasingly substituted for soft corn and nonmalting barley products consumed by the indigenous population. The brewing industry therefore had to import 34,000 tons of barley in 1979.

Three breweries annually required 15,000 to 18,000 tons of barley per year for malting during the seventies. Completion of a new brewery in July 1979 raised import requirements to 20,000 tons a year. This is in addition to the small quantity supplied by domestic sources—less than 8,000 tons in 1975.

Table 31--Barley area, production, imports, use, and stocks, 1960-81

Year beginning July 1	Area	Production	Imports	Consumption	Ending stocks
	1,000 hectares		1,000 tons		
1960	82	62	0	60	35
1961	53	49	0	61	23
1962	73	58	0	65	16
1963	76	67	0	68	15
1964	73	62	4	70	11
1965	75	67	0	68	10
1966	74	66	0	69	7
1967	74	73	2	71	11
1968	74	76	0	72	15
1969	76	69	0	69	15
1970	76	76	5	83	13
1971	76	69	6	74	14
1972	69	62	3	71	8
1973	66	57	5	64	6
1974	61	56	6	59	5
1975	67	55	10	60	5
1976	50	40	16	45	0
1977	40	32	16	56	0
1978	32	22	38	55	0
1979	35	31	32	60	0
1980	42	36	36	72	0
1981	40	36	30	76	10

Source: Attache's report.

## Livestock Production and Use

Ecuador has been essentially self-sufficient in meat, milk, and other livestock products, except for minor imports of nonfat dried milk. The sector's contribution to the GDP ranges from 7 to 8 percent compared with 9 to 10 percent for crops.

Two significant developments of the seventies were the extension of pasture areas and the rapid development of the poultry industry. The opening up of pasture areas in the coastal Provinces of Manabi and Esmeraldas in the sixties and seventies provided the increase in carrying capacity that made possible the growth of herds. Poultry production grew from a low base in 1970 to a level equaling pork production by 1980, and surpassing it in 1981.

The distribution of livestock production is a good example of geographical specialization. Two-thirds of all dairy cattle are concentrated in the cool Sierra, which in turn accounts for three-fourths of the milk production. Some of the cattle in the Sierra are dual purpose. But beef cattle, mostly Brahman, are largely on the warmer, more humid coast. Some cattle raising is slowly moving into the Oriente region, but transportation is a major drawback to development. While hogs are a specialty of farmers in the coastal Province of Manabi, large numbers are also raised near the major cities. Sheep are grazed in the paramos, or high pastures of the Sierra. Commercial poultry production is concentrated on the periphery of the three largest cities. Some cattle raising is slowly moving into the Oriente, but transportation is a major drawback to development.



Improved livestock breeds were imported in the seventies to take advantage of expanding pasture area in both the Costa and Sierra zones. Upper left: native Criollo cattle. Upper right: More than 30,000 head of improved beef cattle, principally Braham-crossed cows, were imported, mainly from Costa Rica. Lower left: Imported Hosten-Friesian herd on a highland pasture. Lower right: Purebred Rambouillet sheep imported from Utah. Photo lower right: Rene Vasco.

Pastureland, already abundant, expanded sharply in the midseventies:

	Million hectares
1973	2.31
1974	2.66
1975	3.06
1976	3.41

The conversion of banana plantation lands to pasture was a major factor in this expansion. The Provinces with the largest pasture areas in 1976 were Manabi with 520,000 hectares and Pichincha with 420,000 hectares.

#### Cattle and Beef

Ecuador's cattle population expanded from 1.2 million head in 1954 to 2.47 million head in 1974. However, by 1982 the number of cattle had dropped to just under 2.35 million head from a peak of 2.8 million 5 years earlier. Four years of drought and increased slaughter had wiped out the gains of the first half of the decade and had reduced herd numbers well below levels of the census of 1974.

The U.S. agricultural attache estimated annual growth in cattle numbers at 5 percent between the 1954 and 1974 censuses; then a 3.9-percent growth rate in 1974-77; but finally a drop during each remaining year of the decade. Growth in cattle numbers at the coastal Provinces, with their wide areas of potential pasture, made possible the 160-percent increase between the two censuses and caused the Costa cattle count to catch up with that of the Sierra, where limited pasture area inhibited cattle expansion. Beef and veal production in 1980, 1981, and 1982 were 92,900 tons, 93,500 tons, and 100,500 tons respectively.

Under a livestock repopulation program, begun in 1973 with a budget of \$33 million, 32,000 cattle were eventually imported for breeding and upgrading herds. The program involved both the public and the private sector.

Under the public sector program for the coast, the Government imported 30,600 Brahman-crossed females and 1,600 bulls for herd development. Costa Rica was the principal supplier, providing a total of 29,000 heifers and 1,000 bulls. Panama was the source for 500 bulls. The program ground to a halt in 1976 because of lack of funds and because of opposition of domestic breeders who feared that further imports would depress prices.

The private sector program was designed primarily for the dairying in the Sierra but also made some provision of Brahman cattle for the coast. It provided credit for breeding cattle imports.

#### Dairy Cows

Dairy development paralleled beef cattle. Growth came with good weather and the imported breeding cattle; it declined in the late seventies because of drought and relatively low prices.

Government funds amplified by those of international lending agencies financed dairy cattle imports. Private-sector imports surged from 350 in 1974 to 1,800 in 1975, but shrank to under 500 in 1976 with a freeze in credit. A subsequent thaw in the credit supply resulted in a rebound to 1,500 head in 1978 and 1,400 head in 1979. The principal breeds imported were Holstein-Friesian and Brown Swiss.

The drought of the late seventies, however, reduced dairy cattle numbers and milk production. The pricing system, geared to urban consumers, left farmers with little incentive to attempt supplementary feeding. The number of dairy cows remained almost static around 650,000 during the drought years. Milk production, which had increased from 492,000 tons in 1970 to 804,000 tons in 1977, declined to 641,000 tons in 1978 under the impact of drought and low prices. Production in the eighties has been at an even lower plateau; 352,000 and 355,000 tons were reported for 1980 and 1981, respectively.

The Government made two moves to encourage dairying in 1980. It raised fresh milk prices by some 70-80 percent, from 24 cents per liter in 1976 to 42 cents in 1980. In addition to this the Government offered purebred Brown Swiss bulls for sale from the breeding station at Santo Domingo de los Colorados, a location transitional between the Sierra and the Costa that is accessible to both regions.

#### Swine

Pig numbers increased 65 percent between the 1954 and 1974 censuses to reach 1.3 million head. The Attache reported a tripling of these numbers by December 1981 to 4.1 million and the estimated numbers for 1982 were 4.3 million. The coastal Province of Manabi accounted for the largest numbers in both census counts. Pork production increased from 27,000 tons in 1970 to 47,300 tons in 1980. The 1982 production forecast is 57,600 tons.



