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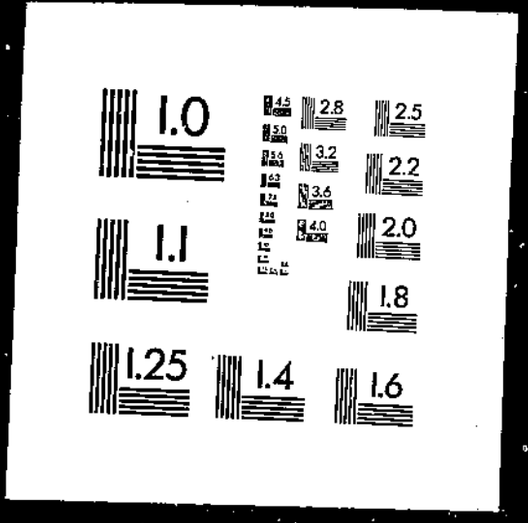

PB87-183299

Colombia: An Export Market Profile

(U.S.) Economic Research Service, Washington, DC

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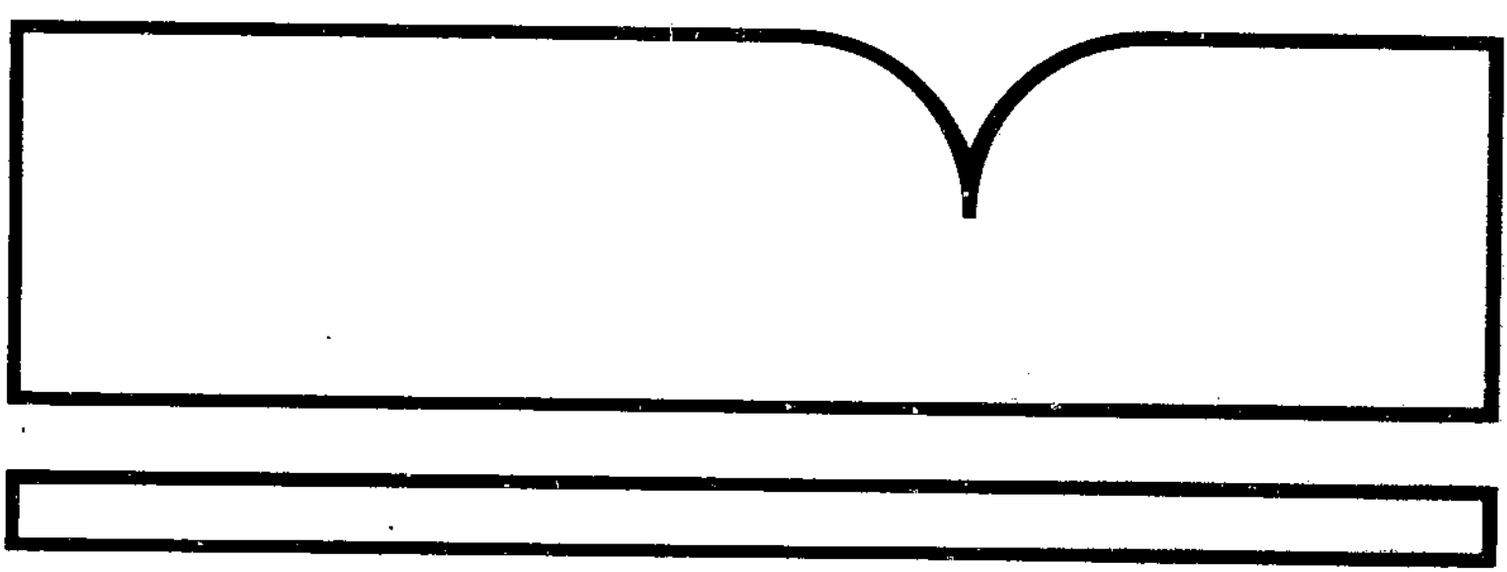

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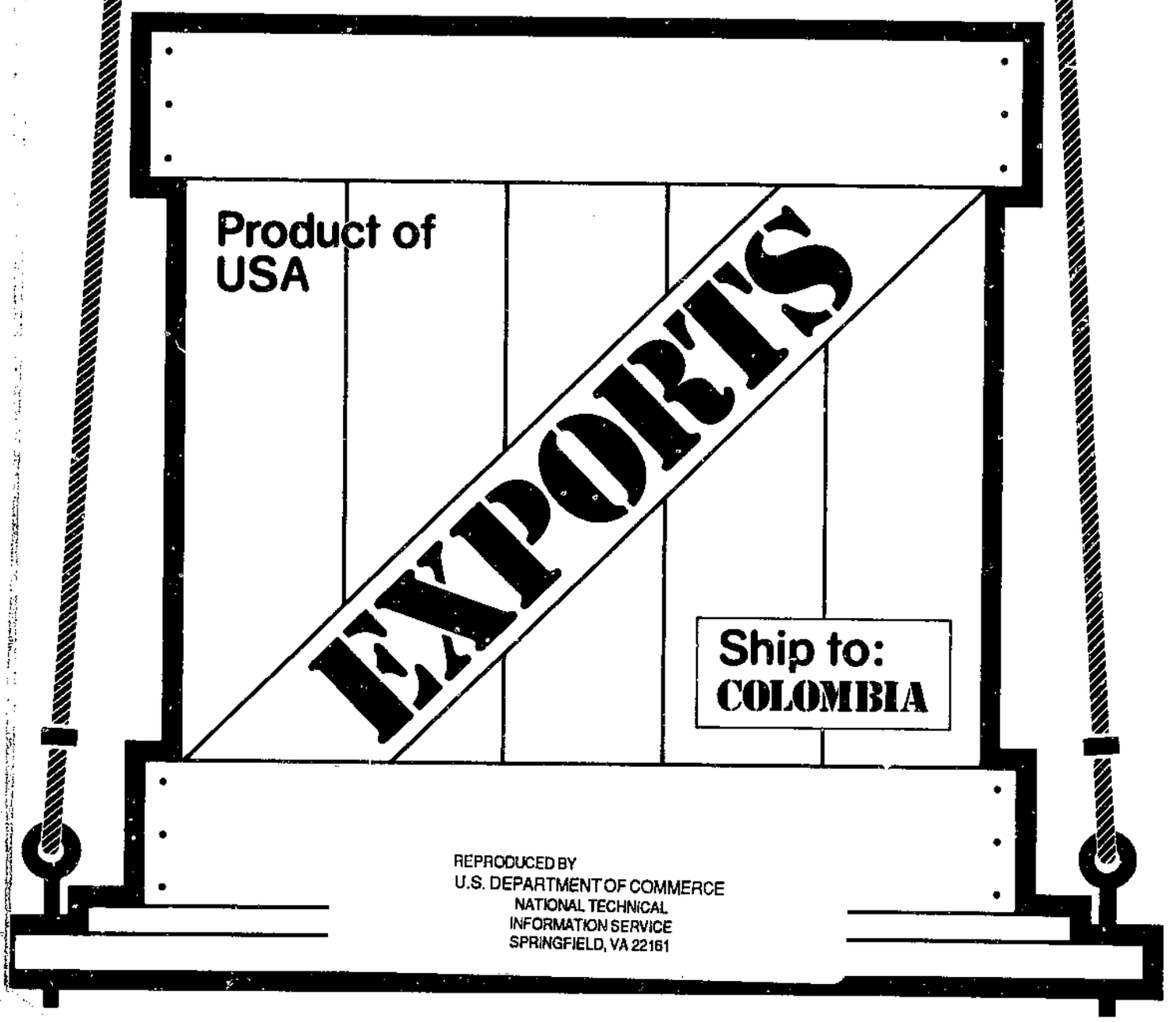
Foreign Agricultural Economic Report Number 225

Colombia

An Export Market Profile

H. Christine Bolling



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ABSTRACT

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KEYWORDS: Colombia, economic growth, agricultural imports, agricultural production, agricultural trade policies, trade shares, import projections

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March 1987

PREFACE

Expanding the markets for U.S. agricultural exports is a major goal of the U.S. Department of Agriculture (USDA). The Economic Research Service (ERS), in cooperation with the Foreign Agricultural Service (FAS), is preparing export profiles for a number of high-potential markets for U.S. agricultural products. ERS is USDA's major source of agricultural and trade information on foreign countries and regions, while FAS has the key role in helping U.S. agriculture increase exports in world markets. Profiles are being prepared for selected markets in Africa, the Middle East, Asia, and Latin America.

This report presents information and analysis on the prospects for U.S. agricultural exports to Colombia. The study surveys the basic factors underlying agricultural supply and demand in Colombia and presents longrun projections of food and agricultural trade. The report is aimed at officials responsible for export market development programs, the agribusiness community, and the general public.

Conversion Chart

This report uses metric units throughout.
1 metric ton = 2,204.62 pounds
1 hectare = 2.471 acres

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CONTENTS

SUMMARY

U.S. agricultural exports to Colombia were valued at $218 million in 1985, up more than fourfold since 1970, and could reach $400 million by 1990. Despite suffering a slump in the early eighties, Colombia is one of the fastest growing Latin American markets for U.S. farm products and is the fourth largest market for U.S. agricultural products after Mexico, Brazil, and Venezuela. U.S. exports to Colombia will be dominated by wheat, corn, sorghum, soybeans and soybean products, tallow, lentils, and apples.

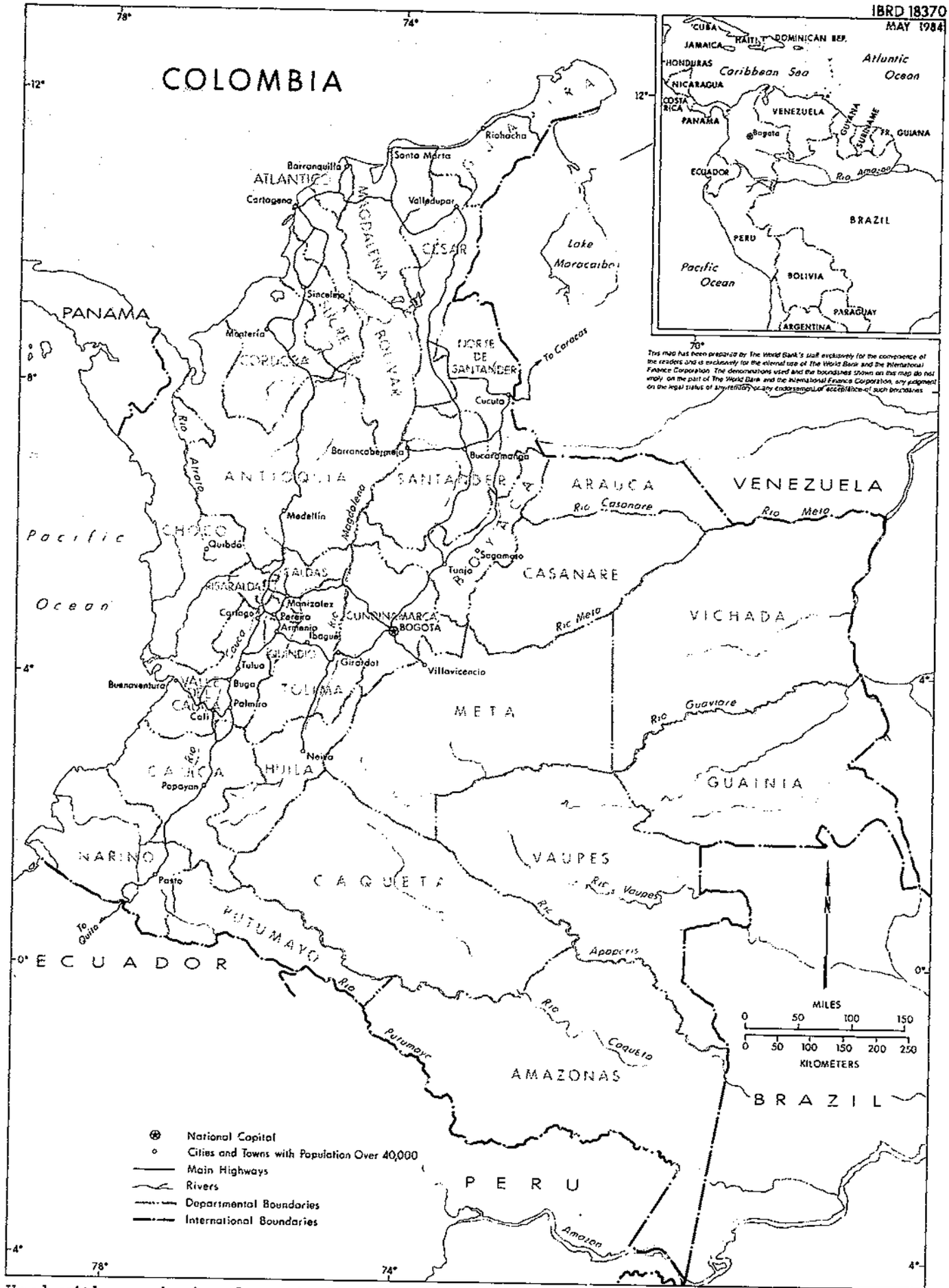
Over three-fourths of Colombia's agricultural imports in 1985 came from the United States (see table). Wheat made up about one-third of Colombia's total agricultural imports. Other major imports are corn, soybean oil and meal, sorghum, barley, tallow, lentils, dry green peas, apples, and powdered milk. The United States has traditionally been the sole or principal supplier of wheat, corn, sorghum, soybean oil, tallow, and dried peas. Its share of these agricultural commodities increased from 48 percent in 1969-71 to 62 percent in 1979-81. However, the United States faces strong competition, especially from Argentina, Brazil, and Chile, in maintaining its market for these traditional products. Colombia now imports dairy products primarily from the European Community and barley from Canada. Trade prospects will likely improve in the long run, but competition from other sources as well as Colombia's own agricultural production will challenge U.S. suppliers.

The following major problems will affect current and prospective U.S. exports to Colombia:

- Colombia had been in an economic slump since 1979 and began to pull out in 1986.
- Much of its population is very poor with diets comprised of the least expensive staple foods.
- A large foreign debt limits the availability of foreign exchange. Windfall profits from coffee, however, should improve Colombia's foreign exchange situation in the next 2 years.
- Because Colombia produces and exports many tropical crops, U.S. export opportunities will be limited mostly to temperate-zone products like wheat and vegetable oils. Colombia imports less than 10 percent of its food. Colombia has a positive agricultural trade balance with the United States. It exports about $2 billion of farm products, including coffee, bananas, flowers, sugar, tobacco, beef, cotton, and cheese.
- Colombia has generally restricted agricultural imports to limit foreign exchange expenditures. It also has the institutional apparatus in place, with the Colombian Institute of Foreign Trade (INCOMEX) and the Instituto de Mercadeo Agricola (IDEMA), to limit imports. Colombia uses prior licensing, import tariffs, allocation of foreign exchange among imports, and manipulation of the exchange rate to limit imports.
- Colombia's import potential is limited by infrastructure. For example, its population is concentrated in the western half of the country. Some regions are remote and virtually impassable.

Import value (c.i.f.) and U.S. share of major agricultural products, Colombia

Product and origin	1969-71 average		1979-81 average		1985	
	Value	Share	Value	Share	Value	Share
	Million dollars	Percent	Million dollars	Percent	Million dollars	Percent
Wheat	19.7	100	84.8	100	97.0	100
United States	13.8	70	82.1	97	84.0	87
Barley	3.2	100	13.1	100	13.0	100
United States	3.1	97	1.5	11	10.0	77
Sorghum	1.3	100	10.1	100	13.0	100
United States	0	0	9.9	98	11.0	85
Soybean oil	2.3	100	70.5	100	33.0	100
United States	2.3	100	56.4	80	10.0	30
Tallow	6.3	100	17.2	100	25.0	100
United States	5.1	81	16.7	97	23.0	92
Lentils	1.7	100	8.8	100	9.0	100
United States	.4	4	3.4	39	4.0	44
Dry peas	0	0	8.4	100	3.0	100
United States	0	0	7.4	88	3.0	100
Apples	.9	100	11.3	100	5.0	100
United States	0	0	4.5	40	2.0	40
Powdered milk	.4	100	14.6	100	4.0	100
United States	.1	25	0	0	0	0
Total agricultural imports	81.0	100	448.7	100	291.0	100
United States	39.0	48	277.3	62	217.9	75



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Colombia

An Export Market Profile

H. Christine Bolling

INTRODUCTION

This study focuses on Colombia as a potentially growing market for U.S. agricultural products. It examines the major factors directly or inversely related to import growth during the seventies--mainly population, income, and inadequate domestic food production--as well as the country's position regarding foreign reserves, food aid, and import prices. These data are keys for determining the potential for U.S. exports to Colombia through 1990 and for examining the constraints limiting future U.S. exports.

