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*agriculture and
trade of*

NICARAGUA

ECONOMIC RESEARCH SERVICE
U. S. DEPARTMENT OF AGRICULTURE

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This report, originally issued as FAS-M-87, is now reissued, without change in text, by the new agency.

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AGRICULTURE AND TRADE OF NICARAGUA

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SUMMARY

Agriculture is the most important industry in Nicaragua - largest of the Central American Republics. The census of 1950 showed that about 68 percent of the economically active population were engaged in agricultural pursuits. Many of the industries also are based on agriculture, since they are concerned with the processing, exploitation, or transporting of farm products. Slightly more than 80 percent, by value, of all exports are furnished by agriculture.

There are some small manufacturing enterprises in the country, and mining, petroleum, forestry, and shrimp fishing offer promising economic development potentials.

The population of Nicaragua is increasing at an annual rate of more than 3 percent, and current estimates place total population at around 1.4 million. Normally the country is self-sufficient in most of the foods it consumes, and often has a small balance to export. But still it depends upon imports for wheat flour, some rice, and small quantities of fruit and vegetable preparations. Daily per capita calorie intake has been estimated at around 2,200 calories, which is comparable to that in neighboring countries, but still lacking in some essential elements.

Plans to diversify agriculture have been undertaken by various departments of the Nicaraguan Government and by certain producer associations. Many of the programs are the direct responsibility of INFONAC, the National Development Institute. One of its current projects is the cattle improvement program. Approximately 1,000 head of registered purebred cattle of various breeds have been imported and distributed to Nicaraguan cattlemen, but as of mid-1959 imports have been limited to Brahman and Brown Swiss, deemed most adaptable to conditions in Nicaragua.

A modern slaughterhouse at Managua is operated by INFONAC in cooperation with the National Cattlemen's Association, and a nearly completed milk sterilization plant at León is also under the auspices of INFONAC.

Future developments for the Caribbean coast include financing of about 2,500 acres of cacao and bananas, improving river transportation, and planned exploitation of pine forests.

BACKGROUND FACTORS

The areas of greatest agricultural activity in Nicaragua are determined largely by the physical makeup of the country. There are three main agricultural areas: The eastern lowlands and plains, the mountainous central portion, and the Pacific coast and lake region.

A range of mountains traversing the country from northwest to southeast is closer to the Pacific than to the Atlantic side. To the west of this mountain range lies another range, parallel to the Pacific coast and reaching an elevation of 2,500 feet. These ranges divide the country into two sections, each with little access to the other.

The Pacific coastal region extends from border to border and is bounded on the east by the lakes, Managua and Nicaragua, and by a series of volcanoes. Economically and commercially, this is the most important section of the country, as well as the most densely populated. Here are produced a variety of agricultural products, such as corn, rice, sugar, cotton, and dairy products, as well as 80 percent of the country's coffee.

To the east of the mountain ranges, a large section, more than one-half of the total area of the country, forms a series of plateaus which gradually descend to the coastal plains of the Caribbean. These flat coastal plains extend 40 to 50 miles inland from the Caribbean and are subject to heavy rainfall and high humidity. When Nicaragua was a leading exporter of bananas this region was the center of production. Rice, corn, bean, and vegetable growing are confined to the river banks and the alluvial lands adjoining the rivers.

Climate

Altitude determines the climate to a great extent, here as elsewhere. The coastal plains up to about 2,000 feet are hot and humid. The average temperature on the Pacific side is around 78° F., with extremes of 60° and 95°, and rainfall ranges from 60 to 65 inches. The Caribbean coastal plain is constantly hot and humid, with an average rainfall of 150 inches.

In the plateau regions of the interior the climate is pleasant, and around the mountain tops it is distinctly cool. Annual rainfall in the mountainous central region averages around 90 inches, most of which falls between May and December. Somewhat heavier rainfall, about 120 inches, occurs in the eastern section of the central highlands and falls from April through December.

Soils

The best agricultural lands in the country are to be found in the Departments of León and Chinandega. Soils here are of volcanic origin, porous and well drained. The black loam reaches a depth of 3 to 4 feet. The area around Managua has the same type of soil as that found in León and Chinandega but it is probably not as deep. Elevation in both these major areas is from 140 feet up to a maximum of 500 feet and the land is well

adapted to mechanized agriculture. This same type of soil extends to Granada, Diriamba, and Rivas. Between Managua and Granada, soils have a high clay content and are said to be the best rice land in Nicaragua.

At Diriamba the elevation is about 2,500 feet. This is good coffee land; the plantations are fairly level, but other land in the area is rather steep and rugged. Lack of water is a serious problem here.

East of Lake Nicaragua are the rolling lands of the Department of Chontales, most of which are used for pasture. Some of the steeper slopes are badly eroded, but lands at 2,000 to 3,000 feet are used extensively as pasture. In the Departments of Matagalpa and Jinotega, elevation ranges from 3,000 to 5,000 feet. The soil is of reddish-brown clay under a thin layer of top soil.

The Caribbean littoral is a typical humid, rain-forest area with abundant rainfall, high temperatures, and high humidity. Weathering is excessive and organic matter does not accumulate. Soils are shallow and fine textured, and in general the fertility is low. However, along the main rivers the alluvial soils are fertile but limited in area. Soils of the pine flats are coarse textured and lacking in essential minerals and organic matter.

The Cukra area, roughly bounded by the Escondido, Sequia, and Curinhuas Rivers, and the Pearl Lagoon, has deep brown clay loam with good drainage and is level to rolling. The soils of the rest of the coastal area are of heavy clay which erodes badly when exposed by clean cultivation. During the rainy season the topsoil is quickly depleted and in the dry season it forms hard dry clods.

