A SURVEY OF AGRICULTURE IN GUATEMALA

U.S. DEPARTMENT OF AGRICULTURE
ECONOMIC RESEARCH SERVICE

ABSTRACT

Agricultural production, the basis of Guatemala's economy, increased during the past 15 years and is expected to continue to rise in the next decade. The principal export crops--coffee, cotton, sugar, and bananas--are grown on large holdings and have benefited the most from improved growing and marketing techniques. Corn is the principal subsistence crop and wheat is the most important agricultural import. Both crop and livestock output can be expanded, but their rapid growth is handicapped by the low level of education of many farmers, unimproved agricultural technology on numerous farms, inadequate farm credit, and political and social problems.

The United States and Guatemala are politically and economically important to each other. The United States is the first market for Guatemala's exports, but its share in total export value is declining as members of the Central American Common Market take a greater quantity of Guatemala's commodities.

Key Words: Guatemala, Agricultural production expansion, Agricultural policies, Farming patterns, Economic integration, Foreign aid.

PREFACE

Economic and political ties between Guatemala and the United States are strong, and trade is mutually profitable. The United States supplies Guatemala with large quantities of wheat and lesser amounts of dairy products, breeding stock, inedible tallow, and other agricultural commodities. Guatemala exports large quantities of commodities to the United States that complement U.S. agricultural output--coffee, bananas, and essential oils--as well as products of a supplementary nature--sugar, beef, cotton linters, and sesame seed.

This report updates material published in the out-of-print report, Guatemala, Its Agricultural Production and Trade (ERS-Foreign-14). The author has relied heavily on information received from the U.S. Embassy in Guatemala City, particularly the reports of the Agricultural Attaché, and on the assistance and advice of members of the Western Hemisphere Branch, Economic Research Service (ERS), U.S. Department of Agriculture, especially the Guatemala desk officer, Mary S. Coyner. The author also is grateful to the staff of the Special Projects Branch, ERS, for constructive suggestions, statistical support, and preparation of the maps. A bibliography of useful references is included at the end of this report.

Metric units were used for the most part in the report; their equivalents are given below:

1 metric ton = 2,204.6 pounds
1 hectare = 2.471 acres
1 kilometer = 0.6214 mile
1 meter = 39.37 inches
1 square kilometer = 0.386 square mile

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Agricultural production in Guatemala, even on a per capita basis, has increased substantially during the past 10 to 15 years. Higher coffee and cotton output in the early 1960's and increased food production in the latter part of the decade are responsible for this increase. Agriculture remains Guatemala's dominant industry.

Coffee is the principal commercial crop and the leading export. Cotton, sugar, beef, and bananas are important foreign exchange earners. Guatemala's principal trading partner, for both imports and exports, continues to be the United States.

Corn is the basic food crop in Guatemala and supplies more than half the food energy. It is widely grown--on small farms in the highlands, and on larger plantations in the lower elevations. Beans, panela (a brown sugar cake), squash, and a few other vegetables supplement the tortillas, tamales, and other corn products in the Guatemalan's diet. Animal protein makes up only a small part of the food intake. Wheat bread, made largely from imported grain, is mostly consumed in the cities, as are other imported specialty foods. Wheat is the most important agricultural import.

About one-third of the total area of the country is in farms, and almost 30 percent of the farmland is in pasture. Modern farming practices are being adopted on the large, commercial plantations of the Pacific Plains and Piedmont, but the hoe and machete are still the common tools used on the smaller farms, and the farmers there have practically no assistance from animal or machine power.

Land tenure problems resulting from the underutilization of large holdings and the overutilization of small holdings are being tackled by Government agencies with foreign technical and financial aid. The Government also is making a start in helping farmers to improve their operations by providing credit and research and extension services.

The Guatemalan Government has formulated several development plans that include agricultural expansion goals, but thus far implementation has been slow. The 1970 Agricultural Development Plan promises institutional reforms and assistance in increasing output of both food and export commodities.

Guatemala is cooperating in the Organization of Central American States and in the economic integration goals set forth in the General Treaty of Central American Economic Integration. Trade patterns are beginning to be affected by the provisions for free trade among the member countries, and other Central American countries are accounting for an increasing share of Guatemala's trade.

Despite Guatemala's physical resources to greatly expand both crop and livestock production in the longer term future, only a moderate increase in agricultural output is projected in the next 10 years. Problems of political instability, lack of educational opportunities, inadequate financial resources, and unimproved agricultural technology on many farms continue to hamper immediate achievement of the goals of the 1970 Agricultural Development Plan as well as those of the economic integration program for Central America prepared by the Joint Planning Mission for the Organization of Central American States.

A SURVEY OF AGRICULTURE IN GUATEMALA

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INTRODUCTION

Guatemala, the northernmost country of Central America, has close economic ties with the United States, and there is mutually profitable agricultural trade between the two countries. Since Guatemala's economy is still based largely on agriculture, imports into the United States are primarily of agricultural commodities, most of which complement U.S. agricultural production. The United States, on the other hand, sends Guatemala a wide variety of goods, but its agricultural exports, while much smaller in value than agricultural imports from Guatemala, increased steadily through 1968. In 1969, U.S. exports of agricultural products to Guatemala declined sharply to $10.4 million because of the growing importance of the Central American Common Market (CACM) to Guatemalan trade (see following tabulation, shown in million U.S. dollars):

Period or year	U.S. imports	U.S. exports
Average:		
1950-54	59.5	6.4
1955-59	66.6	9.8
1960-64	57.6	10.1
1965	62.0	10.8
1966	76.8	12.8
1967	59.7	14.1
1968	65.8	14.8
1969 (Preliminary)	70.3	10.4

Guatemala's dependency on agriculture dates back to its precolonial days when the land was peopled by Indians of Mayan and Quiche ancestry. These Indians depended for their livelihood on an agricultural economy based mainly on the cultivation of corn. The first Conquistadores reached the highlands of Guatemala in the early sixteenth century, introduced cattle from Europe, and set up large estates for grazing and commercial agriculture. The influence of the precolonial and colonial agricultural practices is still evident today. Agriculture dominates the economy, corn is the staff of life, and Indian and Spanish land tenure patterns are only recently beginning to change under pressure for land reform.

Agricultural exports--coffee, cotton, sugar, bananas, and beef--sparked a significant rise in the gross domestic product during the past 15 years.

Guatemalan development plans call for continued expansion in output not only of export commodities, but also of domestic food and fiber products. Implementation of these plans is hampered by inadequate farm credit, the low level of education, poor transportation, and the violence of dissident elements throughout the country.

Historical Relationships

During early colonial days, Guatemala was part of the Captaincy-general of Guatemala, a subdivision of the Viceroyalty of New Spain in Mexico City, comprising all of Central America plus the Mexican State of Chiapas. Following Mexico's independence from Spain, Central America, under the rule of Guatemala, declared its independence from Mexico in 1823. Soon, however, El Salvador, followed by other population clusters, broke away from this Central American confederation. In 1839, the cluster that is now Guatemala became an independent republic. Since then, at least 25 attempts have been made to reconstitute a Central American political entity--all of them unsuccessful.

Economic integration, however, has achieved some measure of success. The Charter of San Salvador, signed in 1951 by five Central American countries, 1/ created the Organization of Central American States known as ODECA. Since 1951, several additional Central American organizations have been set up under the authority of treaties and agreements covering a wide range of fields. The principal treaties are the General Treaty of Central American Economic Integration of 1960 and the Central American Convention on the Equalization of Import Tariffs and Charges.

Guatemala has had a turbulent political life during the past 25 years, and from 1951 to 1954 was ruled by a Communist-controlled Government that was overthrown by revolution. Today, a large, restive, "floating" population provides tinder for revolutionary fires and continuing guerrilla activity.

Nature of the Economy

Agriculture has always been the mainstay of Guatemala's economy. In early colonial days, the principal commercial crops were indigo, cocoa, sugar, cereals, and cotton. Exports of hides and live cattle, however, far surpassed exports of crops in the early years, and sarsaparilla root was also a valuable foreign trade item. Indigo declined in importance after coal dyes were discovered. In the middle of the nineteenth century, coffee exports rose rapidly to become the number one exchange earner and remain so today.

Since 1955, the gross domestic product has been rising at a much faster rate than the population increase, resulting in a real per capita gain of approximately 3 percent annually. Agriculture, forestry, and fisheries have contributed a declining proportion of the domestic product over the past 15 years, but they still accounted for more than 27 percent of the total in 1969, with crop production by far the most important segment. Although crop production

1/ Guatemala, El Salvador, Nicaragua, Costa Rica, and Honduras.

continues to provide the major source of foreign exchange earnings, exports of beef are increasing in relative value.

Recent Central American economic integration efforts are stimulating industrial development in Guatemala, but, for the most part, industry there depends on agriculture for raw materials. The fisheries industry is still underdeveloped, and the outlook for commercial exploitation of Guatemala's forestry resources is not favorable at this time, mainly because of legal restrictions.

Agricultural production has increased substantially over the past 15 years, with coffee and cotton leading in the early 1960's and higher food production in the latter part of the decade. The index of agricultural production (on a per capita basis) was 111 in 1969, compared with 100 in 1957-59. The increase is expected to continue and, for the immediate future, Guatemala's economy will continue to rely on the agricultural sector.

Physical Environment

Guatemala is located in northern Central America, with Mexico as its northern neighbor, and El Salvador and Honduras to the south and southeast (fig. 1). British Honduras lies east of the large undeveloped department of Peten. The Pacific Ocean washes a long coastline on the southwest, and the Gulf of Honduras provides an outlet to the Caribbean Sea for the area between British Honduras and Honduras. Although the country is entirely within the Torrid Zone, the mountains that cover almost two-thirds of the area moderate the temperatures and permit cultivation of a wide variety of agricultural products ranging from bananas in the lowlands to wheat in the higher elevations.

Topography--The Sierra Madre range, which traverses Guatemala from Mexico southeastward to El Salvador and Honduras, divides the country into four landforms:

(1) The Petén Lowlands, covering about a third of Guatemala, are an extension of the lowlands of Mexico and northern British Honduras. Within this general area are the Petén Hills, consisting of low, rounded ridges or knobs along the southern part of the boundary with British Honduras.

(2) The Pacific Lowlands are a continuation of the Chiapas lowlands and reach from the ocean inland 10 to 35 miles.

(3) The Caribbean Lowlands lie between the lowlands of British Honduras to the north and those of Honduras to the south and stretch inland from the coastal plain along three stream valleys.

(4) The Central Highlands comprise the largest landform and vary between 95 and 145 miles in width. These highlands have several spurs from the main Sierra Madre range, including the Sierra de los Cuchumatanes, Sierra de Chuacus, and Sierra de las Minas.

GUATEMALA: PHYSICAL

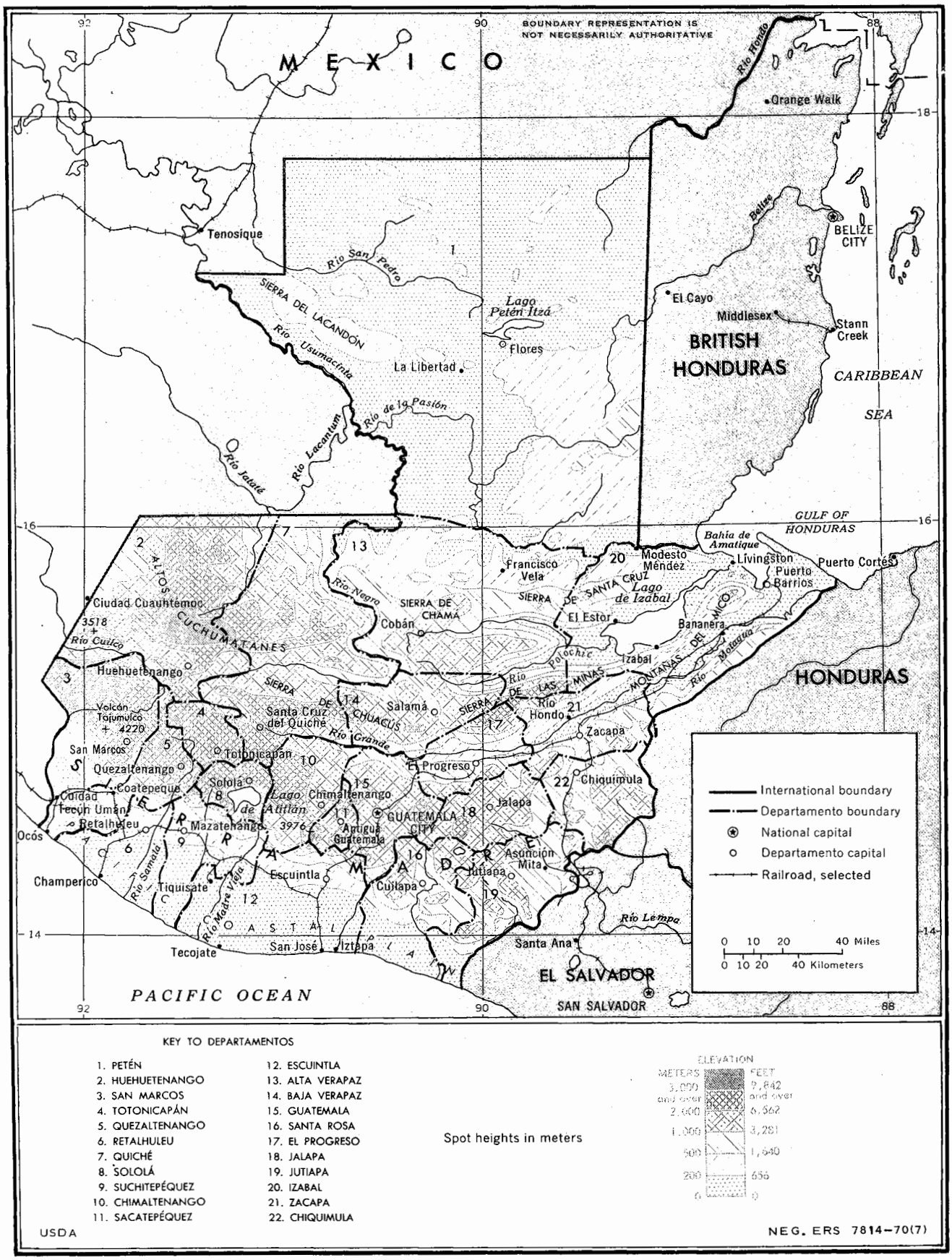


Figure 1

Numerous scattered upland plains and basins provide opportunities for cultivation and grazing. Some 21 active or formerly active volcanoes are scattered along the cordillera, and over the years have poured volcanic ash over the Pacific slopes of the mountains. The volcanic peak Tajumulco in southwestern Guatemala, which is the highest mountain in Central America, rises 4,200 meters (13,800 feet) above sea level.