THE GENERAL ECONOMY

Growth in food imports during the rest of the eighties will be determined mostly by population growth, even though other macroeconomic factors like income growth and foreign reserves will also play a part. Colombia's population is expected to increase nearly 25 percent from 1979-81 to 1990, but per-capita real income will probably increase by less than 10 percent from the base years. Moreover, foreign reserves in 1990 will probably be less than half the 1979-81 level and will further limit internal income growth.

Population

Colombia, with 30 million people, is the fourth most populous nation in Latin America after Brazil, Mexico, and Argentina (table 1). The population has increased about 2.8 percent per year since 1970, but the rate is now down to about 2.1 percent per year. The population should reach 33 million by 1990. The Colombian birthrate declined sharply in the seventies, following the high fertility rate in the sixties. Increased emigration to neighboring countries has slowed growth. The population is moving from the rural areas to the cities. Today, nearly 70 percent of the population is urban; 23 cities have 100,000 people or more each. Urbanization has reduced the number of families who produce some of their own food. It has also changed the kind of food consumed. People consume less yucca, beans, corn, and plantains, but more wheat products.

Income

Colombia had a gross domestic product (GDP) of about $37 billion (1981), and income is expected to grow slowly.1/ Colombia's economic growth will depend

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The author is an agricultural economist with the International Economics Division, Economic Research Service.

1/ Income is measured by Gross Domestic Product.

somewhat on the rate of real economic growth in the United States. The short-term outlook is for real growth to improve slightly over the 1981 rate of 2.1 percent as Colombia recovers from the slump dating to 1979. The slow economic growth was the result of a combination of external and internal factors: world economic recession, increased protectionism in world markets, low coffee prices, low prices for other export commodities because of overvalued exchange rates, and depressed domestic demand. The current low economic growth contrasts sharply with the real GDP growth rate of 6.1 percent between 1970 and 1978 when Colombia was one of the fastest growing economies in the Andean region. Its industrial development policy emphasized export expansion and diversification into nontraditional products. The world market at that time was also more expansive. Nevertheless, Colombia still has a relatively small modern sector superimposed on a broad traditional base.

Agriculture's share of total GDP declined from 34 percent in 1960 to 26 percent in 1980, making Colombia one of the more industrialized countries of the Andean region (23).2/ Manufacturing, transportation, and trade have gained most and currently provide 18, 9, and 19 percent of the GDP. Processing of food, beverages, and tobacco still accounts for about 7 percent. Chemicals and machinery and equipment are other manufacturing activities.

Per-capita GDP in 1985 was $1,372, the fourth highest in the region after Venezuela, Argentina, and Chile. But, Colombia's GDP grew slowly during the seventies because population increases eroded national income growth to where per-capita real income actually fell. In the 1986-90 period, per-capita

2/ Underscored numbers in parentheses refer to items in the references at the end of this report.

Table 1--Macroeconomic indicators, Colombia

Item	Unit	1969-71 average	1979-81 average	1985	1990 projected
Population 1/	Millions	20.5	27.1	30.4	33.3
Real gross domestic product (GDP)	Billion 1980 pesos	985	1,607	1,747	2,136
Per capita real GDP	1980 pesos	479	594	578	642
Foreign reserves	Billion dollars	191	4,492	1,586	2,096
Consumer price index	1980 = 100	14	102	270	670

1/ Growth rate, 4.4 percent in 1980, is projected at 1.9 percent for each year, 1985-90.

2/ Growth rate, 4.1 percent in 1980, is projected at 3.1 percent for 1985, 4.0 percent for 1986 and 1987, 4.3 percent for 1988, 4.1 percent for 1989, and 4.0 percent for 1990.

Sources: (1, 9).

income is expected to grow 2 percent annually at best, and it will take until 1987 for real per-capita income to reach the peak levels of the late seventies (594 pesos per person in real terms) (1).

Poverty limits consumption to the most basic staples for many people. Fifty percent of Colombia's people earn less than 20 percent of the national income, and they spend nearly 60 percent of that income on food. The richest 1.4 million people (5 percent of the population) earn 33 percent of the income. They consume large quantities of meats, vegetables, dairy products, and prepared foods. Lifestyles in rural and urban areas differ, but many of these differences are due to rural poverty. Although nearly 90 percent of the urban people have electricity, less than 20 percent of the rural people do. Three-fourths of the urban people and less than half of the rural people have piped water. Illiteracy is also more prevalent in rural areas, although the country is 80 percent literate (25).

Import Purchasing Power

Colombia's trade policies change as it alternates between periods of trade surplus and deficit. The country, currently in a trade deficit, has adopted import-restricting policies. In 1982, Colombia's trade deficit reached $2.4 billion when export prices fell and the worldwide economic situation deteriorated. This deficit followed the 1975-80 trade surplus, when coffee, providing half of Colombia's foreign exchange, was priced relatively high in the world market. After initiating some austerity programs, Colombia again had a trade surplus in 1984 and 1985. Even after falling off from the nearly $4-billion export earnings of 1980, Colombia's nominal dollar export earnings in 1981 were more than four times the level of 1970. Colombia's exports were valued at $4 billion in 1985 (table 2).

Growth in foreign trade was the basis of Colombia's latest growth spurt. This rise was part of the outward-looking development strategy of expanding and diversifying exports to world markets and of tapping more markets in the Andean region. Colombia has increased exports as a means of pulling out of its current troublesome debt situation. Between 1979 and 1982, Colombia had a buildup in reserves, mostly because of heavy foreign borrowing and high coffee prices. But, after 1982, Colombia faced a heavy debt burden because of debt repayments and the turnaround in its own export earnings.

Total foreign debt reached $13 billion in 1985. Principal and interest payments on long-term official debt alone were nearly $1 billion. Debt repayment cut into reserves and, consequently, stifled the long-term growth of the general economy. However, increased exports in 1984 and 1985 began to alleviate the balance of payments problem and have been boosted by added export earnings from coffee in 1986. Nevertheless, debt is less burdensome in Colombia than in most of its Latin American neighbors.

Coffee still dominates Colombia's exports, but its share of total exports in 1985 was 65 percent after having dipped in the early eighties. Fuel oil exports increased twentyfold during the seventies and now account for 6 percent of total exports. Flowers were also among the big gainers, increasing from $1 million in 1970 to $140 million in 1985. Clothing and textiles are now the largest category of manufacturing exports and have increased nearly sevenfold. However, most of their growth was in the early seventies. Mechanical and electrical equipment and paper products have also increased significantly.

Emeralds are another nontraditional export that provided foreign exchange during the seventies. Cocaine and marijuana are large illegal foreign

Table 2--Balance of payments and trade, Colombia

Item	1969-71 average	1979-81 average	1985 1/	1989 projection 1/
		Million dollars		
Exports of goods	738	3,575	4,130	6,538
Coffee	403	1,953	1,962	1,986
Fuels and lubricants	17	2,159	482	844
Manufactured goods	2/ 111	784	821	1,516
Coal	0	0	59	1,240
Nickel	0	0	175	230
Other goods	2/ 416	621	631	722
Imports of goods	784	4,068	4,626	5,848
Petroleum and derivatives	0	548	510	865
Nonoil imports	784	3,520	4,116	4,983
Trade balance	-46	-493	-824	690
Services and receipts	2/ 250	1,493	1,430	1,711
Services and payments, excluding interest	2/ -541	-1,477	-1,166	1,933
Interest payments	2/ 58	326	1,704	1,734
Unrequited transfers 3/	2/ 36	113	150	75
Balance of payments	2/ 180	1,020	-330	330
Current account balance	-307	-690	-2,114	-1,191
Direct foreign investment	17	1,170	402	425
Errors and omissions	9	328	-200	-150
Other official capital 4/	316	1,201	450	300
Amortization payments	2/ 96	459	1,834	3,458
International reserves	191	5,050	1,256	2,096
Total external debt	2/ 2	7	12	15
		Ratio		
Debt service ratio	12.6	15.7	67.6	62.9

1/ ERS estimates.
2/ 1972 data.
3/ Money sent home by foreign nationals.
4/ Net capital inflows.

Sources: (1, 8, 9).

exchange earners. The amount of earnings from these products is not known, and proceeds do not necessarily return to the Colombian economy for reinvestment. But, their earnings do affect Colombia's purchasing power. Although Colombia shied away from an open import policy in the early eighties (which replaced a tight import substitution policy in the sixties), total imports grew fivefold from 1969-71 to 1979-81. Capital goods--mostly for industry--were over 35 percent of imports; industrial raw materials were another 35 percent. Food imports, while growing, were only 5 percent of the total. Capital goods and industrial inputs maintained about the same share of imports in the seventies, but imports increased more than fivefold (24).

Transportation Facilities

Transportation facilities somewhat limited the distribution of imported food because costs are still high and transportation is often difficult. Nevertheless, it is often less expensive to import grain and oilseeds (even with tariffs) and transport them to the population centers than to transport them from the producing areas in the highlands and other remote regions.

Highways

The Colombian road network totals 31,000 miles. About 75 percent of internationally bound dry cargo and about 65 percent of imported goods are moved over roads. Coffee, sugar, and rice are commonly hauled by truck.

Colombia's two main north-south roads are the backbone of the highway system. The Western Trunk Highway (Troncal Occidental) runs from the Ecuadorean border to the Caribbean coast, passing through Medellin, the major industrial city. The Central Trunk Highway (Troncal Central) goes through Bogota, and farther northeast to the Venezuelan border. Another major road artery was completed in 1982 between Bogotá and Medellin, which shortens the time between these cities when landslides do not block the road. The 1,700-mile Caribbean Trunk Highway (Transversal del Caribe), another vital road system, cuts through the northern coastal area. It was recently completed with the construction of a bridge across the Magdalena River near Barranquilla.

The Colombian Government has assigned high priority to completing construction of a 50-mile section of the Pan-American Highway which will complete the link between the Peruvian and Panamanian borders. This project, together with a similarly long section to be built in Panama, will complete the last remaining gaps in the Pan-American Highway. Construction on the Colombian link began 3 years ago, but was halted because of lack of funds. The area is remote and swampy.

Plans are also underway to construct the Jungle Edge Highway (Carretera Marginal de la Selva) to run parallel to the eastern range of the Andean Mountains and then interconnect in the eastern plains with roads leading to Peru, Ecuador, and Venezuela.

Railways

Colombia's 2,100-mile rail network has key terminals in the ocean ports of Buenaventura on the Pacific and Santa Marta on the Caribbean. Seven of the 10 largest cities are connected by rail. Most of Colombia's railroads were built at the beginning of the century and were fully integrated in 1961 when the Caribbean Railroad was completed. Rail service, however, is still slow, uncertain, and expensive. Rail cargo is diversified and includes chemical

fertilizers, wheat, coffee, petroleum, steel, sugar, and corn. Approximately 60 percent of all coffee exports are carried to ports by rail. Container service is also being introduced into Colombia. The main users of container service are manufacturers of fiber, textiles, agricultural implements, and miscellaneous finished goods.

Port Facilities and Shipping

Colombia has many ports on its 1,000-mile coastline, including Buenaventura on the Pacific and Santa Marta, Barranquilla, and Cartagena on the Caribbean. Buenaventura, moving over half the country's total dry cargo and the main outlet for coffee exports, has 12 berths for handling dry cargo and another berth for handling liquid products in bulk such as chemicals, tallow, fats and oils, and other products.

Total port capacity is 2.4 million tons per year. Covered warehouse space is 1 million square feet. Modern handling equipment includes cranes, tractors, and lifting trucks capable of moving standard and containerized cargo.

Ever since completion of the rail connection between the interior and the Caribbean in 1961, the northern Caribbean ports have increased their share of port traffic. Santa Marta underwent complete transformation from a banana port to a leading Caribbean terminal, equipped with five piers for large ocean freighters and one dock for small vessels. Closed warehouse storage space totals 193,174 square feet; additional open yard and silo storage brings capacity to 1 million tons per year.

Barranquilla has six wharves with cargo capacity of 1.2 million tons per year. Covered warehouse space is 355,000 square feet. The port is being dredged for silt accumulation from the Magdalena River so that the waterside depth will clear 30 feet.

Cartagena, Colombia's oldest port, has a capacity of 800,000 tons per year in the four international trade piers. Work on a fifth dock is about to begin. Enclosed warehouse space is 193,680 square feet.

Colombia possesses vast coal reserves in the northeast. New port facilities have been built on the upper Guajira peninsula to handle increased coal production. Exports are just beginning and should reach high levels in 1987.

Investments have recently been channeled to construct, repair, and modernize airport facilities in Bogota, Medellin, Cali, Baucaramanga, and Leticia (Amazonas) (22).

THE AGRICULTURAL SECTOR

Colombia's food import needs are closely integrated with its domestic production, and wide year-to-year variations in imports are due to production shortfalls. Nevertheless, food imports (like wheat, vegetable oils, and dried milk) have increased in recent years because the agricultural sector was unable to keep up with the steady rise in domestic demand. Population alone was growing at about 3.2 percent per year, and incomes were increasing about 2.1 percent per year. Colombia's agricultural production has increased 3 percent per year since 1970, with rice, sorghum, potatoes, coffee, sugar, and tobacco increasing the most (table 3). Rice production doubled during the decade, mostly because of the increased use of irrigation and the introduction of high-yielding rice varieties. Colombia's rice yields are now among the

Table 3--Area harvested, production, and agricultural yields, Colombia

Item	Area harvested			Production			Yield		
	1969-71 average	1979-81 average	Percent change	1969-71 average	1979-81 average	Percent change	1969-71 average	1979-81 average	Percent change
	1,000 hectares		Percent	1,000 tons		Percent	Tons/hectare		Percent
Crops:									
Wheat	53	38	-28	57	52	-8	1.08	1.36	26
Rice	246	424	72	509	1,218	139	2.07	2.87	39
Corn	770	618	-20	844	875	-4	1.10	1.42	29
Barley	62	57	-8	90	96	7	1.45	1.68	16
Sorghum	73	211	189	155	471	204	2.12	2.23	5
Beans	1/ 66	115	74	48	84	75	.72	.73	1
Potatoes	1/ 88	150	70	927	1,977	113	10.53	13.18	25
Cassava	1/244	212	-13	1,067	2,018	89	4.37	9.52	117
Tobacco	23	26	13	44	32	-27	1.91	1.23	-36
Cotton	242	192	-21	122	113	-7	.50	.58	16
Soybeans	57	65	14	100	130	30	1.75	2.00	14
Sesameseed	27	24	-11	29	20	-31	1.07	.83	-22
Bananas	18	21	17	819	1,082	32	45.50	51.52	13
Plantains	1/320	425	33	1,681	2,178	30	5.25	5.12	-2
Coffee beans	802	1,142	42	469	776	65	.58	.67	16
Cocoa	1/ 46	65	41	17	34	100	.37	.52	41
Sugarcane	1/ 69	92	33	2/ 687	2/ 1,174	71	n.a.	n.a.	n.a.
Oil palms	1/ 13	24	85	682	851	25	52.46	35.46	-32
Livestock products:									
Beef	--	--	--	456	658	44	--	--	--
Mutton	--	--	--	2	11	450	--	--	--
Pork	--	--	--	48	117	143	--	--	--
Poultry	--	--	--	42	114	171	--	--	--
Milk	--	--	--	2,250	2,287	2	--	--	--
Eggs	--	--	--	104	193	85	--	--	--

-- = Not applicable.
n.a. = Not available.
1/ 1970 data.
2/ Raw sugar.
Sources: (17, 21).

highest in the world. Sorghum production has tripled, mostly because of the introduction of new varieties. Productive land in the valleys of the Cauca department previously planted in cotton has shifted to sorghum production. The decline in Colombia's cotton production reflects weakened world demand and low cotton prices prevailing in the late seventies.

