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A. IMPORTANCE OF AGRICULTURE

Despite efforts to change the productive structure of the economy, the agricultural sector continues to be the mainstay of the Guatemalan economy. It employs 58% of the economically active population and provides two-thirds of the country's foreign exchange earnings (Table 1). During the period 1983-1986, the value of traditional agricultural exports as a proportion of the value of total exports increased from 55% to 67%, with an absolute growth of 20%. Non-traditional agricultural exports increased almost as fast (17%) during the last three years.

Tax revenues on traditional agricultural exports grew from Q9.6 million in 1970 to a record high Q158 million in 1978, thanks to exceptionally high coffee prices in 1977 and 1978. These taxes accounted for 25% of total tax revenue for the government in 1978. However, during the period 1980-1985, total tax revenues dropped by 54% from Q686 million to Q315 million, reflecting steadily declining tax revenues from traditional agricultural exports, which accounted for only 3% of total tax revenues by 1985 (Table 2). These revenues of Q10.7 million in 1985 were almost the same in absolute value as those of 1970.

The contribution of agriculture to the Gross Domestic Product (GDP) has historically been very important, although it fell from an average of 28% during the period 1970-1975 to 25% in 1980 (Tables 3 and 4). This resulted from an increase in the pace of growth of total GDP relative to agriculture, specifically in the manufacturing and construction sectors of the economy, in response to expanded trade opportunities in the Central American Common Market (CACM). During this period, agricultural production increased absolutely, but at a slower pace.

The economic shocks experienced by the Guatemalan economy since 1980 have led to a renewed interest in the agricultural sector as an engine of growth. In the midst of the drastic economic downturn, caused in part by the demise of the CACM, the agricultural sector has provided more consistent output

performance than the other key sectors (manufacturing; transportation, storage and communications; and commerce). Beginning in 1980, the Guatemalan economy experienced a process of contraction whereby real GDP in 1985 was 5.8% less than in 1980, while real agricultural GDP was only 2.8% less during the same period. Although absolute agricultural production declined, it still contributed an average of 25% to the GDP during the period 1981-1985.

B. LAND UTILIZATION AND DISTRIBUTION

1. Land Use

Of Guatemala's land area of 108,889 km.², 82% is in hillside and/or Highland area (Figure 1). In global terms, 12% of Guatemala's land is devoted to annual and permanent crops, while an additional 23% is dedicated to mixed uses, crops and pasture, and crops and forest (Table 5). Adding in the 25% of land in natural and improved pasture and mixed pasture and open forest, the proportion of land dedicated fully or partially to farming and/or grazing is over 60% of total land surface. The productive capacity of soils and potential land use are shown in Figures 2 and 3.

Actual land uses vary greatly from one part of the country to another (Figure 4). The Highland areas, which comprise the areas of greatest man/land ratios, have the greatest proportion of land dedicated to crops. The dry eastern Highlands, the Pacific Coastal Plain, the piedmont (Boca Costa), the northern Highland slopes, and the lower Motagua River Valley dedicate a greater proportion to pasture and forest uses. Much of the land in the eastern Highlands is not suitable for farming. The other areas noted above produce most of the traditional, export-oriented agricultural production in Guatemala, which is generally less intensive than Highland, small-farm production. Most of the grazing land is in these areas as well. The smallest proportion of land in crops and pasture is in the northern parts of the country, an area made up of the Northern Transversal Strip (the northern portion of Huehuetenango, Quiché, and Alta Verapaz, along with western Izabal) and all of the Petén. These are largely fragile lands and ecosystems. This area has been the focus of recent development efforts, but still remains largely in native forest.

In terms of land utilization by farm size category, as would be expected, smaller farms tend to have a higher proportion of their land in annual crops, while larger farms devote more land to permanent crops, woodlands, and pasture. These small farms also produce most of Guatemala's food for domestic consumption.

2. Land Size and Distribution

Guatemala has the most highly skewed land distribution of any Central American country. In 1979, farms smaller than 3.5 hectares in size comprised 78% of all farms, while occupying only 10% of the land in farms (Table 6). At the other end of the scale, fewer than 1% of farms in Guatemala were over 450 hectares in size, yet they occupied 34% of all land in farms. The Gini coefficient, which is a measure of land concentration, was 85 for Guatemala in 1979, higher than all but two Latin American countries: pre-reform (1961) Peru with 93.3, and pre-reform (1964) Colombia with 86.4.

A comparison of data from Guatemala's three agricultural censuses in Table 6 indicates that concentration of land in larger holdings increased between 1950 and 1979. In 1950, 76% of farms were in the size range between 0.04 and 3.5 hectares. By 1979, this proportion had risen slightly to 78%. However, the total number of farms rose during the intercensal period, so that the absolute number of farms in the 0.04 to 3.5 hectare size range rose from 265,629 in 1950 to 416,662 by 1979, representing a 57% increase in the number of farms in that size category. This is the largest absolute increase in any farm size category and a percentage increase exceeded only by farms of over 450 hectares, which increased from 7,572 in 1950 to 13,254 in 1979, an increase of over 80%. It is worth noting that family-sized farms, which could support an acceptable standard of living, increased in number at the slowest pace.

About 54% of all farms, containing perhaps 80% of the rural population, consists of plots of 1.4 hectares or less. This is generally considered too small to generate enough subsistence and cash on-farm income for the basic needs of a rural family (5 or more people), without resorting to off-farm employment, usually as migrant laborers on Pacific Coastal plantations.

Regionally, the smallest-scale farmers (campesinos) are concentrated in the predominantly indigenous Western Highlands (44.6% of total farms) and

in the East (10.8% of total farms), while the largest are on the Pacific Coastal Plain (21.2% of total area), the Northern Lowlands (13.5% of total area), and the Petén (11.4% of total area) (Table 7). Given this concentration of small farms and lack of first class land in the western Highlands and the East, the probability that the campesino and small farmer social groups will be cultivating poor quality land is great.

3. Land Tenure

Although nationwide 74% of total farms have recognized ownership, covering 89% of the area under cultivation, there is a considerable difference in degree of ownership between large and small farmers and between regions. Generally, most commercial farmers have title (93%), while small farmers (79%) and campesinos (72%) are less secure (Table 8). This is especially true in the Petén and the Northern Lowlands, where spontaneous and government-directed settlement is taking place and where farming is slash-and-burn. It should be noted that campesinos and small farmers in the Western Highlands have the highest levels of ownership of any region, but much of this is based on historical de facto ownership rather than de jure title. Insecurity of ownership among campesinos and small farmers has a related impact on low levels of on-farm investment and long-range improvements, such as permanent crops and installation of irrigation facilities.

4. Land Pressure

As a result of the country's high population growth rate (2.8% annually) and an increasing concentration of land in larger holdings, a growing pressure can be observed on land. All regions and Departments of the country, to a greater or lesser extent, show a continued reduction in the availability of land per rural inhabitant. The average nationwide per capita availability in 1964 was 1.82 hectares, in 1973 it was 1.52 hectares, and in 1982 it dropped to 1.11 hectares (Table 9). The regions most affected are the Western Highlands and the East, while the Departments with the most critical situation are Totonicapán (0.22), Chiquimula (0.28), Guatemala (0.35), San Marcos (0.38), and Sololá (0.48). At the other extreme, El Petén (22.37), Izabal (2.09), Alta Verapaz (1.50), Escuintla (1.36) and Retalhuleu (1.14) still have availability of land per capita higher than the national average.

Due to this land pressure, much land not appropriate for agricultural use has been placed under production, especially forest land (Table 10). This situation is critical in the Departments of Chiquimula, El Progreso, Zacapa and Jalapa in the Eastern region and Baja Verapaz, Santa Rosa and Suchitepéquez. Cultivating this inappropriate land results in serious soil erosion and low levels of productivity.

Not only does the land pressure result in the above, but creates discontent and insecurity among the landless and land poor. Rural Guatemalans place great importance on land ownership and tillage. This is especially true of Indian people, but also applies to many rural ladinos (non-Indians) as well. This means that ownership of land, even a very small plot suitable only for partial subsistence, has importance beyond its simple productive capacity. This helps to explain, at least in part, why possession of land seems to take on such transcendental importance among Guatemalans.

The issue of landless farmers is one that presents serious problems for the Cerezo administration. Not only are the numbers of landless unemployed growing, but movements such as that of Father Girón are capable of mobilizing them into a powerful political force. The Cerezo government's answer to the problem, to date, has been to propose land purchase and resale programs along the lines of those proposed by Father Girón and others, but organized and operated by the state. The land marketing program is controversial and has much opposition from among the large landholders. Also, it seems doubtful that sufficient land and funds to buy it will be available to satisfy more than a small fraction of those demanding land. Nevertheless, alternate approaches to solving the problem, such as colonization of government-owned land or securing employment for the large numbers of unemployed and landless, are not feasible. The manner in which the government deals with this problem will have a serious bearing on its success and, possibly, even survival.

C. NATURAL RESOURCE USE AND CONSERVATION

The country is divided by three major watersheds: The Pacific Watershed with 19% of total runoff; the Atlantic Watershed with 34% of total runoff; and the Gulf of Mexico Watershed with 47% of total runoff (Figure 5). The rate of runoff depends principally upon the degree of natural resource use and conservation in the headwaters of these watersheds. Unfortunately, accelerated deforestation and soil erosion are occurring in these areas which have both short- and long-range impacts on the productivity of the country's soils.

Natural resource conservation has not been seriously pursued in Guatemala until very recently. Even now, the few conservation efforts of governmental agencies have been very limited in scope and impact. The result is that natural resources, especially forest and soil resources, are becoming seriously depleted.

1. Forest Management

Softwood pine forests that once covered large sections of the western and Northern Highlands are now reduced to a few small areas, and even those are being cleared to meet the demand for firewood, charcoal, lumber, and new farm land. Tropical hardwood forests that once covered most of the Pacific Coastal Plain were removed in the 1930's to 1950's to make way for agriculture. In the 1970's and 1980's, the most extensive tropical forests of the Northern Transversal Strip are being cleared along an expanding agricultural frontier, a process similar to that which has been occurring in the Petén for the past 30 years. These northern sectors of Guatemala still possess the country's main forest reserves, but they are rapidly being cleared. Estimates of total forest cover vary widely, partly because of differing definitions. Undisturbed forest is probably on the order of about 27% of total land area (29,000 km.²) while forest cover amounts to about 40% of total land area (44,000 km.²).

According to conservative estimates, natural forest stands are being reduced by 1% to 1.5% per year, which is equivalent to 1,080 to 1,620 km.². This would result in the disappearance of the natural woodland cover of Guatemala in a period of 25 to 40 years.

In 1982, 22 million cubic meters of standing wood were felled, of which 13 million were used for fuelwood (60%). Forty percent of this fuelwood came from pine forests, while 60% was provided by broadleaf trees. About 6 million cubic meters of both types came from areas other than the Petén, a major source of wood products, which is resulting in a serious depletion and/or extinction of this resource. Forest fires and pests were additional factors in deforestation, accounting for more than 5% of the losses. Land clearing for colonization also contributes to declining forest resources. Estimates indicate, for instance, that from 1969 to 1982, the woodlands in the Department of Petén have decreased from 36,000 km.² to 32,000 km.². This deforestation implies an annual loss of 5 million cubic meters of wood attributable solely to colonization.

Forest clearing is proceeding much faster than replacement. The government plants about 4,000 hectares of replacement forest per year, or less than 7% of the estimated rate of removal. The private sector accounts for another 1,000 hectares replanted annually. Regrowth in replanted forest varies greatly, depending on local conditions and species composition, but averages about 15 cubic meters per hectare per year, considerably above the rate of production of mature forest.

Intensive grazing in forests has negative impacts in the natural regeneration of tree stands, resulting in a hardening of the soil from goat and sheep hooves and a trampling of tree seedlings. In the long run, this phenomenon could be more destructive than forest fires and pests, since these areas could become permanently damaged.

The annual deforestation is much more than the National Forestry Institute (INAFOR) authorizes and controls, thereby necessitating appropriate forestry policies, enforcement, and programs to educate the population on conservation and rational use of forest resources. Also, substitution of some other fuel for wood as a cooking fuel would significantly reduce the pressure on Guatemala's forest resources.

Secondary effects of forest clearing include destruction of native wildlife, which includes many endangered species, and damage to the hydrological system. Most of Guatemala has a climate that is characterized by a prolonged dry season. Forested watersheds act to hold water from rainy season accumulations as soil or ground water, to be released during the dry season in springs and seeps. These springs and seeps contribute to the base flow of streams, keeping water available during the dry period. Forest clearing contributes to greatly increased runoff, which reduces soil and ground water storage, thus increasing the incidence of flooding in the rainy season and reducing the level of flow in springs and rivers in the dry period. The problem of increased runoff and rainy season flooding is especially acute on the Pacific Coastal Plain, where bridges, roads, and farm land are destroyed nearly every year by streams carrying excessive runoff from the nearby mountains and piedmont.

Conservation efforts on the part of the Guatemalan government have been limited largely to setting aside land in national parks and preserves, which presently are poorly developed. These preserves contain over 1.56 million hectares (14.4% of the total national land area), 1.4 million hectares of which is in a single, large zone in the northern Petén. Conservation laws are ineffective and poorly enforced. This means that even protected areas are often protected only in name, and that exploitation may take place there at nearly the same pace as in unprotected areas. Also, some of the "protected" areas have already been damaged by exploitation, and will be restored only with difficulty, if at all.

2. Soil Management

Pressure on Guatemala's agricultural land is very great, especially in the indigenous Highlands, where rural population densities are in excess of 100 persons per square kilometer in many areas. This pressure on the land has led to the spread of agriculture into increasingly more fragile and erodible land. For example, it is estimated that 4 million metric tons of top soil per year are lost from the Quetzaltenango Valley alone. This soil loss is principally the result of clearing and cultivation of steep mountain slopes and of failure of farmers to utilize even simple erosion reducing methods of cultivation. This loss of soil quickly leads to soil impoverishment and loss of fertility, thus increasing already severe rural poverty and causing farmers to clear even steeper slopes that are still more erosion prone and less suitable for farming.

It should be pointed out that 65% of the national land is classified as having a susceptibility to erosion ranging from great to very high (Figure 6). According to some authors, the removal of the fertile layer of soil from the beginning of the century to the present is equivalent to 40% of the productive capacity of the land. In general, deforestation with its associated erosion, represents a degradation and withering process in an estimated percentage of the surface of the country of approximately 40%.

The primary focus of government soil conservation activities has been in the Western Highlands (Ministry of Agriculture's Region I), where Agricultural Extension Service (DIGESA) teams have developed very successful techniques for involving farm communities in building terraces and training participants in construction techniques. Based on the Region I experience, DIGESA now has six technical assistance teams working in about half of the national territory and covering virtually all of the land in the highest erosion risk categories, except for the Petén.

D. PHYSICAL INFRASTRUCTURE

1. Access Roads

The 1981 Population Census indicated that 64% of the Guatemalan population lives in rural areas and that 54% of Guatemala's work force is engaged in agriculture. One of the main constraints to improving the income and productivity of this large rural population has been the lack of an adequate road system. In most rural areas, especially in the indigenous Highlands, small farmers are often unable to obtain agricultural inputs or market their products because transportation is not available. When available, it is both expensive and unreliable.

Guatemala has invested in the development of a large and complex transportation network, including primary highways and paved secondary roads, which connect the main population centers and serve major areas of traditional export production on the Pacific Coastal Plain and piedmont. However, this network is not supported by a sufficient tertiary and farm-to-market feeder road system. As a result, the majority of Guatemalan small farmers still lack reliable year-around access to markets and agricultural inputs.

Although these small farmers have the potential to increase farm yields, they do not have the incentive to do so because they must still rely on human or pack animal transport over poor foot trails to get their products to market. Poor roads also increase vehicle maintenance costs and lengthen transport time for buses and trucks using the roads. These costs also reduce truckers' frequency of service and raise freight prices to the small farmer.

In 1976, it was estimated that at least 15,000 kilometers of foot paths and seasonal trails needed to be upgraded to all-weather access roads to provide adequate transportation to the rural population; yet during 1978 to 1984 less than 1,000 kilometers of access roads were built.

2. Energy and Rural Electrification

Guatemala is particularly rich in energy resources. Of the six Central American countries, it ranks first in geothermal potential and second in hydropower potential. Oil and gas reserves are located in the underdeveloped Petén. In small-scale renewable energy resources, it has a vast potential in biomass feedstocks, including woody biomass, sugar cane bagasse, and rice husks. There is also some potential for wind and solar energy applications in certain areas. Small hydropower potential is enormous over much of the country. Guatemala has been slow to develop and distribute its energy resources, however, and consequently, energy shortages in the near to mid-term threaten the country's anticipated economic recovery.

The energy sector in Guatemala is characterized by the predominant use of fuelwood as the principal source of fuel for cooking in the rural areas, representing 62% of total energy consumption. Most of this fuelwood is gathered by women and children, with very little being sold. Annual consumption of fuelwood is estimated to be about one ton per person, resulting in an annual consumption of almost 6 million tons on a nationwide basis. This has serious impacts on deforestation, principally in areas of heavy population concentration corresponding to regions where the natural forests are already most depleted. However, pruning practices with shade trees for coffee produce a large quantity of wood which is used for fuel in coffee-growing areas.

Petroleum, including thermal generation of electricity, accounted for 32% of the total energy consumed. This percentage has not declined as expected because of problems with the national hydropower program. In fact, Guatemala's petroleum import bill increased from 14% of merchandise exports in 1978 to 22% in 1984. Even with sustained efforts to develop hydroelectric and geothermal resources, rural energy use will consist mainly of fuelwood for the foreseeable future. Thermal generation of electricity will be reduced significantly, however, as these other sources are developed.

INDE has been quite effective in addressing its obligation to meet urban power demands, to the exclusion of the rural sector. As a result, only 7% of Guatemala's rural population has access to electricity, the lowest rate

in Central America. Approximately 4.4 million people in rural areas and about 1.5 million urban dwellers in Guatemala are without electricity. While Guatemala contemplates selling energy to neighboring El Salvador, 5.9 million people within the country are without electricity. Fuelwood will continue to be the major source of energy in rural areas, primarily for cooking and heating, but this leads to deforestation and erosion and does not address the commercial energy requirements of most of the rural population.

3. Irrigation

The sharp division between the rainy season (June-October) and the dry season (January-April) in the Guatemalan Highlands severely constrains agricultural production by limiting farmers to one crop a year. This situation is exacerbated by the relatively short moisture retention period of volcanic soils and fast runoff on steep slopes where soil conservation activities have not been implemented. This problem is most critical for small farmers.

Irrigation in Guatemala is neither extensive nor well developed, due to the mountainous nature of much of the cultivated areas and the generally sufficient rainfall in most cultivated lowland areas, except for some valleys in the East. Presently, Guatemala is only irrigating 3.5% of its irrigable land, much lower than any other Central American country. Twenty-five public sector irrigation projects capable of servicing 17,300 hectares have been constructed (Table 11). However, due to a lack of secondary canal installation, only 5,800 hectares are actually being irrigated, of which 80% of the area is used for double cropping of corn. Figure 7 indicates the geographic distribution of the irrigation systems, with 45% of the systems now in operation being located in the Zacapa Department and 23% in the piedmont.

Small-scale irrigation systems provide one solution for some small farmers. Such systems, mainly gravity-flow, utilizing simple technology, are relatively cheap and easy to install and maintain. In some cases more complex systems using pumps have been installed, but higher costs of installation and maintenance and the continuing costs of energy limit their effectiveness.

System designs are developed by especially trained DIGESA personnel, who also advise beneficiaries and oversee construction work. BANDESA handles loans to participant farmers and other financial aspects of the program. As with terracing, most labor inputs for installing irrigation systems are provided by the beneficiaries themselves.

Unlike terracing, the technical and financial aspects of small-scale irrigation preclude independent adoption. Also, not all communities have access to suitable water sources. Nevertheless, given sufficient technical support and financial resources, small-scale irrigation technology has the potential to contribute far more than its already impressive impact in diversifying production, limiting erosion (irrigation is, of necessity, nearly always linked to terracing or some other form of erosion control), improving nutrition and increasing small farmer income.