The Sierra Madre is the principal drainage divide; the streams flowing toward the Pacific generally pass through narrow gorges of the Central Highlands and become deep streams on the coastal plain. Marshes, swamps, and lagoons are common in places. The relatively narrow Pacific slope is the most densely settled area of the country. Rivers draining the Central Highlands to the north generally empty into the Gulf of Honduras, some by way of Lago de Izabal, Guatemala's largest lake. The longest of these rivers is the Rio Motagua.

Earthquakes occur frequently in southern Guatemala, particularly from the department of San Marcos eastward to Cuilapa and Salamá. Landslides are common in the highland area not only as a result of earthquakes, but also following periods of heavy rainfall. Tsunamis, long-period sea waves produced by underwater earthquake or volcanic eruption, may also occur along the Pacific Coast.

Climate--The mountains have a marked effect on both the climate and rainfall in Guatemala. Although Guatemala lies entirely within the Tropics, its temperature shows the influence of the Temperate Zone of the Northern Hemisphere as well as that of changes in elevation. The annual temperature range is small, but there is a seasonal cycle, with April through September being the warmest months in most of the area and November through February the coolest--corresponding roughly to the rainy and dry seasons. Two airstreams dominate; the more important is the northeast trade wind which brings rain to the northern and central portions of the country, and the second is the moist air from the Pacific Ocean which is the major source of rain for southern Guatemala.

Three temperature zones are recognized, but they merge into one another and cannot be sharply delineated. The Petén and coastal lowlands constitute the "hot land" (tierra caliente) where the mean annual temperature ranges from about 79°F. at sea level to 72°F. at about 1,000 meters. Mean daily maximums are generally in the high 80's and lower 90's. The temperate land (tierra templada) is in the middle latitudes of 1,000 to 1,900 meters, with mean annual temperatures dropping to 63°F. in the upper reaches. The cold land (tierra fria) in the higher altitudes has mean annual temperatures ranging from 63°F. to 41°F. Here, both the daily and seasonal variations are greater than on the coast and, at the highest altitude, freezing temperatures occur occasionally during the dry season. Relative humidity is high throughout much of the country.

Pronounced wet and dry seasons exist in most areas of Guatemala, although the length and intensity of each vary greatly. In general, each season lasts about 6 months, but the driest period is from December through March. The rainy season begins around April in the lowlands and about a month later in the Central Highlands. Rainfall increases as it moves from the Pacific Ocean to the mountains, ranging from about 55 inches at San José to as much as 200 inches

along the southern mountain slopes. The rainfall is lower on the northern and eastern sides of the divide, but it follows the same pattern of increasing from the coast to the higher elevations. In the northern lowlands, the rainfall ranges from 40 to 80 inches per year.

Wet season rainfall is often torrential in exposed locations, sometimes averaging 20 inches per month. In addition to the severe storms that are characteristic of the rainy season, Guatemala's crops are threatened from time to time by earthquakes and volcanic activity, particularly on the Pacific side of the divide.

Soils--Guatemala has a wide variety of soil types and a large diversity of crops. The degree of fertility between regions also varies, and estimates of soil specialists indicate that almost two-thirds of the country has soils of little potential for farming. Most of these areas are forested or in pasture, but where depth of soil permits, there is some cultivation. The Pacific Coastal Plain and Lower Piedmont contain productive soils that support coffee, bananas, cotton, and sugarcane as well as pasture grasses. The location of different soil groups is shown in fig. 2.

The Alluvial soils of the Pacific slopes and plains are fertile and well-drained, with a loam or silt loam surface and a fine sandy loam subsoil. They have potential for more intensive use than at present. The Humic Gley soils on the Pacific plains, on the other hand, are poorly drained and are commonly too wet for cultivation. With proper drainage, however, they could be productive. The Grumusols are productive soils but difficult to manage since they are sticky when wet and very hard when dry. With good management they too could be cultivated. The Ando soils are moderately fertile with loamy surfaces and subsoils containing slightly more clay than the surface soil. They are subject to erosion on the steep hillsides, but are intensively cultivated on the more gentle slopes. The deep, well-drained, friable Reddish Brown Latheritic soils are among the most productive of the country, but they are relatively not widespread. Somewhat less productive are the Red-Yellow Podzolic soils in limited areas of central Guatemala, but they respond well to fertilization.

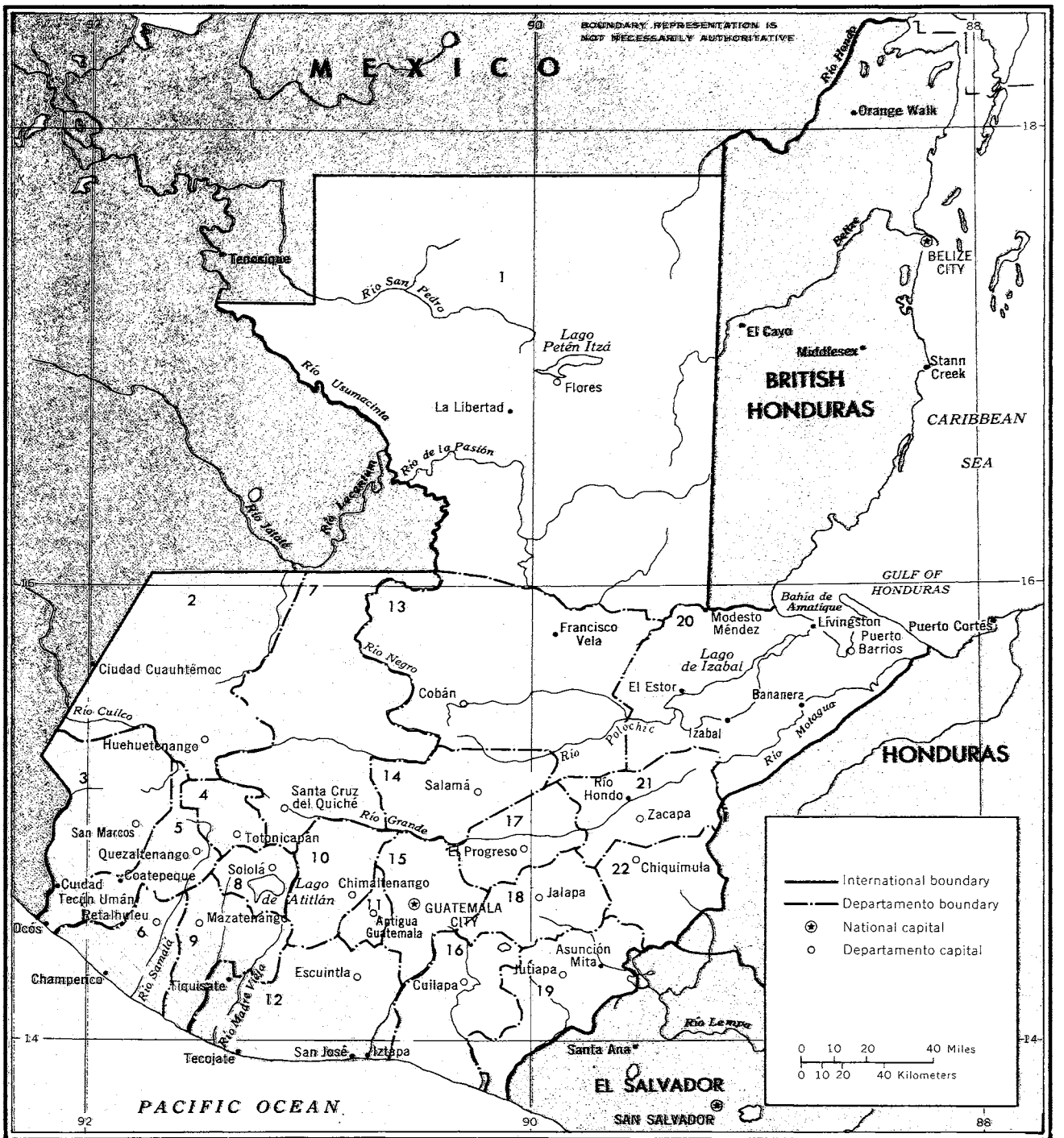
The Terra Rossas (red clays) and the Rendzinas (black or dark brown clays) occur on the plains and hills in northern Guatemala. Although both types are shallow, their surfaces are high in organic matter. Lithosolic soils, which are dominant on the mountains and steep slopes of central Guatemala, have little potential for farming and are largely forested. Northeast of Puerto Barrios is another area that has little, if any, potential for agriculture. Acid fibrous peat, which is interspersed with low ridges of beach sand, is the dominant soil.

Human Resources and Labor Supply

Total population in Guatemala is rising rapidly; the annual rate between the Agricultural Census years 1950 and 1964 was just over 3 percent. 2/ Some 71 percent of the total was on farms in 1964, a slight drop from the 75 percent

2/ This may be partly a reflection of a more complete census in 1964.

GUATEMALA: SOILS



KEY TO DEPARTAMENTOS

1. PETÉN
2. HUEHUETENANGO
3. SAN MARCOS
4. TOTONICAPÁN
5. QUEZALTENANGO
6. RETALHULEU
7. QUICHÉ
8. SOLOLÁ
9. SUCHITEPÉQUEZ
10. CHIMALTENANGO
11. SACATEPÉQUEZ
12. ESCUINTLA
13. ALTA VERAPAZ
14. BAJA VERAPAZ
15. GUATEMALA
16. SANTA ROSA
17. EL PROGRESO
18. JALAPA
19. JUTIAPA
20. IZABAL
21. ZACAPA
22. CHIQUIMULA

- Alluvial soils
- Humic Gley soils
- Grumusols (dark, plastic)
- Ando soils (from volcanic ash)
- Peat and sand
- Reddish-Brown Lateritic soils
- Red-Yellow Podzolic soils
- Terra Rossas (red) and Rendzinas (black)
- Lithosolic soils (shallow)

USDA

NEG. ERS 7815-70(7)

Figure 2

reported in 1950. 3/ By 1970, the percentage of rural population may have declined somewhat because of what appears to be an accelerating migration from farm to city.

Supply of farm workers--About 65 percent of the economically active persons 7 years of age and over were reportedly engaged in activities related to agriculture, forestry, and fishing in 1964. Almost 30 percent of these workers were permanently employed in large-scale agriculture, and more than 40 percent were either self-employed farmers or unpaid family workers. The majority of the farmers in the highlands are on plots too small to support a family, and many of them migrate to large coffee, cotton, and sugarcane plantations during the harvest season or seek nonfarm employment for part of the year. Of the 861,000 persons gainfully employed in agriculture in 1964, almost one-fourth were estimated to have migrated from their own area during part of the year. An estimated 80,000 to 90,000 persons were permanently employed on large cotton, coffee, and sugarcane farms.

Working and living conditions--Guatemala has no minimum agricultural wage, and the daily wage for farmworkers is far below that in other industries. Although the 1961 Labor Code generally is intended to cover agricultural workers, a substantial proportion of these workers do not benefit from the regulations. Because of underemployment of agricultural workers and the number of farmers on small holdings, the working conditions or wage scales of agricultural workers is not likely to improve in the near future. During slack periods, many farmers and their families make pottery and weave rugs and blankets which are sold in the village markets. As mentioned earlier, many supplement their farm earnings by working on large plantations during part of the year, and some seek nonfarm employment in the cities.

The permanent laborers live on the farm--usually under a 4-year contract--and are given a plot of ground on which they can have a house and can cultivate corn and beans and other subsistence crops for their own use. They work specified periods for the owner and may receive, in addition to the plot of ground, cash wages, a part of the owner's crop, rations, or a combination of these. Wages paid for work vary considerably between cotton, coffee, and sugarcane farms, as well as from one farm to another within these classifications.

Agricultural workers and subsistence farmers are poorly housed, clothed, and fed; consequently they are relatively unproductive. More than three-fifths of the total population is illiterate, with the percentage in the rural areas running much higher--85 percent in the highlands. Some 43 percent of the total population was classed as Indian in 1964. 4/ The Indians speak about 20

3/ Unadjusted data show 66 percent on farms in 1964; however, the census definition differs between the two censuses. Using the same definition in 1964 as was used in 1950 gives the higher percentage. There apparently was an increase of 45.7 percent in rural and 77.1 percent in urban population between 1950 and 1964.

4/ The Indian, as classified officially, is one who does not speak Spanish and who "lives as an Indian." The Ladino, dominant in the economy, is so classified if he speaks Spanish and has discarded Indian ways, even though he may be ethnically Indian, of mixed blood, or perhaps a descendant of the Spanish conquerors.

different languages, although they are mostly of Mayan and Quiche origin. Few of them speak any Spanish. Since the schools are conducted in Spanish, attempts to educate the Indian have met with little success. The Indians and the non-Indians have separate ethnic and social patterns of living, resulting in two distinct cultures with little mixing of the two.

Per capita food consumption, in terms of energy value, averages about 2,200 calories daily for the country as a whole. 5/ According to a 1965 survey by the Institute of Nutrition of Central America and Panama (INCAP) (12), 6/ about 4 percent of the rural population consumed only 60 percent or less of daily caloric requirements. Corn is the principal food of the country, supplying more than half the calories and almost two-thirds of the protein. It is the basis of tortillas, tamales, pozole (a thick soup of hominy and other vegetables seasoned with chile peppers), and atole (a thick starchy gruel of boiled dough seasoned with chile peppers and usually drunk from a clay bowl). Toasted corn is also ground into a coarse flour, sometimes flavored with honey, to make pinole. This product can be carried on travels from village to village. Gruel can easily be prepared from it.

The diet of farmers on small farms and of workers on larger holdings consists, for the most part, of tortillas, tamales, beans, panela, salt, and coffee. Only occasionally do they eat meat, eggs, or cheese, and then only for one meal a day once or twice a week. The INCAP survey showed that the daily per capita animal protein consumed in Guatemala City was 27 grams (12). In the rural areas, however, 17 percent of the people consumed 2.5 grams or less of animal protein per capita. The survey also revealed a serious deficiency of vitamin A and riboflavin. Other on-the-ground surveys confirm that low-income families in both urban and rural areas have inadequate diets. Health is poor in many rural areas and, in the lower elevations, malaria is endemic.

New food supplements developed by INCAP in 1960 hold promise for improving nutrition throughout Central America. These supplements are popularly known as INCAPARINA and are prepared from locally produced grains and other products. The mixtures contain 25 percent or more protein and are further fortified with calcium and vitamin A. They can be added to foods such as stews and soups or can be prepared as hot cereal or gruel. INCAPARINA is being distributed to local health centers and schools to enrich the diets of patients and school children.

ORGANIZATION OF AGRICULTURE

The sharp variations in altitude, rainfall, temperature, and soils define the agricultural regions, the location of crops, and the methods of agricultural production in Guatemala. In the dry, tropical zone along the Pacific Coast,

5/ Because of inadequate data, it is difficult to calculate food consumption. Hence, specific estimates should be used with caution.