Coffee production has increased since 1976 when new dwarf varieties (caturra coffee) began to bear fruit. These high-yielding varieties boosted output without a significantly expanded area. During the period of relatively high coffee prices, yields were raised through higher fertilizer use; however, with the decline in world coffee prices, growers cut back on fertilizer and general maintenance of coffee trees.

Banana production has benefited from the introduction of new varieties, increased fertilizer use, and improved management. However, the banana industry has suffered some setbacks in the past 3 years because of an outbreak of Sigatoka Negra disease. Sugar production has increased mostly from additional cane plantings, but this industry is also cutting back because of low world prices.

In contrast, cotton output rose rapidly in the midseventies, but it had fallen by 1980 because of the declining international market for cotton. The increase in the general price level and the costs of cotton production have made Colombian cotton less competitive with other countries. A significant comeback took place in 1984-85, but marketing problems and high domestic support prices compared with world prices may hamper continued expansion.

Corn is the staple of Colombia's agricultural economy, but production levels changed little during the seventies and early eighties. Farmers keep much of the corn to feed their families.

The wide variety of climates in Colombia causes various cropping patterns. In the highlands, wheat and barley are competing crops, although barley growers must have contracts with breweries before they raise barley. Cotton, sorghum, rice, and corn compete for the same land in the north coast area. The Cauca Valley, a prime producing area, grows sorghum, cotton, sugarcane, and corn. Profitability based on changing price relationships is important. Coffee is grown in a narrow zone from 1,000 to 2,000 meters and has few competitors in the short run. Rice has a similar comparative advantage in its production areas that was strengthened by the changeover from dryland to irrigated farming.

Colombia has made the tradeoff between extensive production of export crops and limited domestic food production. Coffee is the principal agricultural export, but is grown in a particular thermal zone not suited to many other commercial crops. Moreover, coffee is often interplanted with fruits and vegetables for home consumption on small farms. Cut flowers for export have replaced dairying in the savannah region near Bogotá; even so, the planted area of this labor-intensive crop is very small. Cotton is grown as an export crop and competes with some feed grains. Corn, the principal food grain, is grown throughout Colombia.

About half the income generated by agriculture is from crops, principally coffee, rice, potatoes, corn, bananas, and plantains. Beef and dairy are followed in importance by poultry.

Colombia's livestock industry has remained rather traditional. It is a low-cost industry because of the extensive pastures in the llanos region. But lack of genetic improvement, feedstuffs, and general management has kept productivity low, particularly of beef cattle. Relative factor prices, however, have not favored the adoption of new technologies. It takes 4 years in Colombia for an animal to reach a weight of 400 kg, compared with only about 2.5 years in Argentina. Birth rates are also extremely low compared with other countries. Until the 1983 devaluation in Venezuela, however, Colombia's beef industry was competitive with Venezuela's. Purebred cattle account for 10 percent of the national herd, crossbred for 58 percent, and native (Criollo) for 32 percent.

The dairy sector has grown rapidly in the past 4 years; the country is nearly self-sufficient in milk output at the current low per-capita consumption level. There are seasonal shortages and surpluses in some areas. Colombia has imported dairy cattle to improve its genetic base for higher milk production. Swine production is relatively new, but some fairly large commercial operations began in 1980. Both the swine and poultry industries are stifled by lack of reasonably priced, adequate, and timely supplies of basic feedstuffs.

Topography and Agriculture

Colombia is located only slightly above the equator in the northwest corner of South America. The Andes Mountains split into three separate ranges, creating three distinct topographical regions: the flat coastal areas, central highlands, and the eastern plains (llanos).

Because of Colombia's diverse microclimates and topography, the country produces a wide variety of crops. Most crop and livestock production is in the fertile Cauca and Magdalena river valleys, the mountain plains, and the low regions bordering the Caribbean Sea. Dairy production is generally in areas of moderate climate near large cities. Production patterns also change with altitude. Cacao, sugarcane, coconuts, bananas, plantains, rice, tobacco, cassava, and most of the country's beef cattle are produced in the hot regions (from sea level to 1,000 meters). The temperate regions (1,000-2,000 meters) are better suited for coffee, corn, citrus fruits, pears, pineapples, and tomatoes. The cold region (2,000-3,000 meters) produces wheat, barley, potatoes, cold climate vegetables, dairy cattle, and poultry. Most of the country's more developed production areas are taken up by coffee, corn, and rice.

Corn is grown throughout Colombia, but most other crops are raised in the west. The llanos bordering on Venezuela are important cattle-grazing areas, but rice production there is increasing as well. Only about half of the total land area of nearly 104 million hectares is settled. Two-thirds of the beef cattle population is in the mid-Magdalena or the Caribbean coast areas. The unsettled half of the country includes mainly the Pacific coastal plain and eastern llanos.

Agricultural Inputs

Only 5 percent of Colombia's land area is arable. About a fourth of Colombia's GDP originates in agriculture, and about 27 percent of the people are employed in agriculture (table 4). The cost and short supply of many basic inputs like fertilizers and mixed feeds have, at times, stifled agricultural production.

Colombia's use of fertilizer, for example (at 537 kilograms per hectare of arable land and permanent crops), is low compared with that of neighboring countries, even though per-hectare use has increased nearly 75 percent since 1969-71 (table 4). Nitrogen is used mainly in coffee and rice, 31 and 23 percent. More than 50 percent of the phosphorus goes to potatoes, and 14 percent goes to coffee. Potatoes and coffee are also the principal users of potash, 44 and 22 percent. Other important fertilizer users are barley, sugarcane, and bananas. Nearly 35 percent of the 146,000 tons of nitrogen fertilizer used in Colombia are produced domestically. Colombia also plans to build an ammonia/urea plant with a 200,000-ton capacity on the Caribbean coast. Nearly 95,000 tons of nitrogen were imported during 1969-71.

Sixty percent of nitrogen is imported from Venezuela, 15 percent from the United States, and 25 percent from various other sources. In 1979-81,

Table 4--Agricultural inputs, Colombia

Input	Units	1969-79 average	1979-81 average
Land area	1,000 hectares	103,870	103,870
Arable land and permanent crops	1,000 hectares	5,052	5,650
Arable land and permanent crops: share of total land area	Percent	5	5
Arable land	1,000 hectares	3,586	4,050
Permanent crops	do.	1,466	1,600
Permanent pasture	do.	30,000	30,000
Forest and woodland	do.	61,800	53,500
Irrigated land	do.	250	310
Total population	Millions	20.8	25.8
Agricultural population	Millions	7.8	7.1
Agriculture's share of total	Percent	38	28
Economically active population	Millions	6.2	7.7
Employed in agriculture	Millions	2.3	2.1
Agriculture's share of total	Percent	37	27
Fertilizer use 1/	1,000 tons	155	294
Nitrogen	do.	65	146
Phosphate	do.	56	75
Potash	do.	34	73
Use per hectare of arable land and permanent crops	Kilos/hectare	310	537
Nitrogen	do.	130	269
Phosphate	do.	112	135
Potash	do.	68	134

1/ Active ingredient basis.

Sources: (2, 3).

60 percent of the 75,000 tons of phosphate consumed in Colombia were produced domestically. Basic slag is the main phosphate fertilizer produced. Paz del Rio, an integrated steel mill, is the only basic slag producer. Imports of phosphate are virtually all from the United States and are principally mono- and diammonium phosphates. The 73,000 tons of potash used in Colombian agriculture are totally from imports. The United States supplies 40 percent of the potash; West Germany and Spain are also important sources. Virtually all the potash used is potassium chloride.

Colombia's limitations on mixed feeds have constrained the livestock and poultry industry. Mixed feed production reached 1.3 million tons in 1983. About 70 percent of the manufactured feed (including that mixed on farm) is for poultry. Nearly two-thirds of the egg producers, but only 7 percent of the broiler producers, mix their own feed. About a fifth of the ingredients are imported, including fish and animal meals, vitamins, and other minor ingredients.

Agricultural Policy and Institutions

The Ministry of Agriculture (MAG) has the basic responsibility as the planning, policy formulating, and coordinating agency for the agricultural sector. MAG's organization consists of the Office of the Minister, the Vice-Minister, and the Secretary General and two Divisions [Organizacion Campensina y Regulacion Tecnica and the Oficina de Planeamiento del Sector Agropecuario (OPSA)]. MAG operational programs relate to Campensino organization and to the preparation of technical regulations on grades and standards for agricultural products and inputs. OPSA is responsible for the overall budget of the agricultural sector.

Attached to MAG are several decentralized agencies for which the ministry retains planning, budgeting, supervising, and coordinating responsibilities. These agencies include the Banco Ganadero, Caja de Credito Agrario, Industrial y Minero, Federacion Nacional de Cajeteros, Instituto Colombiano Agropecuario (ICA), Instituto Colombiano de la Reforma Agraria (INCORA), Instituto de Mercadeo Agricola (IDEMA), and the Instituto de Desarrollo de los Recursos Naturales Renovables (INDERENA). National commissions, representing producer groups of the major agricultural products, are also attached to MAG. The purpose of these commissions is to consult with MAG and to provide permanent dialog between MAG and interested producers when there are policy changes.

Caja de Credito Agraria, the largest development bank in Colombia, provides credit and technical assistance to farmers, cattle farmers, and small industry for purchasing machinery, farm supplies, and rural housing, and for developing farmer cooperatives.

Banco Ganadero, a credit institution with shares held by the Government, Caja Agraria, and private subscribers, was founded in 1956 as a division of Caja Agraria. The Colombian congress made the bank a separate institution in 1968 to be used for credit to livestock producers and slaughterhouses. Banco Cafetero was created in 1953 by the National Federation of Coffee Growers, its sole stockholder, and was empowered to engage in all commercial banking operations. It was founded to finance the production, transport, and export of coffee and other agricultural products, as well as to assist in the general development of the coffee zones.

INCORA, the Colombian agrarian reform agency, was created as part of the Agrarian Reform Law 135 of 1961. INCORA has statutory responsibility for administering the land tenure restructuring provisions of that law and of

Law 1 of 1968 extending coverage to renters and sharecroppers. Law 135 also authorized INCORA to initiate proprietary activities such as farm credit, land improvement, and social development. The agency has expanded its programs from the distribution and titling of public lands to include redistribution of private lands and complementary investments in credit, land improvement, and social development. There has been some colonization of the eastern plains through INCORA.

ICA, established in 1963, is the agricultural research, education, and extension organization of the Colombian Government. ICA's research program covers the full range of agricultural disciplines, with emphasis on adaptive research and on the economics of alternative technologies. The extension service has 62 agencies distributed throughout the country.

INDERENA, created by decree in 1968 under the supervision of MAG, regulates, administers, conserves, and develops maritime and continental water fisheries, national parks, hydrographic basins, communal grasslands, and national prairies. Major emphasis for development is placed on forests and fisheries and, to a lesser extent, on national parks and wildlife.

IDEMA is a quasi-Government agency with broad responsibilities for pricing and marketing agricultural products. The agency's principal activities center around an agricultural price-support program and include the purchase and sale of storable commodities. Through IDEMA, a farm support price is announced at planting time for rice, sesame, barley, edible beans, corn, sorghum, soybeans, wheat, potatoes, cotton, and anise. Through purchase and storage operations, IDEMA carries out this price support activity. Until recently, IDEMA was also the exclusive import agency for basic deficit agricultural products--mostly wheat--and for export surpluses.

IDEMA's purchasing of only a portion of Colombia's domestic crops has a limited influence on the domestic market. In 1965, IDEMA purchased only 3 percent of the rice and corn produced, 23 percent of the beans, 2 percent of the potatoes, and virtually no wheat. By 1980, IDEMA purchased 8 percent of the sorghum and 38 percent of the wheat. Until recently, IDEMA had more influence on the market through its role as the exclusive importer of these major commodities.

Producer federations and associations are concerned primarily with promoting, producing, or marketing specific crops or commodities. Their main objectives are: (1) to act in behalf of members before the national Government and other public and private entities, (2) to assure that effective technical assistance is received from public and private sources, (3) to assure adequate supply of agricultural inputs, and (4) to assist in agricultural marketing. The major organizations are the National Federation of Coffee Growers, the Cotton Growers' Federation, the Sugarcane Growers' Association, the Potato Growers' Federation, the Poultry Producers' Federation, and the Rice Growers' Federation.

Farm Prices

Support and farm prices for many farm commodities such as wheat, corn, soybeans, and cotton are well above world prices. Colombia has insulated its producers of these products by instituting quotas, tariffs, and import-licensing schemes. The agricultural sector is plagued with problems in production and marketing, and it faces high producer costs. During the seventies, farm prices for sorghum, sugarcane, plantains, and milk rose faster than prices for other

agricultural commodities. Farm prices for other major commodities rose less than the overall consumer price index (CPI), which increased 628 percent from 1969-71 to 1979-81. In Colombia, wheat and corn are priced nearly the same. Among livestock products, poultry meat is still priced considerably higher than beef, mutton, or pork (table 5).

FOOD CONSUMPTION

Colombians eat mostly domestically produced food, but imported foods, mainly wheat products and some vegetable oils, have become an important part of the national diet (table 6). The average Colombian diet is calorically

Table 5--Farm prices for selected commodities, Colombia

Product	Nominal prices			Real prices		Price in dollars	
	1969-71 average	1979-81 average	Increase	1969-71 average	1979-81 average	1969-71 average	1979-81 average
	Pesos/metric ton		Percent	Pesos/metric ton		Dollars/metric ton	
Wheat	1,975	10,780	445	141	106	106	240
Rice	1,829	9,484	418	130	93	98	211
Corn	1,501	10,093	572	107	99	87	224
Barley	1,692	9,893	484	121	97	91	220
Sorghum	1,319	9,446	616	94	93	71	210
Dry beans	7,675	42,439	443	548	416	413	944
Potatoes	1,129	7,378	553	81	72	61	164
Cassava	1,047	6,245	496	75	61	56	139
Tobacco	6,298	30,709	387	449	301	339	684
Cotton	4,157	28,991	597	296	284	224	645
Cottonseed	1,040	7,245	596	74	71	56	161
Soybeans	2,797	17,422	522	199	177	151	388
Sesameseed	4,690	26,815	471	335	263	252	597
Bananas	1,144	5,192	354	82	51	62	115
Plantains	821	7,675	834	59	75	44	171
Coffee	8,996	61,494	583	642	603	484	1,369
Cocoa beans	13,821	94,427	583	987	926	744	2,102
Sugarcane	91	746	719	6	7	5	16
Palm oil	6,243	34,065	445	446	334	336	758
Beef and veal	11,280	69,470	515	806	681	608	1,546
Mutton	17,743	74,700	321	1,267	732	955	1,663
Pork	15,339	77,970	408	1,095	764	826	1,735
Poultry meat	24,333	153,650	531	1,738	1,506	1,310	3,420
Milk	1,804	13,110	626	129	128	97	292
Eggs	15,600	75,560	384	1,114	741	840	1,682

adequate by standards of the Food and Agriculture Organization (FAO) of the United Nations.