4. Crop Storage

Storage activity in food crops is performed principally by INDECA. There is also a system of private warehouses, the storage capacity of which is unknown. The private warehouse system generally works with export crops, although they do some storing of wheat, rice and occasionally corn. The installed storage capacity of INDECA is 694,000 metric tons in silos and 470,000 metric tons in warehouses. Real storage capacity is around 75% of installed capacity because of the condition of silos and warehouses. Furthermore, the management of INDECA has never permitted full utilization. The regional distribution of INDECA's storage capacity is presented in Table 52.

E. STRUCTURE OF PRODUCTION

The internal structure of the agricultural sector 1/ has changed very little over the last 15 years (Tables 12-14). The relative importance of crops (for traditional and non-traditional exports and for domestic consumption) and livestock has not shown the flexibility that is required to adapt to the changing demand patterns that characterize current international markets. However, there were some slight adjustments during the period 1970-1980 when traditional and non-traditional export crops increased in importance due to favorable world prices. During the period 1980-1985, crop production for exports dropped as did livestock production, while production of food crops for domestic consumption increased.

1. Situation and Outlook for Traditional Export Crops

According to Table 1, traditional export crops have contributed from 55% to 67% of total country exports, increasing constantly from 1970 to 1982. There was a sharp turnaround in 1983, but by 1986 the figure was back up to 67%, thanks to high coffee prices. The performance and outlook for the major traditional export crops are discussed below.

a. Coffee. Coffee continues to be the mainstay of the Guatemalan agricultural economy, accounting for about 19% of the overall structure of production and providing \$503 million of foreign exchange earnings in 1986, or 47% of the total value of exports. Its importance in the GDP declined from 22% in 1970 to 18% in 1980, rising again to 20% in 1984 due to exceptionally high world coffee prices in that year. It accounts for 350,000 people employed in the economy. Eighty thousand small farms under 7 hectares account for 82% of the total number of coffee farms but only 9% of national production.

1/ When this term is used, it includes crop, livestock, forestry and fisheries production.

Small and medium producers are concentrated in the piedmont area, with some large plantations found on the northern slopes of the Highlands in the Alta Verapaz Department. Total area under production of coffee amounts to about 250,000 hectares.

Coffee export volume averages around 160,000 metric tons of the total 180,000 metric tons produced annually. In 1987, coffee exports are expected to be 136,000 metric tons at an average price of US\$130/cwt. The contribution of coffee to total export earnings is expected to continue the decreasing trend initiated in the mid-seventies because of slow growth in coffee production and increases in diversified exports. Efforts to increase coffee production center on the introduction of new coffee varieties and the application of improved technologies in order to maintain acceptable production levels on reduced land area. In addition to low international prices in 1986, coffee production has been hit by the spread of coffee rust, whose control requires intensive use of imported chemicals with a resulting decrease in profitability.

The area dedicated to coffee production increased modestly to about 290,000 hectares by 1980 and has remained at about that level. While yields increased nearly 20% to over 650 kg/ha. during this period, they are still 25% lower than the highest yields in Latin America. Only 15-20% of the coffee uses agro-chemical inputs, and the yields on that portion reach no higher than 850 kg/ha. which is substantially below international averages for intensively managed coffee.

The following indicates percentage changes over three five-year time periods:

	<u>1972-76 to 1977-81</u>	<u>1977-81 to 1982-86</u>
Area	+ 1.5	- 0.2
Yield	+18.9	- 8.7
Production	+21.6	- 8.2
Farm Price	- 0.4	+ 0.5

Expansion of this crop is inhibited by international coffee agreement (ICO) limits on exports to member countries, the spread of leaf rust into all growing areas, and low yields. Better market prices might permit expansion, but competitiveness of local producers would be improved by better yields, thereby lowering the average cost per unit. Prospects for world market prices of coffee are dim, with a projected increase of only 20% from the 1987 level until 1991.

Perhaps the farmers hardest hit by the declining importance of coffee production and decreased profitability are those small owners whose yields are low, trees are old, and who cannot find financing to plant rust-resistant varieties and/or purchase the necessary chemical inputs to increase productivity. Declining coffee production will also cause dislocations and/or unemployment among the large amounts of indigenous labor used to harvest coffee.

b. Cotton. The traditionally second most important crop in Guatemala is cotton, which accounted for about 10% of the overall structure of production and provided \$200 million of foreign exchange earnings in 1980. However, the growth of production experienced in the period 1970-1979 was reversed in 1980 and has been declining since then, accounting for only 5% of the overall structure in 1985. Nevertheless, cotton still provides for 150,000 part-time jobs at harvest time and generated \$28 million of foreign exchange earnings in 1986.

Area under production and yields increased with high international prices during the 1970's. Yields at this time were almost 40% higher than those of other Latin American countries principally due to excellent growing conditions and the massive use of insecticides. Resulting high costs and increasing insect resistance left the industry in a poor position to respond to sharp drops in world cotton prices in the early 1980's. In addition, cold weather in the 1984/85 season, and an extended drought in 1985 contributed to yield decreases. Finally, lowered world demand for textiles reduced the internal demand for raw cotton by more than 50% during the early 1980's.

The prospects for cotton production in Guatemala remain dismal. Although the area planted to cotton in 1987 is expected to double to around 40,000 hectares due to a short-run increase in world prices, it is well below the 126,000 hectares planted during the 1978/79 production year. International prices for cotton over the medium run are expected to increase moderately, but costs of production will continue to increase due to the widespread use of expensive methods of pest control. If cotton prices do not jump sharply or cost reducing methods are not found and implemented, cotton production will cease to be an attractive activity in Guatemala and may disappear altogether.

Production is concentrated on large, technically sophisticated farms on the Pacific Coastal Plain. A new, high quality, long-staple variety (ALFA) could enjoy good demand, but performance of this new variety under Guatemala's dryland production methods is not yet fully demonstrated.

The following indicates percentage changes over three five-year time periods:

	<u>1972-76 to 1977-81</u>	<u>1977-81 to 1982-86</u>
Area	+12.8	-44.3
Yield	+ 5.3	-19.2
Production	+19.1	-54.9
Farm Price	+ 0.6	+ 0.6

In addition to the negative effects felt by the economy as a whole due to sharply decreased cotton production and export earnings, domestic edible oil and cattle cake sub-products are simultaneously declining in production. This implies either increased production of other edible oils 2/ or greater imports to fill domestic demand. This phenomenon could also seriously affect quantity and/or quality of beef cattle production. An increasingly serious problem on the Pacific Coastal Plain is greater amounts of land lying fallow and growing dislocation and/or unemployment among the large amounts of indigenous labor permanently living on the Pacific Coastal Plain which has been used traditionally to pick cotton.

2/ Area dedicated to soybean production has increased from 3,000 hectares in 1983 to an estimated 21,000 hectares in 1987, principally on prior cotton land.

c. Bananas. This crop has accounted for about 5% of the overall structure of production and provided \$73 million of foreign exchange earnings in 1986. ^{3/} Value of exports declined during the period 1975-1980, but has increased to pre-1975 levels over the last five years. This was a result of increased production rather than better prices, while production increases have resulted from expanded area under production rather than through improved yields. Banana production for export, which is located in the lower Motagua Valley, provides 7,000 permanent jobs. Export marketing is dependent upon the Del Monte fruit company, with all exports going to the U.S.. Production technology on these farms is not as advanced as that used in other exporting countries as indicated by yield declines over three five-year time periods:

	<u>1972-76 to 1977-81</u>	<u>1977-81 to 1982-86</u>
Area	+78.0	+21.3
Yield	-37.5	-11.5
Production	+11.2	+ 7.4
Farm Price	+16.6	+ 1.8

Production for local consumption occurs throughout much of the lower elevations of the country on small landholdings. In total, about 8,000 hectares are planted to bananas both for export and domestic consumption. Production is expected to increase as new areas, particularly on the Atlantic Coast, are placed into production.

Use of improved technology could increase yields, and the major exporters believe banana production could be re-established on the Pacific Coast, where the United Fruit Company had operations from the 1930's to 1964. Deficient infrastructure, particularly rail and port loading facilities, are inhibiting factors, both to expanding exports from Caribbean ports, and to re-establishing Pacific Coastal production. Of course, increased areas under production could have quite favorable impacts on increased employment, especially for the unemployed ex-cotton and coffee laborers on the Pacific Coastal Plain.

^{3/} World Bank and FAO estimates are considerably higher, around \$150 - \$160 million annually.

d. Sugar. This crop is of similar importance as bananas to the Guatemalan economy, accounting for about 5% of the overall structure of production and providing \$52 million of foreign exchange earnings in 1986 from the export of 250,000 metric tons.

Both the area devoted to sugar cane and gross production expanded during the 1970's, reaching 87,000 hectares planted in 1986/87. Both the average cane yield and the sugar extraction rate dropped in the late 1970's as an increasing portion of production moved from intermediate to low altitude areas on the Pacific Coastal Plain. However, recovery rates and sugar yields are still among the best in Central America.

Low international prices characterize the trade condition of sugar. Its importance as a source of foreign exchange has varied through the years. Recently, there has been a noticeable increase in the area devoted to sugar cane and in the production of sugar. Nonetheless, cane yield levels have remained static. This is indicated by the following percentage changes over three five-year time periods.

	<u>1972-76 to 1977-81</u>	<u>1977-81 to 1982-86</u>
Area	+16.7	+ 4.3
Yield	- 4.4	+ 3.0
Production	+11.1	+ 10.3
Farm Price	0.0	0.0

The future of cane production is cloudy. World prices are uncertain, and Guatemala is not the most efficient producing country in terms of cane yields. Competition could be improved with better management, but current world prices do not provide incentives for investment in technology. Energy production could possibly maintain a market ^{4/} but the economics need study, and investment in large-scale production could be significant. Energy production also emphasizes cane varieties that stress bio-mass over sugar extraction.

^{4/} In fact, the country processed 650,000 - 700,000 metric tons of sugar cane in 1986 to produce ethanol to mix with gasoline.

Probably the most important recent occurrence seriously affecting the sugar cane industry is the reduction of import quotas allowed by the U.S.. Guatemala's quota, which permits the country to sell sugar to the U.S. at \$0.18 pound instead of the \$0.02 or \$0.03 a pound on the international market, was cut by 17% in 1986 and by a subsequent 47% in 1987, thereby reducing the foreign exchange earnings over the two-year period by \$19.3 million. With low yields and high costs, this would imply that the country's most inefficient operations would be driven out of business, thereby affecting the rural labor force on the Pacific Coastal Plain which has traditionally cut cane and worked in the sugar mills. It would probably also have a negative impact on many of the 13,000 independent producers.

e. Cardamom. This crop, which was about one-fifth as important in the overall structure of production of the country in 1980 (0.7%) as were both bananas and sugar, has steadily increased its importance to 3% in 1984 providing \$100 million of foreign exchange earnings in that year. Both output and price increases, as indicated below, made this performance possible:

	<u>1972-76 to 1977-81</u>	<u>1977-81 to 1982-86</u>
Area	+117.2	+44.2
Yield	+ 33.3	- 5.0
Production	+193.3	+ 31.8
Farm Prices	+ 56.8	+ 28.9

Occupying less than 10,000 hectares in the early 1970's, cardamom has expanded to around 50,000 hectares in 1986 in the lower altitude coffee areas. The Department of Alta Verapaz is responsible for 75% of the area cultivated. Because the cardamom plant is affected by a virus, little further expansion is expected in area planted unless that problem is solved.

During recent years, Guatemala has been the world's largest exporter of cardamom because of its high-quality grain, replacing India which had traditionally held the top spot. However, due to high international prices of cardamom, other countries (including Brazil, Colombia, Ecuador, Costa Rica,

Honduras, El Salvador and Mexico) found it profitable to cultivate this crop, thereby providing India and Guatemala with increasing competition and a downward pressure on prices. Presently, total world demand amounts to 8,500 metric tons, while world supply (including 7,000 metric tons from Guatemala and 4,500 metric tons from India) will reach 13,700 metric tons.

Despite strong price performance in the past (Q626/cwt. in 1984), prices have dropped over the last two years to Q400/cwt. in 1986. With carry-over stocks from excess production building up over the next few years, there will most likely be a downward trend in international prices until the most inefficient producers are eliminated from the world market. If prices continue to drop, large numbers of the approximately 50,000 Guatemalan small cardamom farmers could experience serious drops in their incomes from declining value of exports.

2. Situation and Outlook for Non-Traditional Export Crops

Table 12 indicates that non-traditional export crop production has become steadily more important in the overall structure of production, moving from 16% in 1970 to 19.5% in 1983 and subsequently leveling off at 19% during 1984 and 1985. In 1985, perishable agricultural exports (principally fruits, vegetables, ornamentals, and flowers) provided \$34 million in foreign exchange (Table 15), with almost half of that corresponding to fresh or frozen vegetables. Although these perishables accounted for only 3% of total export earnings in 1985, their importance should increase due to increasing demand in the United States, Western Europe, and East Asia and expanding expertise of Guatemalan producers and exporters. Although the largest market for Guatemalan goods outside of the CACM is the United States, these exports currently make up a very minor portion of total U.S. imports (Table 16). ^{5/} These levels could increase, however, because Guatemala, as other CBI coun-

^{5/} In the case of vegetables, the largest non-traditional agricultural export item, this proportion amounted to only 2% of all U.S. vegetable imports.

tries, has the advantages of its close proximity, harvests during the period of a winter decrease in U.S. production, and the diversity of environments within the country which allows production of tropical and temperate crops, such as mangoes and broccoli, within a relatively short distance of each other. The major Guatemalan competitors for exporting non-traditional crops to the U.S. are Taiwan, Mexico, Canada, the Dominican Republic and Costa Rica (Table 16).

Although factors such as sea freight costs are in Guatemala's favor, the Dominican Republic and Costa Rica are currently ahead of Guatemala as suppliers for U.S. non-traditional agricultural products. This tie with the U.S. market is due largely to the amount of U.S. support they have received. In the case of the Dominican Republic, a strong private sector was encouraged by the presence of major U.S. corporations, while the government offers institutionalized support and few controls on free trade zones to encourage exportation. Costa Rica's policies also became more conducive to exportation but only as a result of massive development assistance programs funded by the United States over the past few years. Now, although much smaller and less diverse agriculturally than Guatemala, Costa Rica surpasses its Central American neighbor in exports to the U.S. because of favorable credit policies, promotional campaigns in the United States, strong U.S. economic support and technical assistance, the existence of a Ministry of Export to coordinate information and promote trade, and other measures aimed at taking advantage of the Caribbean Basin Initiative benefits.

Because of its strong natural and human resource base for the expansion and intensification of its agriculture, Guatemala has the capability to become the leading supplier of U.S. non-traditional products from the region, if sufficient U.S. interest and investment are forthcoming. The Guatemalan government is more likely to respond with favorable policies and programs when the private sector is fortified and new agricultural exports are making more impact on the country's economy.

Of the ten leading non-traditional commodities being exported from Guatemala to the U.S. over the past five years (Table 17), broccoli and cauliflower have provided 15% of these foreign exchange earnings (\$7 million in 1985). However, the overall importance of these ten commodities in relation to total U.S. imports indicates that greater production could be absorbed by the U.S. market if the commodity were to have a competitive quality and price.

To facilitate governmental support to agricultural activities, Guatemala has been divided into seven regions by the Ministry of Agriculture (Figure 8). Regions I and V -- the Western and Central Highlands -- have primarily cooler climates where vegetables, asparagus, carrots, snow peas, apples, strawberries, garlic, cabbage, flowers, and lettuce are produced. Region IV -- the Pacific Coastal Plain which has a continuously warm climate -- grows tropical fruits, nuts, spices, lemons and ornamental plants. Region VI -- the South East portion bordering Honduras -- is drier than the other regions and varies in altitude. Principal crops include broccoli, melons, and onions. Region VII -- the North East area where the major Atlantic port is located -- is the center for the country's banana and plantain production, and also grows citrus, melons, okra, tomatoes, root crops (cassava, taro), and spices (Table 18). Regions II, III, and VIII have presently limited potential due to an inadequate access and secondary road infrastructure.

On the national level, all highly perishable crops are limited by the lack of efficient, inexpensive air transport. Other constraints to exportation are U.S. plant health regulations (i.e., quarantines against fruit fly host crops); lack of experience in producing, classifying and marketing non-traditional crops; and lack of adequate financing. Yet many of these constraints are being confronted in programs with international organizations and the Ministry of Agriculture, along with the efforts of the national and foreign private sector.

According to an analysis completed in 1986 ^{6/}, at the present cost of export, the non-traditional products bringing the highest absolute return in

^{6/} Importer's Guide to Non-Traditional Products from Guatemala, prepared by the Office of the Agricultural Attache, U.S. Embassy, Guatemala.

the U.S. winter market (highest net earnings per unit) are pineapple, spices, asparagus, strawberries, and mangoes. Also noteworthy are cantaloupe, honey dew, cauliflower, and broccoli. All of this could change, of course, with fluctuation in prices at either end. High returns will probably not continue for melons, for example, because of increased competition. In contrast, a low percentage of the spices imported to the U.S. originate in CBI countries, Mexico or Canada; current competitors in these crops are physically much further from the U.S. market than Guatemala.

One of the key impacts of this increased growing and exportation on non-traditional agricultural products has been a shift from subsistence crops (corn and beans) to non-traditional vegetables and fruits in the Western and Central Highlands, thereby providing diversifying farmers with higher incomes, greater value of production and increased on-farm, productive employment. It has also provided the Pacific Coastal Plain with an alternative to cotton production (about 1,000 hectares of previous cotton land are now in fruits and vegetables) and employment opportunities. Consequently, this trend away from traditional crops, though not yet significant in terms of total area, is a reflection of world trends of a decrease in the value/market for traditional exports from this region and the abandonment of subsistence crops for local consumption--crops which provide very low return at a time when the need for capital is heightened, even in the most remote rural areas.

Since the initiation of the CBI in 1983, many small and medium exporting companies have been established -- a good number of these dealing with fresh produce -- and national exporter associations (the Gremial de Exportadores de Productos No Tradicionales and the Cámara de Exportación) oriented toward non-traditional exports have doubled their memberships from one year to the next and are providing considerably expanded services to their members.

The most expensive step in exporting from Guatemala is international transportation. Most produce is sent by sea, leaving from Puerto Santo Tomás on the Atlantic Coast or, in some cases, from the Pacific Puerto Acajutla in El Salvador. The majority of shipments arrive to Miami, but regular service is

also operating to Houston, New Orleans and, less frequently, to Mobile and Tampa. Prices have decreased over the past six months due to lower fuel costs and increased competition among companies of the rate agreement made among SeaLand, Concorde, CCT and Seaboard; only the latter two companies continue in the agreement, and only for northbound freight. The other two companies are now independent. New lines have offered services at lower rates but have proved to be less reliable in terms of frequency of shipments.

Air transportation is even more problematic from Guatemala. Foreign airlines give preference to their country's exporters so that flights such as Lacsas often arrive at Guatemala already full, while others such as Mexicana can actually unload Guatemalan freight in Mexico in order to load Mexican freight. Eastern and Pan American airlines do not follow this practice, but are limited in space because of their passenger service. Aviateca, the Guatemalan airline, is also limited in space, charges higher rates, and operates in conjunction with McLean freight carrier service, which is equally expensive. Many complaints have been made to the government of Guatemala regarding air transport policies. The situation is being studied currently by an appointed council consisting of governmental officials and representatives of the private sector.