6/ Underscored numbers in parentheses refer to the numbered listings in the bibliography, pp. 52-53.

there are various combinations of pastures with cotton, rice, bananas, and the usual corn and beans. A little farther inland is a strip of land utilized for pastures, sugarcane, cocoa, rice, and subsistence crops. At higher elevations are lands in coffee, corn, beans, and potatoes, as well as pastures. Higher still, wheat appears and supplementary crops and pastures continue. Farther north, as elevations decline, crop and livestock combinations shift again toward warm weather crops until the relatively unsettled area of Petén is reached.

Use of Farmland and Number of Farms

Approximately one-third of Guatemala's land area is in farms (table 1), less than 14 percent is considered cropland, and somewhat more than 9 percent is in pasture. The nonfarm area is largely undeveloped except for scattered forest activities.

Farms comprise most of the South Zone but only 15 percent of the North Zone (table 2). The area in farms in Escuintla and Santa Rosa in the South Zone may be overstated. For example, if a parcel is in more than one municipio (roughly similar to the U.S. county concept), it is allocated to the principal one--sometimes resulting in a slightly skewed distribution. In the case of Escuintla, the area shown in farms is in excess of the total area of the department. At the other extreme, the North Zone contains the undeveloped department of Petén which reports only 0.4 percent of its land in farms.

Land in permanent crops, including coffee, expanded from 1950 to 1964, as did that under fallow, whereas land in annual crops declined. This decline, however, may be more apparent than real. For example, the data collected by census takers are based on reports from farmers who, because of little or no schooling, do not have detailed knowledge about the size of their holdings or the areas devoted to various commodities. Hence, these reports should be viewed with caution.

As table 2 indicates, between the 1950 and 1964 Agricultural Censuses, the number of farms increased, but the area declined. The increase in number of farms probably results from the fact that the number of farms reported in 1950 did not include parcels of 25 varas (about 21 square meters) or less, whereas in 1964, no minimum area was specified. A farm (finca) or unit of exploitation includes one or more parcels, wholly or partly utilized, if they constitute a technical unit operated under the same direction or administration, using the same machinery and labor--regardless of whether they are contiguous--but which are in the same municipio. There were 672,069 parcels included in the 417,344 farms. (The farms do not include parcels used exclusively for forest activities.) The apparent reduction in the area of farms between 1950 and 1964 probably results from error in one or both sets of data.

Size and Tenure of Farms

Guatemala's farms are still characterized by large holdings (895 hectares or more) and small farms (less than 7 hectares). Although the number of

Table 1.--Land use in Guatemala, 1950 and 1964 1/

Use	Area		Percentage of total	
	1950	1964	1950	1964
	1,000 hectares		Percent	
Land in farms:				
Cultivated	1,044	1,065	9.6	9.8
Fallow	371	418	3.4	3.8
Abandoned cropland	57	2/	0.5	2/
Pastures 3/	582	1,014	5.4	9.3
Other 4/	1,660	945	15.2	8.7
Total farmland	3,714	3,442	34.1	31.6
Other 4/	7,175	7,447	65.9	68.4
Total land use	10,889	10,889	100.0	100.0

1/ Estimates differ widely on the breakdown of total area into forest, pastures, cultivated, etc. Tomo I of II Censo Agropecuario (7) states that the data on land in farms are subject to 5 to 11 percent error. Other sources show 1950 area in farms as 3,720,800 hectares; Tomo I of II Censo Agropecuario, however, repeats 3,714,000 in comparing 1950 with 1964 data. 2/ Included under Other. 3/ Data for 1950 are for natural pastures; data for 1964 include natural and semipermanent pastures.
4/ Includes land in forest.

Table 2.--Number and area of farms, by zone, Guatemala, 1950 and 1964

Zone 1/	Total area	Number of farms		Area in farms	
		1950	1964	1950	1964
	1,000 km^2	Thousands		1,000 km^2	
Central	6.5	51.1	53.2	4.2	3.5
South	7.3	26.0	35.5	7.2	6.8
West	19.6	139.4	172.5	9.7	9.6
North	65.1	74.4	97.4	10.7	9.5
East	10.3	57.7	58.7	5.3	5.0
Total 2/	108.9	348.7	417.3	37.1	34.4

1/ Central Zone: Guatemala, Progreso, Sacatepéquez, and Chimaltenango. South Zone: Escuintla and Santa Rosa. West Zone: Sololá, Totonicapán, Quetzaltenango, Suchitepéquez, Retalhuleu, San Marcos, and Huehuetenango. North Zone: Quiché, Baja Verapaz, Alta Verapaz, Petén, and Izabal. East Zone: Zacapá, Chiquimula, Jalapa, and Jutiapa.
2/ Figures do not always add to totals because of rounding.

Source: (7), Tomo I, p. 29.

Table 3.--Percentage distribution of farms, by size group, Guatemala, 1950 and 1964

Size group 1/	1950		1964	
	Percentage of total farms by--		Percentage of total farms by--	
	Number	Area	Number	Area
	Percent			
Microfarms	21.3	0.8	20.4	0.9
Subfamily farms	67.1	13.5	67.0	17.7
Family farms	9.5	13.5	10.5	18.8
Medium-size, multifamily farms	2.0	31.4	2.0	36.6
Large-size, multifamily farms	0.1	40.8	0.1	26.0
Total	100.0	100.0	100.0	100.0

1/ Microfarm--less than 1 manzana or less than 0.6987 hectares; subfamily farm--1 to 10 manzanas or 0.6987 to 6.987 hectares; family farm--10 to 64 manzanas or 6.987 to 45 hectares; medium-sized, multifamily farm--64 to 1,280 manzanas or 45 to 895 hectares; large-sized, multifamily farm--1,280 manzanas and over or 895 hectares and over.

Source: (7).

"large" farms decreased between 1950 and 1964, small holdings represented more than 87 percent of the total in 1964 (table 3). Even the small units are sometimes fragmented, containing two or more noncontiguous parcels.

Most of the small farms are located in the central mountains where the population is largely Indian. The large farms on the other end of the scale are the commercial enterprises located principally on the Pacific Piedmont and coastal plains. Medium-sized farms prevail only in the eastern highlands. More than three-fifths of the total number of farms were operated by Indians in 1964, but the area farmed by them was less than one-fourth of the total land in farms.

The pattern of land tenure that has developed in Guatemala is a mixture resulting from royal grants given by the Spaniards and communal Indian village lands. Village landownership persists to the present day, and land surrounding a village is assigned to families to use as long as it is tilled. Cultivation of coffee and bananas brought new forms of land tenure and changes in the settlement pattern.

The usual inheritance practice in Guatemala is for land to be divided equally among the sons and quite often the daughters. Land titles are confusing, and in many cases "title" in the mind of the inhabitant may be a bundle of "rights" recognized only by members of the family and local community (10).

Proprietors operated almost 58 percent of all farms in 1964, slightly more than in 1950. Rented farms declined from 17 to 11 percent of total farms between 1950 and 1964, and communal holdings decreased from 10 to 5 percent of the total number.

Farming Patterns

Guatemala has many types of farms, but generally they can be divided into three main types:

(1) Large, relatively modern plantations growing crops for export

(2) Small subsistence farms

(3) Small, specialized farms, for example, those growing wheat and rice in certain areas.

For the most part, the large plantations are located on the Pacific Coastal Plain and lower Piedmont. Interplanting is not common in plantation agriculture, except that banana plants are used as shade for coffee trees. Although relatively modern methods are used for the principal crop of the plantation, permanent laborers still farm their own plots on the plantation with old, unimproved methods. Forest or brush is cut and burned and corn is planted. Many laborers still use the dibble or planting stick. Lands on the plantations are sometimes rented to Indians in exchange for seeding part of the land to pasture grass, or for clearing new lands. Two crops a year can be grown on some of the lower elevations.

Subsistence plots are of two types--both little changed from early Indian use in precolonial days. Under one type--a migratory, slash-burn cultivation--small plots within the forest are cleared during the dry season and the dried branches and logs burned. At the start of the rains, seed and tubers are planted in holes punched in the ash-covered soil. After 2 or 3 years, the farmers abandon these plots for 8 to 20 years and move to new plots. This type of agriculture still exists in parts of the lowlands and on the higher, more isolated mountain slopes in the highlands.

The second subsistence type--milpa agriculture--is more prevalent. The milpa is, in fact, a horticultural unit (10). Corn is planted around the hut in a year-round process. Beans are planted, usually by women, in the same hill, 2 days after the corn, and squash is planted between the rows. Burning of the previous year's vegetation during the dry season on the milpa is for the control of weeds. Fresh corn provides food for the family, usually in August; later on dry corn again furnishes food for the family and fodder for the animals. Corn husks are used for wrapper for the tamales and the stalks support the bean vines, which in turn enrich the soil. Beans furnish fresh vegetables and later the dry beans are harvested for food. The large leaves of the squash cover the ground, help control weeds during the growing season, and later add humus to the soil. Human waste and garbage are strewn around the hut and, together with animal droppings (mostly from sheep and chickens), serve to fertilize the soil.

Figure 3.--Wheat, on the far hillside, is grown in combination with corn.

Most of the specialized farms are small or of medium-size and are scattered among the areas devoted to milpa agriculture (fig. 3). Government price supports are encouraging wheat growing on such specialized farms on higher slopes up to 3,000 meters in elevation. Operators on these farms are entering the market economy, but production is still largely a hand operation (2, 16). Terracing on the steep slopes is practiced on a few holdings, largely by farmers growing wheat, vegetables, and flowers (fig. 4). Even on specialized farms, corn, beans, and other subsistence crops are grown for family use.

Farm Practices

The use of machinery, fertilizer, improved planting materials and breeding stock, and pesticides is increasing on the large plantations, and such practices are beginning to be used on the specialized farms. Most farms still depend, however, on the hoe and machete as principal farming implements. Mechanized clearing of land is becoming more common, and some machinery is being introduced in the tobacco, vegetable, and rice fields, and in the lowlands for corn production. Machinery, however, is used principally on cotton, sugarcane, and banana plantations.

Figure 4.--Terracing on the steep slopes is practiced on a few farms.

Preliminary data from the 1964 Agricultural Census indicate that 92 percent of all farms that year were operated by human power alone, and that less than 1 percent were operated by both mechanical and human power (7). As expected, the power machinery was concentrated almost entirely on the large farms (table 4).

In 1950, only 1,149 farms reported the use of 13,627 metric tons of commercial fertilizer materials; by 1964, 28.4 percent of the 137,000 farms reporting fertilizer use were applying 34,000 tons of commercial materials. Today, lands in bananas, cotton, coffee, and corn receive the major proportion of the fertilizer. Manure and humus from composts and forest litter are important in some areas, as are garbage and human waste from the Indian milpas. Commercial fertilizer used on small farms is concentrated primarily on land in wheat, vegetables, and flowers.

Data on application of commercial fertilizers, as reported by the United Nations' Food and Agricultural Organization (FAO) on a plant nutrient basis, indicate a sharp rise in 1966/67 to 33,300 metric tons--an increase of 77 percent from 1960/61. Consumption in 1967/68, however, fell to 25,000 tons. According to FAO, all commercial fertilizers are imported.

Improved varieties of rice, wheat, corn, grain sorghums, and beans have been introduced, although the subsistence milpa type of farm is making the

Table 4.--Use of power on farms, by size of farm and type of power, Guatemala, 1964

Farm size (hectares) 1/	Percentage of total number of farms using--		
	Mechanical and human power	Animal and human power	Human power only
	Percent		
Less than 0.70	0.1	2.5	97.4
0.70 to 6.99	0.3	6.7	93.0
6.99 to 45.13	1.8	14.4	83.8
45.13 to 902.51	13.1	26.5	60.4
902.51 and over	40.2	10.3	49.5
Total	0.7	7.0	92.3

1/ Converted from manzanas given in source to hectares; one manzana = 0.6987 hectares.

Source: (8).

change from traditional varieties to the newer hybrids slowly. Mosaic-resistant sugarcane is generally grown. Several Government agencies are assisting the farmers to improve their crops. The National Institute for Agrarian Transformation is instrumental in helping farmers on newly settled lands to use improved planting materials and to control pests. The Agency for International Development (AID), the Rockefeller Foundation, and other agencies have cooperated with the Guatemala Ministry of Agriculture in developing disease-resistant and high-yielding varieties of various commodities and in providing extension-type services to encourage their use by farmers.

Guatemala banana production has been plagued by both Panama and sigatoka diseases; the latter can be controlled by spraying with Bordeaux mixture, but no permanent control of Panama disease has been found. A Panama-disease-resistant variety of banana, the Valery, was introduced in 1966. The most serious coffee disease is American leaf-spot, Mycana citricolor, and the most destructive insect is leucoptera coffella Guer. Leaf-spot and black rot (koleroga) are both controlled by copper oxide sprays on progressive farms. Weed control by herbicides is practiced on some coffee farms, but weeding is usually done by machete or hoe. The boll weevil, false pink bollworm, and the armyworm are the principal enemies of cotton. Airplane dusting is used extensively in the principal growing areas of the Pacific plain to control insects.

Banana producers irrigate their fields, usually by means of overhead sprays, and some rice, sugarcane, and pasture lands are also irrigated. Both the number of farms using irrigation water and the area irrigated increased between the 1950 and 1964 Agricultural Censuses, but in 1964 the irrigated land accounted for only 3.5 percent of that cultivated (table 5). Most of the irrigated land was on large farms on the Pacific slopes, but the number of irrigated small farms more than tripled during the 14 years, and projects are

Table 5.--Number and area of farms in irrigation, by size of farm, Guatemala, 1950 and 1964

Farm size (hectares) 1/	Number of farms irrigated		Area irrigated	
	1950	1964	1950	1964
	Number		1,000 hectares	
Less than 0.70	3,219	10,502	1.8	5.0
0.70 to 45.13	1,343	2,576	2.5	4.6
45.13 to 902.51	654	1,230	10.8	22.0
902.51 and over	61	83	17.0	20.7
Total	5,277	14,391	32.1	52.3

1/ Converted from manzanas given in source to hectares; one manzana = 0.6987 hectares.

Sources: (7, 8).

in progress that will benefit additional small holdings, particularly in the Zacapá area. Drainage in cultivated fields is not a serious problem, but it is receiving some attention as a means of controlling malaria.

AGRICULTURAL POLICIES AND INSTITUTIONS

The basic agricultural policy of the Government of Guatemala is to attain and maintain self-sufficiency in output of food crops, to encourage expanded production of exchange earners, and to improve the living conditions of its farm population. These goals roughly parallel those outlined in the economic integration program prepared by the Joint Planning Mission (JOPLAN) for ODECA (Organization of Central American States) (13). Guatemala's decision to participate in this integration program reflects an important Government policy and may affect not only agriculture but also the total economy over the next 20 years.