Consumption Trends

Average per-capita food consumption in Columbia is about 2,300 calories per day, but the country has pockets of malnutrition (table 6) (4). About 30 percent of the calories are from cereals, and 10 percent are from roots and tubers. Some 25 percent of the calories are from sugar. Animal products, including milk, provide only 16 percent of the calories in the national diet (4). Although Colombia's aggregate availability of calories per capita appears adequate, about 20 percent of the population consumes only 60 percent or less of the minimum adequate diet recommended by FAO. Protein availability is 17 percent under recommended per-capita intake. Nutritional problems include iron deficiency anemia and other mineral and vitamin deficiencies. A 1978 study by the National Plan for Food and Nutrition (Colombia) presents a less optimistic picture of the Colombian food supply with half the families having diets that meet less than 70 percent of their consumption requirements. During the seventies, per-capita caloric intake of foods increased about 10 percent, as Colombia made a national effort to improve its nutritional status. Rice, corn, cassava, potatoes, and plantains are the major sources of carbohydrates. Wheat provides less than 5 percent of the calories in the national diet. The other carbohydrates are from domestic sources (table 7). Colombians also consume large quantities of fruits and vegetables, especially bananas and citrus fruits. Tomatoes, onions, and cabbages are the basic vegetables.

Beef, at 24 kilograms per person per year, is the primary red meat consumed. Poultry consumption is still only 3 kilograms per year, and fluid milk consumption is about 55 kilograms per year.

Vegetable oils are replacing animal fats. Use of corn oil, palm oil, and cottonseed oil exceeds soybean oil. Soybean oil and a small quantity of coconut oil are supplemented by imports, whereas the other oils are produced domestically.

The proportion of a Colombian family's budget spent on food always declines as income rises, according to a study by the Brookings Institute on Consumer behavior in Latin America (11). The decline is especially marked for cereals and vegetables. The wealthiest quartile of the population (with a mean annual income of $6,200) allocated about 34 percent of total expenditures to food and beverages, whereas the poorest quartile (mean income of $1,000) spent nearly 60 percent (11). The share of the family budget for cereal products falls from about 12 percent for the lowest income to 5 percent for the highest income. The share drops for meat and poultry products, but less sharply, from 11 percent to 8 percent.

Market shares among income categories also reflect these consumer spending habits. The richest quartile of Colombia's population has 65 percent of the income. Their expenditures account for 43 percent of the country's expenditures on food and beverages. Their expenditures for dairy products, eggs, meat, poultry, and fruits are about 40 percent. Their market share of seafood and beverage (especially alcoholic) consumption is considerably higher than for total foods, but their market share for cereals is only 35 percent.

Table 6--Per capita food consumption, 1975-77 average, Colombia

Product	Per person average	Average daily caloric intake	Average daily protein intake
	Kilograms/year	Calories/day	Grams/day
Wheat (flour)	12.5	125	3.3
Rice (milled)	29.5	294	5.8
Corn	26.7	263	6.6
Pulses	4.5	42	2.7
Cassava	39.7	98	.8
Potatoes	42.8	86	2.2
Plantains	59.4	148	1.3
Yams	3.9	10	.2
Sugar	52.5	533	.6
Pineapple	3.6	3	--
Papaya	1.6	1	--
Bananas	22.4	38	.5
Apples	.3	--	--
Citrus	5.4	4	.1
Coconut	1.7	6	.1
Tomatoes	6.5	4	.1
Onions	8.7	10	.3
Cabbage	9.7	6	.3
Carrots	3.3	3	.1
Corn oil	1.3	31	--
Palm oil	1.6	38	--
Soybean	.2	5	--
Cottonseed oil	1.6	30	--
Beef and veal	23.9	132	9.6
Pork	3.9	21	1.4
Poultry	2.9	10	.9
Eggs	4.5	16	1.2
Fluid milk	55.2	92	5.3
Cheese	1.5	14	1.4
Lard and tallow	1.5	36	--
Butter	.5	9	--
Coffee	4.2	5	.8
Cocoa beans	1.1	15	.4
Barley malt/beer	34.0	34	.3
Other	16.4	84	2.3
Total	489.0	2,246	48.6

-- = Not applicable.

Source: (3).

Retail Prices

Food prices have risen about 30 percent per year since 1970, a sevenfold increase in 14 years (table 7). During the seventies, Colombia's retail food prices generally rose faster than did other consumer items. Since 1970, Colombia has had several bursts of inflation, the first following the 1972-74 commodity boom and first Organization of Petroleum Exporting Countries (OPEC) price hike in 1973. Other bursts occurred in 1977 and 1979; 1983 food prices rose 17 percent. Changes in food prices are hard felt as food expenditures alone account for about half of all consumer spending.

Such basic items as corn flour, red beans, yucca, vegetable oil, pork loins, and pasteurized milk changed the most. U.S. dollar equivalents of Bogota retail prices show that Colombia's food prices are fairly comparable with U.S. food prices, although some products, like chicken and cheese, are much higher, while others, like beef and coffee, are significantly lower.

In the early sixties, wheat flour prices were subsidized, particularly when Colombia received U.S. food aid in wheat. During the early seventies, the Colombian Government controlled milk and vegetable oil prices even though price controls eventually led to shortages of these products.

Table 7--Retail prices for selected foods in Bogotá, Colombia

Item	Nominal prices			Deflated prices		Dollar prices	
	1969-71 average	1979-81 average	Increase	1969-71 average	1979-81 average	1969-71 average	1979-81 average
	Pesos/kilogram[1/]		Percent	Pesos/kilogram[1/]		Dollars/kilogram[1/]	
Rice	4.32	30.18	599	30.9	29.6	0.23	0.64
Corn flour	2.74	23.13	744	19.6	22.7	.15	.49
Wheat flour	3.84	28.14	632	27.5	27.6	.20	.60
Bananas	2.21	16.66	653	15.8	16.4	.12	.35
Plantains	2.13	8.97	321	15.3	8.8	.11	.19
Red beans	11.10	100.87	808	79.3	98.9	.59	2.13
Potatoes	2.27	17.37	665	16.3	17.1	.12	.37
Yucca	2.47	22.93	828	17.7	22.5	.13	.49
Sugar (panela)	2.78	19.22	591	19.9	18.9	.15	.41
Powdered coffee	13.98	63.07	351	99.9	61.9	.75	1.33
Vegetable oil	8.84	71.80	712	63.2	70.4	.48	1.51
Beef cutlets	15.93	63.96	301	113.8	62.7	.85	1.35
Pork loins	17.78	148.12	733	127.0	145.3	.95	3.13
Poultry	n.a.	106.73	n.a.	n.a.	104.7	n.a.	2.26
Pasteurized milk	1.80	15.24	746	12.9	15.0	.10	.32
Eggs	.75	4.61	514	5.4	4.6	.04	.10

n.a. = Not available.

1/ Except for eggs, which are priced per egg.

Sources: (13, 14, 15, 16).

Fluid milk prices were removed from fully controlled status in 1979 to quasi-control, and output increased sharply during 1980-85. Self-sufficiency was attained for most of this period, albeit at low per-capita consumption. Dairy product prices are high and per-capita consumption is low.

FOREIGN TRADE

In 1985, Colombia imported about $291 million of agricultural commodities, three-fourths of them from the United States. Wheat constituted about a third of Colombia's total agricultural imports. Soybean oil, barley, tallow, sorghum, lentils, apples, dry peas, beans, powdered milk, and corn are also major import items. The United States is the sole or principal supplier of wheat, corn, sorghum, soybean oil, tallow, and dried peas (tables 8 and 9).

Agricultural Trade Policy

Colombia has had a restrictive import policy most of the time and has only loosened trade restrictions when it was enjoying considerable economic growth. However, Colombia's current trade policy reflects the need for belt-tightening and is now being used to halt the recent decline in international foreign exchange reserves. The Government maintains overall control over exports through the Colombian Institute of Foreign Trade (INCOMEX). This agency administers import and export regulations. Permission to import is granted after INCOMEX is satisfied that a deficit for a specific commodity exists. INCOMEX maintains control over imports through (1) prior licensing, (2) import tariffs, (3) allocation of foreign exchange among authorized imports, and (4) variable exchange rates. IDEMA purchases most agricultural products, and INCOMEX grants import licenses for these products after consulting with IDEMA and MAG. IDEMA was the sole importer of wheat, sorghum, corn, soybean meal, and dried milk. The Government gradually reduced tariffs and removed import items from the prior licensing list during 1967-82; it has once again moved toward tighter control through prior licensing. Tariffs have also generally been raised in recent years (app. tables 11-20).

In this network of trade restrictions, grains and oilseeds are also officially subject to import duties which are waived when IDEMA is the sole purchaser of these basic imports; however, IDEMA charges the equivalent amount and uses these fees as operating expenses. Import duties are quoted ad valorem on the c.i.f. value of the shipment. Surcharges are assessed as follows:

* A 5-percent surcharge of the c.i.f. value of the merchandise for the export promotion fund (PROEXPO),
* A 1.5-percent surcharge of c.i.f. value of the merchandise for the Coffee Promotion Fund, and
* A 1-percent of f.o.b. value surcharge on the merchandise for the consular tax.

Imports are also subject to a sales tax of about 3 percent for most essential goods.

Most major agricultural imports are handled by IDEMA, Colombia's central agricultural marketing agency. More agricultural products were added to the import licensing system in April 1983. Policies for products whose domestic production is threatened by imports are especially protectionist. For example,

Table 8--Import value (c.i.f.) of main agricultural products, by country of origin (1973-80), Columbia

Commodity and origin	1973	1974	1975	1976	1977	1978	1979	1980
				Million U.S. dollars				
Wheat	40.0	85.0	54.1	65.1	26.7	52.6	52.6	129.2
United States	40.0	83.2	54.1	65.1	19.8	46.7	44.6	129.2
Other	--	1.8	--	--	6.9	5.9	8.0	--
Soybean oil	.9	4.9	4.3	14.4	22.9	28.5	48.2	60.3
United States	.5	4.6	3.7	11.2	16.5	25.8	43.2	60.2
Brazil	--	--	--	--	6.3	2.7	4.1	--
Other	.4	.3	.6	3.2	.1	--	.9	.1
Barley	6.5	9.4	2.4	9.7	16.2	15.4	11.1	8.8
United States	5.5	7.9	2.4	--	7.0	--	--	--
Canada	--	--	--	9.7	7.9	15.4	11.1	8.8
Other	1.0	1.5	--	--	1.3	--	--	--
Tallow	7.7	8.7	9.2	11.3	14.4	14.4	18.5	20.4
United States	6.6	8.4	9.2	11.3	14.4	13.7	18.5	20.4
Other	1.2	.3	--	--	--	.4	--	--
Sorghum	5.0	.4	--	--	13.7	4.9	.5	27.8
United States	4.8	.4	--	--	7.9	.1	.5	27.4
Argentina	.2	--	--	--	5.8	4.8	--	0.4
Lentils	3.3	5.5	3.1	6.3	6.2	8.4	5.4	11.4
United States	2.0	2.0	.2	1.7	.7	.6	.7	3.2
Chile	.6	3.2	2.8	3.2	3.7	4.7	4.4	7.9
Other	.7	0.3	0.1	1.4	1.8	3.1	.3	.3
Apples	1.5	3.2	3.1	4.8	3.7	3.2	8.9	12.9
United States	--	.02	.01	.1	1.1	1.0	3.1	5.6
Chile	1.4	3.1	3.0	4.6	2.4	1.9	5.5	6.0
Other	.1	.08	.09	.1	.2	.3	.3	1.3
Dry peas	.9	1.7	2.7	2.1	5.5	3.5	5.3	10.2
United States	.9	.7	.9	1.5	2.8	1.3	5.0	9.0
Canada	--	--	--	--	.7	1.0	.3	1.2
Other	--	1.0	1.4	.6	2.0	1.2	--	--
Powdered milk	1.3	1.9	1.5	8.1	20.1	10.8	6.7	02.3
United States	.1	.2	--	--	--	.1	--	--
Belgium	--	.5	--	1.1	4.1	.6	1.1	7.8
France	.5	.2	--	1.7	.7	.4	.3	4.4
Netherlands	.1	.2	.7	.6	3.8	8.3	1.1	1.7
United Kingdom	--	--	--	.4	.3	--	--	3.3
Other	.6	.8	.8	4.3	11.2	1.4	4.2	5.1

See notes at end of table.

Continued--

Table 8--Import value (c.i.f.) of main agricultural products, by country of origin (1973-83), Colombia--Continued

Commodity and origin	1973	1974	1975	1976	1977	1978	1979	1980
	Million U.S. dollars							
Corn	10.0	6.2	--	2.2	13.4	8.0	8.7	30.8
United States	10.0	6.2	--	2.2	11.2	.1	6.6	30.8
Argentina	--	--	--	--	2.2	7.9	2.1	--
Ecuador	--	--	--	--	--	--	--	--
Total agricultural imports	154.3	222.6	151.8	212.0	251.7	289.3	322.3	532.5
United States	118.0	138.0	85.0	97.0	135.0	135.0	246.8	265.8
Other	36.3	84.6	66.8	115.0	233.4	154.3	75.5	266.6

-- = Not applicable.

although private millers have been permitted to import wheat since 1982, IDEMA still has substantial control over imports as it handles all grain import licenses. Colombia currently has a 6-month import quota on wheat and soybean oil. Because of the internal inflation and the recent balance of payments problems, Colombia had a series of mini-devaluations through the seventies to more closely align its currency with the world economy. Despite these devaluations, the Colombian peso is still considered overvalued, mostly because the Government did not allow the peso to float to its economically optimum level. One outcome of this overvaluation is that imports are priced lower than domestic products. Overvaluation of the currency has been detrimental to exports.

Trade Agreements

Colombia became a full member of the General Agreement on Tariff and Trade (GATT) on October 3, 1981. In 1980, Colombia ranked fourth among Latin American beneficiary countries under the U.S. Generalized System of Preferences (GSP) with $139 million in imports entering the United States duty free under GSP. Major products benefiting from GSP include: syrup and molasses, candy, and many nonfood products. U.S. imports of cut flowers, yams, and candied fruit from Colombia were excluded from preferential treatment as of March 31, 1981.

COMMODITIES

I examined the supply and distribution of major import commodities and evaluated their import potential by 1990. Grains are by far the leading import item and have import growth potential.

Projections of supply and demand potential for 1990 are based on the structural models discussed in appendix 1. Underlying these projections are assumptions of future changes in income and population growth and consumer prices for basic foods. Assumptions about near-term changes in producer prices are key

Table 9--Import value (c.i.f.) of main agricultural products by country of origin and share of dollar value, 1981-85, Colombia

Commodity and origin	1981		1982		1983		1984		1985	
	Amount	Share	Amount	Share	Amount	Share	Amount	Share	Amount	Share
	Million U.S. dollars	Percent	Million U.S. dollars	Percent	Million U.S. dollars	Percent	Million U.S. dollars	Percent	Million U.S. dollars	Percent
Wheat	72.5	100	104.8	100	127.4	100	109	100	97.0	100
United States	72.5	100	104.8	100	121.6	95	104	95	84.0	86
Other	--	--	--	--	5.8	5	5	5	13.0	14
Soybean oil	102.9	100	78.4	100	47.8	100	52.5	100	33.0	100
United States	65.9	64	49.4	63	30.0	63	19.1	40	10.0	30
Brazil	27.9	27	18.9	24	7.8	16	14.3	30	0	0
Other	9.1	9	10.1	13	10	21	19.1	40	23.0	70
Barley	19.5	100	32.8	100	36.6	100	34	100	13.0	100
United States	4.4	23	6.4	20	2.1	6	--	--	10.0	77
Canada	15.1	77	23.6	72	21	94	34	100	2.0	15
Other	--	--	--	--	--	--	22.5	100	1.0	8
Tallow	12.8	100	17.9	100	23.8	100	21.6	96	25.0	100
United States	11.2	88	17.1	95	22.9	96	.9	4	23.0	92
Other	1.6	12	.8	5	.9	4	6.8	100	2.0	8
Sorghum	1.6	100	9.3	100	29.4	100	--	--	13.0	100
United States	1.6	100	9.2	99	26.4	90	.5	100	11.0	85
Argentina	--	--	.1	1	3	10	.3	55	2.0	15
Lentils	9.5	100	7.9	100	12	100	.2	45	9.0	100
United States	6.4	67	4.5	56	3.8	32	3.8	100	4.0	44
Chile	.7	7	--	--	.1	1	1.1	29	5.0	55
Other	2.4	26	3.4	44	6.1	61	2.7	--	0	0

See notes at end of table.