Land Use and Tenure

Nicaragua is the largest of the Central American Republics, with a total area of slightly more than 57,000 square miles. This includes the 3,475 square miles of water in Lakes Managua and Nicaragua. The Agriculture and Livestock Census of 1957-58 showed a total of 7.3 million acres of farmland, or 20 percent of the total land area. Of this 7.3 million acres, 12 percent was in annual crops, 6 percent in permanent crops, 12 percent fallow, 47 percent in pasture, and 23 percent was unused. Census figures indicate that 1.6 percent of the total number of landowners control 42 percent of all farm area. Farms of less than 87 acres account for 72 percent of the total number of farms.

Much of the eastern area of the country is nationally owned and available for purchase or lease. Numerous "squatters" cultivate land both on government property and on privately owned plantations. They move about from place to place and constitute a floating agricultural labor supply.

Large companies own thousands of acres of coffee, sugar, timber, and grazing lands which they farm with hired labor, although there are also many small landholders. While approximately half of all forest land is state owned, nearly all commercial exploitation of timber for export is in the hands of North American companies. There are approximately 1,500 registered

TABLE 1.--Farms: Total area and land use by type of farm and by Department, crop year 1957-58

Department	: : Total : area of : farms	: : Land : under : cultivation	: : Perma- : nent : crops	: : Annual : crops	: : Fallow	: : Seeded : pas- : tures	: : Natu- : ral : pas- : tures	: : Other : farm : land
	: : 1,000 : acres	: : 1,000 : acres	: : 1,000 : acres	: : 1,000 : acres	: : 1,000 : acres	: : 1,000 : acres	: : 1,000 : acres	: : 1,000 : acres
Boaco.....	641	411	25	36	2	348	43	187
Carazo.....	206	156	53	23	4	76	7	42
Chinandega.....	767	308	31	122	30	125	418	42
Chontales.....	824	482	13	39	142	288	176	166
Estelí.....	271	203	10	39	5	149	5	63
Granada.....	191	133	15	50	15	53	40	17
Jinotega.....	488	243	56	34	83	70	52	193
León.....	521	352	5	184	38	125	103	67
Madriz.....	243	157	16	18	6	117	13	73
Managua.....	659	442	54	118	183	87	129	88
Masaya.....	113	96	15	25	16	40	1	16
Matagalpa.....	1,096	804	63	75	191	475	36	257
Nueva Segovia.....	230	121	19	18	16	68	28	81
Río San Juan.....	294	54	8	5	34	7	11	229
Rivas.....	365	241	37	19	38	147	87	37
Zelaya and Cabo Gracias a Dios.....	: 368	: 228	: 22	: 43	: 88	: 75	: 20	: 119
Total.....	7,277	4,431	442	848	891	2,250	1,169	1,677

TABLE 2.--Farms: Number, area, and distribution, by size of farm, 1952

Size of farm	: : Farms	: : Total area in farms	<u>1/</u> : : Percentage : distribution
<u>Acres</u>	<u>Number</u>	<u>1,000 acres</u>	<u>Percent</u>
1.7 - 8.6.....	10,214	46	19.8
8.7 - 17.3.....	7,729	90	15.0
17.4 - 34.7.....	8,621	196	16.7
34.8 - 86.9.....	10,687	556	20.7
87.0 - 173.7.....	7,829	853	15.2
173.8 - 347.5.....	3,782	798	7.4
347.6 - 869.0.....	1,874	885	3.6
870.0 - 1738.0.....	483	534	0.9
1739.0 - 4345.0.....	256	618	0.5
4346 and over.....	106	1,314	0.2
Total.....	51,581	5,890	100.0

1952 Agricultural and Livestock Census.
Bureau of Statistics, Ministry of Economy.

cotton producers, of whom only a handful are non-Nicaraguans. Of 18 gins, only 3 are non-Nicaraguan owned. Foreign participation in the coffee industry is somewhat greater, with roughly 12 percent of total production processed by foreign-owned mills. Of 65 mills, only one is owned by North Americans. Only a very small percentage of the total of 1,200 coffee growers are non-Nicaraguans.

Population

The racial composition of Nicaragua's population is predominantly of mestizo (Indian and European) blood. About 75 percent fall into this category, with 10 percent predominantly white, another 10 percent predominantly Negro, and 5 percent of relatively pure Indian blood. While most of the people live in the western part of the country, the Negro population is almost totally confined to the Caribbean coastal regions and the pure Indians inhabit the remote regions of the Caribbean seaboard. Of the economically active population, about two-thirds are engaged in the agricultural and livestock industries.

Transportation and Marketing

Nicaragua's general development program calls for improving agriculture, expanding power facilities, and bettering transportation. The road building program has lagged far behind the country's transportation needs. However, in recent years it has proceeded at a fairly rapid pace, and in 1959 15 percent of the national budget was for building and maintaining public highways.

The 240-mile Nicaraguan section of the Inter-American Highway is now either graded for paving, or paved. Work continues on the transcontinental Rama road but is severely restricted from time to time by heavy rainfall. Paving of the important arterial highway between Managua and León was well advanced by early 1959 and a 9-mile all-weather dirt road was completed during August between Matagalpa and San Ramón in the center of an important coffee growing district.

A new bridge connecting the port of Corinto to the mainland was opened to traffic in September 1959, thus linking the port city to the important cities of Chinandega, León, Managua, and Granada, and other communities connected by the Inter-American Highway.