In addition to its close relationship with the other countries of ODECA, Guatemala is a participating member of the Organization of American States and the United Nations and also maintains close economic and political ties with the United States.

Domestic Policies

Development plans--Formal economic and social development plans for agriculture in Guatemala were prepared during the 1950's on the basis of a survey conducted in 1950-51 under the auspices of the International Bank for Reconstruction and Development (IBRD). The first plan covered the period 1955-59. Of the $42 million planned for use in agricultural development, however, only $18 million was actually spent during the 5-year period (6). The second plan for the years 1960-64 called for an expenditure for agriculture of

$29 million, but of this, only $9.9 million was actually used. The third 5-year plan for 1965-69 envisaged a massive colonization program and the promotion of industrial nuclei for decentralizing the economy. The Committee of Nine, established under the Alliance for Progress, reviewed the plan and made recommendations for revision that were incorporated in a so-called shortrun plan for 1967-70. This version included plans for improvement in rural education, agricultural research and extension, and farm credit, for distribution of land to farmers, and for increased output of both crops and livestock. Another plan for rural development, calling for an investment of some $153.7 million, has been announced for 1971-75. Included in it are projects to increase grain production, diversify agriculture, promote arts and crafts, and train personnel.

Internal market and price regulations--The Production Development Institute (INFOP) was organized in 1948 to stimulate agriculture, industry, and housing, but it was rather ineffective until the late 1950's when it received funds under the first development plan. The Institute has responsibility for setting minimum producer prices for corn and rice, but in most years, it has purchased only small quantities of these grains. Hence, the program it administers has had little stabilizing influence on seasonal price fluctuations. The Ministry of Economy exercises control over sugarcane prices, allocates the preferentially priced U.S. sugar import quota among the mills, and fixes minimum prices for cane that sugar mills must pay. The Ministry of Agriculture sets the price of local wheat delivered to the mills, and requires the mills to purchase a specified percentage of their wheat needs from locally produced wheat. The National Coffee Association (ANACAFE) acts on behalf of the Government in administering the coffee quota under the International Coffee Agreement. However, a council for coffee policy established in 1966 gives the Government more control over the actions of the Association than was formerly the case.

Acreage and production controls as such are not in effect in Guatemala, but licenses to plant cotton are required from the Ministry of Agriculture. These licenses, for the most part, ensure that improved seed is used, approved technical practices are observed, and that spraying is carried out to control insects. No penalties have been assessed thus far against producers who exceed their authorized acreage.

Farm credit--Private banks and Government banks and agencies make credit available for crop and livestock production, and supply about half the agricultural credit annually. 7/ The balance comes from farm suppliers, producer associations, exporters, and processors. A breakdown of Government and private bank credit reported by the Bank of Guatemala indicates that more than half the institutional credit is extended by private banks (table 6). Despite the emphasis placed on providing credit to small farmers, the largest share of institutional credit for crops has gone to coffee, cotton, and sugarcane producers.

The banking system is headed by the Bank of Guatemala, which also operates as the central bank. Other state banking institutions offering credit to

7/ No information is available on the actual extent of noninstitutional credit, and the estimate of one-half the total has no statistical foundation.

Table 6.--Institutional credit granted for agriculture in Guatemala, by type of lending agency, 1967 and 1968

Year and type of agency	Crops	Livestock	Total 1/
	Million U.S. dollars		
1967:			
Domestic private banks	23.3	4.9	28.3
State banks	10.4	4.5	14.8
Foreign private banks	4.8	1.0	5.8
Total 1/	38.4	10.4	48.9
1968:			
Domestic private banks	20.6	5.2	25.7
State banks	13.3	5.8	19.2
Foreign private banks	6.6	1.3	8.0
Total 1/	40.5	12.4	52.9

1/ Figures do not always add because of rounding; total includes very small amounts supplied by so-called "mixed" banks.

Source: (5), pp. 118-119.

farmers include the INFOP, the National Agrarian Bank (BNA), and the National Mortgage Credit Bank. 8/ The INFOP finances farm requisites, usually lending to large-scale operators. In addition to its other activities, it aids in the diversification of agriculture. The BNA specializes in credit for farmers on small holdings to help increase production and to improve living conditions of the total population. The National Mortgage Credit Bank is an important source of agricultural credit to individuals.

The Inter-American Supervised Agricultural Credit Service (SCICAS) extends supervised credit to small farm operators and recipients of land in rural development areas. This agency receives funds from the Ministry of Agriculture as well as loans from the Inter-American Development Bank. It makes long-term farm improvement as well as short- and intermediate-term production loans.

The principal privately financed banks lending to farmers are the National Agrarian Commercial Bank and the Agrarian Bank. The latter can lend for periods up to 5 years, but most of the private banks make only short-term loans. Long-term credit to individual farmers for the purchase of land or for permanent improvements is scarce.

Land reform--Since the early days of independence, land tenure problems have been of economic and political concern in Guatemala. The first agrarian law was enacted as early as 1825, and in 1871, an agrarian reform was instituted for the purpose of creating a new "middle class" of farmers (4). Despite these

8/ The Workers' Bank, established in 1966, is a "mixed" bank, financed in part by private employees.

reforms and other efforts to effect improvement in the structure of land tenure, it is still characterized by (1) numerous landholdings too small to provide a livelihood for the operators and their families, and (2) a few extensive landholdings. Large numbers of farmworkers are still without land.

Relatively recent efforts at reform include the action by a Communist-supported Government in 1952. Much of the land owned by the Government was to be made available to landless farmers, and certain private property was to be expropriated with reimbursement by issuance of Agrarian Reform bonds. This Government was overthrown by revolution in June 1954, and new legislation in 1956 revised all previous land reform laws and instituted a more conservative Rural Development Program. Much of the land distributed under this program came from the National Farms; part was coffee plantations expropriated from German Nationals during World War II, and part had been ceded to the Government by a private fruit company. Under the 1956 law, some 25,000 titles were delivered covering 160,000 hectares of land.

Land reform was made a prerequisite for large-scale economic assistance to Latin American countries as a result of the 1961 Charter of Punta del Este initiating the Alliance for Progress. Guatemala responded with a new law (Ley de Transformación Agraria), effective November 1962, creating a National Institute for Agrarian Transformation (INTA). The Institute, which functions under the direction of a national council, has primary responsibility for the programs of agricultural colonization and settlement. The 1962 law provides that idle land be subject to increasing land taxes. The number of land titles and the number of hectares distributed under this program from 1963 to 1969 are shown in the following tabulation:

Year	Number of titles	Area (hectares)
1963	154	823
1964	61	588
1965	115	248
1966	460	2,591
1967	955	5,997
1968	1/ 746	10,340
1969	1/ 1,636	30,064

1/ Includes 203 community property titles in 1968 and 58 in 1969.

In addition to INTA's activities, the Government has distributed some lands in the Central Highlands and the Pacific Coastal Plain to individual farmers for subsistence agriculture, and to agrarian communities to be owned and cultivated on a communal basis. A few colonization projects have been undertaken in the Petén. Resettlement of rural population has taken place that is not related to Government programs, such as the migration of Indians from the area near Cobán to the valleys bordering Lago de Izabal. According to a 1967 study, the northeastern part of the country, particularly the department of Izabal, seems to offer the most promise for settlement projects (15).

Other domestic programs--In addition to the foregoing land reforms, several other programs and reorganizations are being sponsored by the Government. The Ministry of Agriculture was reorganized in late 1964 to make it

function more efficiently. Under this reorganization, separate units were established for agricultural research, marketing, and quality control--not only for agricultural products but for inputs as well. Farm extension services are provided by the Ministry at some 30 offices, and research is conducted at 19 stations. The Service for the Development of the Indigenous Economy (SFEI) provides extension-type services in areas of concentrated Indian population. Also, agricultural education is provided at the University of San Carlos, the National School of Agriculture, and the National Forestry School.

Farm Organizations

The General Association of Farmers (AGA) is the only farm organization in Guatemala that is a general association devoted to agriculture as a whole rather than to producers of a specialized commodity. It was organized in 1920 but has been active only since 1944. Membership is presently confined almost exclusively to large-scale producers of commercial items such as coffee, cotton, and cattle. AGA publishes a monthly review and, in general, supports measures that encourage improvement in quality of plants and livestock, provide farm-to-market roads and good systems of schools for farm children, and improve farm life conditions.

The principal commodity association of producers is the National Coffee Association (ANACAFE), established by law as an autonomous organization. The law requires that farmers producing as much as 40 quintals of coffee (of 46 kilograms each) be members. Three organizations promote the production or marketing of cotton, and associations and cooperatives represent producers of many other commodities, including wheat, sugar, essential oils, flowers, rubber, and vegetables. Livestock and poultry producers have also organized.

The Agricultural Cooperative Section of the Ministry of Agriculture is encouraging the formation of agricultural cooperatives, particularly in connection with land settlement and colonization programs. These cooperatives assist members in improving production techniques and in marketing their products. In 1963, there were about 12 agricultural cooperatives with approximately 1,200 members. Although it is generally known that the number has increased since then, no specific information is available on present numbers or membership.

The organization of agricultural workers has progressed slowly, and since 1954, has been restricted by regulations. Only 12 organizations were reported in 1964, compared with 352 ten years earlier.

Foreign Trade Policies

Guatemala is not a contracting party to the General Agreement on Tariffs and Trade (GATT), but is an active member of the Central American Common Market (CACM), a part of the Central American economic integration program. Two basic agreements regulating the intraregional and external trade of the CACM countries are the General Treaty of Central American Economic Integration and the Central American Convention on the Equalization of Import Tariffs and Charges. The former provides for free trade among the five countries for all "natural

products of the Contracting States and the products manufactured therein. . .," with a few temporary exceptions. The latter provides for the eventual establishment of a single external tariff. Agreement has been reached on a common outside tariff for more than 95 percent of the items in the tariff schedule, and protocols spell out specific regulations. Integration policies are already increasing trade among the countries and decreasing trade between individual CACM countries and traditional trading partners outside the area. However, recent difficulties between El Salvador and Honduras may have an adverse effect on the CACM.

The CACM tariff structure is two-column and uses a common nomenclature. Both specific and ad valorem duties are applied. The specific duties are expressed in Central American Pesos--a bookkeeping unit equivalent in value to the U.S. dollar. Guatemala's own currency, the quetzal, is also equivalent to the dollar, and is freely convertible, with all foreign exchange transactions carried out at the official rate. A surcharge of 30 percent of the applicable import duty is levied on imports originating in non-CACM countries, and an additional surcharge of 100 percent of the duty may be applied to imports from countries with which Guatemala has an unfavorable trade balance. Import duties range from zero on breeding stock to high rates on items considered nonessential. Wheat imports are regulated, and wheat flour may be imported only under license for use in specified products. Licenses are also required for imports of poultry. Remittances to pay for imports require exchange licenses, but these are granted freely.

All exports require a license from the Exchange Department of the Bank of Guatemala, except those included in the General Treaty. Certain exports must also meet other requirements. Coffee trade is controlled by quotas to ensure that Guatemala conforms to the provisions of the International Coffee Agreement to which it belongs. Sugar exports are controlled to meet the quotas for import into the United States, which receives practically all Guatemala's sugar exports. Duties are levied from time to time on the principal exports for revenue purposes, but they may be eliminated on exports going to certain markets. For example, coffee going to nontraditional markets (countries not included in the quotas under the International Coffee Agreement) is not subject to the export tax.

Foreign Aid

Both technical and financial types of assistance from outside its borders have been of vital importance to Guatemala in the agricultural development that has taken place there during the past 15 years. By far the largest share of foreign aid received in the field of agriculture has come from the United States. During World War II, the U.S. Department of Agriculture (USDA) initiated a cooperative program with Guatemala to promote the production of rubber and cinchona--commodities important to the United States--and of other agricultural commodities important to Guatemala. This program was later expanded and reorganized several times. AID is currently the principal operating agency in the cooperative program between the two governments, USDA is still active, and the Export-Import Bank is a source of financial assistance.

In addition, U.S. private capital assists not only agriculture directly, but also other segments of the Guatemalan economy that indirectly influence agricultural development. The United States also finances, in part, international agencies that have supplied loans and technical assistance to Guatemala. Several U.S. voluntary agencies (such as CARE) conduct active programs in Guatemala. Official bilateral financial and technical aid has also been extended to Guatemala by other countries, including Germany, Austria, and Israel.

The basic objective of the Agricultural Division of AID/Guatemala (and its predecessor agencies) is to assist the Ministry of Agriculture in the research, extension, and development work needed to improve the social and economic level of the rural sector through programs to increase and diversify agricultural production and to attain desirable land use. Until 1963, efforts were concentrated at the technical level to assist in establishing basic institutions and to train personnel to staff them. Since then, efforts have also been directed toward policy making and program planning that would result in maximum utilization of these resources and facilities. Bilateral assistance in supervised farm credit, started in 1956, has been expanded, and bilateral aid in land reform was given impetus by the Alliance for Progress in the early 1960's.

The Inter-American Development Bank has provided funds for (1) farm credit, (2) an irrigation program to help diversify Guatemala's agricultural output and raise farm yields, (3) construction of farm access roads, (4) education, and (5) housing. Agencies of the United Nations have been active in supplying milk for school children and in helping revise the rural school curriculum. The FAO has made surveys of the water and forestry resources, worked with the extension service in testing fertilizers, and is cooperating with the National Coffee Association in the crop diversification effort. The Rockefeller Foundation's research on corn and other grains in Guatemala has resulted in many improved varieties.

MAJOR CROPS 9/

Coffee is Guatemala's main cash crop, and corn the most important crop for domestic use, but cotton and sugarcane now provide a significant share of exports. Essential oils are also important in export trade, and bananas and plantains are significant crops for both export and domestic use. Corn occupies by far the largest amount of cultivated area, followed--at a great distance--by beans. Corn and beans are Guatemala's principal dietary staples, not only on farms but also in cities. A more diversified agricultural pattern is gradually

9/ Production estimates for Guatemala's cash crops are more reliable than those for subsistence crops, while statistics on fruit and vegetable output are markedly incomplete. Information on crop area and production from the 1964 Agricultural Census is still preliminary, and data for later years from available series do not appear to have been coordinated with the Census figures. Also, there are large discrepancies among sets of data supplied by various agencies. Hence, statistics should be viewed as rough estimates, even for commercial crops.

Figure 5.--Guatemala's principal crop is "mild" coffee important for blending.

evolving in Guatemala with the cultivation of rubber, sesame, sorghum, citrus fruits, and flowers.