Continued--

Table 9--Import value (c.i.f.) of main agricultural products, by country of origin and share of dollar value, 1981-85, Colombia--Continued

Commodity and origin	1981		1982		1983		1984		1985	
	Amount	Share	Amount	Share	Amount	Share	Amount	Share	Amount	Share
	Million U.S. dollars	Percent	Million U.S. dollars	Percent	Million U.S. dollars	Percent	Million U.S. dollars	Percent	Million U.S. dollars	Percent
Apples	12.2	100	13.8	100	15.4	100	1.5	100	5.0	100
United States	4.8	39	5.3	39	5.4	35	1.5	100	2.0	40
Chile	7.0	58	7.1	52	9	58	--	--	3.0	60
Other	.4	3	1.4	9	1	7	--	--	0	0
Dry peas	9.8	100	10.1	100	13.5	100	4.3	100	3.0	100
United States	8.2	84	9.6	95	11.4	84	1	100	3.0	100
Canada	1.5	15	.4	4	2.1	16	.7	16	0	0
Other	.1	1	.1	1	--	--	1	23	0	0
Powdered milk	14.8	100	10.1	100	11.7	100	1	100	4	100
United States	--	--	--	--	--	--	0	0	0	0
Belgium	1	7	1.8	18	--	--	0	0	0	0
France	1.3	9	3.2	32	--	--	0	0	0	0
Netherlands	.7	5	3.1	30	11.7	100	0	0	0	0
United Kingdom	10.5	70	--	--	--	--	0	0	0	0
Other	1.3	9	2	20	--	--	1	100	4	100
Corn	15.2	100	17.2	100	6.3	100	1	100	8	100
United States	15	99	10	58	6.3	100	1	100	0	0
Argentina	--	--	--	--	--	--	0	0	8	100
Ecuador	.2	1	7.2	32	--	--	0	0	0	0
Total agricultural imports	492.9	100	556.2	100	541.2	100	324.3	100	291.0	100
United States	221	45	283	51	256	47	213.8	66	217.9	75
Other	27	55	83.2	49	285.2	53	179.5	34	73.1	25

-- = Not applicable.
Source: (19).

to the future supply of these major agricultural products. Projections are for 4-percent real income growth, 1.9-percent population growth, and foreign reserves of $2.1 billion. Real prices at retail and farm levels are assumed to remain at their 1980 level so that no structural change will take place because of changes in relative prices among commodities. The historic supply, demand, and trade situation of the basic grains and oilseeds and the projections based on the equations presented in appendix table 1 are the most likely developments for these commodities.

Grains

Overall grain production increased from 1.7 million tons in 1969-71 to 2.7 million tons in 1979-81. Grain use rose from 2.6 to 3.4 million tons during the same period, and Colombia increased its carryover stocks. Thus, grain imports rose from 418,000 tons in 1969-71 to 724,000 tons in 1979-81, with some prospect for hitting the 1-million-ton mark before 1990.

Wheat

Wheat is concentrated on farms with small landholdings in the highlands and is raised by traditional methods. Production is concentrated in the Narino, Boyaca, and Cundinamarca departments. Potatoes, barley, and sheep are produced in the same area. Higher returns for other highland crops have reduced interest in wheat (table 10). Wheat production declined from 57,000 tons in 1969-71 to 52,000 tons in 1979-81; it will probably decline through the eighties. Lower yields, the long growing season required for wheat in this environment, and the high costs of transporting wheat from the highlands to the populous coastal region preclude growth in Colombia's wheat production. Former wheat lands around Bogota have switched to flower production or dairy farming. Only a small part of Colombia's highlands are flat and thereby suitable for mechanization. Domestic wheat is a soft red wheat that has to be mixed with hard wheats such as hard red winter to enhance its milling quality. Wheat is milled by 106 flour mills located throughout the country. The local bread-baking industry is largely rudimentary, precluding many economies of scale in bread and pastry production.

Wheat support prices are announced by the Colombian Government through its central agricultural marketing agency, IDEMA, and are the effective prices to farmers at central marketing points. IDEMA also establishes consumption quotas to the millers after local harvesting, and millers buy directly from growers. Regression analysis indicates that changes in real farm prices for wheat have been the major determinant of wheat production, even though wheat is grown in a relatively confined geographical area.

Per capita consumption of wheat at 19.1 kilograms during 1969-71 and 19.3 kilograms during 1979-81 is low relative to other Andean countries. Bread is relatively high-priced and competes with other carbohydrates like corn, rice, cassava, and plantains (27).

Imports make up 90 percent of Colombia's wheat supply, having risen from 337,000 tons in 1969-71 to 448,000 tons in 1979-81. The United States is the principal supplier, but faces growing competition from Argentina. Hard red winter is the principal wheat imported. Some soft red winter is also imported by cookie and cracker factories. Wheat imports are concentrated in the second half of the year, mostly because of U.S. harvests and general world availability. Imported wheat is sold to millers at IDEMA port outlets. As of the

Table 10--Supply and distribution of major grains, Colombia

Item	1969-71 average	1979-81 average	1985	1990 projected
		1,000 hectares		
Harvested area:				
Wheat	53	38	42	35
Rice	246	424	364	450
Corn	770	618	586	564
Sorghum	73	210	203	245
Barley	62	57	17	50
Total	1,204	1,347	1,212	1,344
		1,000 tons		
Production:				
Wheat	57	52	79	45
Rice	509	1,218	1,102	1,575
Corn	844	875	857	862
Sorghum	155	471	535	515
Barley	90	96	29	100
Total	1,655	2,712	2,702	3,097
Beginning stocks:				
Wheat	44	210	262	250
Rice	48	240	157	220
Corn	23	68	20	115
Sorghum	8	93	77	80
Barley	16	79	0	60
Total	139	690	516	725
Ending stocks:				
Wheat	42	254	313	210
Rice	84	216	154	220
Corn	23	115	20	115
Sorghum	16	8	67	80
Barley	13	63	0	60
Total	178	728	554	685
Total imports:				
Wheat	337	448	597	710
Rice	1	1	0	0
Corn	23	117	25	140
Sorghum	9	93	115	293
Barley	48	65	145	120
Total	418	724	882	1,263

See notes at end of table.

-- Continued

Table 10--Supply and distribution of major grains, Colombia--Continued

Item	1969-71 average	1979-81 average	1985	1990 projected
		1,000 tons		
Total exports:				
Wheat	0	0	0	0
Rice	0	0	25	0
Corn	0	10	0	0
Sorghum	0	0	0	0
Barley	0	0	0	0
Total	0	10	25	0
Total consumption:				
Wheat	391	523	625	755
Rice	465	1,213	1,080	1,575
Corn	853	945	875	--
Sorghum	759	577	660	1,808
Barley	140	177	174	220
Total	2,608	3,435	3,414	4,358
Total feed use:				
Wheat	0	0	10	0
Rice	0	0	0	0
Corn	93	68	0	--
Sorghum	159	577	660	820
Barley	0	0	0	0
Total	252	645	670	820
Food use:				
Wheat	391	523	615	705
Rice	465	1,213	1,080	1,577
Corn	760	877	875	988
Sorghum	0	0	5	0
Barley	140	176	174	220
Total	1,756	2,789	2,749	3,490
Per capita food consumption:				
Wheat	19.1	19.3	20.2	22.4
Rice	22.6	44.8	35.5	47.3
Corn	33.7	32.3	28.8	29.7
Sorghum	0	0	.2	0
Barley (beer)	6.8	6.5	5.7	6.6
Total	82.2	102.9	90.4	106.0

-- = Not applicable.

Source: (21). Projections are based on equations in appendix table 1 and on projected income and population growth in table 1 footnotes. Relative producer and retail prices are assumed to stay at their current level.

mideighties, private millers directly imported about 80 percent of the wheat with licenses from IDEMA, and IDEMA imported about 20 percent for price-stabilization purposes and for sale to smaller millers.

Between 1973 and 1982, U.S. wheat exports to Colombia were on a commercial basis, following the large U.S. food aid program during the late sixties (18). The United States currently uses GSM-102 Commodity Credit Corporation (CCC) credit guarantee financial arrangements with Colombia. IDEMA places 12 to 14 percent of the c.i.f. value surcharge on imported wheat, creating a high-priced domestic market insulated from world market prices. The price for domestic wheat is equivalent to the c.i.f. price, plus levies and surcharges. IDEMA has been able to insulate the Colombian domestic market by being the sole licensee/importer of hard wheat; it does not have to pay the import levy itself, but passes on the levy as a surcharge to millers. For many years, the difference between the import price and the higher price that millers paid IDEMA was used for IDEMA's operating expenses. The farm-level price is also supported well above the world price. Wheat import demand is related more to the internal wholesale price than to the world wheat price. Internal income growth is also a more important determinant of imports than are changes in foreign reserves. Regression results provide some evidence that Title 1 imports and domestic production itself are close substitutes for imports (app. table 1).

The continued limited growth in real income with an income elasticity of about unity will limit expansion of wheat, flour consumption, and imports through the late eighties. Population growth of about 2.5 percent will be the major factor influencing wheat imports. By 1990, wheat imports may edge up to about 700,000 metric tons, as production is projected to be only 45,000 tons and total consumption needs are projected to be 755,000 tons (table 10).

Rice

Rice, experiencing tremendous production growth in the late sixties, now offers considerable competition to wheat imports. Even between 1969-71 and 1979-81, rice production increased from 509,000 tons to 1.2 million tons. Rice is an example of successful technology transfer. Between 1965 and 1975, rice yields increased nearly 12 percent per year, but have since leveled off (27). The changeover to high-yielding varieties (HYV) occurred in 1968, when the proportion of rice sown to HYV jumped from 7 to 43 percent (16). HYV now represents virtually 100 percent of total rice production. Colombia also changed its rice technology from dryland upland rice to irrigated rice. Although the producing area grew through the sixties and seventies, irrigated rice land increased from 70 percent of the total rice land area in 1969-76 to 95 percent by 1979-81.

With yields on irrigated land nearly triple the upland yields, this changeover in itself was a boost to overall rice production. Rice area increased 72 percent. Most of this land had been either pastureland or planted to cotton and sesameseed. Since 1944, the Government has operated a price-support scheme through IDEMA. There are now 24 separate support prices based on the type of rice, humidity, grain quality, and impurities. Production is directed largely to domestic food consumption.

The area devoted to rice production is mostly responsive to changes in farm-level rice, cotton, and sugarcane prices. Declining real prices and increasing production costs are now halting expansion. Rice production in the Eastern Plains (Meta Department) has increased the most and has outgrown that

region's drying and milling capacity. Tolima, Cesar, and Huila are the traditional rice-producing departments. Rice production is also expanding into the northern areas of the country. Major varieties are CICA-7, CICA-9, and CICA-8, but CICA-8 has recently developed some weaknesses to pests. Colombia has traditional rice-milling facilities as well as two mills that produce parboiled rice.

From 1969-71 to 1979-81, per-capita rice consumption doubled from 22.6 to 44.5 kilograms. Per-capita consumption of rice is affected principally by income growth (income elasticity of 1.4) and by retail prices for yucca and beans. Rice is one of the main staples in the average Colombian's diet and is priced low relative to neighboring countries. Moreover, between 1965 and 1975, real retail prices for rice declined 6 percent per year and have dropped 0.2 percent per year since then (27). Colombia currently holds considerable rice stocks and has attempted to export in recent years, but with little success, as the international rice market has been depressed. Even in the domestic market, Colombian producers must sometimes compete with contraband rice from Venezuela. Rice production is forecast to reach 1.5 million tons, but this level will probably meet only domestic consumption.

Corn

Corn is produced throughout Colombia. Production increased only 4 percent from 844,000 tons in 1969-71 to 875,000 tons in 1979-81. About 80 percent comes from small landowners in the mountains. Technology used by these producers is extremely rudimentary and is limited by both socioeconomic problems and poor soil conservation practices. The area devoted to corn production declined in the seventies; however, yields have increased somewhat as some corn has been cultivated by larger, more mechanized producers in the lowlands. Their corn yields are double those of traditional producers, but their production costs are considerably higher. Poor and scarce irrigation facilities are the major deterrent to higher production in the lowlands. Corn competes with sorghum, cotton, and soybeans in some commercial producing areas. Analysis indicates strong competition between corn and sorghum (app. table 1). Antioquia, Cundinamarca, and Narino--the largest producing areas--use mostly traditional methods. The Magdalena, Sucre, Tolima, Meta, and Valle departments also produce corn commercially. Colombia has developed some corn hybrids that are adapted to the Cauca valley such as ICA-H-259 and ICA-260 (both white corn varieties) and ICA-H-213 (a yellow variety).

Most of Colombia's white and yellow corn is consumed as food, and corn flour is a traditional part of the Colombian diet. Corn provides about 10 percent of the total carbohydrate intake in the Colombian diet. Corn flour manufacturers usually have a buying network in the producing areas to procure their supply. Per-capita corn consumption has declined over the past two decades.

Corn is imported in small amounts, traditionally from the United States. Corn production is expected to reach about 860,000 tons, for a deficit of 110,000 tons. Corn for human consumption alone will be nearly 1 million tons (table 10). Some imported corn may also be used as feed grain.

Sorghum

Sorghum is now the principal feed grain and has been a growth crop. Sorghum production tripled between 1969-71 and 1979-81, reaching 471,000 tons. It was a substitute crop for cotton during the current fiber crisis in some areas,

especially in the Cauca valley. Sorghum sometimes rotates with cotton. The strong inverse statistical relationship between sorghum area and the price for rice, however, shows a more price-competitive relationship between sorghum and rice. The northern regions also produce sorghum. Cesar, Meta, Tolima, and Valle are the principal producing departments. Sorghum makes up about 90 percent of the grain available for feed use. The dramatic increase in poultry has boosted demand for mixed feeds and, therefore, for sorghum.

Domestic sorghum used in the feed industry competes with feed contraband from Venezuela, because the price differential has shifted as a result of Venezuela's devaluation in 1983. IDEMA relies on imports to fill the gap between domestic production and feed needs during shortages, so Colombia has imported sorghum only since 1979, chiefly from the United States and Argentina. IDEMA controls sorghum imports. The Board of Directors establishes the imports made by IDEMA every 6 months. Grain sorghum is generally imported during May and September, between the spring and fall harvests.

Sorghum will continue as the dominant feed grain, and feed grain import requirements (corn and sorghum) will reach nearly 300,000 tons by 1990. Feed grain import needs will continue to grow with the poultry industry and the pork industry, which are now in their initial stages of industrialization. Sorghum production is expected to reach 515,000 tons by 1990.

Barley

Barley is produced mostly for brewing. Production increased only 7 percent during the seventies to 96,000 tons in 1979-81. Nearly half is produced in Cundinamarca; other areas like Narino and Boyaca are also important barley-producing areas. Production has declined markedly since 1980 because of brown rust. Low domestic prices have also contributed to production declines. Imports have made up an increasing share of brewers' barley. The United States exports some, but Canada has traditionally been the principal supplier.

Oilseeds and Products

Oilseeds and related products were the second largest group of Colombian agricultural imports in 1979-81 and have growth potential to 1990. Colombia imported 20,000 tons of soybeans, 5,000 tons of soybean meal, 38,000 tons of fishmeal, and 84,000 tons of soybean oil.

Colombia depends on larger imports of oilseeds and products to meet its needs, even though it produces soybeans, African palm for oil, cottonseed, sesameseed, and peanuts. Sesameseed and cottonseed production have declined; African palm and soybean production have trended upward (table 11). Experiments are underway to test the feasibility of sunflowers there. Colombia has a sizable oilseed-crushing industry, with a capacity of 630 tons/day.