## Sheep

The Sierra accounted for 99 percent of sheep in each of the censuses. The paramos at higher altitudes above the crop areas of the Andes are suitable for sheep grazing. Sheep numbers, which had decreased between the census counts to 1.09 million head, rebounded by 1982 to 2.34 million head. The Government directed its repopulation efforts in the Sierra to sheep rather than to beef cattle. In 1975, 1,000 Rambouillet ewes and 75 rams were imported from the United States, and 5,000 Corriedale ewes and 250 rams were imported from Chile.

## Poultry

After 1973, petroleum revenue increased personal income, fueling demand for poultry. The poultry sector responded rapidly, making possible a drop in prices for poultry meat to levels comparable with beef. Residents in Ecuador recalled that chicken prices had been roughly double those of beef during the sixties. Average annual poultry population grew from 5.7 million birds in 1967 to 7.5 million birds in 1976. Much of this was in producing units that exceeded 20,000 birds (table 33).

The broiler industry grew rapidly, beginning with less than a million birds in 1970 and reaching an estimated 8.5 million birds in 1976. The laying hen population increased 20 percent per year after 1973 and broilers increased 35 percent per year. Growth was largely in commercial flocks because family flocks changed little. The structure of the industry in 1976, the last year for which data are available, showed a concentration of numbers in large commercial operations.

Table 33--Distribution of poultry production, 1976

Flock size	Farms	Birds
	Number	Thousands
<b>Laying flocks:</b>		
20,000 or more	20	600
10,000-19,999	30	400
5,000-9,999	50	400
3,000-4,999	75	250
1-2,999	600	600
Total	775	2,150
<b>Broiler flocks:</b>		
50,000 or more	7	400
20,000-49,999	15	300
10,000-19,999	25	300
5,000-9,999	40	200
1-4,999	120	240
Total	207	1,440

The production of poultry meat grew from 24,000 tons in 1978 to 36,000 in 1981. Production of eggs increased from 45,000 tons to 73,000 tons during the same period.

Ecuador's 10 hatcheries in 1976 had a combined incubation capacity of 2.1 million eggs. The United States supplied 95-99 percent of the hatching eggs during the decade. The duty rate for shell eggs for reproduction was 30 percent; that for day-old chicks, 10 percent.

## Agricultural Trade

The striking rise in petroleum revenue during the seventies is manifest in the growth in import value of agricultural products from \$19 million in 1970 to \$202 million in 1980 (table 34). The principal gainers among imports were wheat, lard, and soybean oil. The United States was the major supplier.

Although petroleum was the dominant export of the seventies, agricultural exports showed remarkable growth, increasing from \$174 million in 1970 to \$734 million in 1979. The United States was the principal market.

The jump in the value of petroleum exports to 50 percent of Ecuador's total (1976) reduced agriculture's share. Agricultural exports, nevertheless, maintained their value, and in one year, 1977, when cocoa and coffee prices were at their zenith, surpassed petroleum exports of \$502 million with a total value of \$539 million.

## Major Agricultural Exports

Agricultural exports in the seventies were dominated by four tropical products: bananas, cocoa, coffee, and sugar. Minor exports that had significant value were castorbeans and pyrethrum. Effort at diversification added or increased exports of abaca, tea, pineapples, honeydew melons, and cantaloupes.

The trend toward processing products for export gained momentum during the decade and included cocoa, castor oil, and soluble coffee. Reclassification of cocoa products as manufactures would completely obscure the fact that cocoa in any form was the most valuable agricultural export during 2 years of the seventies. These items are therefore included in tables of agricultural value.

**Bananas.** Bananas were Ecuador's most valuable agricultural export from 1960 to 1975. Although the

Table 34--Agricultural trade, 1970-81

Year	Imports			Exports		
	All sources	From United States		All destinations	To United States	
		Value	Share		Value	Share
		Million dollars	Percent		Million dollars	Percent
1970	19.4	13.5	69.4	174.1	94.7	54.5
1971	23.4	18.5	78.9	173.0	71.8	41.5
1972	32.4	21.0	64.9	228.6	82.5	36.1
1973	42.4	30.6	72.3	200.6	90.0	45.0
1974	72.7	56.7	78.0	358.5	175.3	48.9
1975	83.5	65.8	78.8	311.1	147.9	47.5
1976	84.6	71.2	84.2	419.2	232.7	55.6
1977	87.4	75.9	86.8	602.5	292.7	48.5
1978	117.7	81.5	69.2	701.2	411.0	57.2
1979	154.2	95.0	61.6	734.5	371.7	50.6
1980	202.6	118.8	58.7	654.2	356.0	54.4
1981	--	122.4	--	--	314.7	--

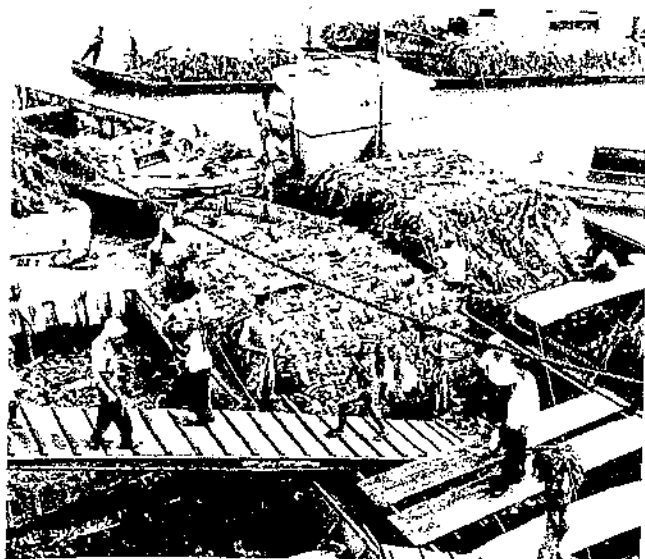
-- = Not available.

Sources: FAO, U.S. Customs, *Anuario de Comercio Exterior*.

high prices of coffee and cocoa in the late seventies relegated them to third place, firmer banana prices in 1980, coinciding with a sharp drop in coffee and cocoa prices, enabled them to resume first place in 1980 and 1981. The volume of exports throughout the seventies was notably uniform in a range between 1.2 to 1.4 million tons.<sup>3</sup>

<sup>3</sup>The two sources of banana export statistics are the National Banana Program and the customs series in the *Anuario de Comercio Exterior*.

Ecuador's position in the world market is that of a residual supplier. It has two handicaps. Higher transportation costs including transit rates through the Panama Canal give the Country's Caribbean competitors an edge in the major U.S. and European markets. Taiwan and the Philippines hold the same advantage in the Japanese market. The multinational banana marketing corporations in the Caribbean also have the advantage of vertical integration as they own the plantations, packing facilities, land transport, ocean



Banana exports, then and now. Bananas were once bulk-loaded on boats for transportation downriver (photo, left). The higher yielding, but more easily bruised, variety now produced is carefully cartoned at the plantation (photo, right).

shipping, and even marketing facilities abroad. These corporations do not own the Ecuadorian plantations.