Although the Inter-American Highway is the country's foremost transport project, Nicaragua has organized its own airline and merchant marine and is now spending \$5 million to improve the port of Corinto. The government-owned National Railway is a small-scale operation of about 220 miles. It connects Corinto with León, Managua, Granada, the Jinotepe-Diriamba coffee region, and other smaller towns. A spur runs from Chinandega to Puerto Morazán on the Gulf of Fonseca and a separate section connects the city of Rivas with the Pacific port of San Juan del Sur.

The west coast of Nicaragua has no rivers of consequence but several large east coast rivers furnish inland transportation. The Río Grande,

Prinzapolca, and Coco could be navigated by oceangoing vessels but for bars at their mouths. The Escondido has a channel permitting vessels of 12-foot draft to pass at Bluefields. Barges, launches, dugout canoes, and small steamers with 3- to 6-foot draft are used on other rivers. Small steamers and sailing craft ply the coastal waters between ports. The San Juan River connects Lake Nicaragua with the Caribbean coast but at present is little used by traffic.

Nicaragua's international airport is currently being operated by the government. Half-a-dozen airlines operate regular international flights out of the country.

The capital city, Managua, and the cities of León, Granada, Masaya, Matagalpa, and Bluefields are the principal distribution centers. At present Bluefields is relatively unimportant but it is the only center in the eastern part of the country. Upon completion of the Rama road this town will be the center of development of eastern Nicaragua.

AGRICULTURAL DEVELOPMENT

Since colonial times Nicaragua has been principally an agricultural country. At one time in the not-too-distant past, gold mining was an important activity and gold was the export of highest value. Agriculture, however, remains the chief economic activity and furnishes around 80 percent by value of all exports. Coffee and cotton are the chief foreign exchange earners, with gold ranking third in 1956, 1957, and 1958. Other important exports are sesame, sugar, livestock, lumber, and cottonseed. Corn is the major food crop grown; rice, beans, and sorghum are also staple foods and small quantities are exported in years of surplus production. Of the 1.3 million acres of land in annual and permanent crops, coffee and cotton occupied 0.4 million acres, corn 0.4 million acres, and rice, beans, grain sorghums, and sugarcane another 0.3 million.

Production Practices

Mechanization is making some progress, especially on the larger farms where most of the country's export crops are produced but production methods for many crops are still somewhat antiquated. The farmer cultivates his land with ox power and the machete, and his crops are grown year after year on the same plot of land. Frequently two crops of corn are produced in one season, and beans are sometimes planted with the second crop.

However, medium and large-scale producers account for the majority of Nicaragua's agricultural exports. Most of the coffee, cotton, and sesame crops, much of the rice, and some of the corn are produced on large farms. Owners of these farms usually live in the cities but they take close interest in their properties. They are progressive and much improvement in agricultural techniques is apparent in their farming operations; they are responsible for much of the progress made so far in mechanization.

TABLE 3.--Principal agricultural products: Quantity and value of exports, average 1935-39 and annual 1956-58

Product	Average 1935-39		1956		1957		1958	
	Quantity:	Value	Quantity:	Value	Quantity:	Value	Quantity:	Value
	1,000 pounds	1,000 dollars	1,000 pounds	1,000 dollars	1,000 pounds	1,000 dollars	1,000 pounds	1,000 dollars
Coffee.....	34,876	2,596	37,352	23,169	48,578	28,511	50,513	24,231
Cotton.....	2,073	251	80,110	23,567	79,400	21,793	94,139	24,890
Cottonseed.....	3,853	36	122,025	3,383	147,976	3,496	154,220	3,863
Rice.....	372	7	517	28	3,772	193	1,222	84
Corn.....	599	4	0	0	0	0	1,483	36
Beans.....	295	4	918	63	7,666	376	482	26
Sesame.....	1/ 965	1/23	7,700	1,390	8,785	1,630	14,017	2,158
Sugar.....	6,660	103	8,636	429	19,774	1,013	33,897	1,639
Bananas 2/.....	66,060	877	6,408	159	3,352	91	2,766	70
Cacao.....	792	58	356	140	262	64	226	64
Live animals.....	3/4,268	55	3/10,783	669	3/26,111	1,764	3/21,473	1,467
Butter.....	24	3	75	34	104	48	12	6
Cheese.....	40	3	147	44	196	41	135	27
Total value, listed products.....		4,020		53,075		59,020		58,571
Share in total value of exports.....		Percent		Percent		Percent		Percent
		63.7		81.6		82.9		82.4

1/ 1 year only; none reported before 1939.

2/ Converted at 30 pounds per stem.

3/ Mostly cattle. Number of head.

In 1949 there were 409 tractors in the country and by the end of 1952 an additional 500 had been imported. However, the use of tractors has not been an unqualified success, owing to lack of knowledge of their proper use and to lack of adequate repair service and a supply of spare parts. In 1955, imports of new and used tractors totaled 604 but since that time only a few replacement units and spare parts have been imported.

An outstanding advance has been made in the field of insect control. The National Development Institute employs a fleet of small planes which regularly dust the cotton fields with insecticide. Increased yields of cotton have demonstrated to farmers the value of such measures.

Much remains to be done to improve agricultural practices. The use of fertilizer or other methods of improving the soil is just beginning. Erosion is serious in some areas and farmers give little attention to soil conservation measures.

Agricultural and Trade Policies

Nicaragua embarked, in 1950, on a vigorous program of agricultural expansion. Evidence of the vigor of this program could be found in increased budgets for agriculture, in loans obtained for agricultural development, in improved credit facilities for farmers, in the expansion of roads into remote farming areas, and in the technical assistance program. The increase in agricultural production that has taken place in recent years may be attributed to these government programs and policies. Currently, the government is seeking means to overcome the adverse economic effects of falling prices for coffee and cotton, which account for about 70 percent of foreign exchange earnings. Measures to stimulate the production of additional export crops and essential foodstuffs are being undertaken.