Coffee

Guatemala's principal commercial enterprise is the cultivation and export of coffee beans (fig. 5). Coffee, which became the most important export (in value terms) after the middle of the 19th century, accounted for 30 to 55 percent of Guatemala's total export value during the 1960's despite the growing diversification of trade. Production of coffee has trended upward, partly as a result of higher yields per hectare, from less than 70,000 metric tons during the early 1950's to about 110,000 tons in the late 1960's (table 7). Average yields range from 400 to 500 kilograms per hectare; on the most efficient farms, yields have reached 2,000 kilograms per hectare. Guatemala's exportable output represents only 2.5 to 3.5 percent of world coffee exports, but it accounts for about 10 percent of the world's "mild" coffee, which is used for blending with the Brazilian types.

The United States is the major outlet for Guatemala's coffee, and Western Germany is a strong second market. Other Western European countries bought most of the rest of the coffee crop until 1965 when Asia and Africa became heavy buyers.

Table 7.--Coffee beans: Production, exports, and domestic consumption, Guatemala, averages 1951-65, annual 1961-70

Period or year 1/	Total production	Exportable production 2/	Exports	Domestic consumption 3/
	1,000 metric tons			
Average:				
1951-55	67.7	54.3	55.9	13.4
1956-60	81.4	69.5	71.5	11.9
1961-65	102.2	90.0	86.7	12.2
1961	90.0	78.0	79.0	12.0
1962	102.0	90.0	82.4	12.0
1963	114.0	102.0	99.8	12.0
1964	107.4	94.8	77.2	12.6
1965	97.8	85.2	94.9	12.6
1966	123.0	110.1	109.2	12.9
1967	100.2	87.0	81.3	13.2
1968	111.0	97.5	94.3	13.5
1969 4/	104.4	90.0	na	14.4
1970 5/	105.0	90.0	na	15.0

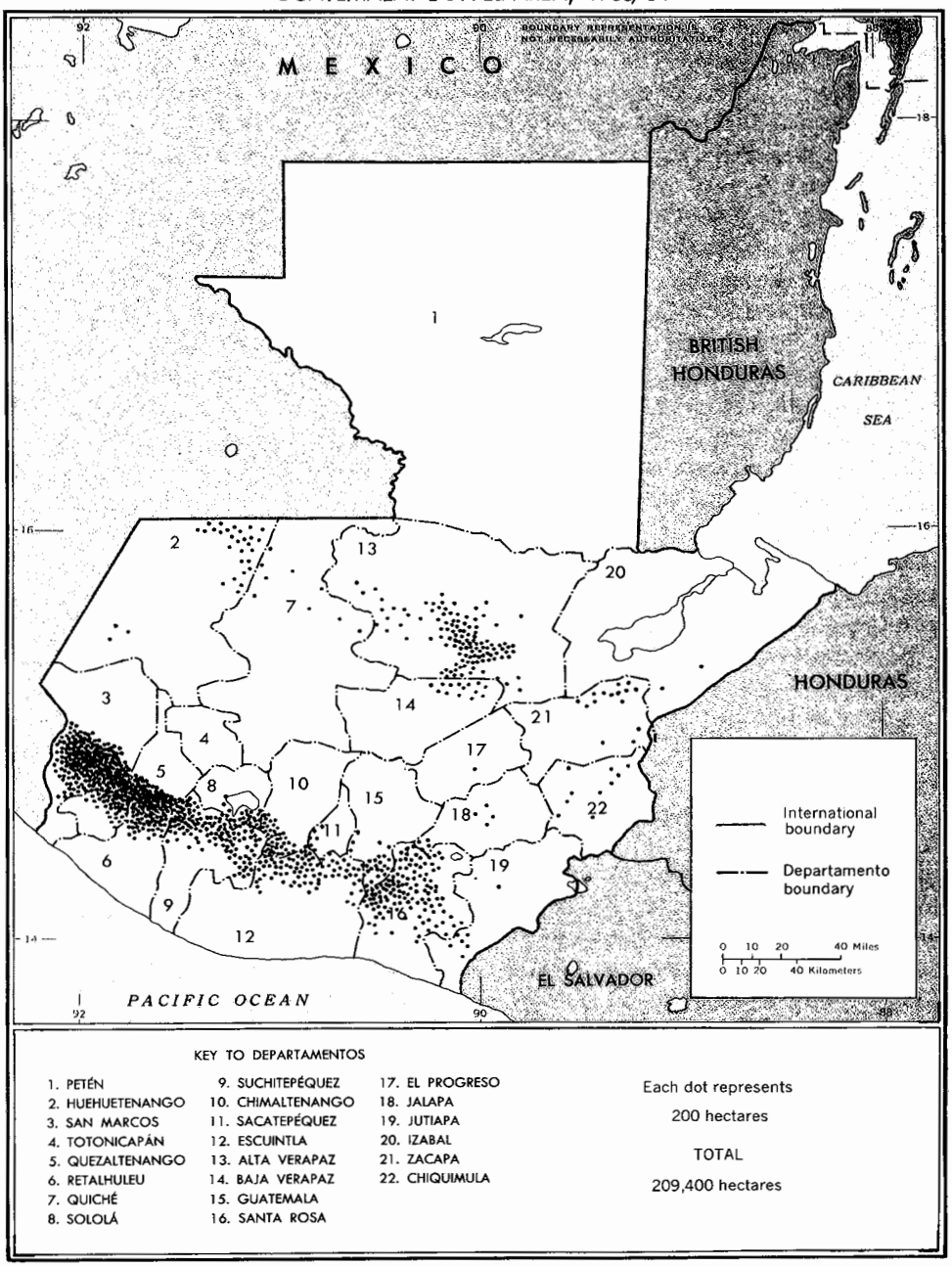
na = Data not available.
1/ Production is for crop year ending September 30; trade is for calendar year. 2/ Exportable production represents total production less domestic consumption. 3/ As estimated by Foreign Agricultural Service, USDA. 4/ Preliminary. 5/ Forecast.

Sources: Foreign Agricultural Service and attaché reports.

The large coffee plantations are located, for the most part, on the Pacific slopes of the mountains (fig. 6) at elevations of 600 to 1,200 meters where the climate is warm and moist and the volcanic soils provide good growing conditions. Coffee trees are found, however, as low as 300 meters and as high as 1,800 meters. Frost is a hazard in the higher elevations. Almost 210,000 hectares were reported in coffee in 1963/64--the largest area in the department of San Marcos--although coffee experts in Guatemala believe that more than 23,000 hectares listed as "new" plantings may in fact be interplantings in the "old" area.

Arabica Tipica was formerly just about the only variety of coffee grown in Guatemala, but it is being replaced by Arabica Bourbon, which now accounts for about half the total crop. The plants are raised from seed in well-prepared seedbeds, and the seedlings are moved to the field after 12 to 18 months in the nursery. The plants are then grown under shade in the field and are kept pruned by a method known as agobio (3), in which young plants are bent over and secured in the bent position and three or four shoots are allowed to develop from the base of the plant. When these branches bear cherries, they are bent over and the cycle repeated.

GUATEMALA: COFFEE AREA, 1963/64



USDA

NEG. ERS 7816-70(7)

Figure 6

The ripe coffee cherries are harvested by hand, from September through November at the lower elevations, and from February through April higher up the mountains. The cherries are processed by the wet method to produce what is known as washed coffee. Most of the small-scale producers transport their coffee cherries to the larger plantations for processing, many by burro and some by human carrier. Small farms (producing 9 metric tons or less of cherry coffee) account for about 12 percent of the total cherry harvest. The processed beans that are ready for market are usually picked up and hauled by truck to the marketing centers, although part of them move to market by rail.

The major share of the coffee crop is exported--most of it as green coffee. There is one plant in Guatemala that produces soluble coffee, most of which is exported (over 70 percent to the United States). Guatemala participates in the International Coffee Agreement which establishes the quantity of exports going to "traditional" markets by a system of quotas. ANACAFE, which is authorized by the Government to regulate the coffee industry, controls exports and oversees the application of any quota that governs the internal sale of coffee. Coffee, both in the bean and soluble, is subject to an export tax if shipped to traditional (quota) markets, but exports to "new" markets are not taxed. Part of the receipts from the export tax is used in the crop diversification effort. ANACAFE is studying the feasibility of diversification, but both the Association and the Government maintain that the new crops will supplement rather than replace coffee.

Grains

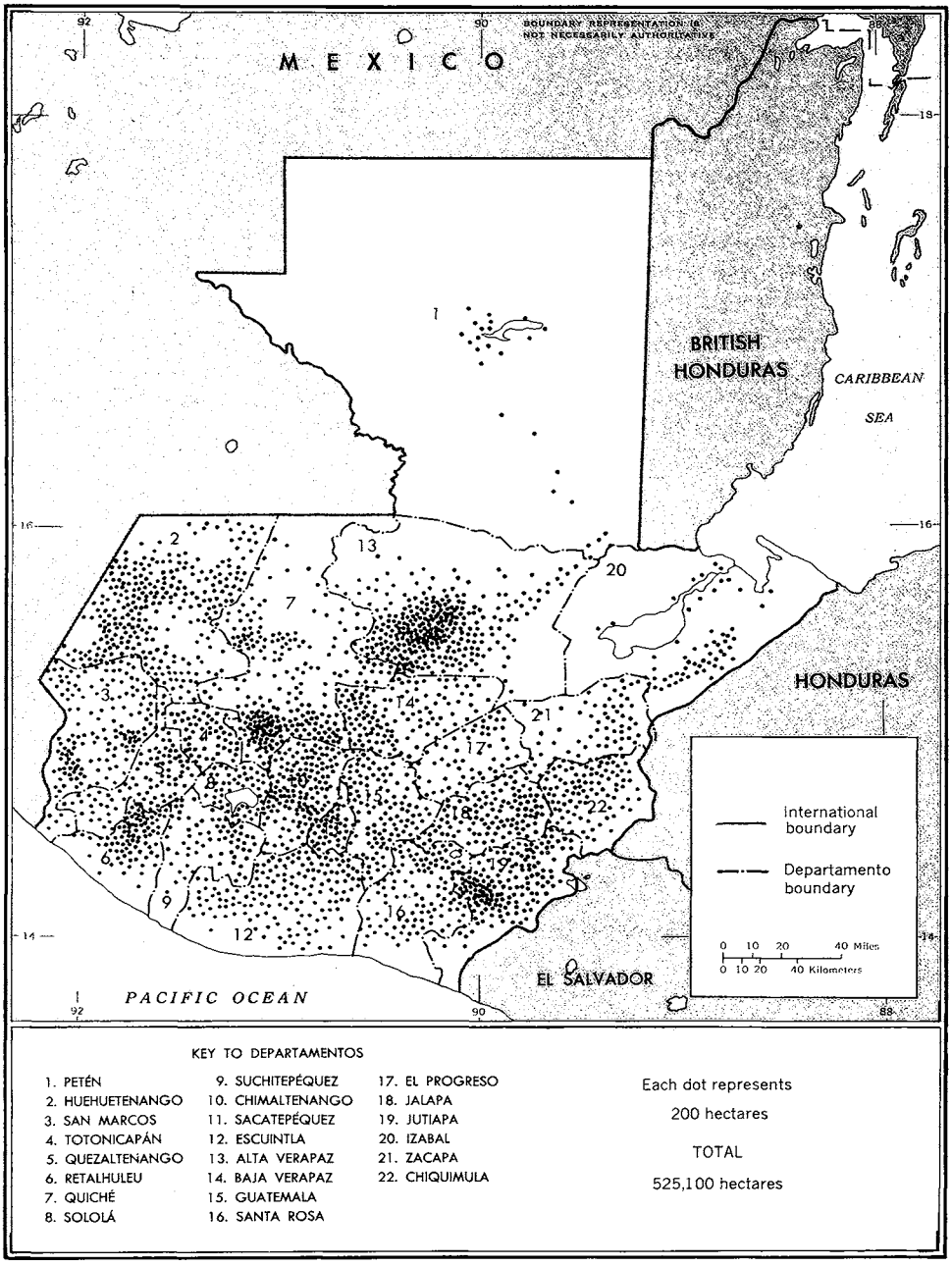
Corn, wheat, rice, and grain sorghum are the important grains grown in Guatemala, with corn by far the principal one. Corn and beans are the mainstay of the milpa agriculture of the highland Indian. Corn, rice, grain sorghum, and beans move freely among the Central American countries in accordance with the Grain Protocol under the Central American Common Market. Wheat is the only grain imported in significant quantity from outside the CACM, except in years of unusually unfavorable weather when corn is imported from the United States.

Corn--Almost all sections of the country produce at least one crop of corn each year (fig. 7). In the hot, humid lowlands, a second crop is cultivated the same crop year. Corn, which occupied almost half the cultivated area in 1963/64, furnishes more than half the daily calories and almost two-thirds of the protein in the average diet. It is eaten not only by the Indians but by a majority of Ladinos as well. Many varieties have been developed to adapt to the different altitudes and growing seasons in Guatemala.

Planting and harvesting dates depend on the elevation. The first crop in the lowlands is planted in April or May and harvested from late July to September; the second crop is planted in September and harvested in January and February. The principal crop in the highlands is planted in May or June and harvested in October and November.

Local production of corn supplies the bulk of domestic consumption in most years (table 8), but there is usually a small border trade, both import and export, with other CACM countries. Almost two-thirds of the corn crop was grown on farms of 7 hectares or less at the time of the Agricultural Census of 1964,

GUATEMALA: CORN AREA, 1964



USDA

NEG. ERS 7818-70(7)

Figure 7

Table 8.--Corn: Area, production, and net trade, Guatemala, averages 1955-59 and 1960-64, annual 1965-69

Period or year	Area	Yield per hectare	Production	Net trade 1/	Available for domestic consumption 2/
	1,000 hectares	Quintals	- - - - 1,000 metric tons		- - - -
Average:					
1955-59 . . .	620	7.5	463	+16	479
1960-64 . . .	682	8.3	566	+10	576
1965	700	9.7	677	+11	688
1966	769	9.5	731	-3	728
1967	748	9.2	690	+9	699
1968	777	9.5	736	+6	742
1969	836	9.1	759	-2	757

1/ Net trade, + = imports; - = exports. 2/ No allowance for changes in stocks.

but a growing percentage of the crop is being produced on the larger farms of the Pacific Piedmont. The Indians on the small holdings consume the corn they raise or sell it in the village market (fig. 8). Part of the corn on the

Figure 8.--Farmers in the Highlands sell their products in village markets.

Figure 9.--Storage facilities are usually inadequate; this unit is located near Escuintla.

larger farms moves to market by truck, and part is sold to plantation owners for labor rations. Seven to 10 percent of the total crop goes into feed.