Freedom from high winds gives Ecuador an advantage when weather-related disasters cut supplies in other countries. Also the lower production costs, notably in labor, offset to some degree the higher transport costs. The export pricing policy during the seventies was aimed at keeping the banana prices 60 cents per box below those of Ecuador's competitors.

In 1974, Costa Rica, Honduras, and Panama set up a consortium similar to OPEC in an effort to emulate for bananas the price cartel success of the oil group. Ecuador, however, sent only observers to the first meeting and refused to endorse the proposed export tax of \$1 per box. Ecuador believed that the higher price would bring new competitors such as the Canary Islands and Brazil into the market.

Ecuador had gained a strong position in the U.S. market between 1961 and 1964 when the Panama disease and hurricanes reduced competition from Caribbean countries. Average annual export volume to the United States was 744,000 tons, over 60 percent of Ecuador's total. The Caribbean countries, however, countered by developing the Cavendish variety which was disease resistant and less vulnerable to storms. A consumer preference for Cavendish also gave them an edge in competition for markets. This cut into Ecuador's lead until 1972, when only 15 percent of Ecuador's banana exports went to the United States.

Ecuador met these challenges by also shifting to the Cavendish variety. Its adoption and a replay of hurricane damage in Honduras assured a recovery of banana exports to U.S. markets in 1974 and 1975. The United States has been the major market for Ecuador's bananas, surpassing the European Economic Community (EEC) in every year since 1975. The annual volumes at the end of the decade were uniformly above 500,000 tons.

The case of entry into the Japanese market was similar to that into the U.S. market but did not have a happy ending. After Taiwan, the principal supplier of Japan, suffered from storms in 1968, Ecuadorian bananas moved into the Japanese market, with exports in excess of 425,000 tons per year from 1970 to 1972. This offset the drop in the U.S. market. However, Japan's nearby suppliers, the Philippines and Taiwan, in 1973 and 1974 recovered from disasters and were able to cut into Ecuador's market share.

The EEC was a slightly larger market than the United States from 1968 to 1973. After cresting at 452,000 tons in 1975, Ecuador's banana exports to the EEC fell to only 255,000 tons in 1980. This drop in sales was partially offset by rising exports to the COMECON market and Yugoslavia.

The principal Latin American market was Chile. Exports to that country averaged 57,800 tons per year during the seventies. Banana exports to Argentina assumed some importance in 1979 and 1980.

**Coffee.** Coffee was second in value among agricultural exports during 1960-75. It rose to first place in 1976 and jockeyed with cocoa during the remaining years of the decade. The sudden rise in coffee prices following the Brazilian freeze of 1975 accounted for much of the rise in export value from \$63 million in 1974 to \$194 million, but volume increased 24 percent.

Coffee exports remained at a high level for the rest of the seventies and into the eighties, but peaked in 1978 when Ecuador exported 87,000 tons value at \$281 million. Drought, insect damage, and low prices reduced subsequent exports to a low of 59,000 tons in 1980, but exports recovered to 66,000 tons in 1981.

Ecuador exports both Arabica and Robusta varieties. Arabica is the principal variety exported, averaging 74 percent for 1973-77, but Robusta gained a little ground in 1978 and 1979 to a 30-percent share.

Completion of two soluble coffee plants raised the value per ton of exports at the end of the decade, but volume of 3,873 tons of soluble coffee, bean-equivalent, was only 5 percent of total coffee exports. Processing capacity increased with the opening of a new plant in 1980 that will affect future exports.

Exports rose substantially between 1960 and 1981 (table 35). Average annual coffee export volume during the 1966-75 decade was 54,000 tons compared with 28,000 tons for 1960-64. The annual average for the remainder of the decade was 76,000 tons. Exports have been lower since then; total volume in 1981 including soluble equivalent was 66,000 tons.

Coffee export taxes became an important source of revenue in 1976 when a revenue value of \$45 million was reported in the press. A new tax schedule was enacted in October 1981 because coffee prices had fallen to low levels; the price to growers at that date was only 60 cents per pound.

Table 35--Coffee exports and imports, 1966-81

Year	Volume	Value	Unit value
	Tons	1,000 dollars	Dollars per ton
1966	43,687	32,539	745
1967	56,694	39,871	703
1968	49,560	34,867	699
1969	37,363	26,045	697
1970	52,286	50,001	956
1971	45,943	36,100	786
1972	61,022	46,990	770
1973	75,414	65,427	867
1974	59,574	67,755	1,137
1975	61,047	63,472	1,040
1976	86,427	193,908	2,234
1977	55,678	174,850	3,140
1978	87,438	281,000	3,213
1979	74,081	247,000	3,334
1980	<sup>1</sup> 58,923	139,986	2,376
1981	<sup>1</sup> 66,164	122,286	1,848

<sup>1</sup>Includes soluble coffee, with a bean equivalent of 3:1.

Sources: 1966-76, *Anuario de Comercio Exterior*; 1977-81, attache reports and export permits.

The United States has been the most important market (table 36). In 1979 the United States took half of the total exports of coffee, followed by West Germany (12 percent) and Hungary (10 percent). The U.S. share rose 73 percent in 1981.

**Cocoa.** Cocoa and cocoa products had been third among Ecuador's agricultural exports during 1966-67, but climbed quickly to rank first in 1977 and continued to share that position with coffee until 1980. The value of \$246 million in 1977 surpassed that of coffee and bananas. The price declines of 1981 lowered the value to \$137 million. Aggregate volume more than doubled as the bean-equivalent exports increased from 41,000 tons in 1970 to 89,000 tons for 1980, reflecting the larger harvests of the late seventies.

The shift from cocoa beans to processed cocoa followed the growth in processing capacity from a negligible base in 1970 to 146,000 tons in 1979 (table 37). As late as 1974, over 80 percent of cocoa earnings were from bean exports. By 1979, their share had dropped to 15 percent. Conversely, cocoa-product exports, which had not exceeded 10,000 tons before 1972, began a sharp climb in 1976 to 28,000 tons and reached an average of 84,000 tons (bean equivalent) by 1979-80.

Government taxes, as discussed earlier, favored products over bean exports during the seventies. However, after prices fell in 1980 to below \$1.40 per pound, producer incentives as well as Government revenues were reduced, and all taxes on beans were dropped.

The tax on cocoa-bean exports had put a premium on contraband shipments to Colombia, which were estimated to have been as high as 8,000 tons a year before stricter border controls were enforced in 1972. The official trade book showed no bean exports to Colombia in 1976 but some estimates suggest that the contraband still was in the vicinity of 4,000 to 5,000 tons.