Oilseeds

Soybean production rose from 100,000 tons in 1969-71 to 130,000 tons in 1979-81, mostly because of a 14-percent increase in area. Soybean production is limited by lack of suitable growing conditions. Soybeans are now almost exclusively grown in the Cauca department. They compete with cotton, corn, and sorghum. Soybean prices are supported, but prices paid to farmers are often above the support price because of strong demand.

Table 11--Production, consumption, and trade of oilseeds, Colombia

Item	1969-71 average	1979-81 average	1985	1990 projected
		1,000 hectares		
Harvested area:				
Soybeans	57	65	50	75
Cottonseed (cotton)	254	202	173	200
Sesameseed	27	24	n.a.	n.a.
Palm kernels	13	24	n.a.	n.a.
		Tons/hectare		
Yield:				
Soybeans	1.75	2.00	2.10	2.10
Cottonseed	.81	.94	1.25	1.25
Sesameseed	.07	.83	n.a.	n.a.
Palm kernels	n.a.	n.a.	n.a.	n.a.
		1,000 tons		
Production:				
Soybeans	100	130	100	160
Cottonseed	206	190	215	295
Sesameseed	29	20	20	20
Palm kernels	n.a.	n.a.	n.a.	n.a.
Beginning stocks:				
Soybeans	0	65	18	20
Cottonseed	10	6	0	0
Sesameseed	0	0	0	0
Palm kernels	0	0	0	0
Imports:				
Soybeans	5	20	75	0
Cottonseed	0	0	0	0
Sesameseed	0	0	0	0
Palm kernels	0	0	0	0
Total use for crush:				
Soybeans	102	141	170	160
Cottonseed	199	179	205	285
Sesameseed	0	0	0	0
Palm kernels	n.a.	n.a.	n.a.	n.a.
Feed seed and waste:				
Soybeans	3	6	7	10
Cottonseed	7	10	10	10
Sesameseed	0	0	0	0
Palm kernels	0	0	13	15
Ending stocks:				
Soybeans	0	24	16	20
Cottonseed	10	7	0	0
Sesameseed	0	0	0	0
Palm kernels	0	0	0	0

n.a. = Not available.

African palm is currently the most promising oilbearing crop in Colombia and is already the primary source of domestically produced vegetable oil. Between 1969-71 and 1979-81, palm oil production nearly tripled to 75,000 tons. The oil palm was first introduced along the southwestern Pacific coast, the lower Calima River region, and lower Magdalena River, where most plantations are located. The Eastern plains were also opened for this crop. There is no support price for African palm, but prices are established in advance between crushers and processors because of the close linkage between them.

Cottonseed production declined from 206,000 tons in 1969-71 to 190,000 tons in 1979-81 because of reduced cotton production. Cotton production fell because export demand for Colombia's cotton and textiles declined. Cotton is now making a comeback.

Sesameseed is disappearing from Colombia's oilseed supply because of the lack of markets abroad and limited industrial use. Domestic utilization, in turn, is hampered by the high price sesameseed commands. Sesameseed is used mostly in bakery and confectionery products exported to Japan.

Vegetable Oils

Vegetable oil production and consumption have both trended sharply upward (table 12). Vegetable oil production (from domestic and imported oilseeds) increased 76 percent to 136,000 tons in 1979-81, but total use nearly tripled to 217,000 tons. Consumption shifted from shortening to liquid oil and margarine during the seventies. Income growth also spurred consumption. The income elasticity for per-capita vegetable oil consumption is calculated here at 3.1; that is, a 10-percent increase in per-capita real income would most likely cause a 31-percent increase in per-capita vegetable oil consumption. Foreign reserves also determine vegetable oil consumption, because Colombia has expanded imports of soybeans and soybean oil to accommodate domestic needs, particularly when foreign reserves are substantial. The elasticity between per-capita foreign reserves and per-capita consumption of vegetable oil is calculated at 1.95 (that is, a 10-percent change in real per-capita foreign reserves probably results in a nearly 20-percent change in per-capita consumption of vegetable oil). Palm oil may soon overtake soybean oil as the principal vegetable oil in blended cooking oils.

Consumption of vegetable oils and oilseed meals has grown at such a rate that the production/consumption gap is being met with imports. Vegetable oil imports increased from 2,000 tons in 1969-71 to 84,000 tons in 1979-81, in addition to the vegetable oil obtained from the 5,000 tons of imported soybeans in 1969-71 and 20,000 tons in 1979-81. Soybean oil is the principal edible oil import; most comes from the United States, Brazil, and Argentina. Brazil's and Argentina's comparatively low prices and the tariff reductions Colombia has granted to those countries within the regional economic integration schemes add to Brazil's and Argentina's competitiveness with the United States for the Colombian oilseed and product market. The outlook is for imports of 90,000 tons of vegetable oils in 1990.

The Government of Colombia, oil crushers, feed millers, and producers are represented on the Fats and Oils Foreign Trade Commission established in March 1982. A 6-month import quota for edible oils is determined after the commission analyzes local needs and production. In late 1981, Colombia placed a 40-percent ad valorem import tariff on U.S. soybean oil. Oilseeds are subject to previous licensing that is valid for 3 months and an import duty of 18-percent ad valorem.

Table 12--Production, consumption, and trade of vegetable oils, Colombia

Item	1969-71 average	1979-81 average	1985	1990 projected
		1,000 tons		
Crush:				
Soybean oil	102	141	170	160
Cottonseed oil	199	179	205	285
Palm oil	n.a.	n.a.	n.a.	n.a.
Palm kernel oil	6	18	24	37
		Percent of crush		
Yield:				
Soybean oil	15	19	18	18
Cottonseed oil	15	16	16	16
Palm oil	n.a.	n.a.	n.a.	n.a.
		1,000 tons		
Production:				
Soybean oil	15	24	31	29
Cottonseed oil	30	29	33	38
Palm oil	29	75	119	151
Palm kernel oil	3	8	11	17
Beginning stocks:				
Soybean oil	0	30	22	22
Cottonseed oil	0	1	0	0
Total imports:				
Soybean oil	2	84	75	86
Cottonseed oil	0	0	0	0
Total use:				
Soybean oil	17	105	105	115
Cottonseed oil	30	29	42	46
Palm oil	27	75	119	151
Palm kernel oil	3	8	11	17
Ending stocks:				
Soybean oil	0	33	23	22

n.a. = Not available.

Oilseed Meal

Oilseed meal production was determined by the availability of raw materials within Colombia until the late seventies (table 13). Soybean meal (from imported and domestic beans) and cottonseed meal from Colombia's own cotton provided the bulk of Colombia's oilseed meal output. Production increased

Table 13--Production, consumption, and trade of oilseed meals, Colombia

Item	1969-71 average	1979-81 average	1985	1990 projected
		1,000 tons		
Crush:				
Soybean meal	102	141	170	160
Cottonseed meal	199	179	205	295
		Percent of crush		
Yield:				
Soybean meal	83	78	79	79
Cottonseed meal	45	45	46	46
		1,000 tons		
Production:				
Soybean meal	85	111	135	126
Cottonseed meal	90	81	95	134
Palm kernel meal	1	9	13	16
Fishmeal	0	1	0	0
Beginning stocks:				
Soybean meal	0	15	10	10
Cottonseed meal	0	23	2	2
Imports:				
Soybean meal	0	5	0	37
Cottonseed meal	0	0	0	0
Fishmeal	6	38	50	55
Total use:				
Soybean meal	85	112	145	163
Cottonseed meal	90	83	95	134
Palm kernel meal	1	9	13	16
Fishmeal	6	38	50	55
Ending stocks:				
Soybean meal	0	20	6	10
Cottonseed meal	0	0	0	2

about 15 percent during the seventies from 176,000 tons to 204,000 tons in 1979-81. In the early eighties, cotton and cottonseed production slid, depressing total oilseed meal output. However, meal output is again on the upturn. Palm kernel meal is increasing, but still represents only 6 percent of total oilseed meal production.

Oilseed meal use has risen with poultry and egg production. During the seventies, it rose nearly 40 percent to about 200,000 tons, when poultry output grew from 42,000 tons to 114,000 tons and egg output grew from 104,000 tons to 192,000 tons. Soybean meal is now the dominant oilseed meal consumed. Colombia began to import protein meals only in the late seventies. Colombia did import some soybean meal in 1977, but it was not until 1981 that soybean meal was imported in any significant amount. Between 1979 and 1981, soybean meal and fishmeal imports together averaged 43,000 tons compared with 6,000 tons of fishmeal alone in 1969-71. Colombia has also imported sizable quantities of fishmeal (38,000 tons in 1979-81). Fishmeal will be the major import product competing with soybean meal. The United States will also face considerable competition from Argentine and Brazilian soybean meal. By 1990, 92,000 tons of soybean meal and fishmeal will be needed to meet consumer requirements. The Government of Colombia, however, continues to maintain a protectionist policy toward oilseed meal imports by establishing a 6-month import quota, and IDEMA is responsible for importing soybean meal. Soybean meal imports are also subject to a 10-percent ad valorem c.i.f. levy plus another 6.5 percent of c.i.f. value import charge.

OUTLOOK FOR ECONOMIC GROWTH AND TRADE

Significant improvement in the Colombian economy is expected in the late eighties, with growth in real GDP (see footnotes, table 1).

Agriculture, mining, and manufacturing are expected to grow substantially by 1990. Construction will also contribute to the recovery. Population will still be a major determinant of consumption and import growth, but population growth is expected to decline to 1.9 percent for the remainder of the decade as Colombians practice more birth control and as outmigration continues. Nevertheless, population growth is such that per-capita real income will grow slowly.

Coffee will continue to be Colombia's largest export and will have years where export earnings will surge (1986 and possibly 1987); however, diversification into nickel, petroleum, and coal will provide the most growth in export earnings. Coal exports from the El Cerrajon coal project in the north central area began in 1985. The Cerro-Matosi nickel mine, opened in 1982, now provides export earnings from ferro-nickel, but less than anticipated. A turnaround in nickel prices will add to earnings from this source. New oil wells are pumping increased quantities of petroleum, and exports should increase within 2-3 years.

A large oil find in late 1984 near the Venezuela border may come onstream in 1986. Cut flowers, exported mostly to the United States, will also continue to be a sizable nontraditional source of export earnings. Despite official attempts to control drug exports, illegal cocaine and marijuana will probably continue to affect total export earnings. Because of these new sources of export earnings, Colombia may get ahead of its current negative trade balance situation by 1987. Although international reserves will rise in the late eighties, they will probably not match the high level of 1980. Moreover, the current debt service problem will persist through 1990.

Agricultural production will continue to increase, but big growth spurts are unlikely. The overall Government policy will probably continue to encourage self-sufficiency in all grains, except wheat. Colombia has a longrun goal of higher productivity and is considering more credit for irrigation and storage facilities. Producer prices are already well above world prices, so technological change through improved varieties and better management practices will be key to higher agricultural production.

Throughout the eighties, consumption of poultry and eggs will increase the most, with wheat, rice, fruits, vegetables, beef, and pork substantially gaining above levels generated by population growth alone.

Even if Colombia has conservative income and population growth during the rest of the decade, its grain import bill could expand above its current high level. Demand for wheat will at least keep up with population growth, and nearly all of Colombia's additional needs will be met with imports. Even if rice area and production exceed their 1979-81 levels, Colombia might have to import rice later in the decade. Stagnant economic growth will also maintain human consumption of corn. Demand for feed grains will continue to be based mostly on their use as poultry feed. Even with limited growth projected for poultry and egg production, demand for coarse grains will clearly outstrip domestic supplies unless corn and sorghum production increases above current projections. Colombia will have to depend on larger coarse grain imports (table 14). Colombia will have more need for vegetable oils and oilseed meal, despite growth in its own palm oil industry and some recovery in cottonseed production.

The prospects for U.S. soybean exports depend on whether Colombia increases its own soybean production. If it cannot, these needs will have to be met by imports from the United States, Argentina, or Brazil. Colombia will have to decide whether to fill its oilseed product needs by importing oilseeds or by importing raw beans for its own domestic crushing industry.

Table 14--Projected imports, 1990 compared with 1979-81, Colombia

Import	1979-81 average	1990
	1,000 tons	
Wheat	448	710
Feed grains	210	433
Barley	65	120
Soybeans	20	0
Soybean oil	75	86
Soybean meal	5	37

This study demonstrates that Colombia will be a growth market through 1990, despite its current economic problems. Wheat imports will increase nearly 60 percent from the 1979-81 base. Growth in the poultry industry will continue to drive up the need for feed grains and protein meal; feed grain imports will more than double, and soybean meal imports will increase sixfold. But prospects for U.S. agricultural exports to Colombia will depend on the competitiveness of U.S. products with other suppliers and on the improvement in Colombia's external balance of payments. Long-term prospects for trade are more favorable than are shortrun prospects. The availability of export credit to maintain and develop the U.S. market share is an important market development tool in Colombia.

REFERENCES

(1) Banco de la Republica de Colombia. Revista del Banco de la Republica. Bogotá, selected issues.

(2) Food and Agriculture Organization of the United Nations. Agricultural Production Yearbook. Rome, selected issues.

(3) _____. Fertilizer Yearbook. Rome, selected issues.

(4) _____. Food Balance Sheets. Rome, 1971.

(5) _____. Food Balance Sheets, 1975-77 Average and Per-Capita Food Supplies, 1961-65 Average, 1967 to 1977. Rome, 1980.

(6) Garcia Garcia, Jorge. Exchange Rate, Commercial Policy and Agricultural Development: The Experience of Colombia from 1953 to 1978. Washington, DC: International Food Policy Research Institute, June 1981.

(7) Grigsby, S. Elaine. "The Impact of P.L. 480 Title I: Trade Finance and Aid in Colombia, 1950-1980." Ph.D. dissertation, University of Florida, 1982.

(8) International Monetary Fund. Balance of Payments Yearbook. Washington, DC, 1983.

(9) _____. International Financial Statistics. Washington, DC, 1983.

(10) Montes, Gabriel, Octavio Campo, Alvaro Silva, and Carlos Ariel Otalvaro. La Economia de la Papa in Colombia, Revista de Planeacion y Desarrollo. Vol. 11, No. 1. Bogotá: Departamento Nacional de Planeacion, Apr. 1979, pp. 69-125.

(11) Musgrove, Philip. Consumer Behavior in Latin America, Income and Spending of Families in Ten Andean Countries. Estudos Conjuntos de Integracao Economica da America Latina (ECIEL). Washington, DC: Brookings Institution, 1978.

(12) Republica de Colombia, Departamento Administration Nacional de Estadistica. Anuario General de Estatistica. Tomo IV: Estadisticas Agropecuarias Precios: Trabajo y Produccion. Bogotá, 1964.

(13) _____. Boletin Mensual de Estadistica. Bogotá, selected issues.

(14) Republica de Colombia, Ministerio de Agricultura, Oficina de Comunicaciones. Evaluacion Agricola, 1976-79. Bogotá, 1980.

(15) _____. Oficina de Planeamiento del Sector Agropecuario, Unidad de Estadistica, Cifras del Sector Agropecuario. Annuals 1978-1980. Anexo memoria No. 1. Bogotá, 1978, 1979, 1980.

(16) Scobie, Grant H., and Rafael Posada. The Import of High Yielding Rice Varieties in Latin America with Special Emphasis on Colombia. Cali, Colombia: Centro Internacional de Agricultura Tropical, Apr. 1976.

(17) U.S. Department of Agriculture, Economic Research Service. Indices of Agricultural Production for the Western Hemisphere, 1970 through 1979, excluding the United States and Cuba. SB-639 (supplemented by unpublished data). July 1980.

(18) _____. U.S. Agricultural Exports under Public Law 480. ERS-Foreign 395 (supplemented by unpublished data). Oct. 1974.

(19) U.S. Department of Agriculture, Foreign Agricultural Service, Colombia: Annual Agricultural Situation Report. CO-4006. Jan. 30, 1984.