The rising share of non-traditional exports, such as fruits, vegetables, flowers, and seafood, marks the beginning of a much needed transformation of the productive structure of the Guatemalan agricultural sector. Fresh fruits and vegetables are particularly time sensitive, and anticipation in processed, as well as fresh, markets should be a part of any study of expansion possibilities for these crops. Expansion is taking place, but good data on production and consumption are difficult to find. Production of these crops is high in employment generation, and local consumption is thought to have increased, with positive nutritional and health benefits. Other countries of the region are also interested in expanding production of many of these same products. The government must be kept as well informed as possible of the production and export plans of the rest of the region, and how Guatemala fares in comparative advantage. Producers need particular assistance in market identification, market channels, storage/processing and quality control, in addition to production technology.

3. Situation and Outlook for Domestic Food Crops

Food crops for domestic consumption have varied inversely in importance with crop production for export markets. With the push during the 1970's for the export crops, which are essentially large, Pacific Coastal operations, importance of food crop production in the overall structure of production dropped from 14% in 1970 to 12% in 1975 to 8.5% in 1980. Thereafter, it has steadily increased to 11% by 1985, while traditional export crop production has steadily declined from 39% in 1980 to 36% in 1985. Most of the increased food production has resulted from increases in area cultivated rather than from increased yields. For example, area planted to corn declined in the early 1970's as cotton and sugar cane production expanded on the Pacific Coastal Plain. However, with the declining world markets for cotton in the early 1980's, corn plantings again increased on the Pacific Coastal Plain. Because of the importance of basic grains in the Guatemalan diet, five of these crops will be analyzed below.

a. Corn. The third most important crop in Guatemala in terms of value of production (after coffee and cotton) is corn, which accounted for 7% of the overall structure of production in 1985. Although its importance fell from 7.3% in 1970 to 5.7% in 1980, it has once again been climbing as area under production on the Pacific Coastal Plain, the East, and southern Petén has increased.

Corn is the food staple of the country, providing about 45% of the per capita daily calories of the population. Corn exports have been minimal (e.g., 600,000 cwt. exported to Mexico from the Petén in 1986) and sporadic, as have imports, reflecting structural inadequacies such as lack of storage capacity immediately after harvest or inaccessibility of certain areas, such as the Petén, to the large consumer market in Guatemala City. Because of the weak foreign exchange positions of the Central American countries, the export potential for Guatemalan corn is uncertain, although temporary surpluses might exist that could be exported.

Corn is produced in every Department of Guatemala, principally for on-farm consumption. Approximately 500,000 hectares are grown as a single crop and another 165,000 hectares are intercropped with beans, sorghum or other crops. There are 321,000 corn farmers with the national average size corn plot of 1.5 hectares. The smaller holdings are concentrated in the Highlands, where 32% of the total area planted to corn is located (Table 19), 54% of the corn farmers live, and which uses very basic technology, resulting in low yields. On the other hand, larger, more technified, mechanized high-yield corn operations exist on the Pacific Coastal Plain and in the Petén, where most of the production is sold rather than consumed. According to the 1979 Agricultural Census, over 88% of the corn farms are under 7 hectares in size (sub-family units) and provide 50% of the total production (Table 20).

Changes in the performance of corn production over three five-year time periods are indicated below:

	<u>1972-76 to 1977-81</u>	<u>1977-81 to 1982-86</u>
Area	+14.6	+ 6.7
Yield	+ 7.5	+17.4
Production	+23.0	+24.7
Farm Price	0.1	0.05

There has been some success at introducing limited technology for corn production, such as improved seed through ICTA, but the high-protein corn Nutricia -- developed in Guatemala -- has not caught hold among small farmers in the Highlands.

b. Beans. In 1970 this crop accounted for 7% of the overall structure of production, but passed through the same experience as corn with a continual decline until reaching its low point of 1.5% in 1980. Since then, it has increased its importance, reaching 2.5% in 1985.

Production levels and yields are subject to appreciable fluctuations because of the vulnerability of this crop to climatic conditions. As a result, the variability of bean prices has shown an increasing trend despite

the price stabilization policies followed by the National Marketing Institute (INDECA). Beans are cultivated by 177,000 farmers in every Department of Guatemala, with the largest concentration of producers (31%) and area (46%) in the East (Table 19). Harvest times vary in different parts of the country, thereby reducing the requirements for storage, but also necessitating inter-regional exchange and national integration. An important protein source for lower income groups, both rural and urban, this crop is also a small farmer crop, with the national average size bean plot of 0.6 hectares less than half that of corn. Farms of less than 7 hectares account for 60% of production (Table 21). Improved seeds from ICTA increased yields markedly through the 1970's to the point where present yields are comparable to the best in the Western Hemisphere. As the following figures indicate, prices remained remarkably stable, since production barely kept up with domestic demand:

	<u>1972-76 to 1977-81</u>	<u>1977-81 to 1982-86</u>
Area	-13.8	+49.2
Yield	+38.2	0.0
Production	+19.1	+49.0
Farm Price	+ 1.2	- 1.2

Yield increases with steady prices have made beans an attractive crop for small producers, though not profitable enough to lead to oversupply. Further gains in small production systems, or the discovery of a profitable large-scale system, may be needed to keep up with domestic demand if growth continues. On the other hand, increasing incomes tend to shift consumption to other protein sources. Export is not likely to be satisfactory, given limited world demand and small-unit production. Economic returns to major efforts to increase yields further appear marginal in the near future.

c. Wheat. This crop has historically accounted for a small portion of the overall structure of production, constantly between 0.7% and 0.8%. It is a small farmer crop (average plot size of 0.6 hectares), grown almost exclusively in the Highlands (99% of all producers) (Table 19). It is usually planted on marginal land so that yield responses to technological inputs are limited. There are 45,000 wheat farmers in the country, of which 94% grow less than 7 hectares of wheat (Table 22). They produce 40,000 - 50,000 metric tons of soft wheat, with area planted to this crop fluctuating between 30,000 - 40,000 hectares depending on the price of inputs and the market price for

the product.

Presently, domestic production accounts for only 30% of national consumption requirements, with the remaining 110,000 metric tons being imported at a cost of \$17 million annually. Growing consumer demand for wheat flour is presently satisfied, and will probably continue to be satisfied, by imports. Exchange rate policy setting the rate for wheat imports at Q2.50 to \$1.00 will increase the cost of imported flour, and may provide some incentive to increase local production. Limits imposed by suitable climate (and subsequently area) mean that soft wheat production can be increased only through improved yields (seed, fertilizers, etc).

The changes over three five-year periods are shown below:

	<u>1972-76 to 1977-81</u>	<u>1977-81 to 1982-86</u>
Area	-16.9	+0.3
Yield	+15.3	+6.0
Production	- 3.9	+6.1
Farm Price	+12.8	-1.5

d. Rice. Similar to wheat, this crop has historically accounted for a small part of the overall structure of production, constantly between 0.5% and 0.7%. Similar to cotton, this crop is produced largely under dryland conditions by some 8,000 farmers. The Department of Izabal and the Pacific Coastal Plain in the Santa Rosa Department are the major producing areas, supplying about 45% of national production (Table 19). Similar to corn, the average rice plot is about 1.5 hectares. In spite of gradual increases in area, and rather notable increases in yields in the early 1980's, production did not cover domestic demand in 1986 due to uncertainties about price policies. Market prices have risen as a result of the shortage, which may result in increased 1986/87 acreage.

Yields of over 5 metric tons per hectare have been demonstrated, but few producers attain that level. The national average of about 3 metric tons has only been attained recently, thanks to use of higher technology. Institutional resource limitations in DIGESA and the secondary status of rice as a staple grain in Guatemala reduce DIGESA's promotion of this crop and limit farmer access to assistance in its production. Production has shifted from

small- to medium-sized operations, apparently because of the latter's greater access to technology, but assistance and technology processes are still seen as limitations to further growth of the crop. The changes over three five-year periods are shown below:

	<u>1972-76 to 1977-81</u>	<u>1977-81 to 1982-86</u>
Area	+4.6	+9.5
Yield	+4.4	+58.2
Production	+8.8	+73.4
Farm Price	+8.4	-6.3

Guatemala has the natural resources favorable for rice production. However, the government should consider the long-term desirability of entering the competitive world market for rice. Comparative advantage cannot be estimated because of an almost complete lack of cost of production data. It is perhaps significant that a major United Nations study of rice in Guatemala, completed in 1984, made almost no reference to production costs.

e. Sorghum. As Table 12 points out, sorghum production as a proportion of total agricultural production has been negligible, although production has increased considerably over 1970 levels. Sorghum production tends to be a small farmer crop in the East (average of 1.5 hectares) and a medium and large farmer crop in the Pacific Coastal Plain (average of 12.7 hectares) as some cotton acreage has been replaced by sorghum (Table 19). Increases in production during the early 1980's were due to expanded area planted, rather than through increased yields, as is shown by the following data:

	<u>1972-76 to 1977-81</u>	<u>1977-81 to 1982-86</u>
Area	-20.6	+25.3
Yield	+4.1	-6.7
Production	+11.7	+15.8
Farm Price	+7.5	+0.4

Gradual increases in yields have occurred with considerable fluctuation in area. Mainly a livestock feed, the crop doubles for human consumption when corn is in short supply. Sorghum is suited to fairly dry regions which are currently marginal in cotton production. Some promise is

seen for further expanding sorghum production for livestock feed in order to free up for human consumption some of the corn now fed to livestock, and to minimize imports of basic grains, except for wheat.

4. Situation and Outlook for Livestock Production

Livestock's participation in the overall structure of production of the country has remained surprisingly stable over the 15-year period of this analysis, fluctuating from 33% to 35%. Exports of beef have declined from 3% of total value of exports in 1970 to 0.6% in 1985, accounting for \$10 million of foreign exchange earnings in that year (Table 1). Most of the reduction in exports during the early 1980's was due to reduced U.S. import quotas for beef and stricter quality control on beef exports to the U.S.. Three-fourths of all beef produced in the country is consumed domestically. Although Guatemala is a net exporter of meat, it is a net importer of milk and milk products. Beef production has been declining since 1983 as a result of reduced consumer demand due to declining real incomes and the increasing importance of poultry in meat consumption patterns. This latter product appears to have considerable growth potential in Guatemala, if feed and animal health can be provided at a reasonable cost.

a. Beef Production and Consumption

In 1985, the Bank of Guatemala estimated the herd size to be around 2.1 million (Table 23), slightly over the number estimated by the 1979 Agricultural Census. The national cattle herd grew steadily during the 1960's, but at a slower rate since 1975. Estimates of total population during last five years are highly tentative, since extraordinary events have interrupted the previous trend and prevented accurate extrapolation. These events include price controls and significant contraband export of cattle due to overvaluation of the Quetzal during 1984 and 1985. What is notable from Table 23 is the constantly declining extraction rate, dropping from a high of 21% in 1978 to 14.5% in 1985, indicating a poorer fed animal.

The 1979 Agricultural Census showed that of 117,596 ranches reporting cattle, only 8,016 (or 6.9%) were 45 hectares (one caballería) or larger in area (Table 24). Although relatively small in number, these larger ranches had 1.4 million head of cattle which represented 69% of the country's cattle. It is assumed that this structure has not changed significantly by 1986.

Illegal export of live cattle without the balancing effect of increasing productivity has created a shortage of cattle, driving prices up and reducing the slaughter rate for domestic consumption. Beef production has declined from 147 million pounds in 1978 to 116 million pounds in 1985. Exports for 1985 in terms of dressed beef amounted to 25 million pounds, equivalent to 21.8% of total production (Table 25).

Consumption of beef has trended downward since 1979, largely keeping pace with production declines and decreases in real disposable income. Domestic consumption fell from 140 million pounds in 1978 to 116 million pounds in 1985. Per capita consumption declined from 21.2 pounds to 14.5 pounds during the same period (Table 26).

Standards of performance of the national cattle herd are shown in Table 27. By any measure of productivity, Guatemala ranks low. The comparative data for United States cattle production show great differences in the calving rate and interval, mortality rates for both calves and adults, rate of weight gain, and milk production of dairy cattle.

b. Milk Production and Consumption

The 1979 Agricultural Census included a breakdown of cattle by types into beef, dairy and dual purpose. The largest classification was dual purpose, accounting for 95% of the 1,560,940 cows under milk production. This figure is most likely overestimated and probably includes all cattle in many herds, where only one or two cows are milked. The largest concentration of dual purpose cattle is mainly in the Department of Escuintla (Region IV), followed by the Departments of Jutiapa and Santa Rosa (Region VI) (Table 28).

Guatemala's 1985 milk production was estimated to be 262.7 million liters (Table 29). Production has trended slightly upward in recent years, largely as a result of expanding to a dual purpose production system, rather than efficiency improvement in the dairy sector. Preliminary figures indicate that almost 70% of total milk production comes from this dual system.

The amount of milk produced is insufficient to meet the domestic demand for dairy products. In order to cover this deficit, the country is importing increasingly larger quantities of powdered milk and milk products, moving from 12.9 million liters in 1975 to 67.9 in 1980 to 125.3 in 1985 (Table 29).

Regarding per capita consumption, a flat trend has been observed since 1980. Actual demand is well above domestic production, with 32% of the demand being filled by imports. Policies of the government have tended to favor price controls and ceiling prices which have discouraged domestic production. However, with Decree 208-86 published in early 1987, price controls have now been officially eliminated. Another serious constraint to increased dairy production is obtaining good dairy feed at a reasonable price.

5. Situation and Outlook for Forestry Production

Guatemala's forest resources are among the most varied of any Central American country. These resources fall into two broad categories: (1) coniferous and mixed coniferous and broadleaved forests, and (2) montane and tropical broadleaved forests. The former accounts for about 30% of the total area of forest in the country. Coniferous and mixed forests are largely restricted to the Western and Central Highlands, although small remnants persist in parts of the East as well. The lowland and montane forests account for the remaining 70% of forested area. They are concentrated in the northern part of the country, primarily the Petén, with smaller areas in the Northern Lowlands of Huehuetenango, Quiché, Alta Verapaz, and Izabal (Figure 9).

There is no good information on the contribution of forests to GDP. If known, such values would, of course, be very small, generally well below 2%. Such data would fail, however, to reflect, or would underestimate, a good

part of the economic contribution of forest resource-based activities. One reason for this is the difficulty of estimating some of the in-kind goods produced by the forest, in particular fuelwood, which makes up a large share of forest extraction.

Use of wood for lumber and associated products was limited until 1985. Average consumption was around 200,000 cubic meters per year in the early 1980's. In 1985 CELGUSA, a large pulp processing operation, was to come on line to supply all of Guatemala's internal demand for pulp as well as export markets. This plant was to help offset the increasingly large negative trade balance in wood products (Q48 million in 1982), but would also have placed additional pressure on dwindling forest resources. Estimates were that industrial use of wood (mainly pulp) would have increased by over 500% between 1982 and 1985, largely as a result of this wood pulp production. However, the government has decided not to permit the operation of the plant until an area is planted and producing sufficiently to guarantee that the plant will not cause large deforestation.

Guatemala's lumber industry produces largely for local demand, although there is some export of exotic woods in the form of unfinished lumber and veneer. The primary areas of timber production are in the northern part of the country, but most of the sawmills are in Guatemala City. This means that logs must be transported up to 200 kilometers from source to sawmill. This adds considerably to the cost of lumber and wood products.

The amount of timber cuttings for industrial uses (finished and semi-finished wood products) steadily declined from 546,000 cubic meters in 1975 to 180,000 in 1982 (Table 30). However, by 1985 it had rebounded to historically high levels (862,000 cubic meters) and is projected to reach 970,000 cubic meters by the year 2000. This could be a promising source of added foreign exchange earnings, assuming that a concurrent reforestation activity is carried out. Fuelwood, on the other hand, has continually increased in use since 1970 and is projected to reach 14 million cubic meters by the year 2000. Given the importance of fuelwood in the life of rural Guatemalans, an ambitious program of reforestation with fast-growing fuelwood varieties (e.g., leucaena) is imperative if the natural resource base is to be maintained.

6. Situation and Outlook for Fisheries Production

Until recently, fisheries and aquaculture were a neglected sub-sector of agriculture, receiving little investment or interest on the part of the government, and only limited attention by the private sector. In the past few years, however, more activity has taken place, largely due to an increasing interest in exporting both cultured and wild shrimp and certain finfish species, as well as a growing interest in aquaculture and fish consumption by the Guatemalan population. Shrimp culture on the Pacific Coast grew from virtually nothing in 1980 to approximately 1,000 hectares by the end of 1986. The following describes each component of the fisheries/aquaculture sub-sector.

a. Capture Fisheries

i. Fresh Water. Capture fisheries provide a source of high quality protein, as well as income, for many Guatemalans. While fish availability may be influenced by proximity to natural water bodies, fish are marketed widely. Neither transportation difficulties nor preservation of freshness greatly impede distribution. Price seems reasonable in regard to distance to the consumer and is comparable to poultry and red meat prices. There is little basis for judging the exploitation level of inland capture fisheries due to a paucity of data (Table 31 presents scant information), and, therefore, as yet there exists no basis for yield estimates and management recommendations.

The importance of freshwater capture fisheries with respect to the impoverished rural population is little appreciated. While capture fisheries will continue to have a heavy influence on the rural population in certain areas, there is little effort in conserving these fisheries.

However, in view of the general low-yield potential of the fresh waters of Guatemala, the fisheries are most probably not capable of much, if any, increase in sustainable yields. If this perception is correct, the protein supplied from these fisheries must be viewed as important, but future escalated needs will have to be met through fish farming efforts. Neverthe-

less, the present level of exploitation should be documented so as to permit the development of a management protocol. If harvest is excessive, or becomes so, a decline or collapse of the fishery may result. Any deficit would place additional demands on aquaculture development.

ii. Marine Fisheries. Commercial shrimp exploitation dominates marine fisheries. Most capture shrimp are exported to the U.S.. The wild shrimp resource is under very heavy pressure, and the magnitude of landings demonstrates the critical nature of the problem. While environmental changes and possibly the catch of larvae/juvenile shrimp exported for grow-out in Ecuador may have contributed to the shortages of last year, fishing alone is enough to account for the low state of the resource. There is a great need for improved shrimp fishing management, which would benefit the industry and the country. While improper management is not likely to totally destroy the resource, the harvest will be erratic for some time to come.

The shrimp fleet, at 44 vessels, is far larger than necessary for national resource exploitation. The fleet, although not new, is well maintained and appears effectively managed. Fishing methods do not appear to have changed much in the last fifteen years, and fishing technology could be improved with the use of more effective gear.

The cooperatives, with their smaller vessels, are subjected to various constraints. Catches are low, efficiency has never been high, financial problems are serious, and loan repayments are in jeopardy. The cooperatives need financial assistance in rescheduling loans and technical assistance to improve efficiency.

There appears to be a potential for the expansion of finfish exploitation on both the Atlantic and Pacific Coasts. However, hard data upon which to base this assumption are not available. The Atlantic resources are likely to be found at some distance from shore north and east of Puerto Barrios. The exploitable stocks are likely to be the snappers, groupers and shrimp, although it can be expected that other species, heretofore unexploited,

will be harvested. Somewhat larger boats and new methods will be needed to exploit these stocks. The Pacific resources include the snappers, groupers, squid and prawns as potential stocks. Despite the long history of fishing along this coast, the snelf and the slope have not been adequately explored. No effective effort has been made at catching squid, for example, utilizing state-of-the-art methodology.

Each of the species mentioned above is worth exploring and holds very real potential for expansion. Additional capital will be required as the sub-sector expands, and the public and private financial agencies must be made aware of the potential in this area so that they can more effectively meet the financial needs.

While the country depends heavily on the shrimp fleet for fish (Table 32), it is unlikely that the fleet will contribute much more to the domestic market. The steady decline in the capture species does not bode well. In spite of the Ministry of Agriculture's program to deliver fish to poorer consumers by making arrangements with shrimp companies to receive the fish that would otherwise be thrown away, efforts to retain more of the bycatch are not likely to prove successful for two reasons: (1) much of the bycatch is not suitable for direct human consumption; and (2) fish cannot compete with shrimp for limited space and ice, nor will it keep well for the length of the trip. However, if the shrimp resource continues to decline, it is likely that more emphasis will be given to fish. At the moment, however, there is little thought being given to using shrimp vessels for fish, nor is anyone considering any additions to the shrimp fleet.