Mature cocoa pods ready for harvest. The value of Ecuador's cocoa bean and cocoa-product exports peaked at \$260 million in 1978, 10 times their value at the start of the decade. Photo: Embassy of Ecuador, Washington, D.C.

Table 36--Coffee bean exports to selected countries, 1971-81

Year	United States	West Germany	Hungary	Chile	Other	Total
1,000 tons						
1971	26.1	3.6	4.2	1.0	11.0	45.9
1972	28.1	7.6	8.6	.1	16.6	51.0
1973	36.2	11.3	2.0	1.0	22.0	75.4
1974	31.3	10.9	3.7	2.4	11.3	59.6
1975	37.0	3.8	5.1	5.8	9.3	61.0
1976	50.9	7.0	3.8	5.1	19.6	86.4
1977	30.8	8.1	4.6	1.6	7.9	53.0
1978	53.0	11.7	.6	4.7	16.2	86.2
1979	41.8	8.7	8.3	5.2	18.0	82.0
1980	28.9	4.9	6.5	3.6	10.0	53.9
1981	40.4	4.0	2.6	3.6	4.4	55.0

Sources: 1971-76, *Anuario de Comercio Exterior*; 1977-81, attache reports and Central Bank export permits.

Table 37--Cocoa bean and product exports, 1965-81

Year	Beans	Liquor	Butter	Cake	Other	Total
1,000 tons, bean equivalent						
Volume:						
1965	39.5	0.0	0.1	0.0	0.0	--
1966	31.7	.5	.9	.3	.0	--
1967	42.2	.5	.7	.7	.0	--
1968	67.2	.2	1.7	.7	.0	--
1969	32.4	.5	1.1	.8	.0	--
1970	36.5	.8	1.3	1.3	.0	--
1971	48.7	1.3	2.2	1.9	.1	--
1972	46.7	2.7	2.5	2.1	.3	--
1973	32.6	3.8	1.5	1.3	.1	--
1974	69.2	6.7	2.6	1.7	.3	--
1975	37.1	11.8	2.5	1.4	.1	--
1976	21.9	25.1	2.3	.8	.1	--
1977	18.6	37.6	3.0	.5	1.1	--
1978	16.2	48.6	5.2	.9	.1	--
1979	15.0	52.7	6.7	1.2	.5	--
1980	14.1	43.5	6.0	8.8	1.4	--
1981	24.1	27.6	5.8	8.4	1.8	--
Million dollars						
Value:						
1965	19.5	0.0	0.1	0.0	0.0	19.6
1966	17.0	.1	1.2	.1	.0	18.4
1967	23.6	.2	1.1	.2	.0	25.1
1968	38.9	.1	2.3	.2	.0	41.5
1969	24.2	.2	1.6	.2	.0	26.2
1970	22.1	.3	1.8	.5	.1	24.8
1971	24.3	.6	2.8	1.0	.3	29.0
1972	23.6	1.7	3.2	1.2	.1	29.8
1973	25.9	4.3	3.7	.7	.7	35.3
1974	102.5	11.9	9.7	1.4	.2	125.7
1975	41.8	20.9	7.4	1.3	.2	71.6
1976	31.5	52.3	10.9	.8	.3	95.8
1977	59.9	167.6	15.1	2.4	.7	245.7
1978	50.1	183.0	22.8	3.5	.6	260.0
1979	40.3	195.6	33.4	4.0	.9	27.4
1980	31.2	127.1	32.8	10.3	2.2	203.6
1981	38.8	58.3	29.0	3.2	1.4	131.7

-- = Not applicable.

Sources: 1965-79, *Anuario de Comercio Exterior*; 1980-81, export permits of Central Bank.

Principal countries of destination in 1981 were the United States and EEC countries, notably West Germany, Netherlands, Italy, and Belgium. Official trade statistics reported large exports of cocoa beans to Colombia through 1975; export permit data show that after 1975 exports to Colombia were in the form of liquor rather than beans (table 38).

The United States took 47 percent of the exports in 1981 and has been the most important market in every year after 1964, except 1977. The USSR entered the market in 1968 to take 24,500 tons but has made only intermittent purchases since.

Cocoa-product exports include chocolate liquor or paste, cocoa butter, and cocoa cake and powder. These increased in value from \$107,000 in 1965 to \$234 million in 1979 with the construction of 10 plants processing to the liquor stage. By 1979, chocolate liquor was the most important form, followed by cocoa butter and cocoa cake and powder.

The United States was the principal market for processed cocoa, taking the largest volumes in every year after 1975. Prior to 1975, Latin American countries were important. Colombia was a market for chocolate liquor, Argentina for cocoa butter, and Peru for cocoa cake. Their imports continued through the rest of the decade, but they were outranked by the United States.

**Sugar and Molasses.** Sugar ranks fourth among the exports. Average annual export value for 1970-79 was \$13.3 million (table 39). Export volume peaked in 1972 at 94,500 tons. It declined in the last 5 years of the decade to an annual average of 49,000 tons in spite of production growth. Increased consumption cut export availabilities during this period. A conspicuous example was 1974, when Ecuador was unable to meet the assigned U.S. quota of 97,000 short tons (including prorrations) because consumption had cut export availability to 54,000 tons. Two other reasons for slumping exports in the late seventies were low world prices and strikes at one of the major refineries. Exports of 71,000 tons in 1979 met the International Sugar Agreement (ISA) quotas of that year (70,000 tons) and ended the decline. With world sugar prices above the ISA quota price level of 16 cents a pound in 1980, no quotas were applied. Exports in 1981 were 47,000 tons.

The United States was Ecuador's only sugar customer except in 3 years. Malaysia purchased 10,000 tons in 1972; France, 9,800 tons in 1973; and Colombia, 2,300 tons in 1977. Ecuador met the U.S. preferential quota assignments, which grew from 20,000 tons in 1960 to nearly 88,000 tons in 1974, in every year except 1974, as mentioned above.

Ecuador as a member of OPEC did not enjoy GSP preference when the United States increased import

Table 38--Cocoa-bean exports by destination, 1963-81

Year	United States	Netherlands	West Germany	Colombia	Other	Total
1,000 tons						
1963	16.3	2.1	4.0	5.7	7.4	35.5
1964	7.6	2.0	3.2	10.0	5.1	27.9
1965	15.3	2.5	4.9	8.8	8.0	39.5
1966	14.8	2.3	3.5	4.8	6.3	31.7
1967	18.3	4.6	2.7	7.7	8.9	42.2
1968	18.1	1.2	3.5	7.8	36.6	67.2
1969	6.2	2.0	2.4	3.7	18.1	32.4
1970	13.7	2.3	2.1	5.0	13.4	36.5
1971	17.2	1.7	3.0	6.3	20.5	48.7
1972	15.8	2.9	4.4	8.1	18.5	46.7
1973	9.3	1.2	2.5	.8	16.9	30.7
1974	23.1	12.7	9.0	6.2	18.3	69.3
1975	7.7	5.6	4.0	3.6	16.2	37.1
1976	9.0	3.4	2.4	--	7.1	21.9
1977	3.4	6.0	4.4	--	6.3	20.1
1978	6.1	4.1	1.7	--	4.3	16.2
1979	4.5	3.2	2.0	--	4.5	14.2
1980	7.2	1.6	1.5	--	3.8	14.1
1981	11.3	4.3	2.8	--	7.7	24.1

-- = Not available.