Included in the government's plan for economic development are its policies for encouraging exports and also for retarding imports. Among these policies are the tariff measures which protect domestic industry, provide revenue and deter imports, the restriction of imports of luxury items to conserve foreign exchange, participation in bilateral and multilateral trade agreements, and state trading.

Although there are no quantitative restrictions or prohibitions on imports, exchange control regulations require that practically all imports be licensed. They are classified on the basis of importance to the country, and three categories have been established for which certain advance deposit requirements must be met. List I items are classed as essentials for which import licenses are freely granted and no prior deposit is required. Some List I commodities of interest to agriculture are purebred livestock, fertilizers, insecticides and fungicides, agricultural machinery, implements and parts, and seed. List II items are said to be of lesser importance, and a prior deposit of 100 percent of the value of the import is required before a permit is granted. Permits are issued 48 hours after the deposit is made. Among the more important agricultural commodities on List II are raw tobacco, inedible animal products, condensed, evaporated, or

powdered milk and cream, wheat flour and other milled cereals, and malt. So-called nonessential or luxury items are on List III and require a 100-percent prior deposit and a waiting period of 30 days before an import permit can be issued.

Nicaragua is a member of the General Agreement on Tariffs and Trade, and a Treaty of Free Trade is in effect between El Salvador and Nicaragua. This agreement provides that certain commodities which originate in either country and are natural products of either can pass between the two countries duty free. A Treaty of Friendship, Commerce and Navigation between Nicaragua and the United States entered into force in May 1958. Nicaragua has also signed and ratified the Multilateral Treaty of Free Trade and Economic Integration which is now in effect between Nicaragua, El Salvador, and Guatemala. About 50 percent of Nicaragua's wheat flour requirements are purchased under the International Wheat Agreement. Nicaragua is also a member of the Organization of American States, the Latin American Coffee Agreement, and the Inter-American Cotton Federation.

National Development Institute

An autonomous organization of the government, the Instituto de Fomento Nacional (INFONAC), or National Development Institute, is responsible for long-range development planning, financing programs to increase national production, and certain forms of technical assistance. The INFONAC also regulates the supply of the three basic foods, corn, beans, and rice, by importing them in times of short supply. The government may invoke the law of consumer protection in times of shortage in order to establish procedures for retaining needed supplies and supplementing those that are deficient.

In order to promote the cattle improvement program, INFONAC has imported purebred cattle and distributed them to Nicaraguan cattlemen. Also it has established a breeding farm near Managua to produce purebred stock for distribution to local cattlemen. Loans have been made for fencing, for improving pastures, and constructing silos.

Among other projects which are under the auspices of INFONAC are: A modern slaughterhouse in Managua, which is now exporting beef to the United States; a milk sterilization plant in León; and the proposed Rivas irrigation project, which will provide irrigation facilities for more than 500 farms.

Agricultural credit operations are largely controlled by the National Bank, the INFONAC, and by several commercial and private banks. The following are types of loans made by these institutions: (1) To owners of less than 35 acres of land; (2) to owners of coffee and sugar mills for the purchase of coffee and sugar; (3) to owners of more than 35 acres of land for use in cultivating their land and harvesting their crops; (4) to owners to promote livestock production, or for fattening feeder steers, for the purchase of farm machinery and fertilizers, for development of new lands, for irrigation and drainage projects, and construction of barns, fences, and silos.

Actually few loans are made to farmers owning less than 35 acres. These farmers prefer to borrow from the large landholders who require only the borrower's signature on a promisory note though their interest rates are high.

The purpose of the Mortgage Bank is to provide long-term credit for agricultural improvements and livestock production where the short-term loans fall short of requirements.

The Ministry of Agriculture has made great strides in recent years in developing extension and research services for Nicaraguan farmers. Headquarters of the Extension Service is located in Managua and there are agencies in each department for dissemination of information. The research service has provided improved varieties of corn, cotton, forage crops, sesame, and other crops, and work done in the field of disease and insect control for crops and livestock has been of great importance to Nicaraguan farmers.

Agricultural Output

Total agricultural output in Nicaragua has been increasing steadily in recent years. Based on a 3-year period, 1953-55 = 100, the index of production in 1958-59 stands at 137 compared to 115 in 1955-56. Crops showing the greatest increase in 1958-59 compared to the average period are corn, 35 percent; sugar, 90 percent; and cotton, 78 percent. Milk production increased rather sharply too - 63 percent. Rice, which along with corn and beans constitutes the chief diet of most Nicaraguans, showed a decrease of 15 percent in 1958-59 while beans increased by only 3 percent. Coffee, one of the country's two big export crops, has remained at a level of about 365,000 bags for the past several years.

Coffee.--The coffee industry has dictated the economic welfare of Nicaragua for many years. Income from coffee has long been a source of wealth for the country's upper classes, while at the same time the industry provides employment for thousands of Nicaraguan families.

Approximately 55 percent of the coffee crop comes from upland regions of the country south of Managua, where elevations vary from 1,000 to 3,000 feet. The best coffee - about 40 percent of the crop - is grown at elevations of 3,000 to 4,000 feet in Matagalpa, Jinotega, and Nueva Segovia. The remaining 5 percent of the crop is grown on hillsides and slopes in the Departments of Estelí, Chontales, Rivas, and Chinandega. In the Managua-Carazo district the machete is the principal implement of cultivation. Just before harvest, leaves and trash are raked from under the trees and collected in the middle of the rows. When harvest is completed the trash is again scattered under the trees to prevent erosion and to retain soil moisture. Fertilization is not generally practiced in this area but considerable attention is given to shade control.