The artisan sector in Guatemala is quite good at exploiting fish species at the basic level. A few of the fishermen are advancing technologically and find resources to improve techniques and increase catch. The vast majority of the fishermen are part-timers, and may not have an interest in adopting more productive methods. On the other hand, some bring capital into fishing from other jobs and are, in fact, the innovators.

b. Aquaculture

While aquaculture is still in the embryonic stage, undoubtedly there is excellent potential for it in Guatemala. Soils, climate, water availability and quality and proximity to local and U.S. markets are favorable.

Presently, marine shrimp culture is the dominant aquaculture activity, with approximately 1,000 hectares in production. Cultured marine shrimp is almost entirely exported. Small enterprises culturing rainbow trout, tilapia, and fresh water shrimp for the domestic market have been initiated and appear to have promise, both domestically and for export.

Native species with food culture potential are the giant fresh water snail, Pomacea zeteni, a fresh water clam, Diplodon sp., and at least two fresh water fish, Rhamdia guatemalensis and Brycon guatemalensis. The two molluscs may have export potential. A number of native species may hold export potential in the lucrative aquarium fish business.

The total contribution of aquaculture to the agriculture sector is difficult to measure at this time, due to a paucity of data. However, the potential for a higher contribution is excellent.

TECHNOLOGY DEVELOPMENT, TRANSFER, AND USE

Agricultural technology development and transfer in Guatemala is undertaken by several public and private sector institutions. The public sector institutions are primarily involved with production of basic grains, with the principal clients being small- and medium-sized farmers. Private sector institutions concentrate on a single export crop and serve large farmer interests. The research and extension responsibilities are combined within each private individual institution. In contrast, Guatemalan public sector research is the primary responsibility of a single research institution, while transfer of the results of this research is managed by two separate extension agencies.

The separation of public sector research and extension activities dates to 1973, when research activities were removed from the Ministry of Agriculture and placed in a quasi-independent research institute, the Institute of Agricultural Science and Technology (ICTA). This split has led to lack of coordination of efforts and hindered transfer of research results to farmers. Since the early 1980's, the government has been urged by external donors (including AID) to better coordinate activities of the research institute with the extension branches of the Ministry of Agriculture (DIGESA and DIGESEPE). Despite the efforts of donor organizations, lack of coordination between these two activities persists. This problem has led to difficulties in delivery of useful information to the small- and medium-sized farmers who are the intended beneficiaries of the ICTA research activities.

1. Research (Technology Development)

a. Private Sector. The nature of agricultural research undertaken by Guatemalan private sector institutions is determined by the production and marketing requirements of the commodity which they represent. Consequently, research is carried out in coffee, sugar, bananas and tea (Table 33). Large farmers and/or their associations also maintain agreements with various Guatemalan universities for agricultural research on cardamom, vegetables, cotton and coffee.

The private sector provided a meager budget for research. Its financial efforts are dedicated to maximizing profit through the use of agrochemicals without looking at production alternatives which would maintain income but reduce the use of agrochemicals and, therefore, their noxious effects on the environment. For example, little has been done by the private sector to introduce the use of integrated pest management (IPM) through biological control.

b. Public Sector. ICTA is internationally recognized as a leading pioneer and example of a farming systems research institution. It was established to develop improved technology for small-scale farming systems and has had considerable impact on the production of maize and beans in Guatemala through varietal and other improvements. Its main research focus is on production of basic grains, temperate climate horticultural products, deciduous fruit, sesame and swine, which it does through its regional stations, called production centers. Approximately 75% of ICTA research is done on individual farms.

The ICTA research methodology starts with a socio-economic and agricultural information gathering activity designed to help research technicians know the farmer, his environment, what he is doing, and why he does it. This information is used to decide what "problem" to focus on and the type of work to do. In the process, international agricultural science institutions and other national institutions are drawn upon for information. If the innovation decided upon has to do with genetic adaptation, the next step will be basic breeding work carried out at the production center (research station). However, if the innovation has to do with farming practices, experimentation is likely to begin in a farmer's field. The next phase, after station and on-farm experimentation have indicated that new technology will be useful, is on-farm experimental testing by the farmer under farm conditions. Once it has passed this test, the technology is ready to be turned over to the extension system for transfer.

ICTA is recognized as one of the most productive agricultural research institutions in Central America. Thanks to ICTA research, bean yields increased from 0.26 tons per hectare in 1977 to over one ton per hectare in 1982, which is presently one of the highest yields in Latin America. Corn yields are traditionally 1 - 1.5 tons per hectare in the Highlands, but ICTA has developed varieties which, with a few improved cultivation practices, can provide yields of 3 - 3.5 tons per hectare. It has also developed a high protein corn (Nutricita) for use on the Pacific Coastal Plain. Increased yields from ICTA research have also been achieved for rice, sorghum and potatoes (Table 34).

ICTA's farming research methodology has produced impressive results in basic grains. However, the lengthy process of developing research designs, conducting experiments, and testing results may take up to four years. This lengthy process creates problems for extension agents, who do not always understand the need for carefully controlled experiments, and who may believe that ICTA is deliberately withholding results of its work.

ICTA has developed relationships with most international research agencies working within the hemisphere, but seems unwilling to accept their research findings and disseminate them without independent validation. This delays the diffusion of research results that could be of great use for farmers. Another problem is that there is no formal mechanism for disseminating ICTA research results to the extension services. There is an obvious need to continue the efforts to improve dissemination of research results outside of ICTA.

The ICTA staff has over 160 technicians and 210 support personnel, with two-thirds of this personnel located in the regions outside Guatemala City. Although ICTA's staff is better trained than those of comparable agencies in the public agricultural sector, there are considerable deficiencies in its technical preparation for adaptive research on fruit and vegetable production and animal husbandry. The distribution of ICTA's budget among administration, research by crop, and seed production and management is presented in Table 35.

In spite of being recognized as a productive institution, during the last ten years ICTA has only received the equivalent of 0.2% of the 1979 nationwide GDP, which is extremely low in comparison to the average 1.1% of GDP spent on research by other Latin American countries. In order to give research the priority position it deserves in this agriculturally-based economy, ICTA's budget should be at least doubled.

2. Extension (Technology Transfer)

Agricultural extension functions are undertaken by two Ministry of Agriculture institutions: DIGESA is responsible for dealing with fruits, vegetables, and basic grains, while DIGESEPE handles livestock.

a. Agricultural Extension Service (DIGESA)

With the exception of the Agrarian Reform Institute (INRA), DIGESA has the largest staff within the public agricultural sector, about 1,800 employees. Most of its administrative staff is centralized in Guatemala City, while the technical staff are assigned mainly to the eight agricultural regions.

DIGESA's traditional extension methodology deals with the following four-stage process:

i. Motivation - This stage includes the training of rural primary school teachers, children through the sixth grade, and youth through the teenage years via 4-H type clubs (4-S) in homemaking, crafts, crop, and livestock projects.

ii. Formation - Agents work with farmers and housewives in groups to provide training in general agricultural technology (production and marketing) and homemaking skills (food, diet, health). Local training centers and mobile teaching units are utilized in this stage. The objective at this

level is to orient those who have not been previously trained. After a farmer has received adequate assistance at this stage, he can graduate to the promotion stage. There is no organized training beyond the formation stage for housewives.

iii. Promotion - Only farmers are included in this phase. A promoter, different from those who oriented the farmer in the formation phase, assists him to develop a credit request and arranges for a loan through BANDESA.

iv. Follow-up or Monitoring - Conceptually, this is the last phase of the DIGESA training approach, from children to adults, which directly provides assistance for application and management of agricultural technology. On farmer request, the promoter provides occasional assistance and technology up-dating; i.e., the farmer is somewhat self-sufficient and requires less than constant guidance.

This traditional process is the one most used by DIGESA extensionists. The traditional model has a team composed of an agricultural extensionist, a 4-S club promoter and a home extensionist. This team works with individuals or groups in order to provide them with the technical assistance needed to increase farm production and family nutrition.

A second extension methodology, initiated in 1984, which is utilized by DIGESA consists of having the community members identify their basic needs and come up with possible solutions. DIGESA extensionists aid the community to coordinate with the various public and private sector institutions to fulfill needs that were identified. The role of extensionist is seen as guiding, motivating, and promoting the process of identifying and resolving community needs.

A third extension methodology is currently used solely in the Guatemalan Highlands. This approach involves DIGESA extension specialists in soil conservation, small-scale irrigation, vegetable production, fruit produc-

tion, and nutrition, who coordinate with ICTA researchers, DIGESEPE livestock technicians, BANDESA credit officers, and INDECA marketing technicians. In this methodology DIGESA is responsible for the promotion, design, acquisition of credit for, and supervision of the construction of soil conservation (terracing) and irrigation projects.

This last extension methodology adopts a farming systems approach. Specialists form teams at the sub-district level in order to coordinate their extension activities to encourage small farmers to adopt non-traditional (i.e., vegetable and fruit) crops and livestock in order to increase family farm income and improve family nutrition. This integrative, farming systems extension methodology has been underway since 1983. The program is generally successful despite problems with coordination of efforts among Ministry branches, whose relationships have traditionally been based upon competition.

As of mid-1986, DIGESA has been using 3,700 para-professional farmers and their wives (representantes agropecuarios) to expand their activities into more remote agricultural areas of the country. Basic extension and organizational activities are undertaken by these representantes in their communities, while the extensionists provide periodic backstopping through visits and the provision of information and materials. One area where DIGESA could use more assistance is in the preparation of simple, illustrated materials, videotapes, and radio programs in various indigenous tongues to expand and make more effective their assistance to Highland communities.

DIGESA has been concentrating a large share of its extension efforts in the Highlands during the last four years in the installation of small-scale, gravity-fed irrigation systems and soil terracing on steeply-sloped hillsides through support from three different AID projects (0233, 0255 and 0274).

The terracing is highly labor-intensive, and the technology to accomplish it is simple and can be applied by farmers using common tools.

Increased corn production on terraced land is approximately 141% greater than unterraced land, for wheat 81%, for potatoes 98%, and for beans 95%. A spin-off benefit of terracing is the highly nutritious grass that is grown on the terrace walls to stabilize and protect them from erosion. The grass provides feed for farmer's livestock. Alternatively, the grass is cut as a cash crop.

As of 1986 over 3,000 hectares of land have been terraced, mainly in Region I. Several impact evaluations have been carried out on these projects, all of which have indicated a high level of acceptance by small farmers. This success is largely due to reduced erosion, higher yields, greater water retention, and easier labor which result from terracing. Because of the urgent need for soil conservation in Guatemala, social payments were used in order to improve adoption rates and increase the rate of terrace construction. The benefits from terracing are so clear that in some communities farmers who are not project participants have built their own terraces, relying on friends and neighbors to teach them the simple technology. There are no data, to date, on the quantitative impact of terraces on soil erosion rates, water retention, or soil fertility, but yield gains leave no question as to their qualitative benefits.

To date, over 100 small-scale irrigation projects, serving between 15 and 100 beneficiaries each, have been constructed with AID funding. Most participant farmers have used small-scale irrigation projects to convert part of their land from basic grain production (corn, beans, wheat) to vegetable and/or fruit production. Part of this production goes to local markets, where it contributes to improving nutrition and varying diet. The remainder is destined for large urban markets or export. In either case most participating farmers report considerably increased incomes (up to 400 percent more) and improved standards of living.

Most irrigation projects have been built in DIGESA Regions I and V, which comprise most of the indigenous Highlands. As with terracing, small-scale irrigation has a "demonstration effect" that has elicited requests for projects from non-participating farmer groups.

Since most soil conservation activities have been narrowly focussed on bench terracing, DIGESA should be aided in expanding the soil conservation effort to broader watershed management concepts, such as contour planting, windbreaks, and small water retention dams. In addition to expanding small-scale irrigation systems, more emphasis should be placed by DIGESA on efficiency of water use.

b. Livestock Extension Service (DIGESEPE). DIGESEPE is regionalized along the same lines as the other public agricultural sector institutions, with its administrative headquarters located in Guatemala City. The organization has about 380 personnel, with more than half stationed at the central level.

A rather recently created division of MAGA, it has responsibility for the provision of livestock extension services and typically serves farmers with medium-sized landholdings. DIGESEPE technicians normally work with individual farmers and not farmer groups. Their extension technicians emphasize disease control and treatment of large animals.

Recent projects sponsored by international donors have attempted to influence DIGESEPE's extension perspective by focusing on small animals and incorporating production practices, credit, and marketing into their extension services, coordinating with ICTA technicians and BANDESA personnel. This allows DIGESEPE clients to benefit from ICTA research and provides small and medium farmers with credit for livestock production.

This new extension methodology has forced DIGESEPE to concentrate closely on the benefit/cost of raising the various types of animals. This expands their previous efforts which focused almost exclusively on animal health.

3. Use of Technical Inputs

a. Seeds

The government encourages the use of improved seeds through a combined public/private sector effort. ICTA is in charge of producing the foundation seed ^{7/}, the private sector is responsible for the multiplication of this seed through individual contracts with the government, and DIGESA supervises the propagation activities and registers the certified seed. Almost 70% of the certified seeds distributed in the country are produced by three commercial firms, who pay a price to ICTA which does not fully reflect the research and development costs involved. ICTA has a monopoly on foundation seed production and must authorize all base seed imports.

Seed availability is no limitation in the area surrounding Guatemala City and on most of the Pacific Coastal Plain. In much of the rest of the country, however, the lack of roads and suppliers makes obtaining seed more difficult for producers. Acceptance of improved seed has been widespread and prices are high. Except for supply cooperatives, supplier credit has all but disappeared, making access to inputs even more difficult.

The impact of ICTA/DIGESA certified seed use has been considerable, with increases in production ranging from 0.25 tons per hectare for sesame to 1.2 tons per hectare for rice (Table 36).

Most varietal development at ICTA emphasizes intensive utilization of fertilizer and other imported inputs. This production system applies better to commercial agriculture, such as that found on the Pacific Coastal Plain, than to small farms. Thus, efforts are needed to develop varieties that perform acceptably under production systems used by subsistence and small commercial agriculture.

^{7/} The production of germplasm by ICTA has grown from 14,488 cwts. in 1978 to 53,353 cwts. in 1984.

b. Fertilizers

The use of fertilizers and other chemicals is promoted by the government through tax exemptions, preferential exchange rates for fertilizer imports and, in some cases, direct distribution at subsidized cost. To date, fertilizer production and marketing has been largely a private sector undertaking.

During the 1970's, the government distributed fertilizers through BANDESA, but abandoned this practice when it considered that the fertilizer marketing system had developed sufficiently. Recently, the government has opted for importing and distributing fertilizers to small farmers because it considers that the price of fertilizers is inflated. Consequently, in May 1986 it imported 18.9 thousand short tons of fertilizer, which cost Q21.65 per cwt. to import and was sold for Q15.00 through the municipal governments.

Corn is the heaviest user of fertilizers in terms of volume. During the 1985/86 production season, it absorbed 540,000 metric tons, compared to 398,000 metric tons used by coffee, which is the second most important user. As indicated in Table 37, more than half of the fertilizer combined with low technology is applied to corn, while almost one-third is used on coffee. This raises the question of whether this expensive input is being used efficiently and whether its use should be promoted in the absence of a technological package that maximizes the effectiveness of fertilizers on these two crops. This is especially true since both corn and coffee are low-yielding crops. On the other hand, high-yielding beans and cotton combine fertilizer use principally with medium and high technologies (i.e., with other technical inputs and cultivation practices).

In terms of numbers of farmers using fertilizers, 70% of the corn farmers, 95% of the wheat farmers, and 18% of the bean farmers apply chemical fertilizers. Almost 75% of the country's small farmers use organic fertilizers, especially on their milpa (family plots of corn, beans and vege-

tables). Imports of chemical fertilizers doubled from 1970 to 1980, but have been declining since then. Because of the relatively high cost of imported fertilizers, increasing emphasis should be placed on the preparation and use of organic fertilizers, especially related to fruit and vegetable production.

c. Pesticides

Pesticides are used principally on the agricultural export crops, especially cotton ^{8/}, sugar cane, coffee, and fruits and vegetables. This has permitted considerably increased yields of these crops, but has had serious negative side effects due to their indiscriminate and excessive applications. Among other effects are included the following: destruction of beneficial and productive insects, especially honey bees; poisoning of rivers and streams from runoff and aerial spraying which destroys water life; contamination of drinking water, beef cattle and dairy cattle and their sub-products from the sprayed regions; and intoxication of farm workers from spraying.

Since 1981 poisonous residuals have declined considerably on the Pacific Coastal Plain due to the reductions in plantings of cotton and the imports of DDT (Table 38). In order to even further reduce this danger, a concerted IPM program should be undertaken.

^{8/} Pesticide use in cotton accounts for 66% of the total cost of production for this crop.

G. AGRICULTURAL FINANCE

1. Public Sector Budget

One of the most prominent indicators of the government's dedication to the development of agriculture is the proportion of the annual budget being allocated to this sector, especially that related to investment (as opposed to operating expenses). A review of the information does not provide a very encouraging picture. In 1976, the sector was provided with 7.6% of the total budget, in 1981 4.2%, and by 1985 it had fallen to 3.2%, which resulted in a ten-year average of 4.5% of the total budget (Table 39). In 1987, the public agricultural sector's budgetary proportion ranked behind the other sectors in declining order of importance: Public Debt, 20.1%; Education, 16.6%; Defense, 13.3%; Health, 9.2%; Transportation, 9.0%; Finance, 8.7%; Labor, 7.7%; General Services, 5.7%; Agriculture, 4.5%.

This downward trend of agricultural sector budget as a proportion of total government budget since 1980 is very discouraging. Although the agricultural investment budget as a proportion of the total agricultural budget has remained steady at around 50% over the period 1975-1985, when the government decides to reduce the budgetary deficit by not fully spending the amounts authorized, the investment portion is not spent 9/. If the government is sincerely committed to the idea that agriculture is to be the country's engine of growth, then it must provide greater budgetary allocations for this sector and maintain the investment budget at higher levels.

9/ In 1986 the government spent only 40% of the total budgetary allocations, reducing expenditures for investment to practically nothing.

2. Banking System

The Guatemalan banking system is comprised of the Bank of Guatemala (Central Bank), three state development banks, fourteen private Guatemalan commercial banks, two foreign commercial banks, and five finance companies, four of which are private. The banking system operates under the guidance of the government's Monetary Board, which is responsible for establishing the country's monetary, exchange, and credit policies and for the management of the Central Bank. The system is regulated by the Superintendency of Banks, an autonomous agency charged with the inspection, supervision and auditing of banking institutions. In addition to banks and finance companies, the financial system also includes various non-banking financial intermediary agencies, including insurance companies, savings and loan associations, cooperatives, and deposit warehouses.

a. Public Sector Financial Institutions

Among the public sector financial institutions are three state-run banks and one finance company: The National Finance Corporation (CORFINA), the National Agricultural Development Bank (BANDESA), the National Housing Bank (BANVI), and the National Mortgage Institute of Guatemala. All were created to promote the economic development of the country, and they mobilize resources from domestic and international sources to finance a wide range of industrial investment. CORFINA is nearly bankrupt due to poor investments and has virtually ceased its lending activities. BANDESA's objective is to finance the agricultural sector; however, it has experienced serious decapitalization due to poor loan recovery and its share of the market has been declining in recent years. BANVI operates as a quasi-commercial bank that has directed a major portion of its activities to construction and housing. Its loan portfolio is considered weak and scant resources are currently available for new lending.

b. Private Sector Financial Institutions

The private financial sector is composed of private banks, finance companies, deposit warehouses, savings and loan associations, insurance companies, and the cooperative movement. Commercial banks are involved in two types of activities: commercial and mortgage banking. The major portion of these activities are commercial (85%), with the emphasis on extending short-term credit for business operations.

i. Commercial Banks. The commercial private banking system is relatively young (a majority of institutions were established since 1969), and their major source of funds (80%) is through domestic deposits. The commercial banks have concentrated on large loans, and in 1984, 13% of the loans awarded accounted for 82% of the bank's resources.

ii. Finance Companies. Finance companies purchase shares and other equity instruments, sell shares to the public, and extend credit for medium- and long-term investment. Few (if any) actually make equity investments, and a majority of their lending has been concentrated in large loans (e.g., 96.4% of loans awarded involved amounts greater than Q50,000).