(20) _____. Colombia: Price changes during the last 22 years (1960-82) for feed ingredients, rations, poultry meat and eggs. CO-3030. Bogotá, May 4, 1983.

(21) _____. Production, Supply and Distribution Tables for Selected Commodities. Selected years.

(22) U.S. Department of State, Bureau of Public Affairs. Background Notes on Colombia. Nov. 1982.

(23) World Bank. World Tables. Baltimore: Johns Hopkins Press, 1979.

(24) _____. World Trade Tables. Baltimore: Johns Hopkins Press, 1979.

(25) _____, Latin America and Caribbean Regional Office. Economic Position and Prospects of Colombia. Report No. 3556-CO. Washington, DC, Sept. 17, 1981.

(26) Sanint, Luis. Demand for Carbohydrates in Colombia and Venezuela. FAER-187. U.S. Dept. of Agr., Econ. Res. Serv., 1983.

(27) Sine Clavijo, Enrique. "Produccion de Arroz en Colombia," Arroz, Vol. 32, No. 327, Oct.-Nov. 1983 (Bogotá), pp. 1-64.

(28) United Nations. Statistical Papers: Commodity Trade Statistics according to the Standard International Trade Classification, Colombia. New York, 1972, 1973, 1974.

APPENDIX 1: METHODOLOGY

The equations presented in this appendix are the structural equations on which the projections to 1990 are based. Except for the wheat model, import demand is derived as an excess demand from domestic supply and demand equations. The wheat demand model is specified as an import demand model. Annual observations for 1961-80 generally represent the data base of these models. The ordinary least-squares method of estimation was used.

Wheat

The model for wheat includes separate equations for import demand for wheat and domestic supply. The import demand equation includes variables for domestic production, Title 1 PL-480 imports, real foreign reserves, real gross domestic product (GDP), and the real wholesale price for wheat. The quantity of commercial imports and domestic production was obtained from Foreign Agricultural Service supply and distribution tables for major grains (20). Title 1 PL-480 imports were taken from Grigsby's study (7). Real GDP in 1980 prices and foreign reserves and the Consumer Price Index were taken from International Financial Statistics (9). The wholesale price for wheat is available in Departamento Administration Nacional de Estadistica (DANE) publications (12, 13). One can expect that commercial wheat imports are directly related to GDP and foreign reserves and that they are inversely related to domestic wheat production, Title 1 PL-480 imports, and the wholesale wheat price. Title 1 imports, real income growth, and the real wholesale price appear to be the relevant variables determining wheat imports (app. table 1), with the following coefficients and elasticities:

	Coefficient	Elasticity
Title 1 imports	-1.139*	-0.183
Real gross domestic product	.234	.928
Real wholesale wheat price	-84.608*	-1.109
Domestic production lagged	-.877	-.423

*Denotes significance of coefficient by t-test.

An alternative specification of the model that substitutes the world price of wheat (expressed in real Colombian pesos) demonstrates that import demand is less influenced by the world price because the wheat import demand elasticity in relation to the world wheat price was -0.129. This finding is expected because Colombia has an elaborate import tariff system coupled with import quotas. Wheat import demand is less responsive to changes in wholesale flour prices.

The wheat production equation includes variables for lagged production and the real farm prices for wheat, barley, and rice. Farm prices and the wholesale price index for agricultural commodities were obtained from Colombian sources (12, 13, 14, 15) and from Grigsby (7). One can expect that both production from the previous year and real wheat producer prices directly affect this year's output. Possible competing grains would be indirectly related. According to the model run here, real farm-level wheat prices and production

Appendix table 1--Wheat model, Colombia

Variable	Coefficient	t-statistic	R^2 corrected	Durbin-Watson test	F-test	Standard error
			Measure			
Domestic wheat production (1950-80):						
Intercept	-29.565	0.683	0.782	2.298	320.131	20.891
Domestic wheat supply lagged	.399	2.732*	--	--	--	--
Real wheat price (farm)	3.811	2.651*	--	--	--	--
Real rice price (farm)	2.008	1.554	--	--	--	--
Real barley price (farm)	-2.481	-.838	--	--	--	--
Commercial import wheat demand (1950-80):						
Intercept	380.922	1.410	.845	3.117	32.658	65.343
Domestic production lagged	-.877	-1.322	--	--	--	--
Title I imports	-1.139	-2.674*	--	--	--	--
Real foreign reserves	.038	-.935	--	--	--	--
Real gross domestic product	.234	1.628	--	--	--	--
Real wholesale wheat price	-84.608	-1.820*	--	--	--	--

* Denotes significance of coefficient by t-test.
-- = Not applicable.

from the previous year were the major determinants of wheat production, reflecting the traditional nature of wheat production in Colombia.

Price elasticities for wheat production were as follows:

	Coefficient	Elasticity
Real farm price for wheat	3.811*	0.925
Real farm price for rice	2.008	.415
Real farm price for barley	-2.481	.442

*Denotes significance of coefficient by t-test.

The rice price is an insignificant variable, but the sign of the coefficient is positive in the equation, perhaps because of developments in the rice industry. Real prices of rice have declined because of technological advances.

Other Grains and Oilseeds

Area and yield equations were developed for corn (app. table 2); sorghum (app. table 3); soybeans (app. table 4); rice (app. table 5); cotton (app. table 6); and cottonseed, palm oil, eggs, and poultry (app. table 7). Yield data were taken from the Foreign Agricultural Service supply and distribution tables (21). Farm prices for major commodities--corn, sorghum, barley, soybeans, cotton, and sugarcane--came from Colombian sources (12, 13, 14, 15). The rice area equation includes variables for lagged rice area, and real farm-level prices for rice, corn, and sorghum. Similar equations were run for corn, sorghum, soybeans, and cotton area. Equations for corn and sorghum were run for 1961-80. Rice was run for 1971-80 because rice production policy has gone through several sharp changes during the past two decades as Colombia adjusted to the effects of the Green Revolution.

According to the equations, corn and sorghum are competing products. Sorghum also appears to compete with soybeans. During the seventies, cotton and sugarcane were the principal commodities competing with rice. The area planted during the previous year was also significant for nearly all these crops, demonstrating a traditional cropping pattern. Coefficients of these variables appear in appendix tables 2-7. The calculated elasticities generally show only limited price elasticity among the crops listed (app. table 8). The only exception is the strong inverse price elasticity between sorghum and rice. Some equations were also run for yields (app. tables 2-6). Rice yields definitely increased because of technological change associated with the changeover from dryland rice to irrigated rice (app. table 5). Projections on growth in area and yields of principal crops are based on the assumption that relative prices among crops will not change significantly.

Consumption Equations

Per-capita consumption equations were also calculated for corn, rice, and vegetable oil. Independent variables for rice and corn included per-capita real GDP and deflated retail prices for corn, rice, potatoes, yucca, plantains, wheat, beef, beans, and vegetable oil (10, 12, 13, 14, 15). The coefficients and statistical tests appear in appendix table 9. Real income and retail prices of yucca and vegetable oil appear to affect rice consumption most. Per-capita consumption of corn is most affected by income and by the prices of rice, potatoes, yucca, plantains, wheat, and beef (although not so strongly).

Appendix table 2--Corn model, Colombia

Variable	Coefficient	t-statistic	R^2 corrected	Durbin-Watson test	F-test	Standard error
			Measure			
Corn area:						
Intercept	357.559	1.269	0.923	2.587	26.120	28.193
Corn area lagged	.384	3.340*				
Real corn price (farm)	5.118	.943	--	--	--	--
Real sorghum price (farm)	-14.883	-2.504*	--	--	--	--
Real soybean price (farm)	.193	.289	--	--	--	--
Real cotton price (farm)	-1.142	-.733	--	--	--	--
Real sugar cane price (farm)	142.534	1.727	--	--	--	--
Real rice price (farm)	13.296	5.212*	--	--	--	--
Dummy 1, observation 7	-119.637	-3.360*	--	--	--	--
Dummy 2, observation 17	-60.083	-1.415	--	--	--	--
Corn yield:						
Intercept	992.933	-20.718*	.500	1.528	20.058	103.164
Time	17.917	4.479*	--	--	--	--

*Denotes significance of coefficient by t-test.
-- = Not applicable.

Appendix table 3--Sorghum model, Colombia

Variable	Coefficient	t-statistic	R^2 corrected	Durbin-Watson test	F-test	Standard error
			Measure			
Sorghum area:						
Intercept	91.855	.516	0.841	2.786	15.371	29.392
Sorghum area lagged	.470	2.307*	--	--	--	--
Real corn price (farm)	3.803	-.757	--	--	--	--
Real sorghum price (farm)	-2.928	-.721	--	--	--	--
Real soybean price (farm)	.143	.260	--	--	--	--
Real cotton price (farm)	.391	.244	--	--	--	--
Real sugarcane price (farm)	34.106	.497	--	--	--	--
Real rice price (farm)	-6.888	-2.256*	--	--	--	--
Sorghum yield:						
Intercept	2.166	27.644*	-.048	1.832	.133	.169
Time	.002	.365	--	--	--	--

*Denotes significance of coefficient by t-test.
-- = Not applicable.

Per-capita consumption of vegetable oil has been affected by growth of income and foreign reserves as well as by corn and potato prices (app. table 10). Projections for consumption through 1990 were based on the assumptions of income and population growth shown in table 1 in the text. Real prices of these products were assumed to remain at their 1980 level. Consumption variables appear in appendix table 10.

Poultry Production and Consumption

Poultry production and consumption were related to foreign reserves, demonstrating that the Colombian Government allowed poultry production to flourish when Colombia could afford it in terms of foreign exchange.

Feed Grains and Protein Meal Use

Poultry is the largest consumer of feed grains and oilseed meals, so feed grain and protein meal use was based on poultry production. These feeds were allocated according to historical feeding patterns, where a given amount of oilseed meal was required to produce 1 kilogram of broiler meat or 1 kilogram of eggs. This study estimates that 3.5 kilograms of corn or sorghum were fed to produce 1 kilogram of broiler meat and that 2.0 kilograms of grain were fed to produce 1 kilogram of eggs during 1972-80. Before 1972, 1.6 kilograms of grain per kilogram of eggs and 3 kilograms of grain per kilogram of broiler meat were the relevant feed conversion factors. In 1976-80, Colombians used about 0.75 kilogram of protein meal (in soybean meal equivalent) to produce 1 kilogram of eggs and broiler meat, although from 1969-1975, reported use of protein meal was higher by 20 percent. This study assumes that the feeding rate of 1976-80 will continue through the eighties. Future changes in relative prices between grains and protein meal will probably change these ratios. The spread of commercial hog feeding practices may also raise the use of feed grains and protein meals above the level forecast here. An alternate model using prices of poultry and poultry feeds was also tested (app. table 7) (20).

Projections

The following assumptions were made for the projections:

(1) Real GDP will grow by 4 percent per year;
(2) Population will grow by 1.9 percent per year;
(3) Foreign reserves will reach $2.1 billion in 1990 compared with $4.8 billion in 1980;
(4) Real retail and producer prices from 1980 will not change;
(5) No technological changes will alter the present input-output relationships between grain-oilseed meal feeds and poultry and egg production; and
(6) Projections on growth in area and yields of principal crops are based on the assumption that relative prices among crops will not change significantly.

Appendix table 4--Soybean model, Colombia

Variable	Coefficient	t-statistic	R^2 corrected	Durbin-Watson test	F-test	Standard error
			Measure			
Soybean area:						
Intercept	57.100	1.443	0.900	1.206	2.075	5.549
Soybean area lagged	.789	4.759*	--	--	--	--
Real corn price (farm)	-.325	.307	--	--	--	--
Real sorghum price (farm)	1.702	2.199*	--	--	--	--
Real soybean price (farm)	-.031	-.309	--	--	--	--
Real cotton price (farm)	.155	.352	--	--	--	--
Real sugarcane price (farm)	3.544	.276	--	--	--	--
Real rice price (farm)	-.931	1.446	--	--	--	--
Dummy 1, observation 7	25.448	4.266*	--	--	--	--
Dummy 2, observation 17	-55.264	-4.940*	--	--	--	--
Soybean yield:						
Intercept	-47.258	-3.644*	.470	2.173	14.339	.121
Year	.248	3.787*	--	--	--	--

*Denotes significance of coeficient by t-test.
-- = Not applicable.

Appendix table 5--Rice model, Colombia

Variable	Coefficient	t-statistic	R^2 corrected	Durbin-Watson test	F-test	Standard error
			Measure			
Rice area (1971-80):						
Intercept	151.181	1.016	.949	1.837	34.198	15.286
Rice area lagged	1.116	9.071*	--	--	--	--
Real rice price(farm)	8.726	1.632	--	--	--	--
Real cotton price (farm)	-2.933	-2.309*	--	--	--	--
Real sugar cane price (farm)	-187.545	-2.612*	--	--	--	--
Dummy 1	98.253	4.826*	--	--	--	--
Rice yield:						
Intercept	1.885	-6.070*	.962	1.365	160.985	.208
Percentage of crop irrigated	---	--	--	--	--	--
Deflated fertilizer price	.068	14.870*	--	--	--	--
Rice area	.157	1.065	--	--	--	--
	-.001	-1.079	--	--	--	--

*Denotes significance of coefficient by t-test.
-- = Not applicable.

Appendix table 6--Cotton model, Colombia

Variable	Coefficient	t-statistic	R^2 corrected	Durbin-Watson test	F-test	Standard error
			Measure			
Cotton area:						
Intercept	1,135.54	3,325.000	0.783	2.057	8.237	47.544
Area lagged	.129	.565	--	--	--	--
Real cotton price (farm)	3.925	1.089	--	--	--	--
Real sugar price (farm)	-920.053	4.768*	--	--	--	--
Real corn price (farm)	36.433	1.920	--	--	--	--
Real sorghum price (farm)	36.076	-1.675	--	--	--	--
Cotton yield:						
Intercept	930.203	8.964	.519	1.527	9.092	48.679
Cotton area	-1.006	-4.164*	--	--	--	--
Real cost of production	-3.306	-3.213*	--	--	--	--

* Denotes significance of coefficient by t-test.
-- = Not applicable.

Appendix table 7--Models for cottonseed, palm oil, eggs, and poultry, Colombia

Production variable	Coefficient	t-statistic	R^2 corrected	Durbin-Watson test	F-test	Standard error
			Measure			
Cottonseed:						
Intercept	-11.700	-.666	0.946	0.968	176.662	8.348
Cotton production lagged	.395	13.291*	--	--	--	--
Palm oil:						
Intercept	14,646.800	-12.155*	.936	1.128	149.299	8.176
Year	7.436	12.219*	--	--	--	--
Eggs:						
Intercept	160.152	7.375*	.950	2.079	122.755	8.941
Real reserves	.036	9.576*	--	--	--	--
Real layer feed price	-2.858	-.284	--	--	--	--
Real egg price	-68.423	-5.277*	--	--	--	--
Poultry:						
Intercept	34.151	--	.975	2.000	4.475	529.117
Real foreign reserves	.035	23.003*	--	--	--	--

*Denotes significance of coefficient by t-test.
-- = Not applicable.

Appendix table 8--Calculated elasticities

Dependent variable	Corn price	Sorghum price	Soybean price	Cotton price	Rice price	Sugarcane price
			Elasticity			
Corn area	-0.117	-0.306*	0.051	-0.075	0.366*	0.192
Sorghum area	.639	.443	.282	.189	-1.397*	.338
Soybean area	-.100	-.475*	-.113	.139	.348	.069
Rice area	--	--	--	-.379*	.387*	-.586*

*Denotes significance of coefficient by t-test.
-- = Not applicable.