When the first plantations were established in the Matagalpa-Jinotega area the forest was simply thinned out sufficiently to allow planting of

coffee trees. Certain of the original forest trees were left to furnish shade. These were later replaced with banana and other plants. Cultivation consists of cutting the weeds several times a year with a machete. Pruning is confined to removal of broken branches and occasional topping of young trees.

Average production per tree usually does not exceed 0.5 pound. Production varies slightly between the coffee zones, with the southern zone producing about 0.6 pound and the Matagalpa-Jinotega area producing around 0.4 per tree in an average year. The National Development Institute, in cooperation with the National Bank and the Coffee Growers Association, has launched a program for coffee improvement. The emphasis of the program is to obtain better yields from existing plantations by improved production practices. The Institute hopes to raise yield per tree to 1 pound.

The coffee industry has, over the years, passed from periods of prosperity to periods of depression, depending upon world prices and the size of the crop. However, coffee has retained its position as the most important agricultural export crop, with the exception of several recent years when it was surpassed by cotton. It is also the country's most important industry from the standpoint of number of people employed.

There are several reasons for the favored position that coffee enjoys in Nicaragua. Two of the most important are that (1) a large part of the country's arable land is mountainous and not suitable for other crops; and (2) world demand for coffee has historically been fairly stable, and although prices have, at times, been very low they usually have been high enough to enable the planter to meet his expenses.

During the worldwide economic crisis of the 1930's when coffee prices declined sharply, and until the end of World War II Nicaraguan planters badly neglected their plantations. Missing trees were not replaced, pruning was neglected, and often the planters did not even remove the weeds from around the trees. Consequently plantations were in run-down condition and not producing at full capacity when an era of high prices dawned in the late 1940's. Not in 30 years had there been a harvest as small as that of 1948-49. Nevertheless coffee remains as the means of livelihood of more people than any other crop or industry in the country. Reliable statistics are not available as to the number of persons employed on coffee plantations. However, it has been estimated that, if families of plantation owners are included, more than 10 percent of Nicaragua's 1.4 million people are more or less directly supported by the coffee industry.

Less than 10 percent of owners of coffee plantations in the southern (Managua-Carazo) zone live on their property all year. Plantations in these departments are easily accessible because of the small area of the departments and because of relatively better roads of the region. They are operated by a foreman, several overseers, and several mechanics who attend to the processing machinery. On the other hand about 90 percent of plantation owners live on their property in the Matagalpa-Jinotega district, so there is less need for high-salaried administrative personnel.

During the harvest, laborers are paid according to quantity picked and usually earn almost twice as much as during the rest of the year. In addition to cash wages, laborers are given a house, firewood, and often a small plot of ground where they can raise food crops for themselves.

Cotton.--This crop has been produced in Nicaragua since colonial times; until 1939 most of the crop was exported but beginning then and for the next several years Nicaraguan textile mills took increasing amounts of local cotton. Then, with the accumulation of large stocks in the country and lack of an assured export market, production fell off sharply.

After 1943, production, domestic consumption, and exports fluctuated at a very low level of 2,000 to 8,000 bales. In 1947 cotton exports amounted to only 1 percent of Nicaragua's total exports and in 1948 no cotton was exported. The increasing needs of the textile mills and sales abroad of stocks caused a revival of interest among farmers and during the 1949-50 crop year cotton emerged as one of the leading crops.

Cotton production over the last 10 years has fluctuated with prices and weather but the trend has been definitely upward. Adverse weather and insects limited the crop in some years. However, more efficient production methods have resulted in increased yields. More fertilizers, herbicides, and insecticides are used and the government supplies technical services, such as providing varieties better adapted to the country, recommendations for control of insects, and airplanes for dusting the crop. Other contributing factors are steady and relatively high export prices and the vigorous campaign carried on by the National Bank to encourage the planting of cotton for export as a source of dollar exchange.

Cotton is produced commercially in 8 of Nicaragua's 16 departments. Largest producing departments are Managua, León, and Chinandega where the flat coastal lands are well suited to the crop. These three account for around 85 percent of total production, which reached a peak of 219,000 bales in the 1957-58 crop year compared to only 5,000 bales in the prewar period. Acreage planted for the 1959-60 crop was substantially lower - possibly 35 percent - than for the previous crop, and recent estimates indicate that production will also be around 35 percent lower than the 1958-59 crop. Cotton growers received a direct subsidy of \$8.25 per acre for the 1958-59 crop but no subsidy was announced for the 1959-60 crop.

Cottonseed is the third agricultural export by value and in 1958 amounted to 154 million pounds valued at \$3.9 million. The three oilseed mills in Nicaragua have a total crushing capacity of about 50 million pounds annually. Around 75 percent of the cottonseed oil produced by these mills is used in making cooking oil and 25 percent in vegetable shortening.

Sesame.--Production of sesameseed in Nicaragua began in 1937 and the seed was first exported in 1939. Sesame rapidly assumed a place of importance in the agricultural economy of Nicaragua and for a few years was the country's second agricultural export until displaced by cotton in 1950. Its ability to survive prolonged dry weather made it especially important in the

western lowlands where rainfall is variable. Production is concentrated in the Departments of León, Chinandega, Granada, and Managua where there are large areas of flat lands suitable for mechanized agriculture.