The financial position of the commercial banks and the finance companies is considered healthy; they hold approximately 86% of the total assets of Guatemala's financial system.

iii. Deposit Warehouses. The main activity of the deposit warehouses is the storage of goods and the issuance of negotiable securities (bonds and certificates) against which depositors may obtain short-term financing. There are one state-owned and ten private bonded warehouses in the country, and all are associated with the commercial banks, their major source of funds.

iv. Insurance Companies. Thirteen insurance companies

operate in Guatemala. Their investments are approved annually by the Monetary Board and they are required to maintain 40% of their reserves in government securities.

v. Cooperatives. The cooperative movement has an extensive national network serving approximately 210,000 individuals. The movement's major source of funds is a combination of state financing from BANDESA, CORFINA, and BANVI, and the deposit of cooperative members. With the exception of the National Federation of Savings and Loan Cooperatives (FENACOAC), the general financial position of the cooperative movement is extremely weak, suffering from low member capital participation, high loan delinquency, inadequate reserves, poor credit administration, low profitability, and inadequate pricing and operational policies.

3. Agricultural Credit

a. Private Banks and Finance Companies

Although the fiscal and monetary measures undertaken by the government in 1986 through their economic stabilization program are likely to have favorable long-term impacts on the economy, economic recovery and growth are linked to private sector investment, particularly in agriculture.

The private commercial banks have been the main source of financing in local currency for the agricultural sector, providing approximately 90% of all credit during the 1983-1985 period. In 1985, the private banks provided a total of Q190 million to the sector (agricultural production, livestock, forestry and fisheries) (Table 40). However, this was a decline in real terms of approximately 10% over the 1983-1985 period. A majority of the financing (approximately 94%) was limited to short-term working capital. In addition, 75% of this credit was for the production of cotton, coffee, sugar cane and livestock, and over 90% of these loans were for annual operations. In the past, the lack of investment financing did not cause critical problems to the agricultural sector because the high prices of

the country's export commodities on international markets made it possible for the lands planted in those crops to yield sufficient profits. However, now that the prices of the major export commodities (particularly cotton) have dropped, the sector is in need of investment capital to diversify production into crops yielding a higher return. Many farming operations are in a position to diversify and increase their production. However, they are blocked from doing so by a lack of working capital and investment financing. The main source of resources for the private banks has been domestic savings and time deposits. However, the ceilings placed upon lending rates (12% through 1986) have discouraged the commercial banks from all but the safest and most attractive loans.

Private finance companies extend credit for medium- and long-term capital investment and some short-term operations. They are not subject to the same interest rate controls as the private banks, and generally extend credit at rates two-to-three percentage points higher. They acquire resources through the issuance of tax-free bonds and certificates. In recent years the asset growth of the finance companies has been rapid (approximately 38% annually). Nevertheless, a large percentage of these "new" resources (40%) are the result of U.S. loans channeled through the state-controlled CORFINA. Neither the private commercial banks nor the finance companies have access to long-term, local currency resources, and external lines of credit in foreign exchange cannot be contracted without the authorization of the Monetary Board and the channeling of such loans through the Central Bank. To date, resources channeled by the Central Bank have not been significant.

As with the commercial banks, overall finance company lending has been concentrated in large loans to a small and highly collateralized clientele. The distribution of private bank and finance company agricultural financing has also been concentrated in the hands of few borrowers, with a preference for those specializing in the high-value export crops. In 1983, only 2.4% of the borrowers had loans in excess of Q50,000, which corresponded to 75.7% of the total credit awarded. In contrast, some 55.5% of the total number of borrowers received loans up to Q1,000 in size, corresponding to 3.3% of the year's credit volume.

The traditional reluctance of commercial banks to provide financing to the agricultural sector grew as a result of the restrictive monetary policies introduced by the government in mid-1986. However, the degree to which these policies reduced commercial bank agricultural credit provision requires further analysis. For example, although the increased reserve requirements and the withdrawal of public sector institutional deposits did reduce overall private bank and finance company liquidity, the commercial banking system still possesses very high liquidity. Only a small portion of this excess liquidity is invested in agriculture (approximately 10%), and the greatest portion has been invested in government bonds. The commercial banks state that their excess liquidity is due to a lack of demand. Nevertheless, in 1986 the Non-Traditional Products Exporter's Guild reported that 371 firms seeking working capital and investment credit have been unable to obtain bank financing. The demand for financing from these firms totals Q103.7 million and US\$47.9 million (Table 41).

It is apparent that the commercial banks have continued to limit their financing to those borrowers possessing large amounts of collateral (and preferably urban property) that can be pledged as a guarantee. Since well-run agribusiness enterprises tend to concentrate capital investments in productive assets (e.g., machinery, rural infrastructure and inventories), few qualify for commercial investment loans. In addition, it is possible that the interest rates being offered on the government bonds (where banks have invested the major portion of their liquidity) are high enough to attract banks seeking to balance low risks with the highest earnings rate possible. Given the current ceiling placed upon lending rates (recently raised to 14%), the interest rate paid on government securities could provide an incentive to the banks to further reduce their agricultural lending.

Finally, banking legislation, which dates from 1947, further restricts credit availability by limiting the amount of financing that a bank may provide to 50% of the total planned investment. This essentially requires borrowers to provide collateral totaling 200% of the face value of a loan. Few,

if any, small- and medium-scale farmers possess such assets, and commercial bank credit is limited to a very small percentage of the farming sector.

Not only is commercial bank willingness to provide agricultural credit important to economic recovery, but mechanisms are needed to encourage increases in their agricultural lending. Currently, private bank preference is toward making short-term, highly collateralized loans for industry and commerce, and few incentives exist to shift this preference. Interest rate policy is also a constraint to promoting greater amounts of commercial bank agricultural financing. The maintenance of positive rates has not been an explicit element of monetary policy, and the ceiling placed upon lending (12%) resulted in a real rate of minus 9.1% in 1985 when the inflation rate (21.15%) is factored into the equation. It is clear that the recovery of the agricultural sector and the economy as a whole will require government policies designed to encourage private sector initiative and commercial bank willingness to invest in agriculture and its related industries.

In summary, access to agricultural financing is being constrained by a combination of government monetary policy and the continued unwillingness of the commercial banking community to invest in the sector. The recent government efforts to control inflation and provide stability to the exchange rate by reducing the liquidity of the banking system and limiting access to external resources have provided a disincentive to the commercial banks to invest in agriculture. In addition, commercial banks have continued to prefer investment in commercial and trade activities, or in low-risk government bonds, and to limit their exposure to the higher-risk agricultural lending. This has reduced current levels of agricultural investment and contributed to the continuing economic stagnation of the economy.

b. Public Sector Banking

As stated earlier, agriculture is the most important sector of the Guatemalan economy, and access to credit is one of the major obstacles to

increasing agricultural output and productivity. Current macroeconomic policy of the government is directed at restoring the levels of agricultural production with a view to the promotion of exports and the attainment of domestic self-sufficiency in basic consumption products. However, the emphasis upon price and exchange rate stability has weakened investment in the sector. The government utilizes two principal institutions for channeling resources to agriculture: Central Bank credit lines and rediscount facilities, and the National Agricultural Development Bank.

i. Central Bank. The Bank of Guatemala is the government's executing institution for the monetary policies of the Monetary Board. In addition to its policy execution role, the Central Bank also mobilizes resources from both domestic and international sources for onlending to the commercial banking sector through rediscount facilities and lines-of-credit. Recently, Central Bank lending has not been significant as a percentage of total resource flows, since the government has been attempting to reduce the liquidity of the private banks as part of its economic stabilization program. However, in response to the perceived shortage of agricultural investment credit, the government is currently considering the approval of a \$40 million loan from the Inter-American Development Bank. Approved by IDB/Washington in late 1986, this loan is intended to increase the supply of medium- and long-term investment credit, and to supplement commercial bank domestic resources which are primarily used to finance working capital requirements. The loan is directed at investments in permanent crops, land improvements, warehouses and storage facilities, agricultural inputs, and irrigation systems, with the intent of promoting an expansion of agro-export initiatives. If approved by the government, the Central Bank will channel these resources through eligible commercial banks and finance companies. Although this loan does have the potential of increasing investment within the sector, it remains to be seen whether the commercial banks will make use of this credit line. Additionally, under the best of circumstances, the likely beneficiaries will be the few large farming operations having access to the commercial banking system. Small- and medium-scale farmers, the majority of whom produce traditional crops for domestic consumption, and who cannot meet

the collateral requirements of the commercial banks, will not have access to this financing.

ii. National Agricultural Development Bank (BANDESA).

BANDESA is the government's primary financial institution for channeling public sector credit to the agricultural sector. It was created in December 1970, as the result of the consolidation of three state credit institutions -- the National Agrarian Bank (BNA), the Production Development Institute (INFOP), and the Inter-American Cooperative Supervised Credit Service (SCICAS). BANDESA has features of both a development and a commercial bank. However, since its creation, the focus of its operations has been to provide financing to the small- and medium-scale farmers who traditionally have lacked access to the commercial banking system.

In general terms, the Bank has succeeded in providing credit to approximately 30,000 small- and medium-scale farmers, many of whom lack traditional collateral and who would not have access to any other formal banking credit or informal credit at reasonable rates. The Bank has not attempted to develop its commercial banking operations, since the mobilization of domestic resources would require the use of competitive interest rate structures to capture deposits. Until recently, interest rates charged by the Bank were typically less than the maximum rates established by the Monetary Board, a reflection of BANDESA's belief that small- and medium-scale farmers require concessionary rates to produce effectively and profitably. The primary source of BANDESA resources for onlending has been a series of twenty-two trust funds established by the government. These funds provide financing for three specific areas: (1) agriculture and livestock, (2) rural housing (particularly following the 1976 earthquake), and (3) rural artisanry and small industry. The large number of trust funds being administered by the Bank has permitted it to increase services to the small farmer. The limited capital that BANDESA has mobilized through its commercial operations is invested in the more traditionally commercial regions of the country (Pacific Coastal Plain) and to the larger farming and ranching operations.

The BANDESA credit portfolio is heavily weighted in favor of the agricultural sector (four-fifths of total loans are for crop production). However, in recent years, the Bank's relative position in agricultural lending has declined. Additionally, although the number of loans is substantial and average loan size is small (indicating a concentration in small- and medium-scale farmers), the total number of borrowers served by the Bank has not changed since 1977.

BANDESA has always suffered from high delinquency in its loan portfolio. Although current, reliable data is not available, in 1983 it was estimated that approximately 79.3% of the portfolio was in arrears and, more seriously, a majority of the delinquent payments were more than one year past due. The delinquent portfolio has immobilized both BANDESA's loanable capital derived through deposits and the resources obtained through its administration of trust accounts, severely restricting the Bank's ability to meet the credit demand of the small farming sector. Currently, the Bank's ability to attract new resources is also very limited. The government is unwilling to increase public sector transfers, and international financial institutions (e.g., AID, IDB) have made future assistance conditional on improvements in loan recovery, decentralization and mobilization of domestic deposits.

BANDESA does possess a country-wide network of regional offices and local agencies that could permit it to provide effective services to all areas of the country. However, its operations are overly centralized in the capital. Very limited loan approval authority is provided to its regional offices, and little effort has been made to promote commercial operations. In addition, it possesses a high-cost and bloated bureaucracy and an insufficient number of technical personnel. In 1986, BANDESA had 1,096 employees, with approximately 50% located in the capital and only 97 classified as technical and management personnel.

In late 1986, in response to the high loan delinquency and to the difficulties in obtaining new resources, the Bank began to introduce a series of measures designed to improve its operations. Interest rates were

raised to the maximum allowable (12%), authorized credit limits for specific crops were updated to reflect inflation and the recent devaluation, new portfolio classification and collection procedures were introduced, and credit approval policies were tightened. Although attempts were made to reduce central office overhead and to proceed with an effective decentralization of operations on a regional basis, these did not succeed. More seriously, the stricter credit eligibility criteria and the limits placed upon credit approval authority in the regional offices have created a bureaucratic nightmare for the potential borrower. The substantial documentation required by the Bank as part of each loan application does not provide it with any greater assurance of loan recovery, but compliance is very costly to the borrower, in both time and money. In addition, the increased documentation has slowed the analysis and approval process dramatically, since the Bank does not have sufficient technical personnel in its credit department to rapidly process the increased document flow. This has resulted in weak pre-loan analysis, frequent and untimely delays, and little follow-up monitoring of its portfolio.

In summary, the future of BANDESA as the principal channel of agricultural credit to the small- and medium-scale farmer is not bright. The high levels of delinquency in its portfolio and the unlikelihood that new external financing will become available in the near future suggests that the Bank's role as a provider of agricultural financing will continue to deteriorate. As this occurs, small- and medium-scale farmers will find it increasingly difficult to obtain BANDESA financing, and lacking access to the commercial banking sector, it is likely that productivity will decline and diversification efforts will be adversely affected.

H. INSTITUTIONAL INFRASTRUCTURE OF AGRICULTURE

The private and public sectors of Guatemala have developed myriad organizations and institutions to direct their working environment. A public sector organization, depending on its nature, represents the mechanism through which the government oversees implementation of its rules, regulations, and policies. Similarly, the Guatemalan private sector has developed an organizational framework to safeguard and defend its economic interest.

1. The Private Sector

a. Interest Groups

The Guatemalan private sector is organized into over 100 commercial, industrial, and producer associations known as gremiales. These associations, in turn, are members of chambers (cámaras) that represent specific sectors of the economy. The chambers, in turn, are members of the Coordinating Committee of Agricultural, Commercial, Industrial and Financial Associations (CACIF). It has six institutional members: the Chamber of Commerce, the Chamber of Industries, the Chamber of Financial Institutions, the Chamber of Tourism, the National Farmers Union (UNAGRO), and the Association of Sugar Producers. CACIF is primarily a lobbying organization that is intended to represent the private sector's interests before the national government and to rally public support in favor of its interests.

The same organizations that belong to CACIF have joined in the creation of the Chamber of Businessmen (Camara Empresarial--CAEM), which comprises the development arm of the organized private sector. CAEM is responsible for identifying, preparing, analyzing and evaluating programs and projects to further promote private sector development. The benefits of CAEM projects accrue mainly to members of the Chamber for which they are developed.

UNAGRO is the coordinating mechanism of the private agricultural sector, used by the two large agricultural producers' associations -- the Farmers Association (AGA) and the Chamber of Agriculture -- to represent their joint interests. AGA and the Chamber of Agriculture

differ in that individual producers or groups may be members of the former, while only groups (gremiales and associations) may join the Chamber of Agriculture (See Table 42 for the list of participants). Despite the fact that the private sector agricultural organizations each have one cooperative member, they largely represent the interests of large- and medium-sized independent agricultural enterprises. UNAGRO and its sponsoring organizations have political influence far beyond the relatively narrow representation of their membership and are able to affect many government agricultural policy decisions in their favor.

The Non-Traditional Products Exporters Guild (the Gremial), established in 1982, is a trade committee within the Guatemalan Chamber of Industry. The Guild was founded for the purpose of protecting the interests of the exporting sector, encouraging the establishment of fiscal incentives to encourage production, and facilitating the process of exporting Guatemalan products to international markets. Perhaps more importantly, the Guild provides exporting businessmen with an effective means of communication with other private sector organizations, and especially with the public sector and the government at the highest levels.

The Gremial has organized its operations into five separate groups of products (Figure 10): perishable agricultural products, processed foods, non-food consumption items, raw materials and semi-processed goods, and furniture and other durables. Within these five main groups there are numerous sub-groups (e.g., within perishable agricultural products the sub-groups are composed of cardamom, grains, dairy products, etc.) which have working groups formed by the members to study and recommend programs and policies related to their specific group. As of 1987, the Gremial has 430 business affiliates, including some cooperative organizations.

With the assistance of AID, the Gremial has opened a branch office in Quezaltenango to serve the Western Highlands, has strengthened its market information system, and has led and/or participated in various investment promotion and international market development activities.

b. Agribusiness

Private enterprise is relatively well developed in Guatemala in comparison with its Central American neighbors, with many businesses and agroindustries supporting the agricultural sector, both in the provision of technical inputs and the processing and marketing of products.

i. Input Suppliers. The fertilizer and pesticide marketing system has about 30 wholesaling firms (Table 43 presents a shortened list) which are organized into the Association of Agricultural Input Suppliers (GREPAGRO). GREPAGRO's objectives are to develop consistent pricing policies and restrict outside competition. There are approximately 380 retail fertilizer distributors throughout the country.

ii. Product Processors. This is a well-developed industry, although there is a tendency for the processors to collude on prices and exercise oligopsonistic control. The list of firms in Table 44 is not complete but provides an idea of the principal processors by the following specializations: coffee processing (12 firms); cotton gins (6); sugar mills (19); wheat mills (25); corn mills (5); rice mills (11); vegetable processing (8); meat packing plants (14); animal feed (11); dairy plants (9); and sawmills (23).

iii. Exporters. This list is extensive but Table 45 includes the names of the principal exporters by type of product: Cardamom oil (4), garlic (16); sesame (26); cotton (22); sugar peas (9); cocoa (5); coffee (49); sugar (7); cardamom beans (49); onions (4); fresh fruits (3); and melons (9).

c. Guatemalan Development Foundations

There are numerous non-government organizations (ONG's) in Guatemala which work for the social and economic well-being of the rural disadvantaged. Three of these domestic development foundations have been selected for description, due to their importance in agricultural development and their prior and present experience with the USAID/Guatemala.

i. FUNDAP. The Foundation for the Integrated Development of Socio-Economic Programs (FUNDAP) was formed recently as an outgrowth of CAEM for the purpose of applying the knowledge and techniques of modern business practice to development problems of the Western Highlands. The Foundation has a legal charter as a private, non-profit, apolitical institution without religious ties.

Currently, FUNDAP is carrying out two programs through its offices located in Quezaltenango. From the Hanns Seidel Foundation of Germany, FUNDAP has received assistance to promote dialogue between different sectors of Guatemalan society on the most pressing development issues facing the country. In more concrete terms, FUNDAP has undertaken the "Momostenango Project" with the assistance of USAID/Guatemala in which sheep and wool production has been chosen as the primary economic activity followed by wool processing, weaving and marketing of finished products.

Improvements in all phases of this traditional activity of the Momostenango region are expected to increase the productivity and profitability of wool production, create additional employment opportunities, and establish patterns of private business in wool products which may be replicated or emulated in other pursuits of a self-help nature. On the production side, FUNDAP has developed a research and outreach system for producers including pasture improvement, upgraded breeding stock, disease control, and technical assistance in management practices. On the commercial side, the Project is focused on increasing artisan production of woolen items, improving the quality and variety of products, as well as the establishment of a marketing entity intended to provide a reliable, effective outlet for finished goods as well as the provision of inputs to weavers.

Although modest in scope and limited in resources, FUNDAP has made a promising start in sound development programs in some of the most difficult regions of the country.

ii. Penny Foundation. The Guatemalan Development Foundation, known as the Penny Foundation since its inception in 1962, is a private Guatemalan entity dedicated to rural development primarily in the areas of agriculture, housing, small business and public works. Operated under the direction of a board of 8 Guatemalans, the Foundation has been successful in attracting significant donations from local sources and generating income from the sale of commemorative coins. From headquarters located in the capital city, the Foundation maintains 4 regional offices, 2 in the Western Highlands and 2 in the east-central region of the country.