Sources: 1963 and 1979, *Anuario de Comercio Exterior*; 1977, 1978, 1980, and 1981, Central Bank.

duties on sugar in the late seventies. Ecuador nevertheless continued to market its sugar in the United States.

Ecuador's export market for molasses is the U.S. live-stock feed industry. Exports during the decade ranged in volume between 25,000 tons in 1972 and 85,000 tons in 1973. Growing domestic demand during the decade from alcohol producers and livestock farmers cut back amounts available for export. Molasses exports in 1981 of 54,000 tons were valued at \$3.2 million.

**Rice.** Ecuador entered the rice export market during World War II when supplies from Southeast Asia were cut off. The average annual volume dropped from 43,000 tons in the forties to 31,000 tons during the fifties, and then to 24,000 tons for 1960-64 (table 40). Ecuador stopped exporting rice after 1966 except for contraband movements to Peru during the droughts of 1968 and 1975, and in 1976, when ENAC made export sales.

Stagnant production left no surpluses for export during the decade after 1966 and deficits appeared for drought years 1968 and 1974. Imports in 1974 included 9,000 tons from the United States, 6,900 tons from Italy, and 5,400 tons from Colombia. Imports in 1981 were 4,000 tons. Government credit and other programs combined with good weather conditions led

Table 39--Sugar and molasses exports, 1966-81

Year	Sugar		Molasses	
	Volume	Value	Volume	Value
	Tons	1,000 dollars	Tons	1,000 dollars
1966	59,336	6,619	50,219	479
1967	67,667	7,547	18,496	271
1968	63,463	7,111	27,731	323
1969	76,773	10,372	27,005	245
1970	55,355	8,036	60,928	685
1971	89,041	13,216	60,497	601
1972	94,517	12,275	25,369	289
1973	76,602	12,460	84,744	1,591
1974	49,784	21,709	59,312	2,041
1975	44,851	23,632	49,523	1,463
1976	40,116	11,692	28,570	977
1977	50,612	8,802	69,554	1,666
1978	39,048	6,772	28,391	980
1979	71,165	12,553	61,886	3,446
1980	53,804	35,483	58,000	3,903
1981	47,254	13,800	54,000	3,237

Sources: 1966-76, *Anuario de Comercio Exterior*; 1977-81, Central Bank.

to exportable surpluses for 1975 and 1976 totaling at least 30,000 tons. Under the proper incentives of government policy and international prices Ecuador could again become an increasingly important exporter of rice.

### Minor Agricultural Exports

Ecuador has made periodic efforts since World War II to diversify exports and lower dependency on bananas, coffee, and cocoa. Two labor-intensive minor exports developed since World War II were castorbeans and pyrethrum. Since 1965, Ecuador has added six other exports that earn foreign exchange, often providing cash income for specific areas: fresh flowers, mushrooms, abaca, tea, canned pineapples, and melons.

Table 40--Rice exports, 1940-77

Year	Volume	Value
	Tons	1,000 dollars
1940	18,342	912
1941	20,546	1,603
1942	32,028	4,128
1943	46,992	6,719
1944	64,609	9,131
1945	29,318	4,474
1946	58,962	15,079
1947	61,988	14,385
1948	62,983	13,225
1949	30,999	5,315
1950	62,775	8,417
1951	5,022	814
1952	56,500	11,300
1953	32,800	6,000
1954	19,500	3,300
1955	20,700	2,600
1956	11,700	1,600
1957	37,384	4,397
1958	37,121	3,179
1959	22,506	2,057
1960	37,398	3,153
1961	24,268	2,681
1962	11,852	656
1963	33,846	3,661
1964	10,570	1,331
1965	--	--
1966	22,478	2,970
1975	10,000	--
1976	14,000	2,531
1977	12,500	--

-- = Not available.

Sources: 1941-48: J.S. Efferson, American Embassy Bogota Dispatch 204. 1960-77: *Anuario de Comercio Exterior* and attache reports.

**Castorbeans.** The volume of castorbean exports has fluctuated widely since 1960. Following a drop in price, volume also dropped from 25,000 tons in 1964 to 9,000 tons in 1967. With a steady increase in prices after 1969, exports reached 21,000 tons in 1973, with a record value of \$7.74 million. The principal markets in 1973 by share of volume were the Netherlands, 75 percent, and Japan, 20 percent. Since the completion of a crushing plant in 1976, exports have been in the form of oil instead of castorbeans. The castor oil volume approximated 3,000 tons per year.

**Pyrethrum.** Pyrethrum, a natural insecticide, is exported as dried flowers and as extract. Pyrethrum exports have fluctuated, with values climbing from \$257,000 in 1960 to \$1 million in 1963, to a peak of \$1.9 million in 1965. The value tapered to \$573,000 in 1974, but rose to \$709,000 in 1975. Seventy-five percent of Ecuador's pyrethrum was once produced by two large producers. High labor costs have reduced the large companies' profits, prompting them to shift production to small farms by supplying plants to cultivators and guaranteeing to purchase their production.

Table 41--Castorbean area, production, and exports, 1960-82

Year	Area harvested 1,000 hectares	Production 1,000 tons	Exports (bean equivalent)	
			Volume 1,000 tons	Value Million dollars
1960	12.2	11.0	10.5	1.4
1961	21.1	19.0	18.4	2.3
1962	23.3	21.0	20.2	2.0
1963	24.4	22.0	20.9	2.0
1964	28.9	26.0	25.0	2.6
1965	21.1	19.0	18.5	1.7
1966	11.1	10.0	9.8	1.0
1967	11.1	10.0	9.0	1.1
1968	11.1	10.0	9.1	1.2
1969	--	--	--	--
1970	22.2	20.0	18.3	1.7
1971	18.9	17.0	15.8	1.7
1972	22.0	20.0	19.9	3.7
1973	22.2	20.0	21.0	6.6
1974	22.5	21.0	19.5	5.8
1975	22.5	16.0	14.3	2.3
1976	22.5	12.9	7.9	2.8
1977	22.5	9.6	9.8	2.6
1978	8.2	8.2	7.9	3.0
1979	14.0	10.5	10.1	3.5
1980	13.5	10.1	7.9	--
1981	13.5	10.9	16.7	--
1982	13.5	10.9	11.3	--

-- = Not available.

Source: National Planning Board, 1961-71.