The crop is still produced largely for export. The United States is the principal market followed in 1958 by Japan. Before that, Venezuela was the second market. Production has fluctuated with oilseed prices over the past decade but enthusiasm for cotton also cut into area planted to sesame.

There are two mills in the country capable of refining sesame oil for cooking purposes. Other pressing establishments sell the crude oil for soap manufacture or for pharmaceutical purposes. The yield of oil is 40-45 percent and the residue is sold for cattle feed. Although the local vegetable oil industry uses cottonseed almost exclusively for its requirements it does use small quantities of sesame oil for blending.

Sugar.--Cane plantings in Nicaragua are concentrated in the Departments of Chinandega, Granada, Managua, and Matagalpa; these four account for about three-fourths of the planted area. The smaller plantings in other departments furnish cane for panela, a brown sugar cake, which is consumed in villages and rural areas of Nicaragua.

There are eight sugar mills in Nicaragua but one, the San Antonio mill in Chinandega Department, dominates the industry and produces about 75 percent of the country's centrifugal sugar. This mill pioneered in the introduction of modern machinery and in the use of irrigation and improved cane varieties. In recent years the other mills have also started using fertilizers, irrigation, and other improved methods of production.

As a result of improved production practices by more of the mills, as well as use of previously unused mill capacity of the larger mills the output of centrifugal sugar has more than doubled since 1956. The slow but steady increase in domestic consumption of sugar may be attributed in part to somewhat improved living standards of the poorer classes, to improved transportation facilities which allow shipment of sugar to parts of the country which formerly consumed panela, and also to the growth of the soft drink industry. Most of the molasses produced at the San Antonio mill goes into the manufacture of alcohol; very little is fed to livestock.

Most of the cane producers, both large and small, are members of the Compañía Azucarera Nacional (National Sugar Company) which has a monopoly on sugar sales within the country and fixes the price at a level high enough to guarantee a profit to producers. Although production costs are high compared with costs in Cuba and Puerto Rico, the San Antonio mill cut its costs considerably through its program of modernization and expansion. This mill sells over half its production within the country at prices substantially higher than those prevailing in world markets.

Nicaragua has signed the International Sugar Agreement, and its free market quota is now 5,500 short tons. For the past 2 years Nicaragua has been asking for an increase of 16,500 short tons in order to market

burdensome stocks which have accumulated. Increased sugar exports would also help to alleviate the depressed economic situation caused by the drop in coffee and cotton prices.

Food crops.--Locally grown corn, rice, and beans are the principal components in the diet of about 80 percent of the population, and Nicaragua is traditionally a supplier of these commodities to other Central American countries in years of surplus. The country is normally self-sufficient, at present low levels of consumption, in beef, pork, poultry, and dairy products. In addition, the production of such crops as peppers, cabbage, onions, tomatoes, chayotes, squash, and a variety of tropical fruits is also adequate to satisfy the country's needs.

The only food commodity which Nicaragua imports in substantial quantities is wheat flour, small amounts of preserved meats, lard, preserved milk, and canned fruits and vegetables are also imported.

Corn, historically the basic food item in the Nicaraguan diet, is still the leading crop in acreage devoted to its production. It has been estimated that human consumption of corn is at the ratio of 4 pounds for every pound fed to animals. This grain is grown in every department in the country, with Chinandega, Chontales, Jinotega, León, Managua, and Matagalpa leading according to the 1957-58 census.

Two crops of corn per year are grown and, though the first is usually the larger, the second is of better quality since weather conditions for drying and storing the grain are better when this crop is harvested. Since the first crop is not suitable for storage it is usually sold directly from the fields to consumers as green corn and does not often appear on the export market. The second crop is reserved for export.

Exports of corn are somewhat erratic, ranging from 15,400 short tons in 1951 to none in 1956 and 1957. One of the factors responsible for this is the uncertainty of weather conditions in western Nicaragua where most of the corn is grown. Also lack of all-weather roads up to comparatively recent years made it difficult to ship corn from areas of surplus production to other parts of the country or to ports. Owners of larger and more desirable tracts of arable land were more interested in producing export commodities, particularly cotton, and left the growing of corn to small farmers who produced only enough for their own needs and a small surplus for sale in local markets.

In the last few years, however, changes have occurred in this pattern of production. The construction of roads, increased use of mechanized equipment, and higher prices caused larger farmers to become interested in corn production. But production still varies considerably because of frequent droughts in western Nicaragua and the absence of irrigation facilities to supplement rainfall in dry years.

Rice cultivation in Nicaragua is somewhat primitive, and much of the work of preparing the soil, planting, harvesting, drying, and hulling is done by hand with crude tools and facilities. Such primitive harvesting and

threshing methods result in considerable waste of ripe grain by shattering. About 90 percent of harvested acreage in 1957-58 was in the Departments of Carazo, Chinandega, Granada, Managua, Masaya, Rivas, and Zelaya. Most of the rice produced is the upland variety; only a few of the larger farmers provide irrigation for their rice fields.

Usually Nicaragua is a net exporter of rice, but in 1956 and again in 1958 net imports were 9.6 million and 4.2 million pounds, respectively. For the first 9 months of 1959, exports had increased significantly over the two preceding calendar years. The return of former cotton lands to food production accounts for increased production and exports of rice.

Grain sorghum is grown to a certain extent in all departments in western Nicaragua, but the central highland region comprising parts of the Departments of Matagalpa, Estelí, Chontales, and Boaco is the center of commercial production. This grain is used primarily as livestock and poultry feed, but is also used for human consumption as a substitute for corn, particularly when a poor crop makes corn expensive. Production averages around 45-50,000 short tons.