The institution has been an innovative leader in developing credit schemes for the rural poor. Using group techniques and unconventional repayment schedules, for example, the Foundation has been successful in extending credit to sectors of the rural population traditionally outside of the purview of commercial or development lending institutions. The Foundation's successful experience in financing modest-sized transactions in the purchase of land by small-scale farmers, led USAID/Guatemala to initiate a pilot "land bank" program with the Foundation in 1984. The Foundation now manages a portfolio of loans and properties worth approximately \$1.5 million; plans for refinement and expansion of this pioneer activity are being discussed currently.

In addition to innovative financing, the Foundation has channeled most of its work through informal groupings of rural people, stimulating the development of leadership and shared responsibility in the process. This has led not only to relatively successful credit operations but has also added to the effectiveness of programs in which new production and marketing technologies have been introduced and training programs implemented. In all its programs, the Foundation puts a high value on the participation by beneficiaries in the basic decisions and day-to-day operations of projects.

iii. Movimiento Guatemalteco de Reconstrucción Rural (MGRR)

The Guatemalan Movement of Rural Reconstruction (MGRR) was founded in 1964 and began operations in the east-central department of Jalapa the following year where it has continued to work exclusively. As part of a network of six countries, the MGRR follows a philosophy of broad development in rural areas with a high degree of participation by residents of selected communities. Since its inception, the MGRR has incorporated leading citizens in its 10-person Board of Directors and has attracted significant funding from Guatemalan sources, principally from its local membership of over 50 individuals.

With a staff of 25 professionals and technicians, the MGRR operates programs in four general areas:

Organization, including training, credit through committees, marketing, public works and productive infrastructure;

Education, encompassing literacy training, homemaking and artisanry skills, home improvement and construction, as well as sponsorship of sports and civic events;

Economic Improvement is conducted through an innovative extension program concentrated on the major crops of the region as well as diversified and intensive cropping in which techniques such as soil conservation, fish culture, animal health, and horticultural practices are emphasized;

Health and Dentistry programs emphasize preventive medicine in vaccinations, nutrition, home sanitation, potable water, and parasite control as well as operating modest services in general medical and dentistry clinics.

The MGRR is recognized as a modest, effective regional program in the country. It successfully conducted a non-traditional education program

with USAID/Guatemala which terminated in 1985. Its principal limitations have been funding for expansion.

d. Agrarian Unions and Leagues

Guatemala has never experienced a widespread and sustained development of small farmer associations. Although attempts have been made during the past 50 years to organize small farms, government assistance has been weak and intermittent. Frequently, the existence of small farmer organizations has been viewed with suspicion by both the government and the private sector, since they were believed to possess the potential to create rural unrest. This perceived potential for unrest is linked to the disparities that exist within the agricultural sector. As a result, reaction against small farmer organizations has tended to be most pronounced during times of conservative military rule and weaker or absent under less conservative civilian governments.

The growth of small farmer associations in Guatemala has been slow and difficult, due both to the government's indifference or outright opposition, and to the low educational levels and restricted resources possessed by the farmers themselves. Early organizational efforts began in the 1940's and continued through the early 1970's, when government statistics reported the existence of 160 campesino leagues possessing a membership of approximately 60,000 farmers. The extreme political violence in the rural areas in the late 1970's and early 1980's brought the promotion of farmer associations to a standstill, and many leagues became inactive or disappeared entirely.

Recently, as a result of the return to democratic government and a calming of political violence, organizational efforts among the small-farm sector have increased. The principal motive behind these organizational efforts is demand for land, with current estimates of the number of landless farmers at 400,000, the figure used by the national labor movement, the National Institute of Agrarian Transformation (INIA), and estimated in Land and

Labor in Guatemala: An Assessment. Although accurate data are impossible to obtain, it is known that large numbers of small farmers (approximately 500,000) participate in seasonal migration to large commercial farms on the Pacific Coastal Plain to supplement their incomes. This suggests that many small Highland farmers are unable to sustain themselves through the income generated by their family farming operations.

Currently, the principal organizational efforts among the small farmers are supported by the national labor movement (Confederación de Unidad Sindical de Guatemala - CUSG) and by a charismatic Catholic priest (Andrés Girón). The CUSG was established in 1983 by 7 federations representing approximately 120,000 workers. Currently, its membership includes 20 federations (81 agrarian unions) with 200,000 members, 50% of whom are small farmers or agricultural laborers. Growth of the Confederation has been rapid and is concentrated in three areas: the East, the western Highlands, and the Pacific Coastal Plain. The organizational efforts of Father Girón also began in the early 1980's, and are coordinated through the Asociación de Campesinos Pro-Tierras. Membership in the Association is estimated to range between 60,000 to 100,000 individuals, the majority of whom are seeking land. The efforts of Father Girón have received much more publicity than those of the CUSG due to the organization of large-scale farmer demonstrations in the regional capitals (particularly on the Pacific Coastal Plain) and to Father Girón's success in obtaining public recognition of the landless problem by the current government.

e. Cooperatives

The growth of rural cooperatives in Guatemala has been similar to that of the farmer unions and leagues. Although the cooperative form of enterprise has existed for more than 80 years, growth has been intermittent and cooperatives have never possessed a large membership or widespread distribution in rural areas. The most recent period of growth began in the 1960's through a combination of government and international support. A wide variety of cooperative organizations was established, including those active in

agricultural production and marketing, savings and loan, consumer services, and handicrafts. The political violence of the late 1970's had a negative impact on the growth and operation of rural cooperatives, similar to that on other small farmer groups; however, many were sustained (although frequently providing only limited services). The current number of cooperatives registered with the government's National Cooperative Institute (INACOP) totals 890 organizations with an estimated membership of 209,313 (Table 46). Agricultural and savings and loan cooperatives account for 69% of the number of cooperatives and 84% of total membership.

It is likely that the actual active membership and continued operation of many cooperatives is much less than the government's estimates. However, the cooperative movement is diverse and has a strong presence in the Ministry of Agriculture's Regions I, V, and VI, the areas possessing the greatest number of small farmers and mainly covering the indigenous Highlands.

One aspect that differentiates the cooperative movement within the country is the degree to which the more successful organizations have formed federations. In 1984, 44% of all cooperatives were affiliated with federations. These organizations represent 71% of total cooperative membership. Federated cooperatives not only possess a significant advantage in membership, but they are also much better organized and possess much higher levels of service and member capitalization than do independent cooperatives. Federated cooperative statistics are illustrated in Table 47.

All ten cooperative federations are members of a national confederation of cooperatives (CONFECOOP), a lobbying institution which represents the movement, promotes its integration, and provides some limited sponsorship of national cooperative forums and training exercises. In addition to the coordination and integration activities of CONFECOOP, five federations have sponsored the creation of a cooperative training institute (CENDEC), which specializes in management and administrative training of cooperative personnel. Public sector support to the cooperative movement is provided through the National Cooperative Institute (INACOP), which is respon-

sible for the promotion, registration and regulation of cooperative organizations, and the provision of technical assistance and training. The National Agricultural Development Bank (BANDESA) can also be considered a channel of government assistance, since it has been the primary source of external financing for the movement.

The strongest of the cooperative institutions are the savings and loan cooperatives, the majority of which are affiliated with the National Federation of Savings and Loan Cooperatives (FENACOAC). Created in 1963, this Federation has grown steadily, and currently possesses Q13 million in assets and 77 affiliates. The FENACOAC system provides savings and credit services to approximately 96,000 individuals and is characterized by its professional management and financial strength.

Forty-eight percent of Guatemalan cooperatives are agricultural and, with few exceptions, the strongest of these organizations are also federated. Two agricultural cooperative federations (FEDECOCAGUA and FEDECOVERA) specialize in coffee production and marketing, an activity which represents 55% of the total income generated by agricultural cooperatives. The remaining agricultural cooperative federations (FECOAR, FEDECOAG, and FECOMERQ) specialize in the production and marketing of corn, wheat, beans, vegetables, and fruits. Membership in agricultural cooperatives is almost exclusively limited to small- and medium-scale farmers. They farm extremely small parcels of land using traditional practices and utilize little external capital. Yields are low and very limited technical or financial assistance is available to permit these farmers to diversify into higher-value crops. A high percentage of their production is for subsistence and/or sale in domestic markets and marketing infrastructure is poor. A majority of the agricultural cooperatives (including both federated and non-federated) lack professional management, possess inadequate operational and pricing policies, and are under-capitalized and overly dependent upon external resources for their operations. Two of the agricultural cooperative federations (FECOAR and FEDECOCAGUA) are relatively strong; however, one (FECOAR) was seriously affected by the political violence of the late 1970's (losing both members and

capital), and the other (FEDECOCAGUA) is overly dependent upon the marketing of coffee and external capital. Government assistance to the federated cooperatives has been sporadic, and technical support is often minimal.

In addition to the federated cooperative sector, many small, independent organizations are registered with INACOP. These cooperatives are characterized by their small size and their very limited access to credit and technical assistance. Although they frequently possess cooperative charters, these organizations are more "borrower groups" than they are cooperative business enterprises. Few possess full-time employees or formal administrative systems, member capital is limited, and they are dependent upon the public sector extension programs for their annual planning and operations. INACOP is attempting to strengthen these small, independent agricultural cooperatives as a means of channeling resources to the small farm sector, but costs have been high and results mixed. Several highly-capitalized, agro-export oriented cooperatives (e.g., Cuatro Pinos, Magdalena) are excepted from this general rule for independent cooperatives. However, despite having received substantial international financial and technical assistance, their future still remains uncertain.

f. Farmer Groups

DIGESA, the extension service of the Ministry of Agriculture, and several private voluntary organizations have also been active in organizing small farmers into agricultural committees or farmer groups as a means to provide the traditional farmer with access to credit and technical assistance. The creation of these agricultural committees represents a significant effort to organize the traditional agricultural sector. In 1986, it was estimated that 2,852 groups with a membership of 76,500 farmers had been created, including those promoted by the Ministry (approximately 50%) and those supported by the PVO's. DIGESA's organizational effort includes production associations, 4-H clubs, and women's groups. Some success has been achieved in utilizing the groups for training and the transfer of technology, but credit access is not guaranteed and financing is extremely limited. The

Ministry's greatest success has been in the area of organizing farmer groups to construct and operate small-scale irrigation systems. A total of 90 such groups with approximately 3,600 members has obtained investment credit to construct these systems. However, production credit and follow-up technical assistance have been limited, frequently reducing the profitability of investments.

The American Institute for Free Labor Development (AIFLD) has focused its group organization activities on small farmers and agricultural laborers. The main focus of this effort is to prepare the groups for eventual affiliation to an agrarian union, an action which could increase their access to production inputs and eventually to land. The development of agrarian unions is a relatively new phenomenon, and the impact of AIFLD's group organizational effort will require more time for evaluation.

2. The Public Sector

a. Outside Institutional Influence on the Agricultural Sector

Of the institutions which form the agricultural public sector, the Minister of Agriculture has direct control of only DIGESA (Agricultural Extension Service) and DIGESEPE (Livestock Extension Service) (Figure 11). All other important agencies of the sector (BANDESA, INTA, INAFOR, ICTA and INDECA) are semi-autonomous and governed by boards or councils in which the Minister of Agriculture is a member (Table 48). These boards and councils make decisions on the basis of majority vote. Thus, even though the Minister of Agriculture presides over these boards, he does not have direct command of their policies and priorities. As illustrated in Figure 12, the Ministry of Finance, the Ministry of Economy and the General Secretariat for Economic Planning (SEGEPLAN) have collectively more influence than the Ministry of Agriculture in these agencies. It can be seen that important agencies of the agricultural sector are guided by institutions whose major area of concern is not agriculture. The macro objectives of institutions like the Ministry of Finance and the Ministry of Economics may be in conflict with the needs of the

agricultural sector as defined by the Ministry of Agriculture, thus complicating the process of providing clear guidance to the agencies directly concerned with the agricultural sector.

At a more macro level, the Monetary Board is responsible for defining the monetary, exchange and credit policies of the government. Since these policies are a determining factor in the general performance of the agricultural sector, the Minister of Agriculture is a member of the board. Other important members are the Ministers of Finance, Economic Planning and Economy. The possibilities for the Minister of Agriculture to exert influence on monetary policies are limited because of the minority position he has on the Monetary Board. Because of the recognized importance of the agricultural sector in the total economy, the policy directives emanating from the Board should take more explicit account of the structural adjustment and development needs of the sector.

b. Public Agricultural Sector Institutional Infrastructure

Public agricultural policy and related development programs in Guatemala are designed and carried out by the Ministry of Agriculture, Livestock and Food (MAGA). The component institutions and units of the Ministry can be distinguished by three broad classifications: planning/programming units, executing agencies, and administrative/coordinating committees. Each classification, in turn, defines a vertical hierarchy of units, agencies, and committees spanning the gap between the Minister of Agriculture and the individual farmer and agricultural laborer. Guatemala is divided into eight principal regions according to agroecological, administrative, and political criteria (Figure 8 and Table 49). Each region is further subdivided into sub-regions. In principle, each of the Ministry of Agriculture's executing institutions maintains national, regional, and sub-regional offices. Thus, the pattern of institutions existing at the national level (in Guatemala City) should be reflected in the patterns at regional and sub-regional levels. As an example, DIGESA, apart from its cen-

tral office in the capital, maintains a regional office in Quezaltenango, the principal city of Region I, and three or four sub-regional offices in each of the six component departments of the Region. Region I regional and sub-regional offices are likewise maintained by DIGESEPE and BANDESA. In practice, not all Ministry agencies are fully regionalized (e.g. INTA). Regions I, V, and VI have received most of the Ministry's attention in recent years, and it is in these regions that the institutional infrastructure sketched below is the most complete.

At the risk of oversimplification, the Ministry components are shown in Figure 13, classified by function and level, and include some of the important interrelationships among them. For completeness, the "National Level" incorporates the political authorities who determine and authenticate agricultural policy and prioritize it vis-a-vis other policy areas. The "Sector Level" refers to the central offices of the Ministry, located in Guatemala City.

i. Horizontal Relationships. At each level there is: (1) a principal decision maker, (2) an advisory group whose task is to submit alternatives and recommendations concerning development matters to the decision maker, and (3) a group responsible for the coordination of organizations engaged in planning and execution.

At the national level the principal decision maker is the President of the Republic. Theoretically, the National Congress generates legislation which the President is empowered to enforce. In practice, the tone of any given administration in Guatemala is set by the party in power and/or the Chief Executive himself. The development advisory group at the national level is the General Secretariat for Planning (SEGEPLAN), responsible for the design of medium-term (4 to 5 years) plans in accordance with the policies and guidelines established by the current administration. Jointly, the President and SEGEPLAN establish operating policy, that is, conversion of political objectives into realistic strategies phased over time, within the limits of available resources. These, in turn, govern the allocation of resources across ministries, a process that is aided by the national level coordinating group, the President's Council of Ministers, or Cabinet.

At the sector level, the principal decision maker is the Minister of Agriculture, aided by his two Vice-Ministers. As described earlier, the Minister is limited in his direct control of agricultural institutions to DIGESA and DIGESEPE, the agricultural and livestock extension agencies, respectively. The Minister shares decision making with others on the governing boards of BANDESA, INTA, INAFOR, ICTA and INDECA. Much of the day-to-day work of the Ministry is supervised by the First Vice-Minister; the Second Vice-Minister traditionally oversees livestock matters. The development advisory group at the sector level is the Sector Planning Office for Food and Agriculture (USPADA). USPADA is responsible for the acquisition, processing, and analysis of information concerning the agricultural sector and, using the information, the formulation of projects in accordance with guidelines established by the Minister and by the National Agricultural Development Plan (when there is one). Equally important is USPADA's responsibility for identifying feasible alternatives to achieve the development strategies articulated by SEGEPLAN and to deal with unforeseen economic and agronomic problems affecting the sector. To achieve these ends, USPADA consists of an information unit, a planning unit, a programs and projects unit, and a budgeting unit. To coordinate policy and programs across sector institutions, the Minister periodically convenes the Superior Coordinating Committee (COSUCO), consisting of the national directors of the sector institutions and chaired by the First Vice-Minister. The Coordinator of USPADA (or his deputy) acts as secretary to COSUCO and thus has regular and intimate contact with the Ministers and with the Directors. Problems of mutual concern, projects involving two or more institutions, and broad issues of where, when and how to apply agricultural policy are discussed at COSUCO meetings. Occasionally, the COSUCO visits development project sites or invites lower-echelon individuals and groups to discuss activities and problems with the Committee in Guatemala City.

Within each institution (at the Agency level), the principal decision maker is, of course, the Director. Each agency has a programming and budgeting unit whose job is to translate agricultural plan guidelines and

strategies into quantifiable and financeable programs (or projects) appropriate to the role established for it within the current development plan and by USPADA. Across institutions, the coordinating body at this level is the Sectoral Programming Committee (COPROSEI). The most important single function of the Committee is to insure mutual consistency among programs/projects designed by sector institutions and in the allocation of physical and financial resources over any given budgetary period.

At the regional level, the principal decision maker is the regional Director, and he has his own programming and budgeting unit to advise him about projects and activities assigned to his region. Problems and issues of mutual concern among regional institutions are managed by the Regional Development Committee (COREDA), consisting of the regional directors of all institutions in the region. The regional level, and in particular, the COREDA represent the interface between primarily planning/policy making, on the one hand, and programming, budgeting, and execution, on the other. Regional offices establish overall short-term policies (or better, guidelines) for concrete, physical work in the field consistent with broad-gauge sector strategies, yet they are still one step removed from the actual farm level activities in any specific location. This is the responsibility of the sub-regional offices.

Sub-regional directors tend to be an idiosyncratic group, inasmuch as local conditions and requirements vary widely and because, living at the bottom of the bureaucratic totem pole, they often have to improvise and make do in the matter of logistical support. The sub-regional directors directly oversee the work of extensionists, livestock auxiliaries, credit agents, and other people who work directly with farmers and their families. At this level, programming devolves into field work plans of individuals working within specific villages, communities, or other defined areas. In theory, there exist Sub-Regional Agricultural Development Committees (COSUREDA), but these have functioned recently only in Region I.

Finally, at the farm level, interdisciplinary teams of extensionists, livestock auxiliaries, credit agents, and others have occasionally been fostered as a means of promoting integrated or diversified development strategies for individual farms or specific communities. The farmers themselves are considered full-fledged members of such teams and comprise an important source of feed-back information about farmers' desires, intentions, and opinions.

ii. Vertical Relationships. From a vertical perspective, the Guatemalan public agricultural sector consists of three hierarchies: (1) decision makers (administrative control), (2) advisory bodies (planning, programming, budgeting), and (3) coordinating bodies. In Figure 13, these are shown via the three vertical columns, together with the flows of control, information, and coordination among them at all levels.

Administrative control may be direct or indirect. The President of the Republic does not actually have administrative control over the Minister of Agriculture; that is, he does not manage the agricultural sector per se. But in his role as arbiter of national policy--including agricultural policy--and given his authority to replace ministers seen to be deviating from established policy and ideology, the President functions as if he were the "President of the Board" of a multiproduct firm capable of hiring or firing managers at will.

The Minister of Agriculture exercises even more diffuse control over much of his domain. As indicated earlier, he is merely one of several co-equal members of the board of all but DIGESA and DIGESEPE. On the other hand, these latter two institutions are, probably, the most important in the sector, and they certainly employ the most people. Much, too, depends on the personalities and personal contacts of any given minister and his vice-ministers. Strong ministers with extensive personal contacts will be more influential than otherwise.

The same holds true for individual institution directors and their deputies. A strong agency head (e.g., the Director of DIGESEPE) not only can mold his organization into virtually a personal tool, but, via COSUCO, he can influence other institutions as well.

As a general rule, the farther one is from Guatemala City, the greater the degree of local autonomy. Planners in the capital face theoretical problems and deal in abstract relationships. Regional and sub-regional institution directors face concrete problems and real relationships. In a manner of speaking, the latter are the real managers of Guatemala's agricultural sector. Not only are they forced by circumstances to be more pragmatic than their loftier brethren, but their grasp of actual conditions in their areas prompts the stronger among them to interpret plans and projects in ways sometimes not foreseen by national leaders. In the past, this has led to divergence between original planned objectives and strategies and actual execution in the field. It has led to stagnation of some projects and strong (sometimes excessive) emphasis on others and it has sometimes caused premature abandonment of projects.