Exports to the United States had a value of \$1.5 million in 1968 but had declined to only \$51,000 by 1973. Thus, Latin America is the only remaining major market for Ecuadorian pyrethrum products (table 42). Exports peaked at 150 tons in 1977, and then fell to 5 tons in 1978 and 15 tons in 1979.

**Fresh Flowers.** Fresh flower exports, mostly chrysanthemums and carnations, increased in value from \$11,000 in 1965 to \$687,000 in 1974. A soft flower market in the United States in mid-1975 followed by a worker strike led to the decision to close down the only 50-acre operation in the country.

**Mushrooms.** Mushrooms grown in the Sierra region were first exported in 1968, increasing rapidly to 205 tons on a drained-weight basis in 1971, and to 341 tons in 1973. A worker strike in 1975 played a role in closing the older of two mushroom-producing plants later that year. This curtailed the local supply of the fresh product and canned sales to the United States. A second plant, which had begun to produce in August 1975, was not able to meet even local demand for fresh production by year's end. The new plant has a capacity to produce 1.5 million pounds, half of which would be for the domestic market and the balance for export. The sale of fresh mushrooms as opposed to canned is preferred because the returns are higher.

**Abaca.** Abaca (Manila fiber) exports began with 162 tons in 1966 and peaked at 9,900 tons in 1976 (table 43). They have subsided slightly since because of a decline in prices. The United States is the major importer but small quantities are exported to Japan and Peru. A new direction in the U.S. market has been in the manufacture of coarse paper products such as meat bags. U.S. imports in 1981 were 7,300 tons, valued at \$7.1 million.

Table 42--Pyrethrum exports to selected countries, 1973-79

Country	1973	1974	1975	1976	1979
	Tons				
Argentina	11.4	5.2	6.8	1.4	2.4
Brazil	2.7	2.3	6.8	10.3	.9
Colombia	3.4	1.8	2.9	4.2	2.4
Chile	2.0	--	.1	.1	--
Mexico	3.5	5.5	4.2	3.1	8.3
Peru	.6	.4	.4	.2	.5
Uruguay	.4	.5	.6	--	--
Venezuela	--	.5	1.5	.1	.5
Total	24.0	16.2	23.3	19.3	15.0

-- = Not available.

Source: Attache reports.



**Tea.** Tea is grown on the eastern slope of the Andes, near Puyo. Exports to the United States began in 1968 with a shipment of 15 tons valued at \$10,000. By 1974 exports had grown in volume to over 1,000 tons and in value to \$875,000. Exports in 1979 were 1,512 tons valued at \$1.8 million. The proximity to the U.S. and Canadian markets gives Ecuador an advantage over such traditional tea suppliers as Ceylon, India, and Indonesia.

**Pineapples.** Pineapples are exported fresh, canned, and fresh chilled. The two major markets since 1970 have been Chile for fresh pineapples and the United States for the canned and fresh chilled.

In the early seventies, the volume of fresh exports declined and that of canned increased (table 44). The value of canned pineapples increased rapidly after 1970 when large volumes began to go to the United States; however, it declined sharply after 1974.

**Melons.** Fresh melon exports, mostly honeydews, increased from \$8,000 in 1964 to \$48,000 in 1971. Statistics for 1973 reported a volume of 1,500 tons and value of \$145,000 (table 45). Volume increased steadily to 2,000 tons with a value of \$386,000 in 1979.

**Plantains.** Plantains are exported in substantial quantities but Ecuadorian statistics do not distinguish them from bananas. U.S. import statistics indicate, however, that Ecuador has occasionally been an important supplier. U.S. imports totaled 30,764 tons in 1981 with a value of \$5.7 million.

#### Agricultural Imports

Ecuador's agricultural imports totaled an estimated \$202 million in 1980, with \$119 million, or 59 percent from the United States. Five commodities account for

at least 75 percent of the total value: wheat and other grains, vegetable oils and animal fats, cattle and poultry breeding stock, cotton, and leaf tobacco.

Minor agricultural imports include nonfat dried milk, baby chicks and hatching eggs, oats and malting barley, inedible tallow, seeds, and a fruit group that includes raisins, nuts, prunes, and fresh apples. A large percentage of these products come from the United States, although the Netherlands supplied \$1 million worth of powdered milk in 1973 when the United States had no supplies for export. Argentina and Chile are the principal sources of apples.

**Wheat and Other Grains.** Wheat accounts for about 50 percent of the value of total agricultural imports in most years. The other grains, barley, oats, corn, and sorghum, are minor in comparison. Wheat imports close a large gap between production and consumption, which for example, was 324,000 tons in 1981. Declining wheat production in the Sierra and rapid population growth accelerated imports from only 57,000 tons in 1964. The advance in urban

Table 44--Pineapple exports, 1970-79

Year	Fresh		Canned	
	Tons	Dollars	Tons	Dollars
1970	1,514	259,456	111	28,377
1971	1,381	237,144	191	63,982
1972	1,667	279,634	566	157,502
1973	398	61,740	2,007	511,578
1974	914	159,623	742	246,663
1975	744	141,242	--	--
1976	1,118	235,846	107	72,560
1977	555	118,000	--	--
1978	776	145,000	--	--
1979	823	193,382	4	2,892

-- = Not available.

Source: *Anuario de Comercio Exterior*.

Table 43--Abaca exports, 1970-79

Year	Volume	Value
	Tons	1,000 dollars
1970	1,206	--
1971	1,710	622
1972	2,340	872
1973	3,490	1,396
1974	7,505	5,112
1975	7,879	5,353
1976	9,904	6,596
1977	8,479	5,624
1978	9,879	6,253
1979	8,799	5,936

-- = Not available.

Table 45--Fresh melon exports, 1973-79

Year	Volume	Value
	Tons	1,000 dollars
1973	1,467	145
1974	1,481	182
1975	2,645	303
1976	2,815	339
1977	2,766	366
1978	1,929	291
1979	2,022	385

# Agricultural Progress in Ecuador, 1970-82

incomes after August 1972 sped the consumption shift from rice to wheat.

The Government beginning in 1974 set a reference price of \$138 per ton for imported wheat. If the buying price was higher than the reference price, the Government paid a subsidy equal to the difference from a general fund. If the price was lower, the importer paid the reference price and the difference went into an import-tax fund. In 1981, this subsidy drained \$27 million from the Treasury.

Canada shared the Ecuadorian wheat market with the United States until 1969. Imports from Canada nearly equaled those from the United States until 1966, but declined rapidly thereafter. Since 1971, the United States has been the sole supplier (table 46). The advent of petroleum revenue, which enabled Ecuador to become a cash customer in 1973, is discussed elsewhere.