Yucca is an important product in the diet of the rural population. It is grown in nearly all departments of the Republic, but mainly in Masaya, Zelaya, and León. Production increased from 8,100 short tons in 1952-53 to 11,400 in 1956-57.

Apart from beans for human consumption, few legumes are cultivated in Nicaragua. Beans are usually produced in sufficient volume to meet local needs, and small quantities are sent to neighboring countries from time to time. Data regarding total volume produced are at best a guess, but estimated production ranges from 600,000 to 800,000 bags.

An increase is expected in the harvest of the 1959-60 crop because much former cotton land was planted to food crops, including beans. No substantial imports of beans are expected this season, and there may be small exports. Production is expected to increase as government programs, including irrigation, begin to show results. However, a large part of future harvests will be consumed by the rapidly growing population, leaving very small quantities for export.

Nicaraguans much prefer hog lard to any other edible fat. Local production of lard is estimated at about 6.5 million pounds. The most important oilseed crops grown in Nicaragua are sesame and cottonseed. Small amounts of coconut oil are processed for use in the country and small amounts of castorbeans and oil are exported. At present the African palm oil produced is used in soap manufacturing within the country.

Livestock and products.--Livestock raising has played an important part in Nicaragua's economy for over 400 years. Cattle are said to have been introduced into the country about 1526 and conditions were so favorable and the range so unlimited that tremendous increases in cattle numbers took place. Present cattle population is estimated to be about 1.3 million head, almost one for every person.

Cattle are raised in all departments of the country but the greatest numbers are found in Chontales, Chinandega, Rivas, Matagalpa, Boaco, and León. One of the purposes of the cattle development program backed by the National Development Institute is to get more cattle into the Departments of Estelí, Madriz, and Nueva Segovia in the northwest part of the country to take advantage of good range lands there.

The flat fertile grasslands of the western plains and a relatively dense concentration of human population offer optimum conditions for the production and consumption of meat, hides, and dairy products. The rolling hills of Chontales and Boaco are the site of large ranches devoted primarily to production of beef cattle for export. Although there are fewer cattle herds in the Caribbean coast region, this section with its more uniform rainfall distribution and favorable terrain offers excellent opportunity for expansion of the cattle industry. This is especially true of the north-eastern savanna area.

Cattle are practically all of the native, or criollo, type and are considered to be dual purpose. Purebred bulls of various breeds have been imported by some prominent stockmen or through efforts of the Development Institute which now imports only the Brown Swiss and Brahman breeds.

As is common in most other Latin American countries, cattle in Nicaragua depend to a great extent on pasture rather than on grains or other supplemental feeding. In parts of the country where dairying is important, pastures consist of Pará, guinea, jaragua, or other planted grasses. On the other hand cattle on the large ranches of Chontales, Boaco, and parts of Chinandega subsist on native grasses and the leaves and fruits of trees. During the dry season in the western lowlands, lasting usually from November to May, dairy herds are often given forage of Napier grass, corn, and sorghums. Silage made from corn, sugarcane, grain sorghums, and pasture grasses is also fed, and an increasing number of dairymen are feeding sesameseed or cottonseed cake. In the highlands where a shorter dry season insures green grass all year, trench silos have only recently been built.

Cattle have been exported from Nicaragua for many years but these have been on a comparatively small scale. Principal markets are the neighboring Republics of Honduras, El Salvador, and Costa Rica, though markets for Nicaraguan cattle have also developed in Netherlands Antilles and Peru.

According to official data, over 100,000 head of cattle are slaughtered annually. Informed sources, however, are of the opinion that perhaps as many as 10,000 head are slaughtered each year in remote rural areas.

In 1958 a modern slaughterhouse built by the government and financed by the Development Institute was opened in Managua. This enterprise represents the first real attempt to produce and process meat under controlled sanitary conditions and is a big step forward in the economic development of Nicaragua. During its first year of operation the slaughterhouse shipped, by air, boneless chilled beef valued at \$1 million. About 70 tons were also shipped by sea.

The dairy industry of Nicaragua is concentrated mostly in the Pacific coastal plain, although some milk is produced throughout the country. Total annual production is estimated at about 410-420 million pounds. Largely because of limited transportation facilities and poor or nonexistent roads, most of the raw milk is made into cheese rather than consumed as fluid milk. Cheese is an important supplementary food for the rural population and is also exported in small quantities.

Production and consumption of butter are very low although small quantities are exported to El Salvador and Honduras.

Only those dairies located near the cities and towns sell fluid milk. There is one government-owned pasteurization plant in Managua capable of pasteurizing 2,000 gallons of milk in 8 hours, and a private milk sterilization plant is nearing completion in León.

Hogs are raised in all parts of the country, generally in limited numbers by smaller farmers. Few farms produce hogs under modern methods. Hog numbers are estimated at around 375,000 head. Some of the more progressive breeders have imported purebred animals of the Chester White and Duroc Jersey breeds. According to official data, over 90,000 hogs are slaughtered each year, with possibly another 20,000 slaughtered in remote areas of the country. Hogs or pork products have not entered into the foreign trade of the country to any great extent, though there are some imports of lard.

TRADE IN AGRICULTURAL PRODUCTS

Agricultural products made up 64 percent of Nicaragua's total export value in the prewar period, rose to 84 percent in 1954, and have since declined slightly. Coffee and cotton are the principal exports, accounting for around 85 percent of total agricultural exports.