Planning, programming, and budgeting form the core of the planning process in the Ministry. Plans are combinations of medium-term (5 years) and long-term (5 to 10 years) strategies with accompanying targets and goals designed to move one or more sectors of a country from an existing state of affairs towards one deemed by decision makers to be preferable. Programming, at least in the Guatemalan context, is the design of concrete, budgetable projects aimed at achieving one or more of the targets and/or goals articulated in a plan. A program, consisting of a series of constituent projects and activities, is spanned through time according to existing technologies and the availability of needed resources. Once the physical characteristics of a program and its alternatives are estimated, the financial feasibilities are investigated via the budgeting process.

This is how the planning-programming-budgeting links are seen in Guatemala's public agricultural sector. It should be clear that planners, programmers, and budgeters are not the same kinds of people, although

their functions overlap. This is important, since, running down the right-hand column in Figure 13, one can see an evolution from pure planning (SEGEPLAN) to planning/programming (USPADA) to predominantly programming/budgeting (national, regional, and local levels).

The flow of information--up, down, sideways--among the units of the control hierarchy and the planning, programming, budgeting are critical for the successful implementation of specific projects within the expected time frame. Information flows upward through the control hierarchy via an information management system involving registers of work performed in the field, costs incurred, numbers of farmers or hectares of land affected, and the like. USPADA maintains links with COPROSEC and with individual programming units. It also oversees individual institutional budgets and participates in the annual sector-wide budget preparation. Finally, as indicated earlier, information of mutual concern is mediated via the coordination committees at each level.

iii. Other Relationships. Relationships between the Ministry of Agriculture, on the one hand, and the Bank of Guatemala and the Ministries of Economics and Finance have been described earlier. Suffice it to say here that individual agricultural development projects, especially those financed by USAID and other donors, often give rise to ad hoc structures (local project coordinating bodies, technical assistance teams, sub-committees of COREDA, etc.) superimposed upon the ones described above. These have varied from project to project, and it is difficult to generalize about them.

More permanent are the relationships within such institutions as DIGESA, DIGESEPE, and ICTA. Especially at regional levels, individual program directors and their staffs sometimes comprise a "mini-institution" by themselves. In managing extensionists and field technicians (for example, soil conservation, fruit research, sheep care and breeding), the authority of the program director may clash with that of the local sub-regional director managing the same field workers.

Less clearly defined, yet sometimes important, are two organizations specifically involving DIGESA personnel: the Association of Agronomic Engineers and the Association of Skilled Agronomists. Both organizations are capable of exerting collective pressure on decision makers, particularly at regional levels, and they occasionally produce credible analytic studies of their own regarding policy and strategies.

I. POLICY FRAMEWORK

1. Introduction

The macroeconomic and sectoral policy environment of Guatemala is deeply influenced at the present time by the overriding objective of stabilizing the national economy. Because of the transient nature of this policy approach, it is not possible to say what policies of a longer-term nature the government might adopt in the foreseeable future. There are, however, myriad policies of a more permanent nature, being implemented, especially in the agricultural sector. These and other policies are discussed in this section.

The Cerezo administration inherited an economy in deep trouble. The accumulated balance of payments deficit was accompanied by contracting international money markets, which forced the government to finance the deficit by using short-term credit from private sources at unusually high interest rates. Guatemala, with a track record of low inflation rates, began experiencing rapid increases in consumer prices. Traditional export crop prices continued to decline, as they had since the beginning of the decade, further reducing the country's ability to pay for much needed imports. To hold down the budget deficit, the government reduced its investment activity, thus slowing down the economy in the short run and restricting productive capacity in the longer run.

The policy package adopted by the government to deal with the crisis was primarily based on measures in the foreign exchange market, price controls, and restrictive monetary policies.

2. Macroeconomic Policy Environment

a. Foreign Exchange Policies

For some time it had been accepted that the Quetzal was overvalued against the dollar. However, the political will was lacking to

redress the situation. The Cerezo government moved slowly in this respect, instituting import quotas and a multiple exchange rate system.

The import quotas have been used by the Bank of Guatemala since 1983 as a rationing mechanism. To this effect, the Exchange Control Department of the Bank of Guatemala published lists of imports for which it would make foreign exchange available. The import volume allowed was equivalent to the average import level during the 1977-1981 period. This policy had several objectives which were not totally fulfilled. On the one hand, it attempted to lessen the incremental effect on costs of production of having to buy foreign exchange at a higher-than-official rate in the "parallel market". This expectation was not realized. Limited access to foreign exchange through quotas added a speculative element to retail prices; thus, most imports were sold on the basis of foreign exchange purchased at the parallel market rate. On the other hand, the supply-demand imbalance contributed to price increases of "essential" inputs as they became scarce in the open market. The effect of import quotas on the agricultural sector was to reduce utilization of imports, especially fertilizers, and to diminish activity in the sector, which, in turn, reduced labor demand and lowered rural incomes.

The multiple exchange system was instituted mainly to reduce pressures on the balance of payments. It also served as an indirect tax on agricultural exports and to channel exchange subsidies in the form of preferential subsidies to importers of selected consumer products. Performance in this area also fell short of expectations. Retail prices failed to maintain any relationship with the price at which foreign exchange was purchased. Indirect taxation on traditional exports was initially implemented by allowing exporters to keep only a percentage of foreign exchange proceeds, with the balance paid in local currency. The reform program recently put into practice allows 100% of the foreign exchange proceeds, but is accompanied by a new export tax structure.

Statements from the Cerezo government have expressed the intention of unifying the three foreign exchange rates that were the hallmark of the foreign exchange policy of the former government. In March 1987, the "banking system market" and the "regulated market" will be unified at a rate of 2.50 Quetzales per 1.00 U.S. dollar. Later, the "official market" and the other unified markets will be joined. The implications of the unification process differ in relation to the market being unified. The unification of the "banking system market" and the "regulated market" is determined principally by the government's access to foreign exchange with which to service potential demand. The unification of the "official market" with the other markets will have profound implications on the size of the government deficit and thus is a monetary and fiscal problem.

b. Monetary Policy

The effective reserve ratio has been sparingly used as an instrument of monetary control. From 1980 to May 1986, the effective reserve ratio remained practically unchanged at 35% for short-term deposits and 10% for long-term deposits. In 1986, it will be increased to 41% for short-term deposits and to 13% for long-term deposits.

Although there is no well-established capital market in the country, the Bank of Guatemala has sold bonds and other financial instruments to withdraw money from circulation. This policy has been effective to the extent that it has reduced bank liquidity and the availability of credit. The agricultural sector has been particularly affected by these operations because credit to finance agricultural activities becomes more difficult to obtain.

c. Credit Policy

The borrowing and lending interest rate in Guatemala is set by the Monetary Board. Between 1979 and 1982, there was little change in this rate and, as a result of inflation, the real interest rate was negative. This

situation has had significant negative effects on credit mobilization as it reduces the incentives to save. Monetary Board control of the lending rate has also removed incentives to finance risky and high-cost lending activities, such as agriculture.

The rediscounting operations of the Bank of Guatemala are used mainly to channel financial resources to priority activities. Between 1983 and 1984, rediscounting rates for loans made for basic grains, soybeans and other oil seeds were 4%, for housing 7%, and for a selected number of other activities 9%. As a general practice, banks are allowed to charge three points over the rediscount rate to their borrowers. Cotton cultivation absorbs around 80% of the resources allocated by the Monetary Board for agriculture. Until this situation is changed, agricultural diversification efforts will not find a favorable environment. The same could be said of the guarantee fund for agriculture, since it has mainly covered loans to cotton growers.

d. Investment Policy

As mentioned earlier under the Agricultural Finance section of this report, both public and private investment in the agricultural sector has been reduced since 1980. This has led to reductions in the rate of improvement of productivity, if not actual declines. Some of the investment problems, especially in the private sector, are related to scarcity of credit. Declining prices for traditional exports and political unrest have also been important factors in reducing private sector investment. With respect to the public sector, national policies favoring investment in business and industry have diverted government attention from the agricultural sector. This situation has been exacerbated in recent years by Guatemala's worsening economic problems. Agriculture has often had to bear the brunt of the impact of restrictions on imports, limitations on access to foreign exchange, and government austerity measures. A strategy to encourage greater investment in the agricultural sector by both government and private enterprise would provide a financial base for revitalizing production of

viable traditional crops and moving forward on production of promising new products. It would also permit modernization and expansion of storage and processing facilities, improvement of transportation, and introduction of improved production technology.

e. Credit to the Government

Because of the low level of development of the financial system, most of the budget deficit is financed by the Bank of Guatemala. This credit has shown an increasing trend in recent years as the government has been unable to make reforms in the tax system to improve revenue collection. The Bank of Guatemala has set upper limits to the credit it will make available to the government. This approach has allowed the Bank authorities to keep the budget deficit in check and at the same time maintain the desired level of monetization of the economy.

f. Fiscal Policy

The tax structure of Guatemala is highly regressive. The government depends heavily on indirect taxes for tax revenues because they are easier to administer and politically less controversial. Income and property taxes yield a minimum proportion of their potential. Tax reforms were tried on several occasions but have always been blocked by the powerful business groups. A revision of the tax structure and improvements in the efficiency of the tax collection system are required to reduce the budget deficit.

3. Sectoral Policies

a. Foreign Trade Policies

Export taxes figure prominently as a source of government revenues. With the policy that all export dollar revenues were to be liquidated at the "regulated market" rate, a new export tax structure came

into effect. The new tax structure is temporary and export taxes are planned to decrease at a rate of 3% per month beginning in June 1987. The traditional list of export products, including coffee, sugar, cotton, beef, bananas, and cardamom, are subject to this tax. Non-traditional products are taxed at a low rate of 4% of the FOB value. The tax level varies with the export price of the product and reflects the explicit intention of maintaining producer incentives to the extent possible. With the drop in the price of most commodities, tax revenues have decreased because no measures were taken to develop alternative sources of revenues. The size of the budget deficit and the mode of financing it are expected to be important topics in the policy dialogue of the government with the international donor community.

With the decision to align the Quetzal with its real value, Guatemala removed a major distortion in its foreign trade. There exist, however, a series of legal restrictions in the form of export and import licenses, the effect of which is to isolate the Guatemalan economy from international prices. Although tariff protection for selected agricultural products is determined within the Central American Common Market, the highest level of protection is implemented through licenses and other forms of restrictions to international trade via national policy.

Retail price controls were the centerpiece of the inflation control policy in the early stages of the present government. This policy has been gradually phased out and the list of price controlled products was reduced from 400 to 17. The tendency is to eliminate the list altogether. The real challenge faced by the government, notwithstanding, is how to improve the competitive structure in the products subject to price control. The production and distribution of these products generally presents an oligopolistic structure and government actions represent the countervailing power that the market forces fail to exert.

The policy of guaranteeing minimum prices to producers of corn, beans, rice, wheat and sorghum has had the dual objective of ensuring adequate supplies of these products and protecting the income of small and medium-size

farm operators. The impact of this policy on producer prices has been mixed. For beans, whose production is unstable, floor prices have not stabilized prices nor supplies. The variability of corn, rice and sorghum producer prices has shown a tendency to decline. A recent analysis of the behavior of prices for the staples mentioned above concluded that while the variability of prices received by producers has tended to decline, wholesale and retail prices have shown a tendency to increase. This result indicates that government policy has placed great emphasis on stabilizing producer prices but that little has been done to reduce the instability of consumer prices. The objectives of the floor price scheme as well as the entire approach for setting and administering floor prices by the National Institute of Agricultural Marketing (INDECA) need to be critically examined and the needed modifications implemented.

Agricultural wage rate policies are presently outdated. The last revision of the minimum wages established for livestock and agricultural activities was done 1980. At that time minimum wage rates did not reflect labor productivity in the various activities. For instance, the minimum daily wage for cotton, coffee, livestock and sugarcane was set at Q.3.20 a day. It is well known that the productivity of labor employed in each activity is very dissimilar. The enforcement of the minimum wage legislation is very limited during the off-season, when it is necessary. During the peak labor demand period, the market wage is generally 30 to 50 percent above the minimum wage.

Most of the national plans produced so far assign high priority to the creation of employment opportunities in the rural sector. Nonetheless, there is no well-defined employment policy which could mobilize the investment, production and macroeconomic policies towards the achievement of stated employment objectives. Small-scale irrigation schemes and rural road construction programs are two activities that have proven effective for the generation of employment opportunities in the rural area. Similar programs could be initiated to achieve the dual objective of investment in rural infrastructure and generating income and employment in the rural areas.

The distribution of fertilizers is presently an entirely private sector activity in Guatemala. Recently, the government has been importing and distributing fertilizer in direct competition with the private sector in an attempt to keep costs of production low for small producers. The government promotes the use of fertilizer through various mechanisms including tax exemption and preferential foreign exchange rates. The production technology developed by the Institute for Agricultural Science and Technology (ICTA) incorporates fertilizers as an important input. However, there appears to be a need for developing production technologies that economize on the use of imported inputs while maximizing the use of local inputs (e.g., organic fertilizers).

b. Land Use Policies

The most recent attempts of the government to improve access to land is reflected in the idle land tax and the law for promoting the cultivation of basic grains. Access to land as a productive input has become a touchy issue, and there is an urgent need to find feasible alternatives for making land available to rural laborers.

J. TARGET GROUP PROFILE

For the past 10 years the primary target population for USAID/Guatemala's rural development interventions has been the small farmers of the indigenous Highlands. This focus will continue for future development efforts, with some programs extended to include growing numbers of land-poor farmers and farm workers, most of whom live on the Pacific Coastal Plain. These two groups comprise the largest population of land-poor and landless farmers in Guatemala. They are also the rural population with the greatest current potential for political mobilization in the country.

1. Highland Indian Farmers

The Highlands west and north of Guatemala City are home to the vast majority of the country's Indian population. This ethnic group has lived in the Highlands for millennia. In 1981 there were over 2.5 million Indians in Guatemala, comprising 42% of the national population. Of these, over 77% live in the 10 Departments that comprise the indigenous Highlands: Alta Verapaz, Baja Verapaz, Chimaltenango, Sacatepequez, Huehuetenango, Quezaltenango, Quiché, San Marcos, Sololá, and Totonicapán (Figure 14). The latter six Departments comprise what is sometimes referred to as the Western Highlands. Portions of the Departments of Quezaltenango and San Marcos extend to the Pacific Coastal Plain and include areas of large-scale export agriculture that are not typical of the indigenous Highlands. Similarly, Huehuetenango, Quiché, and Alta Verapaz extend north to include areas of coffee and cardamom production in large holdings for export.

The Indian Highlands are characterized by extremely small land holdings, most of which are devoted to production of traditional crops such as corn, beans, wheat, and squash. Over 90% of the farms in this region are smaller than 7 hectares, the minimum size that has been generally accepted as necessary to support a family with traditional basic grain production. The Indian Highlands have over 65% of the farms in Guatemala in the size range .04 to 0.7 hectares and over 50% of the farms in the size range between 0.7 and 7

hectares. These figures are suggestive of the degree of land shortage and fragmentation that exist in the Indian Highlands. The vast majority of farms are too small to support a family at an adequate living standard. Even taking into account recent interventions in crop diversification, soil conservation (terracing), and small-scale irrigation, which make it possible for farms as small as 0.5 or 0.25 hectares to provide marginal support for a family of 6 persons (the approximate Guatemalan average) under ideal conditions, many farms are still below this size, and only relatively few have been affected by such improvements.

Thus, Indian families must resort to off-farm sources to provide the additional income required to survive through the year. Sources of employment include: (1) work as migrant laborers in the coffee, sugar cane, and cotton harvests of Pacific Coastal Plains, (2) occasional work on farms in the home area, and (3) work in some form of handicraft, artisan, or small commercial activity. It is not unusual for a large family to have members engaged in activities in all of these categories. However, the incomes generated by these marginal activities are usually small, and do not provide for more than the barest of necessities.

The land-poor Highland Indians have an economy that has been referred to as marginal commercial. That is, the bulk of production is directed to family subsistence, but small amounts of corn, beans, or other products may be sold when there is a need for cash or occasionally at harvest times if adequate storage facilities are not available. The exceptions to this rule are wheat and vegetable producers, who grow these products for sale. However, even these farmers usually plant a part of their land each year in the traditional crops for family consumption. Cash incomes are extremely small for subsistence-oriented producers, often amounting to only a few hundred Quetzales per year. Such family incomes include earnings from work off the farm and sale of artisan or handicraft items. By the standards of most rural communities of the Highlands, a family with a monthly income of Q250 (\$100.00)

would be considered financially well off.^{10/}

Clearly, with such small cash incomes, the producers of traditional crops participate only marginally in the national economy. Houses are constructed of traditional materials: adobe blocks for walls with roofs of tile, thatch, or laminated tin, and dirt or concrete floors. Glass windows are rare, wooden shutters close off sleeping quarters at night. Typically, an entire nuclear family occupies a single room. Separate one-room "houses" provide living quarters for parents, married siblings and their families and other relatives. A representative compound might have as many as four or more separate one-room adobe buildings housing several related family units, with a separate house set aside for cooking.

Malnutrition is prevalent in the rural communities of the western Highlands, caused principally by insufficient production of basic grains from small parcels for adequate on-farm consumption, levels of income too low to purchase necessary foodstuffs, lack of foodstuffs available in the nearby market place, large family size, and inadequate biological ingestion of foods which are consumed.

Perhaps the easiest measurement which indicates the nutritional status of the general population is the degree of height and weight development of children in relation to their age. Table 50 indicates that the highest level of malnutrition in Guatemala occurs in the Western Highlands (85.3% of all children less than 5 years of age). This is compared to the overall national average of 75.9%. In terms of degree of malnutrition, the Western Highlands also has the worst situation, with 32.4% of children under the age of 5 years more than 15% retarded in their growth.

^{10/} In 1986, rural family income averaged between Q1,200 and Q1,500 per year.

According to a Guatemala Economic Planning Council/INCAP study done in 1980 ^{11/}, the problem of malnutrition is concentrated in families with the following characteristics (i.e., our target group).

- . living in the rural area, especially in the Western Highlands
- . belonging to an indigenous ethnic group
- . having an illiterate head of family
- . being minifundistas or salaried farm workers
- . when the head of family migrates, but less than two months to cotton farms on the Pacific Coastal Plain
- . using water from rain, rivers or lakes which are exposed to human and animal excrements
- . using the kitchen for the bedroom

Few rural communities are served by electricity. Most have limited access to drinking water, but quality is often poor because of contaminated sources, and scattered farm families often find it more convenient to bring water from streams or springs. This may mean a walk of up to one or two kilometers, including climbs up and down precipitous slopes, to bring in the daily supply of drinking water. Sanitary facilities are generally limited to latrines, and many rural homes lack even those.

Medical facilities are largely restricted to health centers (puestos de salud) that are staffed part time by nurses, visited periodically by a physician, and located only in municipal seats (cabeceras municipales). Few farm communities have medical facilities. Most communities have schools that offer the first three grades of primary school. Completion of the three grades generally qualifies one as "literate", but rates of functional literacy are well below 50% in most of the Indian Highlands. Older adult women are rarely literate, and many cannot speak Spanish. Most adult men can speak and understand at least basic Spanish. Children, both male and female, are generally bilingual and usually attend school in their community. There is a well-developed sense of the importance of education among Indians, so that it

^{11/} Regionalización de Problemas Nutricionales en Guatemala, SGCNPE/INCAP, 1980.

is not unusual for families to send children to continue their schooling in towns that offer upper primary grades and have a secondary school. These students may live with relatives or friends if the distance is too great to walk each day. Such education may be gained only through considerable sacrifice on the part of parents. Many communities are without access by road. Even where roads exist, unless they are major routes of transport, quality and maintenance are poor, thus making travel slow and difficult at best, and sometimes impossible in the rainy season.