Ecuador authorized imports of corn and sorghum to meet the needs of the prepared feed industry because the domestic supply of marketed corn was insufficient. The industry (1977) consisted of 12 manufacturing plants. Poultry consumed 85 percent of the estimated output of 120,000 tons and the rest went to cattle, swine, horses, and rabbits. The corn and sorghum imports in 1977 were 12,600 tons. The Association of Feed Manufacturers (AFABA) contracted for imports of 20,000 tons of corn and 6,000 tons of grain sorghum in 1978. The United States supplied very small amounts between 1967 and 1970, but shipped larger volumes between 1973 and 1978, and again in 1981:

	Tons
1973	16,434
1974	0
1975	8,255
1976	3,474
1977	10,491
1978	19,163
1979	3
1980	0
1981	10,110

Imported oats are processed for human consumption. Imports averaged only 3,362 tons in 1968-70, but increased to 11,000 tons in 1971 and reached 30,000 tons in 1979. The United States was the country of origin for the imports of 1968-70. Australia and Argentina also supplied some in the seventies.

Although Ecuador is a producer of barley, malting barley is imported to meet the needs of the brewing industry. Australia has been the principal supplier of malting barley:

	Tons
1974	5,700
1975	6,348
1976	5,520
1977	13,000
1978	<sup>1</sup>
1979	32,000
1980 (quota)	27,941

<sup>1</sup>Not available.

In 1981, 10,000 tons of barley were imported from the United States.

**Vegetable Oils and Fats.** Vegetable oils and fats were second only to wheat among agricultural imports during the decade. Soybean oil was the most important throughout but was supplemented generally by palm oil and, in 1976 and 1977, by coconut oil. Practically all the soybean oil imports came from the United States. In 1981 this amounted to 42,000 tons valued at \$23.4 million (table 47). Also included were 8,000 tons of soybeans valued at \$2.5 million.

Table 46--Wheat imports, 1964-81

Year	Canada	United States <sup>1</sup>	Total
		Tons	
1964	27,811	28,235	56,146
1965	38,454	23,843	62,297
1966	28,744	31,724	60,468
1967	12,801	68,017	80,018
1968	15,233	56,984	72,217
1969	19,093	53,212	72,306
1970	--	65,326	65,236
1971	8,347	79,558	87,905
1972	--	108,370	108,370
1973	--	119,392	119,392
1974	--	124,699	124,699
1975	--	173,526	173,526
1976	--	204,516	204,516
1977	--	225,675	225,675
1978	--	254,351	254,351
1979	--	243,203	243,203
1980	--	290,100	290,100
1981	--	324,073	324,073

-- = Not available.

<sup>1</sup>Included wheat equivalent of flour; 1 ton of flour = 1.38 ton of wheat.

Sources: 1964-68, Anuario de Comercio Exterior; 1969-71, Commission Nacional del Trigo; 1972-81, U.S. attache, Quito.

Palm oil imports first appeared in the statistics in 1971 and by 1977 they amounted to 7,000 tons. The supplying countries were Indonesia and Malaysia, although some transshipments were received from the United States. Large quantities of coconut oil were also imported from the Philippines in 1976 and 1977, estimated at 17,000 tons and 11,000 tons, respectively. Traditional small imports of olive oil from Italy and Spain continued throughout the decade; volume in 1979 was 109 tons.

The two animal fat imports were choice white grease used for shortening and margarine and inedible tallow used for soap manufacture. Imports of U.S. choice white grease varied from 4,000 to 24,000 tons during 1973-80. In 1981 Ecuador prohibited all white grease imports. Inedible tallow imports increased steadily from 1,500 tons in 1973 to 9,400 tons in 1981 with occasional peaks and valleys in between.

**Cotton.** The production of cotton during the decade was insufficient to meet the needs of the textile industry until 1974 when a bumper crop matched requirements for the upcoming year. In 1981 just over 1,000 tons were imported. Since 1969, fluctuations in the volume of imports had ranged from 1,300 tons in 1972 to 3,500 tons in 1974. Colombia was the principal country of origin,

Table 47--Soybean oil imports by source, 1960-81

Year	United States	Denmark	Other	Total
Tons				
1960	2,820	246	0	3,066
1961	78	0	0	78
1962	2,018	1,354	427	3,799
1963	2,199	2,627	101	4,927
1964	5,326	490	314	6,130
1965	3,958	--	210	4,168
1966	4,947	600	203	5,750
1967	4,937	2,566	1,841	9,344
1968	2,714	3,409	1,802	7,926
1969	3,497	5,140	2,305	10,942
1970	5,329	2,710	2,271	10,310
1971	13,691	--	2,456	16,147
1972	16,894	--	1,538	18,431
1973	12,262	--	392	12,654
1974	14,040	--	4,097	18,137
1975	15,548	--	112	15,660
1976	16,161	--	--	16,161
1977	21,310	--	--	22,800
1978	20,944	--	--	20,944
1979	21,183	--	--	21,183
1980	37,354	--	--	37,354
1981	41,619	--	--	41,619

-- = Not available.

Source: *Anuario de Comercio Exterior*.

followed by Mexico, Peru, and Brazil, which provided smaller quantities. Imports were small thereafter.

**Tobacco.** The cigarette industry imported leaf and smoking tobacco from the United States during the seventies. Imports of leaf tobacco increased from 300 tons in 1969 to nearly 2,000 tons in 1977 and about 1,100 tons in 1981.

#### Trade with the United States

The value of U.S. agricultural exports to Ecuador in 1981 was \$125 million, four times the level of 1973 and 10 times the level of 1967. The bulk of the increase came after 1970, resulting from the rise in demand stimulated by growth of the petroleum industry.

**Imports.** Wheat, the most important commodity, accounted for a large share of U.S. farm exports every year since 1973 when Ecuador became a cash customer. After wheat and roughly in order of importance in 1980 were soybean oil, choice white grease, tobacco, and inedible tallow. Apples, walnuts, and hops, perennial exports throughout the decade, were generally down in the late seventies as Ecuador imposed import restrictions to cope with balance of payments problems that appeared as early as 1975.

Blended foods under Title II of P.L. 480 remained an important import from the United States throughout the period. This included bulgur wheat, corn-soy-milk blend, wheat-flour-soy blend, and infants' dietary supplement. Until 1973, some wheat was shipped under Title I of P.L. 480, as follows:

	Tons
1970	15,000
1972	45,000
1972	14,000
1973	51,000

The usual marketing requirement for the final agreement of that period was 65,000 tons, much of which was purchased under short-term credit.

The influx of petroleum revenue in 1973 transformed Ecuador into a cash market. In the same year, the world wheat shortage raised the world price of wheat above \$200 a ton. P.L. 480 shipments were discontinued and even short-term credit was suspended except under unusual circumstances.

Imports of grains and preparations from the United States were valued at \$6 million in 1981, nearly all

wheat and wheat products. The wheat component had predominated since 1966, when wheat imports were valued at only \$4.3 million. In the interim, the volume of wheat had increased from 55,000 to 311,000 tons.