Despite the price stabilization program of INFOP 10/, corn prices fluctuate widely within the crop year because of oversupply immediately after harvest and scarcity later in the season. Although silos and flat storage units have been constructed by INFOP and feed plants, estimates of corn loss because of inadequate storage range from 8 to 25 percent of the crop, depending on the producing zone. Two-thirds of the storage capacity is located in Guatemala City, with few on-the-farm units available, although some medium- and large-size farms have concrete or metal silos (fig. 9). Corn cribs made of adobe and set on raised platforms have been built on some of the small farms, but most farmers on small holdings store their corn in one corner of the house in temporary bins made of corn stalks. INFOP plans to enlarge its storage capacity to alleviate the problem of farmers on small-size plots as well as of those on larger holdings.

10/ As discussed earlier, the Production Development Institute's program has had little stabilizing influence on seasonal price fluctuations.

Table 9.--Wheat: Area, production, and net imports, Guatemala, averages 1955-59 and 1960-64, annual 1965-69

Period or year	Area	Production	Net imports
	1,000 hectares	1,000 metric tons	
Average:			
1955-59	34	21	60
1960-64	34	23	55
1965	36	30	55
1966	37	24	58
1967	37	34	62
1968	39	34	64
1969	40	36	67

Wheat--Production of wheat in Guatemala rose by almost 50 percent from the late 1950's to the late 1960's, but imports still account for about two-thirds of total wheat supplies (table 9). Wheat bread is consumed largely in the cities, and with the growth of urban population, the demand for wheat is rising. The United States is the principal source of imported wheat. Development of the milling industry over the past 20 years has resulted in a shift in imports from wheat flour to wheat grain.

The land adapted to wheat cultivation is limited by the climate to the high elevations. Most of the wheat is grown in six highland departments 11/ as a small-farm enterprise (fig. 10). The major part of the crop is planted in April-June, but is not harvested until November. Planting and harvesting are still performed mainly by hand, but the National Union of Wheat Producers and INFOP encourage farmers to use improved seed and to fertilize their fields in an effort to raise yields per hectare.

A Wheat Import Control Board sets import quotas for the mills and requires a specified quantity of domestic wheat to be purchased before the mills can import wheat. The mills must also pay a fixed price for domestic wheat which is considerably higher than the price at which imported wheat can be delivered to the mill. In early 1970, the differential was about $2 per 100 pounds. In addition, the mills are required to pay 10 cents per 100 pounds of wheat imported into a fund used for controlling wheat imports. Mills have their own modern storage facilities which are adequate to handle both domestic and imported wheat.

Other grains--Rice production in Guatemala is rising and small quantities of grain are exported from time to time. The average output in 1960-64 was about 16,000 metric tons of rough rice; by 1969, some 25,000 tons were produced. In the 1964 Census year, about 44 percent of the rice was produced in the northeast departments of Izabal and Alta Verapaz, and some 49 percent in five

11/ Quetzaltenango, San Marcos, Totonicapán, Chimaltenango, Huehuetenango, and Sololá.

Figure 10.--Wheat is a small farm operation in Guatemala; field of wheat on the hillside.

departments on the Pacific plains and lower Piedmont. The rice area in the northeast is being developed rapidly. Farmers in that region are using certified seed and receiving supervised agricultural credit for the purchase of seed and machinery. INFOP establishes minimum prices that the mills must pay producers for rough rice. In years of short supply, such as 1966, the Ministry of Economy authorizes INFOP to import rice from outside the Central American Common Market. Otherwise, rice trade, both import and export, is carried on within the CACM.

Grain sorghum is in demand as feedstuff. Output of this commodity has apparently risen from some 13,000 metric tons in the late 1950's to about 35,000 tons during the late 1960's. 12/ Small quantities of this grain are exchanged with other CACM countries, resulting in net imports in some years and net exports in others.

Small amounts of oats and barley are grown in Guatemala, but they are of relatively little importance.

Pulses

Black beans are the principal pulse, and Guatemala produces enough to meet most of its total consumption needs. Small quantities are imported from El

12/ Because of inconsistent production data, only approximate figures are available.

Salvador and Honduras in most years, but small quantities are also exported to El Salvador and Costa Rica. Production data show an upward trend during the 1960's, although total output is probably not reflected in the statistics shown in the following tabulation.

Period or year	Area	Production
	(1,000 hectares)	(1,000 metric tons)
Average:		
1955-59	42	26
1960-64	56	35
1965	69	40
1966	73	51
1967	107	69
1968	107	69
1969	107	62

Beans are cultivated by practically all small-scale farmers, but production probably is not reported by all of them. Only one-quarter of the farms enumerated in the 1950 Agricultural Census reported on bean production, for example, and only 22 percent reported on bean production in 1964.

About 60 percent of the total bean harvest consists of pole beans grown with corn. Bush beans can be cultivated with machinery on a commercial scale, but most bush beans, like pole beans, are still grown for the most part on small farms. Planting takes place in May-June and harvesting from August through January. Research is being conducted on selection of varieties, fertilization, cultivation practices, and control of pests. Recommended varieties for each zone of the country are gradually being adopted.

Broad beans and dry peas are also grown in small amounts. Estimated output of broad beans during the 1960's was in excess of 5,000 tons in most years, but dropped to 2,000 in 1967; production of dry peas averages about 1,000 tons.

Fibers

Small quantities of henequen, kenaf, and letona fiber are grown in Guatemala, but the principal fiber is cotton (fig. 11). During World War II, the Government encouraged abaca output in an effort to have a Western Hemisphere supply of this fiber; production of abaca declined in the 1950's, however, and was abandoned altogether in the early 1960's.

Cotton production and export rose sharply from the early 1950's to a peak in 1966 (table 10). In 1962, the value of cotton exports surpassed that of bananas, and cotton is now Guatemala's second largest export, although export earnings are declining as a result of smaller crops in recent years. The major part of the crop is exported, in contrast to the situation 10 years ago when Guatemala imported cotton. Japan is by far the principal outlet, with Italy, West Germany, and Portugal major customers. The outlet markets shift in relative importance from year to year. In 1967 and 1968, several new markets developed, notably Chile, the Central American Common Market, and Norway.

Figure 11.--Cotton is an important export for Guatemala; this cotton field is ready for harvest.

Table 10.--Cotton: Area, and lint production and exports, Guatemala, averages 1949/50-1963/64, years 1964/65-1969/70

Period or year	Area	Yield per hectare	Production	Exports 1/	Available for domestic consumption 2/
	1,000 hectares	Quintals	----	1,000 metric tons	----
Average:					
1949/50-1953/54	6.7	4.0	2.7	0.5	2.2
1954/55-1958/59	18.9	6.2	11.7	8.0	3.7
1959/60-1963/64	48.7	7.7	37.4	33.4	4.0
1964/65	90.9	7.5	67.9	63.8	4.1
1965/66	115.1	7.5	86.0	82.0	4.0
1966/67	84.8	7.4	63.1	57.0	6.1
1967/68	88.1	8.8	77.5	67.6	9.9
1968/69	92.9	7.8	72.9	na	na
1969/70	76.9	6.7	51.2	na	na

na = Data not available.
1/ Calendar years. For example: 1969/70 = 1970.
2/ No allowance for changes in stocks.

Most of the cotton is grown on large-size farms in the lower elevations of the Pacific Coastal Plain. The department of Escuintla leads in production, with twice as much seed cotton output as Retalhuleu, the second largest producer. These two departments supplied more than 90 percent of the total output in 1965/66. Two-thirds of the cotton acreage is on farms with 1,000 or more acres each, and (including cotton acreage on family-type holdings) the average cotton farmer had almost 1,000 acres of cotton during the past few years.

Considerable progress has been made in improving the efficiency of cotton production as a result of work done by private producers, FAO technicians, and government agencies. Machinery is used in much of the production process, and heavy equipment is used in clearing new land. The use of commercial fertilizer is spreading, especially in the older cotton areas of Escuintla.

Cotton planting usually occurs during July-August, and harvesting during December-March, but these time periods may be extended, depending on the weather. The type of cotton is American-Upland, mostly Deltapine Smooth Leaf, Deltapine 15, and Stoneville 7.

Insects cause severe damage to cotton crops in some years, although the commercial farmers on large holdings spray extensively to control them. Rains during the growing season make frequent applications of insecticides necessary. Disease is a less serious problem, but there have been some instances of Leaf Spot, Black Arm, and Verticillium Wilt.

The Government requires that producers obtain licenses to plant cotton to ensure that they follow prescribed practices in the production and importation of seed, and that they spray their fields and turn under crop residues to reduce the carryover of insects. Cotton cooperatives provide a variety of services for their members. These include importing insecticides, seed, and fertilizer; operating a machinery pool; providing facilities for applying insecticides by airplanes; procuring credit; conducting research; disseminating information on research and production practices; and providing ginning, grading, and marketing services.

The Government fostered cotton production in the early 1950's by setting prices and advancing credit through the INFOP. As production expanded, price support was discontinued, and credit is now granted by national banks and private sources. Since Guatemala has other land that could be devoted to cotton, further expansion in cotton production will depend on the market situation rather than physical limitations.

Sugar

Production of sugarcane has risen substantially over the past 10 years, with raw sugar becoming one of Guatemala's principal exports (table 11). Before World War II, Guatemala was a net exporter of sugar; after the war, it became a net importer. But since Cuba lost its sugar quota in the preferentially priced U.S. market, Guatemala has increased its production of raw sugar for export to the United States.

Most of the cane for commercial sugar production (fig. 12) is grown on the low plains of the Pacific Coast, but cane (used largely for noncentrifugal sugar)

Table 11.--Sugar: Production and net exports, Guatemala, averages 1955-59 and 1960-64, annual 1960-69

Period or year 1/	Sugarcane production	Raw sugar production		Net exports raw	Available for consumption 2/	
		Centrifugal	Noncentrifugal		Centrifugal	Noncentrifugal
	1,000 metric tons					
Average:						
1955-59	1,156	61	56	3/	61	56
1960-64	1,543	112	37	28	84	37
1960	1,236	70	44	1	69	44
1961	1,380	85	42	7	78	42
1962	1,764	121	36	31	90	36
1963	1,917	138	36	47	91	36
1964	1,418	144	29	55	89	29
1965	1,717	132	29	32	100	29
1966	1,963	158	29	52	106	29
1967	2,532	181	42	61	120	42
1968 4/	2,193	145	48	56	89	48
1969 4/	2,674	178	48	na	na	48

na = Data not available.

1/ Crop year ending June 30; trade calendar year. 2/ No allowance for changes in stocks. 3/ Insignificant amount. 4/ Preliminary.

Figure 12.--Sugarcane in a field between Retalhuleu and Escuintla.

can be grown at the lower elevation in almost every department. Cane is usually planted in April-May and left some 18 months before the first crop is harvested. Cutting begins in November and continues until March-June, depending on the length of time required to process the available cane. Centrifugal sugar comes mostly from large plantations, and the cane is processed at commercial mills. Many small mills (trapiches) in rural areas and villages extract the cane juice and boil it down into a brown sugar cake known as panela. This noncentrifugal product is preferred in the rural districts; centrifugal sugar is produced largely for export and the city market. Guatemala's sugarcane also produces some 12 to 13 million gallons of blackstrap molasses, half of which is exported and the remainder used locally by the feed and alcohol industries.

Fruits and Vegetables

Bananas are the principal commercial fruit grown in Guatemala, but plantains are also important and citrus exports are providing a new source of foreign exchange. Citrus production, principally oranges, reached a total of about 56,000 metric tons in 1967/68, and 1968 exports amounted to more than 500 tons. Many different kinds of fruits and vegetables are grown, but with the exception of potatoes, the quantity is not large. Fruits and vegetables are sold in village and city markets, for the most part, by farmers who sell in small lots. Fruits are included in the Government's development plans for agriculture, which project a greatly expanded output.

Bananas and plantains--Commercial production of bananas was started in the early years of the 20th century, and by 1947 exports had reached 338,000 metric tons. Disease, wind damage, and other hazards have made the industry an erratic enterprise during the past 20 years. Bananas and plantains are grown for food throughout the inhabited lowlands and intermountain valleys.

Bananas were the second export (in value terms) until 1962, but by 1967, dropped to fifth place. 13/ Production of bananas was estimated at 145,000 tons in 1969 and that of plantains at about half this figure. Exports of eating bananas dropped to a low point in 1965, but shipments rose to 138,000 tons in 1968, as shown in the following tabulation (in 1,000 metric tons):

Period or year	Production	Exports
Average:		
1955-59	165	129
1960-64	179	141
1965	117	34
1966	80	63
1967	90	1/ 44
1968	140	2/ 138
1969	145	na

na = Data not available.
1/ Export data may be understated in 1967; another series indicates an export of 95,000 tons. 2/ Preliminary.

13/ Value of banana exports is variously reported. As used here, it refers to all bananas and plantains and follows the valuation reported by the Secretaría Permanente del Tratado General de Integración Económico Centroamerico (SIECA) and the Organization of American States (OAS).

More than half the banana exports usually go to West Germany, and most of the rest go to the United States. Plantains are also exported, averaging more than 15,000 metric tons during 1966-68.

Commercial production of bananas was centered first on the east coast in the Río Motagua Valley. To escape Panama disease during the 1930's, commercial plantations were developed on the Pacific Coast, and during the 1950's and early 1960's, most of the exports came from these plantations. In the past 5 years, commercial production has shifted again to the east coast. In addition to the operations of a large fruit company, there is a proposal for planting bananas on 10,000 hectares of land in northeastern Guatemala. Credit facilities are being made available and farmers have organized a cooperative that will coordinate various elements of the undertaking, but the project is developing slowly.

The Valery variety of bananas is replacing the traditional export variety--Gros Michel. The Valery is marketed in the United States as the "Chiquita" banana. Prior to the 1960's, bananas were exported on the stem. Since 1960, hands of bananas are being cut from the stem and packed in boxes of 42 pounds each for export shipment.

Vegetables--Most farmers grow a few vegetables for home use, but fresh vegetables are not important in the diet of Guatemalans. Garlic, onions, cabbage, tomatoes, peppers, and a variety of other vegetables are produced for the city market, and a few farmers specialize in raising fresh vegetable crops, especially around Guatemala City. Squash is widely grown in association with the corn-bean cultivation of the milpa, but estimates of production (2,500 metric tons) probably understate the size of the crop.

Root crops, particularly potatoes and yuca, are important in several areas of the country. About 20,000 metric tons of potatoes are grown annually in the highlands where they are a favorite food crop. Yuca is important in Alta Verapaz, San Marcos, Santa Rosa, and Retalhuleu, but estimates of output by different sources for a single year vary widely from 3,000 to 45,000 metric tons.

Other Commodities

Food crops--A variety of other food crops are grown, the principal ones being oilseeds and cocoa beans. Spices, especially cardamom seed, are also becoming a significant source of exchange earnings. Estimates of cocoa bean production fluctuate widely, but range between 500 and 800 tons annually. The major part of the crop is exported, either as beans or in processed forms, principally to the United States. Most of the cocoa is grown in the departments of Guatemala, Suchitepéquez, and Escuintla.