The United States is the leading market for Nicaragua's coffee, sesame, and sugar. Other important coffee markets are Germany and the Netherlands. In 1958 Germany was the chief buyer of Nicaraguan cotton, with the Netherlands, Japan, Great Britain, and Canada following in that order. These countries, together with the neighboring Central American Republics, take the majority of Nicaraguan agricultural exports. For the first half of 1959, Japan replaced the United States as Nicaragua's best customer, taking 26 percent of its total exports compared to the 22 percent taken by the United States; in the third quarter of 1959 the United States returned to its traditional position as Nicaragua's principal market.

Of imports, agricultural products represent only a small share of the total value. Wheat flour and leaf tobacco are the principal items. Rice has been imported in sizable quantities in recent years. Other agricultural imports are fruit and preparations, vegetables and preparations, dairy products, malt, and specialty meats.

TABLE 4.--Principal agricultural products: Quantity and value of imports, average 1935-39 and annual 1956-58

Product	Average 1935-39		1956		1957		1958	
	Quantity:	Value	Quantity:	Value	Quantity:	Value	Quantity:	Value
	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
	pounds	dollars	pounds	dollars	pounds	dollars	pounds	dollars
Rice (milled).....	486	12	10,165	725	1,487	110	5,452	413
Meat and preparations.....	0	12	0	114	0	138	0	132
Fruit and preparations <u>1/</u>	0	15	0	318	0	405	0	467
Wheat flour.....	8,433	204	30,958	1,988	33,474	2,031	37,607	2,373
Dairy products.....	0	23	0	210	0	231	0	260
Vegetables and preparations.....	0	29	0	274	0	271	0	396
Malt (048-02).....	248	10	1,224	97	2,004	160	1,559	123
Tobacco, leaf.....	175	56	1,048	634	835	594	627	497
Total value, listed products.....	361	361	4,638	4,638	3,940	3,940	4,661	4,661
Share in total value of imports.....	6.5	6.5	6.7	6.7	4.9	4.9	6.0	6.0

1/ Includes edible nuts, but not oilseeds.

The United States continues to occupy first place as the source of Nicaragua's agricultural imports. In 1958 this country supplied 63 percent of the wheat flour, virtually all of the leaf tobacco, and the greater part of the other agricultural imports.

DOMESTIC CONSUMPTION OF FOOD PRODUCTS

Nicaragua is a small net exporter of food products. Aside from wheat flour and rice, imports of foodstuffs are negligible. Export surpluses, however, are dependent on the low levels of food consumption of the native population. Lack of reliable data prevents an accurate evaluation of domestic food consumption.

The Nicaraguan diet is high in starch and low in protein and in total calorie content. Small quantities of dairy products and meat, various kinds of fruit, and chocolate supplement the basic diet of corn, beans, and rice.

The people of northern and central Nicaragua depend more on corn and beans as staples in their diet whereas those in the departments along the Pacific coast substitute rice and plantains for corn. Temperate Zone vegetables, such as carrots, beets, string beans, turnips, and leaf lettuce, are grown in the mountainous areas of north-central Nicaragua. White potatoes are grown to some extent, but they are consumed primarily by the higher-income groups. Yucca is an important food of the rural population.

With the exception of bananas there is no commercial production of fruits in Nicaragua, but scattered plantings of various kinds of fruit, such as citrus, mangos, nisperos, zapotes, passion fruits, and avocados, are found in nearly all departments.

Eating habits of urban Nicaraguans differ from those of rural inhabitants since they consume more meat, poultry, vegetables, and white bread. They also use white sugar instead of the panela eaten in rural areas.

Nicaragua's food problems are not a matter of how much food is available but rather of: (1) A more equitable distribution of income so as to increase the purchasing power of the majority of the population; (2) adequate government supervision to insure that there are no exports of food commodities during periods of scarcity within the country; and (3) further expansion of local food production by means of modern agricultural technology.

Most progress has been made in coping with the second and third problems. The government through the National Development Institute now buys grain when there is an abundant national supply, or imports if necessary, and stores sufficient quantities to maintain a supply for domestic consumption and to assure reasonable prices both to producer and consumer.

In recent years the use of machinery has increased notably and this trend is continuing. Farmers are becoming more interested in soil conservation techniques, seed selection, and other practices which would tend to improve yields.

OUTLOOK

The Nicaraguan Government's plans for future economic development look toward the diversification of agricultural production in order to get away from a coffee-and-cotton economy. Expansion of foodstuff production will lead to self-sufficiency in most food crops and permit greater per capita food consumption. Upon completion, the Rivas irrigation project will encourage production of food crops, especially rice.

Livestock production will be advanced through increased introductions of breeds well suited to climatic conditions in Nicaragua. Other phases of the livestock promotion plan include pasture improvement and the expansion of pasture acreage, especially in the northeast part of the country; supplementary feeding of silage, hay, and other forage during the dry season; and disease and pest control.

In order to increase coffee yields without taking over more acreage, more attention is being given to fertilization and to minor element applications. Trees are rejuvenated by using newer pruning techniques, and shade for the coffee trees is gradually being reduced.

By the use of proved high-yielding clonal material, an expansion in cacao production is being carried forward for the east coast of Nicaragua. Expansion will be accomplished not only on large plantations but on family-sized farms as well.

When current processing and marketing problems associated with African palm oil production are solved the present plantings will be expanded. Oil now produced is used mostly for soap manufacture.

A program of reforestation and afforestation is under way in order to insure a future source of timber and pulpwood and to conserve the soil in heavy rainfall areas. Actually several thousand acres of mahogany are already over 10 years old.

The government is also encouraging the production of crops such as vanilla and pepper which are not now grown in Nicaragua, to augment the country's foreign exchange earnings. Particular emphasis is being placed on crops that can be handled by small farmers with a minimum of machinery and processing equipment.