Corn imports from any source had been negligible before 1973, but corn became the principal feed-grain import. Corn imports ranged from 8,000 to 19,000 tons in the midseventies and were 11,000 tons in 1981. Other coarse grain shipments from the United States were more sporadic. Oats were imported in 1973-75 and 1980, grain sorghum in 1976, and malting barley in 1973 and 1981.

Oilseeds and products, valued at \$26 million in 1981, were second in value among imports from the United States. Practically all of the shipments were soybean oil, which increased in volume from 3,800 tons in 1967 to 40,000 tons in 1981.

Animal and animal-product imports from the United States were valued at \$18 million in 1981. These were generally third in value, except in 1973, 1976, and 1979 when they yielded to tobacco. The variety of products in this category included choice white grease, inedible tallow, nonfat dried milk, baby chicks and hatching eggs, and breeding cattle. Imports of inedible tallow exceeded \$1 million in every year except 1973, and reached \$4.5 million in 1981; nonfat dried milk was unimportant after 1973; dairy and breeding cattle peaked at \$1.3 million in 1975; and choice white grease was the most important item of the midseventies, but its importation was prohibited after August 13, 1981, because the production of domestic palm oil had increased.

A poultry boom has sustained the demand of baby chicks and hatching eggs throughout the period. The total value of poultry and poultry products imports exceeded \$1.2 million in 1981.

Tobacco was valued at \$5.5 million in 1981 and was generally fourth in value among U.S. agricultural sales during the decade. Value ranged between \$732,000 in 1970 and \$11.3 million in 1979, but fell to \$6.4 million in 1981.

Other categories of imports from the United States, with a total value of \$1.7 million in 1981, included hops and hops extract, raisins, and field and garden seeds.

**Exports.** The United States was by far the most important market in the seventies for Ecuador's four

main tropical commodities—bananas, cocoa, coffee, and sugar. The United States took most of the Country's bananas, cocoa, and cocoa products; about one-half of the coffee; and all of its sugar.

Bananas and plantains dropped from first to third place in value after 1975. Improved prices in 1978 and 1979 resulted in the highest volumes of the decade, exceeding 5 million tons, and the highest values of more than \$80 million. Bananas, nevertheless, had to yield place to coffee and cocoa because their relative prices were much lower.

Coffee captured first place in 1976 and held it for the rest of the decade. Value peaked at \$197 million in 1978. Volume fluctuated between 24,000 tons and 46,000 tons, except in 1978 when the volume of 63,000 tons was 72 percent of Ecuador's total. U.S. importers, faced with limited supplies from Brazil, avidly picked up Ecuador's supply.

Cocoa and cocoa products, usually ranked fourth in value among agricultural exports to the United States, were propelled upward in 1977 to second place by the high prices of the late seventies. With growth of the processing industry and the tax policy discussed earlier the total value of these products reached \$115 million in 1980 but fell to \$75 million in 1981 when world prices collapsed. Most cocoa-product exports were in the form of chocolate preparations.

Sugar, usually third in value among agricultural exports to the United States, yielded to bananas during 1975-79 as sugar prices plunged on world markets to 7-9 cents per pound. In addition, rapidly rising consumption left smaller surpluses for export. The United States imported virtually all of Ecuador's surplus sugar and molasses. Between 1965 and 1974, the volume of sugar exports to the United States was often restricted by the U.S. quota. But as available supplies declined in the late seventies the quota was no longer a limiting factor. In 1981 the value of sugar exports to the United States was \$33 million for nearly 45,000 tons. In addition, \$4.1 million worth of molasses was well above the average annual value of about \$2 million for the preceding decade.

### The Future of Agriculture

Ecuador has four assets which in time may ensure a favorable agricultural future. The first is the Government's policy, a manifestation of a determination to modernize agriculture and the rural sector. The second is the initial level of development already

achieved in creating institutions and infrastructure, although admittedly much remains to be done. The third is Ecuador's resources in potential arable land in the Costa and eventually, parts of the Oriente. And last is the long-term prospect of considerable increases in irrigation.

The Government's most effective policy instrument is its credit program. Although funding has fluctuated, its role in agricultural credit has become a fact of life and will likely be sustained. The Government is trying to remove other barriers to development by increasing storage, improving feeder roads, developing flood control and drainage systems, and building marketing institutions. Time is a factor because the policies have not been in operation long enough to fully take effect.

Facilities have already been set up to supply seedlings for tropical crops; that will maintain their productive capacity. Attempts are underway to obtain additional capital to improve the infrastructure for irrigation.

Ecuador has ample land resources awaiting development, especially in the Costa region. The MAG estimated a potential of 3.7 million hectares, more than three times the current crop area of 1.2 million hectares (table 48).

Much of this potential is in the coastal region where water management holds the key to its exploitation. Both flood control and drainage are needed in areas such as Naranjal. The planned diversion of irrigation water to the dry region of Manabi Province would provide an abundance of feed grains, sorghum, and pasture to feed livestock.

The goal is irrigation of the better soils of the Guayas River Basin on a year-round basis that will make possible the harvesting of several crops in a year. If the Government maintains its determination and gets sufficient help from international lending agencies, it may achieve its goal. The rate of development in the

short term will depend upon available credit; in the middle term, upon improvements in infrastructure; and in the long term, upon the completion of irrigation works.

The Oriente region east of the Andes has a completely different potential. Road penetration of this remote mountain area came with oil development after 1970. A survey of Napo Province disclosed areas of alluvial deposits derived from volcanic ashes that totaled 600,000 hectares. Eventually these areas will be settled and cultivated.

Table 48--Potential land resources for crops

Region and Province	Crop area		
	Actual	Potential	Increase
	1,000 hectares		Percent
Costa Region	560.7	1,840.3	228.2
Esmeraldas	67.1	76.7	12.5
Manabi	129.9	585.5	325.7
Los Rios	172.7	343.0	98.6
Guayas	123.9	695.5	461.3
El Oro	67.1	139.6	52.0
Sierra Region	637.8	1,042.6	63.5
Carchi	20.9	41.5	98.6
Imbabura	45.5	76.7	69.5
Pichincha	131.3	128.6	-2.1
Cotopaxi	28.9	64.2	122.1
Tungurahua	53.3	61.4	15.2
Bolivar	79.9	51.5	-35.5
Chimborazo	65.6	147.9	125.5
Canar	50.2	73.8	47.0
Azuay	44.1	135.6	207.5
Loja	117.8	261.4	121.9
Oriente Region	39.6	833.8	2,005.6
Napo	14.5	187.3	1,191.2
Pastaza	6.7	232.3	3,367.2
Zamora	15.7	292.1	1,760.5
Morona	2.7	122.1	4,422.2
Galapagos Islands	1.5	0	0
Total	1,238.1	3,716.4	300.2

Source: MAG.

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