Cottonseed production has risen with the rapid growth of the cotton industry, and in some years this product is exported. Year-to-year fluctuations in production follow those of cotton. In 1965, for example, 145,000 metric tons were produced, but in 1969, output dropped to 83,000 tons. Because of the short crop in the latter year, exports of cottonseed were restricted to assure a supply to the local oil crushing plants. Production of sesame and peanuts is

Table 12.--Essential oils: Production and exports, Guatemala, average 1960-64, annual 1965-67 1/

Period or year	Production			Total exports
	Citronella	Lemongrass oil	Total	
	Metric tons			
Average 1960-64	267	457	724	782
1965	373	462	835	1,063
1966	372	499	871	796
1967	297	444	741	937

1/ Production and trade data from different sources; exports exceed reported output in most years.

rising and sesame seed is being exported. Output of sesame and peanuts in 1967 was estimated at about 4,000 and 1,000 tons, respectively.

Nonfood crops--Essential oils, rubber, tobacco, and flowers--nonfood crops--are important to certain sections of Guatemala. Favorable prices of essential oils during and after World War II encouraged producers to expand their output. Citronella and lemongrass oils became significant export products. Usually four crops of the grasses are harvested each year from plantations on the Pacific Coastal Plain and Lower Pacific Piedmont. The Association of Essential Oil Producers establishes prices and guarantees quality of the product. Practically all the oil produced is for export, as shown in table 12.

Tobacco is a relatively minor commodity, but is important to growers in the departments of El Progreso, Jalapa, Guatemala, and Zacapá. Harvesting dates for tobacco vary with the location: Guatemala--November to February; Jalapa--October and November; and in the east and southeast tier of states--January to May. Output of tobacco increased from 1,200 to 4,000 metric tons from the late 1940's to 1967, but dropped sharply in 1969 to 2,150 tons. Imports declined from more than 400 tons in the 1950's to less than 90 tons in 1967, and in the latter year, Guatemala exported more than 300 tons of tobacco to West Germany, the Netherlands, and other CACM countries. Guatemala imported tobacco mainly from the United States for blending with domestic types to produce a better grade of cigarette.

Rubber production rose sharply during the 1960's to almost 4,000 metric tons in 1969. USDA began experimentation during World War II to develop improved strains of disease-resistant rubber trees which would provide a Western Hemisphere source of rubber. The United States has continued to provide technical assistance through AID, and the Guatemalan Government is emphasizing rubber as a part of the diversification effort. The principal producing zone is on the south Pacific Coast, which accounts for some 85 percent of total plantings. Domestic demand for rubber is rising, and demand for Guatemalan

rubber output will come also from the other CACM countries since Guatemala is the seat of a tire factory that has been established as an "integration" industry under the General Treaty for Central American Economic Integration. 14/

The cultivation of fresh flowers is becoming an important small-farm enterprise in Guatemala. The flowers supply the domestic market and are exported by air to other Central American countries and the United States. The volume and value of flower exports for 1966-68 are shown in the following tabulation (in metric tons and 1,000 U.S. dollars):

Year	Volume	Value
1966	494	393
1967	858	630
1968	344	276

LIVESTOCK AND LIVESTOCK PRODUCTS

Livestock and livestock products account for more than one-fourth of agriculture's contribution to the gross domestic product of Guatemala. Cattle are by far the principal livestock, but hogs, sheep, and goats are important to certain areas, and the number of poultry is increasing. The Spaniards brought animals to Guatemala during the colonial period and granted large tracts of land to the colonists for cattle grazing. These large cattle holdings still predominate. Hogs and chickens became household animals and are still concentrated on smaller holdings. Small sheep and goats adapted readily to the highlands where they are still located.

Beef is Guatemala's principal livestock product entering foreign markets. A variety of livestock products are also imported, with tallow the most important product in 1967 and 1968.

Numbers and Distribution

In 1969, 1.4 million head of cattle were estimated to be in Guatemala. 15/ Estimated numbers of hogs indicate a decrease between 1950 and 1964 and an increase since 1964. 16/ The long-term trend of sheep numbers apparently has been upward, although the 1964 Agricultural Census data do not confirm this.

14/ There is also a tire factory in Costa Rica.

15/ According to cattlemen, this figure probably understates the cattle population, but there is general agreement that cattle numbers have increased little, if any, since 1964.

16/ Data on livestock numbers should be used with caution. The 1950 Agricultural Census enumerated only animals on farms; the 1964 Agricultural Census counted animals not on farms separately; the year-to-year estimates for intercensal years and for 1965-69 probably are intended to include all animals, but this is not clear from the sources used. This uncertainty raises difficult problems, particularly with the data for hogs, since more than one-third of the total are not on farms but are kept around nonfarm dwellings.

Table 13.--Livestock on farms, Guatemala, averages 1950-64, annual 1950, 1964-69

Period or year 1/	Cattle	Hogs	Sheep	Goats	Horses	Mules and donkeys
	1,000 head					
Average:						
1950-54	1,118	428	803	90	232	68
1955-59	1,063	393	791	85	172	65
1960-64	1,139	370	710	88	156	61
1950	919	424	716	79	186	69
1964	1,202	375	569	92	176	74
1965	1,384	495	794	89	155	53
1966	1,328	543	818	90	155	53
1967	1,242	580	820	91	155	53
1968	1,371	662	800	2/ 96	155	53
1969	1,395	728	2/ 550	2/ 85	2/ 155	53

1/ In 1950 and 1964, census data taken in April; other years, estimates as of March for 1950-67 and May for 1968-69. Series are not strictly comparable and should be used with caution. 2/ Estimated.

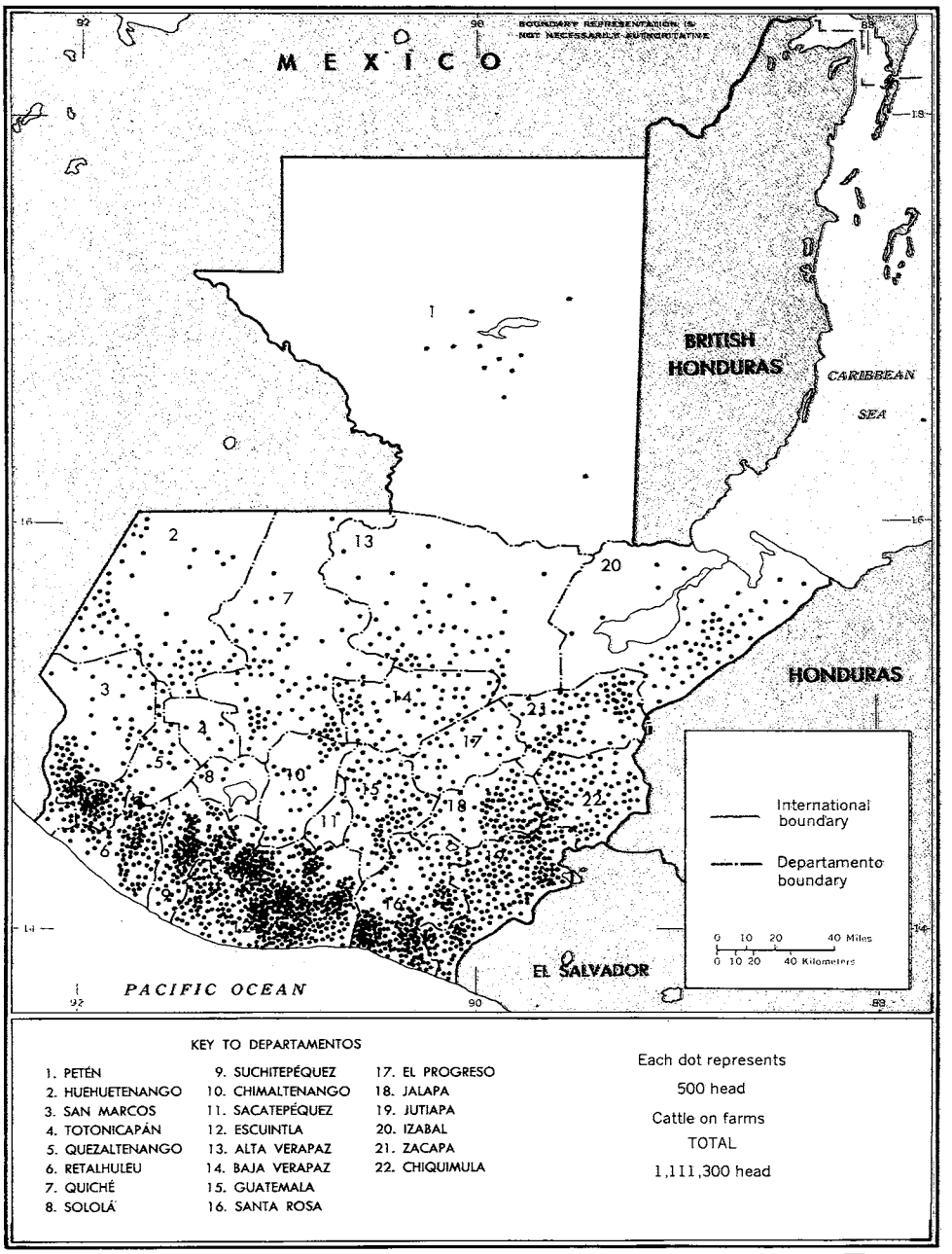
Sources: (7) Tomo III, and Agricultural Attaché Report No. GT0008, February 20, 1970.

Goats are of relatively minor importance. There are an estimated 6 to 7 million head of poultry, the greater part being chickens. Mules and donkeys are used as beasts of burden, and horses mainly for riding by foremen and cowhands, although the Indians of Huehuetenango own substantial numbers of horses (table 13).

The principal cattle regions in Guatemala are located in the southern Pacific plains (fig. 13). Work animals are concentrated in the highland regions, but are also important in other areas. Quiché, Alta Verapaz, and Huehuetenango are the principal hog-raising departments, having more than one-third of the total number of hogs in 1964. Commercial hog production, however, is located near Guatemala City. Three-fourths of the total numbers of sheep and goats are in the departments of San Marcos, Huehuetenango, and Quiché. About two-thirds of the poultry is on farms, the rest being kept for home food supply in both rural and urban areas. Large commercial poultry farms have been established near Guatemala City to provide the city markets with meat and eggs. Although most farm families raise some poultry, there is a somewhat greater concentration in the southeastern part of the country.

Most of Guatemala's cattle are criollo or so-called native breed, but improved breeds--principally Brahman and Santa Gertrudis crosses--are increasing in number. Breeding stock is imported, mainly from the United States. Feeder cattle are imported from other Central American countries, mostly from El

GUATEMALA: NUMBER OF CATTLE, 1964



USDA

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Figure 13

Salvador and Honduras, for fattening on the Pacific Coastal plains. Hogs are exchanged with those of other Central American countries, and breeding stock is imported from outside the area to upgrade the local hogs. There has been little or no trade in horses, mules, and donkeys since the late 1950's, and only moderate trade in sheep and goats.

Livestock and Pasture Management

Considerable improvement in pastures and in the quality of livestock has occurred in recent years on the larger ranches of the Pacific coastal areas. Some of the more progressive ranchers are preparing ensilage of corn and sorghum or hay from pangola and other grasses, and a few have constructed irrigation facilities that provide water for pastures during the dry season. Farmers on the medium- and large-sized ranches are buying breeding stock to improve their herds. The annual National Livestock Exposition encourages this trend of improvement.

The Ministry of Agriculture and international agencies cooperate in promotional programs to improve the livestock industry, but the major portion of the stock continues to be criollo. Cattle require 4 to 5 years to reach slaughter weight. Programs for aiding the livestock industry have been included in the Government's various economic development plans, but none of these programs has been implemented. The Bank of Guatemala is reviewing a proposed feasibility program for the Pacific plain that would provide technical and financial assistance to ranchers on medium- and large-sized holdings.

Commercial poultry farmers around Guatemala City raise purebred stock and feed them with well-balanced rations, but poultry on the smaller farms and in rural and urban yards receive little attention.

Progressive ranchers have pest control programs, and dairy herds around Guatemala City and Escuintla are kept relatively free of disease, but the majority of the cattle are not protected by effective control programs. The cattle are plagued by viruses, parasites, and insects, but are free of aftosa (foot-and-mouth disease). Cholera is the most serious disease among hogs, and occasional epidemics cause heavy losses. Little effort is made to control diseases of sheep, and botflies (Oestrus ovis) often cause serious damage.

Livestock Products

During the 1960's, Guatemala became a net exporter of livestock products (in value terms) owing to the rapid rise of beef exports to the United States. In 1968, beef exports ranked third in value following coffee and cotton. Inedible tallow is the principal livestock product imported in recent years, and dairy products (largely nonfat dry milk) are still imported. Lard imports were large through the 1950's, but have ceased entirely with the expansion of Guatemala's vegetable oil industry. Specialty meats, extracts, and baby food continue to be imported for city markets.

Beef is exported frozen and boneless. As of early 1970, only two of some 30 slaughtering establishments were certified to export meat to the United

States, which takes the bulk of the beef. The beef moves by refrigerated truck-trailer to a port and most of it is shipped by converted landing ship tanks (LST's) to Florida. Small shipments also go to other CACM countries, principally El Salvador.

Reported cattle slaughter rose from an average of 175,000 head in 1955-59 to 320,000 in 1969, and beef and veal from 30,000 to 54,000 metric tons. Reported pork production is about 8,000 tons, and output of mutton and goat meat is much less, totaling some 400 tons. Poultry meat output is rising and is estimated at about 35,000 tons.

Tallow production of about 5,000 metric tons supplies less than one-fourth of total consumption, but lard output of some 4,500 tons allows small exports to other Central American countries. Estimates of total fluid milk output vary, but one series 17/ indicates production increased from 144,000 to 200,000 tons from 1960 to 1969. The quality of dairy products supplied to the Guatemala City market is improving. Four pasteurizing plants serve the capital city, and a fifth, which is the only manufacturer of powdered milk, is located near the El Salvador border.

Honey has been an important minor export item for many years; its annual output is estimated at about 2,500 tons. Most of the product is exported, mainly to West Germany, although small quantities go to other West European countries and to the United States. The traditional producing areas on the Pacific Coast are reportedly declining in importance because of heavy insecticide applications on cotton fields which are destroying the bees. The decline in output there, however, is being offset by new beehive colonies in the Petén area.

FOREIGN TRADE

Guatemala's merchandise trade showed a surplus of exports over imports during the first half of the 1950's; in the middle of the decade, however, coffee prices declined sharply and export earnings fell. Beginning in 1955, import value exceeded export value every year with the exception of 1966, even though export earnings have improved since 1962. Agricultural commodities provide the greater part of the exports, although they declined from approximately 96 percent of the total in the mid-1950's to about 75 percent in the late 1960's. Agricultural items, on the other hand, are a relatively minor share of total import value compared with their importance in export trade. They represented only 13 percent of total import value in 1967.