Appendix table 9--Calculated income and price elasticities

Dependent variable	Corn	Rice	Vegetable oil
		Elasticity	
Per-capita real income	1.048*	1.316*	3.10
Real corn price	.252	.330*	.786
Real rice price	.858	-.292	.518
Real potato price	-.181*	.043	.397
Real yucca price	.274*	.429*	.043
Real plantain price	-.333*	.169	.666
Real wheat price	-.727*	.426	.236
Real beef price	-.788*	.268	.221
Real bean price	.205*	.190	.021
Real vegetable oil price	.281	.853*	.569
Per-capita real reserve	--	--	1.945

*Denotes significance of coefficient by t-test.
-- = Not applicable.

Note: Calculated from equations in appendix table 1.

Appendix table 10--Consumption variables, Colombia

Variable	Coefficient	t-statistic	R^2 corrected	Durbin-Watson test	F-test	Standard error
		Measure				
Per-capita corn consumption:						
Intercept	23.565	4.032*	.969	2.923	50.933	.823
Per-capita real income	.771	5.776*	--	--	--	--
Real corn price (retail)	37.874	1.857	--	--	--	--
Real rice price (retail)	94.219	4.139*	--	--	--	--
Real potato price (retail)	40.914	4.016*		--	--	--
Real yucca price (retail)	-51.801	3.064*	--	--	--	--
Real plantain price (retail)	-76.793	3.401*	--	--	--	--
Real wheat price (retail)	-87.494	5.950*	--	--	--	--
Real beef price (retail)	-21.392	10.429*	--	--	--	--
Real bean price (retail)	8.363	3.233*	--	--	--	--
Real vegetable oil price (retail)	1.319	3.449*	--	--	--	--
Dummy 1, observation 4	13.310	4.856*	--	--	--	--
Dummy 2, observation 14	-19.770	11.135*	--	--	--	--
Per-capita rice consumption:						
Intercept	-51.905	4.297*	.928	3.066	25.527	2.434
Per-capita real income	.816	3.818*	--	--	--	--
Real corn price (retail)	-41.726	1.106	--	--	--	--
Real rice price (retail)	27.060	.793	--	--	--	--
Real potato price (retail)	8.207	.281	--	--	--	--
Real yucca price (retail)	68.250	2.655*	--	--	--	--

See notes at end of table.

Continued--

Appendix table 10--Consumption variables, Colombia--Continued

Variables	Coefficient	t-statistic	R^2 corrected	Durbin-Watson test	F-test	Standard error
		Measure				
Real plantain price (retail)	32.920	.562	--	--	--	--
Real wheat price (retail)	43.298	1.599	--	--	--	--
Real beef price (retail)	6.176	1.258	--	--	--	--
Real bean price (retail)	6.564	.952	--	--	--	--
Real vegetable oil (retail)	3.370	3.226*	--	--	--	--
Per-capita vegetable oil consumption:						
Intercept	-10.334	3.370*	0.972	2.469	60.626	0.384
Per-capita real income	.265	4.996*	--	--	--	--
Real corn price (retail)	-13.660	2.287*	--	--	--	--
Real rice price (retail)	6.600	.870	--	--	--	--
Real potato price (retail)	10.404	2.155*	--	--	--	--
Real yucca price (retail)	-.940	.202	--	--	--	--
Real plantain price (retail)	-17.767	1.577	--	--	--	--
Real wheat price (retail)	3.300	.438	--	--	--	--
Real beef price (retail)	-.148	.188	--	--	--	--
Real bean price (retail)	-.099	.088	--	--	--	--
Real vegetable oil (retail)	.310	1.489	--	--	--	--
Real per capita reserves	.0003	2.874*	--	--	--	--
Corn and sorghum feed consumption:						
Intercept	-285.489	-5.474*	0.846	0.420	72.574	53.307
Egg production	4.477	10.315*	--	--	--	--
Dummy 1, observation 7	-330.093	-4.137*	--	--	--	--

*Denotes significance of coefficient by t-test.
-- = Not applicable.

APPENDIX 2: TRADE POLICY

Appendix table 11--Import requirements for wheat, Colombia

Year and importer	Import levy 1/	Import license required
1984:		
Private millers, but IDEMA handles all import licenses.	20-percent ad valorem c.i.f. plus 2.1-percent f.o.b.	6-month import quota
1983:		
Private millers, but IDEMA handles all import licenses.	14-percent ad valorem c.i.f.	Prior license
1982:		
IDEMA and millers	12-percent ad valorem c.i.f.	
1981:		
Millers authorized to make own imports, but IDEMA still controls private mill imports and collects a surcharge equal to 12.5 percent of c.i.f. value of imports for itself.		
1980:		
IDEMA sole importer of hard red winter wheat. Imported wheat sold at IDEMA port outlets. IDEMA establishes consumption quotas to millers. During local harvest, millers must buy from growers.		

See notes at end of table.

Continued--

Appendix table 11--Import requirements for wheat, Colombia--Continued

Year and importer	Import levy 1/	Import license required
1979:		
Soft wheat imported by private industry, which must pay duty.	15-percent ad valorem c.i.f. plus 5-percent c.i.f. for export promotion (PROEXPO), plus 1.5-percent f.o.b. for coffee fund.	
1978:		
IDEMA imports hard red winter wheat and pays no duty.	15-percent ad valorem c.i.f. plus 1.5-percent c.i.f. for export promotion (PROEXPO), plus 1.5-percent f.o.b. for coffee fund.	
1977:		
IDEMA must authorize imports.	30-percent ad valorem c.i.f.	Prior license; 1-percent prior deposit.
1976:		
IDEMA resells imported wheat at higher prices; IDEMA controls imports as well as prices. Makes a profit from wheat to finance other areas.	30-percent ad valorem c.i.f.	
1975:		
Government of Colombia subsidizes wheat imports. IDEMA controls wheat imports and prices and realizes profit from sales.	0.5-percent ad valorem c.i.f.	
1974:		
IDEMA announces that millers could import on their own.		No prior deposit.
1973:		
If imported by IDEMA, requirement duty is waived by INCOMEX.	30-percent ad valorem c.i.f.	Prior deposit cancelled June 1973; license controlled IDEMA and INCOMEX.

See notes at end of table.

Continued--

Appendix table 11--Import requirements for wheat, Colombia--Continued

Year and importer	Import levy 1/	Import license required
1972:		
IDEMA is sole importer of wheat. Does not pay duties, but charges them to millers.		
1971:		
Private mills may import soft wheat. Argentina required to present importing documents to IDEMA for approval and forwarding to INCOMEX.	30-percent ad valorem c.i.f.	Prior license; also 1-percent prior deposit held for 90 days, but real tie-up is 6-8 months.
1970:		
IDEMA sole importer of wheat to millers and is exempt from paying duties. IDEMA purchases imported wheat directly and resells to millers who then pay the levy.		
1968:		
IDEMA.		Prior license.
1966:		
INA (National Institute of Supplies) gives authority to private mills to import. Mills required to present import documentation to INA and Superintendency of Foreign Trade. Private traders must pay duty and prior deposit.		On Nov. 29, 1966, change from free list to prior license.
1965:		
Prior to Nov. 8, 1965, INA sole importer of wheat buying on basis of bids and reselling to local millers at domestic prices.		Transfer of wheat imports to free list on Nov. 8, 1965; 30-percent deposit required.

See notes at end of table.

Continued--

Appendix table 11--Import requirements for wheat, Colombia--Continued

Year and importer	Import levy 1/	Import license required
1964	30-percent ad valorem c.i.f.	
1963:		
INA sole importer.	20-percent ad valorem c.i.f. plus 0.10 peso/kilo levy	Prior license.

Blanks indicate there was no change in import policy.

1/ Government of Colombia contributes to IDEMA's finances by forgiving the import levies it would otherwise receive and permits IDEMA to charge fees equal to this amount.

Appendix table 12--Import requirements for wheat flour, Colombia

Year and importer	Import levy	Prior license required
1982	24-percent ad valorem c.i.f. plus 6.5-percent c.i.f. plus 1-percent f.o.b.	Approval from IDEMA or Ministry of Agriculture after Sept. 7, 1982.
1981	20-percent ad valorem c.i.f. plus 6.5-percent c.i.f. plus 1-percent f.o.b.	Prior license.
1969:		
IDEMA.	60-percent ad valorem c.i.f.	

Blanks indicate there was no change in import policy.

Appendix table 13--Import requirements for corn, Colombia

Year and importer	Import levy	Import license required
1984:		
IDEMA imports for industry.		Authorization by IDEMA.
1983:		
Government of Colombia authorized imports allocated between IDEMA and milling industry.	9-percent ad valorem c.i.f. plus 5-percent c.i.f. for export promotion (PROEXPO) plus 1 percent of f.o.b. commercial invoice.	Prior license.
1982:		
Imported by IDEMA and Mixed Feed Millers Federation (FEDERAL).		Approval from Agricultural Ministry or IDEMA after Sept. 7, 1982.
1981	15-percent ad valorem c.i.f.	
1980:		
Imported by IDEMA and private firms.		Prior license.
1979:		
IDEMA is sole importer.	9-percent ad valorem plus 5-percent c.i.f. PROEXPO plus 1.5 percent.	Amount of imports authorized by Foreign Trade Council for Treasury.
1978:		
IDEMA and private cereal processors.	1-percent ad valorem c.i.f., plus 3-percent c.i.f. for PROEXPO, coffee fund.	IDEMA; prior license.
1977:		
IDEMA must authorize.		Changed from prohibited list; 130-percent prior deposit.
1973:		
Import levy waived for imports by IDEMA.		Prior deposit requirement cancelled June 1973
1972		Prior license controlled by IDEMA and INCOMEX.

See notes at end of table.

Continued--

Appendix table 13--Import requirements for corn, Colombia--Continued

Year and importers	Export levy	Import license required
1971	25-percent ad valorem c.i.f.	Prior deposit of 130 percent held for 90 days, but real tie-up is 6-8 months.
1969:		
On prohibited list, but IDEMA can import if shortages arise.	20-percent ad valorem c.i.f.	30-percent prior deposit.
1966		Prior license.
1965:		
IDEMA.	25-percent ad valorem c.i.f.	Prior license and 120-percent prior deposit.

Blanks indicate there was no change in import policy.

Appendix table 14--Import requirements for sorghum, Colombia

Year and importer	Import levy	Import license required
1981	15-percent ad valorem c.i.f., plus 6.5-percent c.i.f., plus 1-percent f.o.b.	Prior license.
1980:		
IDEMA and private feed companies.	9-percent ad valorem c.i.f., plus 5-percent c.i.f. for export promotion (PROEXPO), and 1.5 percent for coffee fund.	
1979:		
IDEMA sole importer.	9-percent ad valorem c.i.f. plus 5-percent c.i.f. for export promotion (PROEXPO) and 1.5 percent for coffee fund.	Prior license requiring Ministry of Agriculture approval.
1978	2-percent ad valorem c.i.f. plus 5-percent c.i.f for export promotion (PROEXPO) and 1.5 percent for coffee fund.	Prior license; no prior deposit.
1977:		
IDEMA must authorize.		Prior license; 120-percent deposit.
1976:		
Feed processors.		As of May 31, 1976, Colombian feed processors must fulfil domestic quotas before they can import grain sorghum.
1971:		
IDEMA.	40-percent ad valorem c.i.f.	130-percent prior deposit requirement (held for 90 days, but real tie-up is 6-8 months).

Blanks indicate there was no change in import policy.

Appendix table 15--Import requirements for barley, Colombia

Year and importer	Import levy	Import license required
1983	11-percent ad valorem c.i.f., plus 5-percent c.i.f. for export promotion (PROEXPO), plus 1.5-percent c.i.f. for Treasury, plus 1 percent of commercial invoice.	
1982	9-percent ad valorem c.i.f., plus 5-percent c.i.f. for export promotion (PROEXPO), plus 1.5-percent c.i.f. for Treasury, plus 1 percent of commercial invoice.	
1981	6-percent ad valorem c.i.f.	
1979	6-percent ad valorem c.i.f. plus 5-percent c.i.f. for export promotion (PROEXPO), plus 1.5-percent for coffee fund.	
1978	2-percent ad valorem c.i.f., plus 5-percent c.i.f. for export promotion (PROEXPO), plus 1.5 percent for coffee fund.	
1973: When imported by IDEMA, duty is waived.		Prior deposit requirements cancelled June 1973; import license.
1969: IDEMA in charge of all barley imports.	3.5-percent ad valorem c.i.f.	IDEMA is in charge of all barley imports; prior deposits of 40 percent (barley) and 65 percent (malt).

Blanks indicate there was no change in import policy.

Appendix table 16--Import requirements for soybeans, Colombia

Year and importer	Import levy 1/	Import license required
1984:		
IDEMA imports for industry.	15-percent ad valorem c.i.f. 1/	6-month import quota.
1983:		
Imported by private crushers with individual quotas set by the Government of Colombia and industry commission.	18-percent ad valorem c.i.f. plus 5-percent c.i.f. for export promotion (PROEXPO) plus 1.5-percent c.i.f. to Treasury plus 1-percent f.o.b. commercial invoice.	
1966:		
IDEMA.	25-percent ad valorem c.i.f.	Prohibited list; 120-percent deposit.

Blanks indicate there was no change in import policy.

1/ IDEMA actually charges these duties to importers and retains these funds for operating expenses.

Appendix table 17--Import requirements for soybean oil, Colombia

Year and importers	Import levy 1/	Import license required
1984	15-percent ad valorem c.i.f. (nonfood use); 40-percent c.i.f. (food use).	
1983	40-percent ad valorem c.i.f. (food use) plus 6.5-percent c.i.f. plus 5 percent for export promotion (PROEXPO) plus 1.5-percent Treasury plus 1-percent f.o.b. on commercial invoice.	Prior license, 6-month import quota.
1982	40-percent ad valorem c.i.f. (food use), plus 6.5-percent c.i.f., plus 5 percent for export promotion (PROEXPO), plus 1.5 percent for Treasury, plus 1-percent f.o.b. on commercial invoice.	
1981:		
IDEMA.	40-percent ad valorem, plus 6.5-percent c.i.f., plus 1-percent f.o.b.	
1976:		
IDEMA sole importer; thereafter, any private or public agent may import refined vegetable oils. 1/		Prior license.
1969	50-percent ad valorem c.i.f.	Free list; 120 percent prior deposit
1966	40-percent ad valorem c.i.f. (raw) plus 50-percent c.i.f. (refined)	Prohibited list; 120-percent prior deposit.
1965:		
IDEMA.	40-percent ad valorem c.i.f.	120-percent prior deposit.

Blanks indicate there was no change in import policy.

Appendix table 18--Import requirements for soybean meal, Colombia

Year and importers	Import levy 1/	Import license required
1983:		
Imports made by IDEMA exclusively.	10-percent import duty plus 6.5-percent surcharges.	None.

1/ The Government of Colombia contributes to IDEMA's finance by forgiving the import duties it would otherwise receive and permits IDEMA to charge special fees. IDEMA does not pay import duties.

Appendix table 19--Import requirements for dry beans, Colombia

Year and importer	Import levy	Import license required
1983:		
IDEMA has exclusive right to import beans.	6.5-percent ad valorem c.i.f. plus 1.5-percent c.i.f. for peas and lentils, 20 percent for chickpeas.	Free license.
1982:		
For first time in many years, IDEMA intervened in pulse market.		Import license valid for 3 months, registered at Superintendency of Commerce and Trade.
1981	Pulses 15-percent ad valorem plus 6.5-percent c.i.f.	Import license valid for 3 months.
1965:		
Private importers.	40-percent ad valorem c.i.f.	Prior license; 120-percent prior deposit.

Blanks indicate there was no change in import policy.

Appendix table 20--Import requirements for apples, Colombia

Year and importer	Import levy	Import license required
1982	24-percent ad valorem c.i.f., plus 6.5-percent c.i.f., plus 1-percent f.o.b. on commercial invoice.	Approval from IDEMA; after Sept. 7, 1982, from Ministry of Agriculture.
1976	25-percent ad valorem c.i.f.	
1975		120-percent prior deposit.
1972	30-percent ad valorem c.i.f.	
1969:		
Private importers.	100-percent ad valorem c.i.f.	None.

Blanks indicate there was no change in import policy.

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