Exports

Coffee is Guatemala's chief export (table 14), and cotton, meat, and sugar exports have forged ahead of bananas--formerly the second most valuable

17/ Economic Research Service, USDA.

Table 14.--Value of principal exports, Guatemala, 1963-68

Commodity	1963	1964	1965	1966	1967	1968 1/
	Million quetzals 2/					
Coffee beans	77.1	71.1	91.7	100.1	68.4	73.4
Cotton lint	24.3	32.1	34.4	44.5	31.5	40.1
Sugar	6.1	8.5	4.2	6.0	8.9	8.0
Beef	4.4	3.7	4.6	5.3	8.0	8.6
Bananas 3/	9.1	6.9	2.3	4.6	3.2	5.1
Other 4/	30.5	42.0	48.6	65.6	77.9	87.0
Total exports 3/	151.5	164.3	185.8	226.1	197.9	222.2

1/ Preliminary. 2/ 1 quetzal = US$1. 3/ Excludes adjustment for undervaluation of bananas. Other available series include such adjustment, but they differ from each other as to the extent of the adjustment. 4/ Includes soluble coffee and extracts, sugar preparations, other meat, and plantains, which are sometimes included with the products listed here. See tables 16 and 18.

Sources: 1963-67: Pan American Union, Boletin Estadístico, Sept. 1969; 1968: Agricultural Attaché Report No. GT0001, January 28, 1970.

export. 18/ Cotton and cottonseed were exported for the first time in 1954, and boned beef in 1959. Exports of cottonseed oil and cake, essential oils, flowers, vegetables, and fruits other than bananas are accounting for an increasing percentage of total exports.

The United States is the principal market for Guatemala's agricultural exports, followed by Western Europe (table 15). West Germany is the most important country of the Western European Markets (taking 45 percent of the total agricultural exports--in value terms--in 1967), and Japan is the largest foreign outlet for Guatemala's cotton exports. The Central American Common Market has become more important as a market for other products as well as for agricultural commodities. The four other members of the CACM bought 29 percent of all Guatemalan exports (value terms) in 1967, compared with only 11 percent in 1963.

Imports

Nonagricultural raw materials and consumer goods make up about 70 percent of total imports. Wheat usually ranks highest in value of agricultural imports (table 16), although in some years live animals rank first. Other grains and preparations, dairy products, and tallow lead in value among a wide range of other imports. Corn is imported in years of poor growing conditions in Guatemala.

18/ Total export value and value of banana exports as reported by the Directorate of Statistics, Guatemala. These values do not agree with adjusted valuation reported by the Bank of Guatemala, which considers bananas undervalued; the Bank uses adjusted data for balance of payments purposes. The Bank's adjustments do not always agree with the adjustments made by the International Monetary Fund.

Table 15.--Agricultural exports, by commodity and principal markets, Guatemala, 1967

Commodity	United States	Western Europe	CACM 1/	Other	Total	Percentage of total
	-- f.o.b. value, 1,000 U.S. dollars --					Percent
Coffee & preparations	34,647	31,937	26	2,983	69,593	46.8
Cotton	285	12,530	515	2/ 18,163	31,493	21.2
Sugar & preparations	9,701	0	2,504	33	12,238	8.2
Meat & preparations	7,626	0	1,158	323	9,107	6.1
Bananas & plantains	1,919	1,816	690	1	4,426	3.0
Other fruits, nuts, vegetables, & preparations	185	0	5,816	2	6,003	4.0
Other	2,093	6,036	6,906	825	15,860	10.7
Total	56,456	52,319	17,615	22,330	148,720	100.0
Percentage of total by destination	38.0	35.2	11.8	15.0	100.0	

1/ Central American Common Market includes El Salvador, Honduras, Costa Rica, Nicaragua, and Guatemala. 2/ Japan, $14,835,000.

Source: Anuario Estadístico Centroamericano de Comercio Exterior, 1967 (SIECA).

Table 16.--Agricultural imports, by commodity and principal origin, Guatemala, 1967

Commodity	United States	CACM 1/	Western Europe	Other	Total	Percentage of total
	-- c.i.f. value, 1,000 U.S. dollars --					Percent
Wheat & flour	5,179	20	0	256	5,455	16.9
Other grains & preparations	694	2,090	117	827	3,730	11.5
Live animals	610	5,333	0	25	5,968	18.5
Dairy products	328	29	1,747	15	2,119	6.6
Tallow	2,417	4	0	0	2,421	7.5
Other fats & oils	178	1,786	187	5	2,156	6.7
Other animal products	326	202	295	121	944	2.9
Feedstuff	1,508	513	35	12	2,068	6.4
Fruits, nuts, vegetables, & preparations	936	632	341	131	2,040	6.3
Rubber	514	3	116	767	1,400	4.3
Other	1,402	860	564	1,172	3,998	12.4
Total 2/	14,092	11,474	3,401	3,332	32,299	100.0
Percentage of total by origin	43.6	35.5	10.5	10.3	2/ 100.0	

1/ Central American Common Market includes El Salvador, Honduras, Costa Rica, Nicaragua, and Guatemala. 2/ Figures do not always add because of rounding.

Source: Anuario Estadístico Centroamericano de Comercio Exterior, 1967 (SIECA).

The United States is the principal supplier of wheat, tallow, and feedstuffs to Guatemala, and in 1967 furnished more than 40 percent of all agricultural imports. Western Europe, particularly the Netherlands, is important for dairy products imports. The CACM countries, particularly El Salvador, are becoming more and more prominent as a source of imports; in 1967 they furnished 17 percent of total imports, compared with 11 percent in 1963. They are becoming more of a competitor in supplying agricultural commodities to Guatemala, accounting for almost 36 percent of the total in 1967. Livestock and products and grains and preparations account for the bulk of the import value of these countries.

Some imports from the United States have been financed under U.S. Government programs and some were gifts from voluntary relief agencies. Such imports have included coarse grains, fats and oils, and dairy products.

Although Guatemala exports large quantities of food--sugar, beef, bananas--it imports two-thirds of its consumption of wheat and a wide variety of other foods. Allowing for the live weight of the feeder cattle imported as well as food products for direct consumption, in 1967 Guatemala imported 7 to 10 percent of its food energy (in terms of calories). The low purchasing power of most Guatemalans--both in urban and rural areas--has kept the level of food intake low, compared with that of the more developed countries of the world. A greater purchasing power would result in a demand for a higher level of food consumption and no doubt result in larger imports of wheat, as well as a variety of specialty products.

U.S. Trade with Guatemala

As noted earlier, the United States has a so-called "favorable" balance of trade with Guatemala that increased during the 1960's (tables 17 and 18). Nonagricultural items account for the bulk of U.S. exports. Wheat and flour are the principal agricultural commodities exported to Guatemala. In earlier years, flour exports far outranked wheat, but Guatemala has developed its own milling industry and now buys grain for milling in its own plants. Lard exports to Guatemala have ceased altogether, and vegetable oil exports have declined as Guatemala has provided more cottonseed for crushing. Sesame seed production has also risen, and is now being exported to the United States. Domestic production of tobacco is replacing imports from the United States except for high-grade blending tobacco, but this is also being phased out.

The total value of U.S. agricultural exports to Guatemala trended upward through 1968. The sharp drop in 1969 reflects the growing importance of the CACM countries in Guatemala's trade situation as well as efforts on the part of the Guatemalan Government to become self-sufficient and conserve foreign exchange. U.S. exports of agricultural commodities to Guatemala under U.S. Government programs accounted for $3.2 million in 1968.

U.S. agricultural imports from Guatemala, on the other hand, represent the major share of imports from that country. Traditionally, these have been, for the most part, commodities that complement U.S. production. Coffee, for example, is the principal item, and for many years bananas and plantains were the second item (in value terms). Essential oils, cocoa, and spices are also important complementary imports.

Table 17.--Value of U.S. exports to Guatemala, averages 1955-59 and 1960-64, annual 1965-69

Commodity	Average 1955-59	Average 1960-64	1965	1966	1967	1968	1969 1/
	Million U.S. dollars						
Wheat and flour	2.9	3.7	3.2	4.1	4.0	4.3	3.7
Other grains and preparations	1.6	0.9	0.4	0.4	1.0	1.1	0.5
Tallow, inedible	0.6	1.1	1.9	1.9	2.3	2.0	1.0
Flavoring syrups	2/	0.1	0.5	0.6	0.7	0.8	0.7
Fruits, vegetables, and preparations	0.7	0.5	0.7	0.7	0.8	0.5	0.5
Dairy products 3/	0.6	0.5	0.3	0.2	0.2	0.2	1.2
Feedstuffs	0.3	0.8	0.9	1.1	1.0	0.6	0.6
Vegetable oils	0.3	0.1	0.1	0.1	0.2	0.1	0.1
Lard	1.0	0.1	0	0	0	0	0
Tobacco	0.5	0.3	0.2	0.2	0.1	0.1	2/
Relief and charity 3/	2/	0.8	0.7	1.3	1.5	2.2	3/
Other agricultural 4/	1.3	1.1	1.9	2.2	2.3	2.9	2.1
Total agricultural	9.8	10.0	10.8	12.8	14.1	14.8	10.4
(under U.S. Government programs)	(2.3)	(1.6)	(2.2)	(2.7)	(2.4)	(3.2)	(2.1)
Nonagricultural	62.0	57.9	83.9	76.2	76.4	78.1	73.0
Total exports	71.8	67.9	94.7	88.9	90.5	92.9	83.4

1/ Preliminary.
2/ Less than $50,000.
3/ Exports for relief and charity--mostly nonfat dry milk--are included with the commodity totals in 1969; the major part of total relief and charity for earlier years was also nonfat dry milk.
4/ Includes a wide variety of products such as hatching eggs, breeding cattle, cottonseed for planting, rubber, and glucose.

Table 18.--Value of U.S. imports from Guatemala, averages 1955-59 and 1960-64, annual 1965-69

Commodity	Average 1955-59	Average 1960-64	1965	1966	1967	1968	1969 1/
	Million U.S. dollars						
Complementary products:							
Coffee, green and processed	58.3	44.7	51.4	60.5	35.3	35.9	40.4
Bananas and plantains	5.4	4.2	0.8	1.5	5.0	7.4	7.8
Essential oils	1.1	1.2	1.1	0.7	0.8	0.8	1.0
Other 2/	1.6	0.7	0.5	1.4	1.0	1.1	1.6
Total complementary	66.4	3/ 50.7	53.8	64.1	42.1	45.2	50.8
Supplementary products:							
Beef	0	2.8	3.4	5.3	7.8	9.6	11.2
Sugar	0	3.5	4.0	6.3	7.9	8.8	6.9
Other 4/	0.2	0.6	0.8	1.1	1.8	2.2	1.4
Total supplementary	0.2	6.9	8.2	12.7	17.5	20.6	19.5
Total agricultural	66.6	3/ 57.6	62.0	76.8	3/ 59.7	65.8	70.3
Nonagricultural	4.5	6.3	4.6	5.2	4.8	5.2	5.5
Total imports	71.1	63.9	3/ 66.7	82.0	64.5	71.0	3/ 75.7

1/ Preliminary.
2/ Includes a variety of products, with year to year shifts in composition. In 1955-59, abaca was important; in 1966, spices were important; cocoa is important in some years.
3/ Does not add because of rounding.
4/ A larger variety of commodities was imported during the 1960's than in earlier years, including inedible molasses, cotton linters, and sesame seed.

Beginning in the late 1950's, supplementary (or competitive) products have been imported in increasing quantities. Before 1960, supplementary imports ranged from $200,000 to $300,000 in value; by 1968, they reached a total value of $20.6 million. Boned frozen beef and sugar are the principal supplementary items, although a wide variety of other products are imported, including inedible molasses, cotton linters, and sesame seed.

AGRICULTURAL PROSPECTS

Intermediate and long-term prospects for continued growth in Guatemalan agricultural development depend more on the political and economic climate than on the availability of physical resources. Guatemala has had a stormy political life, and these problems have intensified in the past few years. A new administration promises to curtail the violence that has disrupted efforts to make basic improvements in the institutional structure of agriculture.

Guatemala has the physical resources to expand both crop and livestock production. An estimated 4 million hectares of usable land are presently uncultivated, about half of which is cultivable and about half is suitable for pasture (16). Long-term prospects for Guatemala are that total agricultural output will rise faster than population growth to supply rising per capita domestic consumption as well as to furnish foreign exchange from exports of coffee, cotton, sugar, bananas, and a variety of other products. Any increased exports of beef, however, probably would be made at the cost of increased per capita consumption at home. The longer term outlook is for a reduction in acreage or the mechanization of the production of cotton, sugarcane, basic grains, and coffee, which would decrease the current need for employing large numbers of people in the coastal areas as well as seasonal labor from the highlands. Such development would intensify the need for finding off-farm employment for a population growing at an annual rate of 3 percent.

Intermediate prospects for the 1970's are for increased production of the principal commodities. One set of forecasts for 1980 (1) shows the following percentage increases above the 1969 output:

Commodity	Percent
Corn	53
Beans	40
Wheat	31
Sugar	25
Bananas	17
Beef	18
Coffee	41

The total population of Guatemala is expected to reach 7 million people by 1980, with somewhat more than half expected to remain on the farm. This increase in the number of farmers will undoubtedly raise the number who do not have sufficient land to support a family. Supplementary employment must be found for many farm people if a significantly improved standard of living is to be attained by 1980. Furthermore, even under the most favorable assumptions of low population growth and higher per capita income, dietary deficiencies

are not likely to be eliminated during the coming decade for most of the population. Corn and beans will probably remain the principal items of the diet through 1980.

The short-run prospects for agricultural production were promising until torrential rains and high winds of hurricane Francelia struck in September 1969. Severe damage was inflicted on cotton, corn, tobacco, wheat, and livestock, and the coffee trees suffered minor injury. Railroad and highway bridges were washed out and sections of the highland highways were rendered impassable. Temporary repairs have been made, but permanent repairs will take time and financing.

Although improvements have been made in many areas over the past 15 years, basic problems remain to be solved before Guatemala can have meaningful development. Education must receive immediate attention and massive support; agricultural research and experimentation must continue and the results be transmitted to the field at a much faster rate than formerly; modernization of farming practices must be accelerated; and productivity per worker and per hectare must rise substantially to permit a higher level of food intake per capita than at present.

The new 1970 Agricultural Development Plan, however, if implemented, could result in substantial improvement in intermediate prospects and provide the framework for long-term agricultural development of great magnitude. All programs for economic and social development depend on continued financial and technical assistance from sources outside Guatemala, but there is every indication that such assistance will be forthcoming.

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