The needs of rural Highland communities are indicated by the results of a needs survey carried out in 1979 which showed that the primary need expressed by the interviewed population was potable water, followed by roads, health care, schools, and electricity. While some progress in meeting these needs may have been made in the intervening years, the priorities no doubt remain much the same now as they were in 1979.

Traditional crops of corn, beans, wheat, and squash are generally produced with low technology methods. With the exception of wheat, little improved seed is used, pesticide use is rare, and use of chemical fertilizers, while nearly universal in most communities for all crops, is not carefully matched to local soil deficiencies, not applied in appropriate quantities, nor at the best times in the plant growth cycle to produce the best results.

A growing number of farms of under 7 hectares in size produce non-traditional crops, such as vegetables and fruit, utilizing highly intensive cultivation techniques. For example, the Indian Highland community of Almolonga is one of the most important and prosperous vegetable producing centers in Guatemala. This production comes from very small holdings that are farmed with concentrated inputs of labor, fertilizers, pesticides, and other modern yield-enhancing inputs.

Of a total of 475 farms in Almolonga, only 2 are larger than 3.5 hectares, while 86% are less than one hectare in size. The bulk of cold-climate vegetables and non-tropical fruit produced in Guatemala comes

from such small, intensively farmed properties. The extent to which such production is concentrated in farms less than 7 hectares is illustrated as follows:

	<u>%</u>		<u>%</u>
Broad beans (haba)	93	Beets, carrots	72
Garlic	90	Apples	70
Cauliflower, cabbage	80	Green beans	67
Onions, peas	78	Turnips	64
Potatoes	77	Black beans	60
Plums	76	Lettuce	58
Peaches	74		

In addition to the above crops, small Highland farms also produce important quantities of snow peas, broccoli, Brussels sprouts, and strawberries. Some communities have developed production specialties. For example, Aguacatán is a garlic production center; San Antonio Palopó is noted for onions; San Andrés Itzapa is a major center of cauliflower production; and Joya Grande, in the municipality of Zaragoza, concentrates on strawberry production. Other communities have more varied production. Almolonga, Santa María de Jesús, and Santa Rita, in San Antonio Sacatepéquez, all grow a wide variety of vegetables for market.

Vegetable production commonly occurs in very small, carefully tended plots, frequently of 200 square meters (0.02 hectare) or even smaller. Some crops (e.g., onions) may be started in nursery beds and transplanted later by hand to garden plots. Watering is often by hand, although sprinklers are used with most small-scale irrigation projects. Inputs of fertilizer and pesticides are relatively high, and organic materials such as chicken manure and leaf litter may also be used if they are available. Commercial seed is used and farmers may go to considerable lengths to find the best varieties for their local climate and soil conditions. Some communities have independently developed markets for their vegetables and handle their own transportation.

Almolonga, in particular, supplies vegetables to a region that extends from Quezaltenango in the Highlands to lowland markets from Tapacnula, in southern Mexico, to San Salvador, including major population centers on Guatemala's Pacific Coastal Plain. Vegetable production in well established centers such as Almolonga dates to the late 19th century. It began in order to satisfy the demands of European residents of Quezaltenango and Guatemala City for fresh vegetables. Production has expanded greatly in the past 20 to 30 years, both in volume and variety. Initially, the increase was in response to growing demand in Guatemala; more recently, it has begun to expand into export markets in Mexico, other Central American countries, and the United States, Canada, and Europe. Fresh and frozen produce is exported. Vegetable and fruit production continues to increase among small Indian Highland farmers. As long as markets are not saturated, the production of these non-traditional crops utilizing intensive farming techniques will continue to provide an important means of achieving commercialization of production on small farms. The incomes thus generated lead to improved living conditions for small farmers.

Wheat is also grown commercially on small farms in the Indian Highlands. Major production areas are Huehuetenango, Quezaltenango, San Marcos, Totonicapán, and Chimaltenango, but small amounts are also grown in some other Departments as well. Conditions are suitable only for growing soft wheat, which is consumed entirely within Guatemala.

Production techniques for wheat have improved over the past 20 years, with the introduction of hybrid seed matched to local conditions, and more effective use of fertilizers and other chemical inputs. Much wheat is grown at elevations that are too high for most vegetables and fruits, and local demand exceeds production. Thus, wheat will likely remain a viable commercial crop in much of the Indian Highlands.

The successful diffusion of non-traditional crop production demands improved access to credit, production information, improved seed and other production inputs, access roads, and research on potential markets and alternate crops. If these inputs are made available, there exists great

potential for expanding commercialization of small farmer agriculture and improving the standard of living of the Highland population. In general, the Guatemalan Indians are intelligent, industrious, and motivated to improve their economic situation. They are closely tied to their home communities, preferring to remain there as farmers if circumstances permit. Such a population is an ideal target for interventions that help to improve the productivity of land, such as small-scale irrigation, soil conservation, and crop diversification.

2. Landless Farm Population

Estimates of the number of unemployed landless heads of household for late 1986 are over 400,000, with another 800,000 underemployed workers without land.^{12/} This amounts to over 15% of the estimated 8.3 million population. The growing number of the landless are found throughout the country, but are especially numerous on the Pacific Coastal Plain and the adjacent piedmont area (Boca Costa). Landless workers were attracted to these areas by the availability of work on large farms producing traditional export crops. These crops, mainly coffee, sugar cane, cotton, and until 1964, bananas, have high seasonal labor demands which can be filled by migrants from the nearby Indian Highlands. A certain number of such migrants are able to enter into colonato agreements, whereby they are allowed to farm a small plot of land as partial compensation for their farm work. Such families may become long-term residents of the farms on which they work.

During the late 1950's and early 1960's, several agricultural colonization projects (parcelamientos) were established on the Pacific Coastal Plain. The largest of these, Nueva Concepción and La Máquina, have over 25,000 hectares each. Parcels of 20 hectares were assigned to land recipients. Over the years, parcels have been subdivided and rented to landless families, thus contributing to a large landless population in the parcelamiento. Beginning in

^{12/} It is extremely difficult to obtain accurate data on the landless farm population.

the late 1930's, when United Fruit Company opened a large banana plantation at Tiquisate, and continuing through the 1970's, the Pacific Coastal Plain was the most rapidly growing area of Guatemala. The hope of finding employment in this expanding center of export-oriented, large-scale agriculture attracted many landless worker families. In the 1980's, a combination of declining prices for traditional export commodities, political unrest and changing crop patterns led to a reduction in labor demand.

One measure of the extent of reduction in labor demand is the number of employees in agriculture that are registered with the Guatemalan Institute of Social Security (IGSS). These figures largely represent full-time and/or long-term employees, since very few seasonal workers are enrolled in the Social Security program (Table 51). These data show a shocking drop of 40% in IGSS members in the agricultural sector between 1980 and 1981. This drop in long-term farm employees is a result of widespread political unrest that began to seriously affect large-scale agricultural operations in 1979 and 1980. The fact that agricultural employment showed only a slight recovery as the political situation became more stable in 1984 and 1985 is probably due to declining markets and prices for most of Guatemala's traditional exports.

As profitability of traditional exports has dropped, production has shifted to other, more profitable crops. For example, the area planted in cotton, a crop with high seasonal labor demands, dropped from 124,000 hectares in 1977/78 to only 15,000 hectares in 1985/86. Much of the land that went out of cotton production has been converted to sorghum, soybeans, and corn, all crops with much lower labor requirements than cotton. This is the extreme case, but other traditional exports have reduced labor demand to a smaller extent as production has been cut back.

The majority of landless workers on the Pacific Coastal Plain are children of farm workers who live on the large farms or are members of families that moved to one of the parcelamientos in the 1950's and 1960's. They have now reached an age when they have families of their own, and they are looking for land to farm. A smaller, but also important, source of landless unemployed is seasonal or permanent workers who can no longer find employment in agriculture because of reduced labor demands.

The living standards of the Pacific Coastal Plain population are worse than those of the Highland Indians. Incomes are lower, especially for the landless, who do not have access to land on which to grow subsistence crops. Also, workers who live on large farms or rented land do not invest in home improvements, even if they have the money, because they have no guarantee that they will remain where they are. This means that housing tends to be poorer than in the Highlands, where most people own the site on which their home stands. Health problems are also more serious among the landless on the Pacific Coast. Not only are there endemic diseases such as malaria and many kinds of parasites which are not present in the Highlands, but access to health facilities is more limited. Very few large farms have any kind of dispensary or other health facility, and travel to hospitals or health centers in towns is made difficult for many by lack of transportation.

Even for those who are fortunate enough to gain access to land through rental or colonato agreements, productivity is not as great as for land owners. Renters and colonos do not have access to technical assistance, lack collateral for credit, are often unable to afford improved seed, fertilizer, and other production inputs, and have the added expense of land rental or obligations to provide labor that may prevent them from devoting adequate time to their own crops.

If the land-poor Highland Indians and landless peasants are counted together, their combined numbers amount to over half the population of Guatemala. These groups do not share in the wealth generated by the Guatemalan economy, and for many the situation has become one of a daily struggle for survival. Infant and child malnutrition is increasing, as are other signs of extreme poverty. There are reports that agricultural workers from the Pacific Coastal Plain, unable to find work or land, have migrated to Mexico or the United States seeking employment. These conditions place increasing pressure on the Cerezo government, which is attempting to follow a central line between competing factions of both right and left.

ANNEX I

T A B L E S

(In millions of 1958 Quetzales)

COMMODITY	1983	1984	1985	1986 estimated	1987 projected	Percentage of total exports				
						1983	1984	1985	1986	1987 projected
Coffee										
Export Value	308.8	360.6	451.5	501.3	408.0	28.3	31.9	42.6	46.6	37.8
Volume (000 cwt)	2,583.8	2,842.2	4,041.1	2,949.7	3,000.0					
Unit Price per cwt	119.53	126.87	111.73	169.95	136.00					
Cotton										
Export Value	67.4	72.3	73.1	28.0	40.5	6.2	6.4	6.9	2.6	3.8
Volume (000 cwt)	1,203.8	1,154.1	1,253.6	800.0	900.0					
Unit Price per cwt	55.72	62.65	58.31	35.00	45.00					
Sugar										
Export Value	95.3	71.3	46.4	51.7	49.0	8.7	6.3	4.4	4.8	4.5
Volume (000 cwt)	8,540.6	6,020.6	6,158.2	7,961.8	7,000.0					
Unit Price per cwt	11.16	11.71	7.53	6.49	7.00					
Bananas										
Export Value	53.5	54.9	70.9	73.4	78.0	4.9	4.8	6.7	6.8	7.2
Volume (000 cwt)	5,429.3	5,799.6	7,062.6	7,331.5	7,800.0					
Unit Price per cwt	9.85	9.48	10.04	10.01	10.00					
Meat										
Export Value	15.6	12.7	10.0	5.3	7.0	1.4	1.1	1.0	0.5	0.7
Volume (000 cwt)	190.6	185.3	200.5	90.9	100.0					
Unit Price per cwt	81.77	68.47	49.88	58.31	70.00					
Cardamom										
Export Value	59.4	100.3	60.7	60.0	64.0	5.4	8.9	5.7	5.6	5.9
Volume (000 cwt)	170.4	160.2	144.4	150.0	160.0					
Unit Price per cwt	348.67	626.09	420.00	400.00	400.00					
Petroleum										
Export Value	60.0	34.0	11.9	26.1	34.0	5.5	3.0	1.1	2.4	3.1
Volume (000 barrels)	2,206.3	1,248.2	452.3	1,784.1	2,000.0					
Unit Price	27.21	27.24	26.00	14.60	17.00					
Exports to CACM										
Export Value	320.9	291.4	207.8	200.0	210.0	29.4	25.7	19.6	18.6	19.4
Other (Non-traditional)										
Export Value	110.8	134.7	127.4	130.0	190.0	10.2	11.9	12.0	12.1	17.6
TOTAL EXPORTS FOB										
	1,091.7	1,132.2	1,059.7	1,075.8	1,080.5	100.0	100.0	100.0	100.0	100.0
Traditional Exports as % of Total Exports										
						54.9	59.4	67.3	66.9	59.9

SOURCE: Banco de Guatemala

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Table 2. CURRENT NATIONAL GOVERNMENT INCOME
(In Millions of 1958 Quetzales)

	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
<u>Total Current Income</u>	<u>165.2</u>	<u>329.7</u>	<u>406.8</u>	<u>591.2</u>	<u>660.7</u>	<u>668.8</u>	<u>747.3</u>	<u>740.6</u>	<u>720.7</u>	<u>741.1</u>	<u>666.3</u>	<u>864.8</u>
All Taxes	147.2	300.7	370.3	556.9	626.6	629.4	686.1	658.6	632.7	305.5	264.1	315.3
1. <u>Direct Taxes</u>	23.9	62.7	67.5	79.8	105.1	101.1	104.3	115.0	109.7	134.3	85.4	126.2
a. Income Tax	18.4	54.8	59.2	70.8	94.7	92.9	96.7	107.0	102.2	128.2	78.5	108.0
- Personal	4.3	42.1	45.5	56.7	74.4	72.3	70.6	84.9	83.5	110.1	49.4	72.2
- Business	14.1	42.1	45.5	56.7	74.4	72.3	70.6	84.9	83.5	110.1	49.4	72.2
b. Property Tax	5.5	7.9	8.3	9.0	10.4	8.2	7.6	8.0	7.5	6.1	6.9	18.2
- Land	5.1	7.6	8.1	8.6	9.7	7.9	7.2	7.5	7.0	5.4	5.9	17.6
- Inheritance and Gifts	0.4	0.3	0.2	0.4	0.7	0.3	0.4	0.5	0.5	0.7	1.0	0.6
2. <u>Indirect Taxes</u>	123.3	238.0	302.8	477.1	521.5	528.8	581.8	543.6	523.0	171.2	178.7	189.1
a. Import Tariffs	36.2	60.2	69.9	97.1	108.4	117.9	111.9	105.2	80.5	15.4	18.6	19.4
- San José Protocol	7.6	14.2	16.0	21.3	23.2	26.0	24.8	23.3	18.3	15.3	18.6	19.0
- Others	28.6	46.0	53.9	75.8	85.2	91.9	97.1	81.9	62.2	0.1	---	0.4
b. Export Taxes	9.6	31.3	49.2	152.2	158.3	125.8	149.7	68.2	48.7	45.2	31.5	10.7
- Coffee	8.4	7.8	38.7	140.8	147.2	115.1	133.1	43.1	35.9	27.5	22.0	7.5
- Banana	0.2	0.4	6.2	6.7	7.6	6.5	9.7	10.3	10.0	6.1	2.9	1.3
- Cotton	0.2	1.6	1.6	0.3	3.2	0.7	4.6	7.8	2.2	0.6	0.4	0.2
- Sugar	----	19.3	2.5	0.3	----	0.2	1.7	6.6	----	5.4	3.1	0.8
- Others	0.8	2.2	0.2	4.1	0.3	0.3	0.6	0.4	0.6	5.6	3.1	0.9

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Table 2. (Cont.)

	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
c. Other Taxes on Business	----	----	----	-----	2.9	4.2	3.9	4.1	4.0	----	-----	-----
d. Excise Taxes	77.5	146.5	183.7	227.8	261.9	280.4	316.3	366.1	389.8	110.6	128.6	159.0
- Stamp Tax	35.6	78.5	104.7	140.2	151.6	171.3	200.3	261.0	284.8	23.7	19.3	38.5
- Petroleum	11.5	18.1	19.3	17.6	24.2	28.8	24.3	20.7	19.5	24.5	43.9	42.6
- Tobacco	6.7	10.2	12.4	13.1	13.3	16.9	20.7	20.6	22.8	24.5	23.0	32.5
- Alcohol	15.9	25.6	31.1	36.8	40.4	42.7	46.6	43.0	41.3	33.6	40.8	43.6
- Carbonated Beverages	----	3.2	3.8	5.4	5.5	5.2	5.4	5.6	5.5	3.4	0.7	0.8
- Others	7.8	10.9	12.4	14.7	16.4	16.0	19.0	15.2	15.9	0.9	0.9	1.0

SOURCE: Estadísticas de las Finanzas Públicas, Departamento de Estudios Económicos, Banco de Guatemala

Table 3. GUATEMALA GROSS DOMESTIC PRODUCT BY SECTORS
(In millions of 1958 Quetzales)

	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total GDP	<u>1,792.8</u>	<u>2,356.4</u>	<u>2,540.5</u>	<u>2,723.9</u>	<u>2,859.9</u>	<u>2,994.6</u>	<u>3,106.9</u>	<u>3,127.8</u>	<u>3,016.6</u>	<u>2,939.6</u>	<u>2,958.2</u>	<u>2,925.3</u>	<u>2,925.1</u>
1. Agriculture and related activities	489.7	659.9	689.6	716.6	739.1	760.0	772.0	781.4	757.9	744.9	759.8	750.4	750.4
2. Mining	1.7	2.1	2.7	3.1	4.8	8.6	14.8	9.5	10.7	9.4	7.8	6.5	8.3
3. Manufacturing	283.0	356.3	393.5	435.6	463.7	489.6	517.3	501.2	475.1	466.0	458.4	467.4	469.6
4. Construction	28.4	43.9	76.3	85.8	88.6	94.4	98.0	116.5	103.0	75.8	53.4	49.1	48.5
5. Energy	21.5	32.8	35.4	44.3	49.0	52.0	53.2	53.3	51.9	51.5	54.0	56.3	59.4
6. Transportation, Storage and Communications	98.2	150.8	164.9	176.9	189.5	199.5	215.8	211.2	201.2	199.7	204.8	208.6	206.1
7. Commerce	518.0	648.7	704.1	768.5	802.4	824.7	839.1	844.1	797.2	764.4	770.5	744.6	728.7
8. Finance	42.3	65.0	79.4	79.4	85.7	102.1	106.7	108.8	109.7	107.3	109.5	108.6	111.2
9. Rental Income	124.8	138.7	112.1	121.3	129.5	134.1	138.1	141.7	145.4	149.2	151.9	155.0	157.4
10. Public Administration	86.9	118.2	132.0	131.1	138.2	147.4	163.0	170.1	176.7	185.1	190.3	191.1	197.8
11. Private Services	98.3	140.0	150.5	161.3	169.4	182.2	188.9	190.0	187.8	186.3	187.8	187.7	187.7

SOURCE: Estudio Económico y Memorias de Labores, Banco de Guatemala

Table 4. GUATEMALA GROSS DOMESTIC PRODUCT BY SECTORS
(In percentages)

	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
<u>Total GDP</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.00</u>	<u>100.0</u>	<u>100.0</u>	<u>10.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
1. Agriculture and related activities	27.3	28.0	27.2	26.3	25.9	25.4	24.9	25.0	25.1	25.3	25.7	25.7	25.7
2. Mining	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.3	0.4	0.3	0.3	0.2	0.3
3. Manufacturing	15.8	15.1	15.5	16.0	16.2	16.3	16.7	16.0	15.8	15.9	15.8	16.0	16.1
4. Construction	1.6	1.9	3.0	3.2	3.1	3.2	3.2	3.7	3.4	2.6	1.8	1.7	1.6
5. Energy	1.2	1.4	1.4	1.6	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.9	2.0
6. Transportation, Storage and Communications	5.5	6.4	6.5	6.5	6.6	6.7	6.9	6.8	6.7	6.8	6.9	7.1	7.0
7. Commerce	28.9	27.5	27.7	28.2	28.1	27.5	27.0	27.0	26.4	26.0	26.1	25.5	24.9
8. Finance	2.3	2.8	3.1	2.9	3.0	3.4	3.4	3.5	3.6	3.6	3.7	3.7	3.8
9. Rental Income	7.0	5.9	4.4	4.5	4.5	4.5	4.4	4.5	4.8	5.1	5.1	5.3	5.4
10. Public Administration	4.8	5.0	5.2	4.8	4.8	4.9	5.2	5.4	5.9	6.3	6.4	6.5	6.8
11. Private Services	5.5	5.9	5.9	5.9	5.9	6.1	6.1	6.1	6.2	6.3	6.4	6.4	6.4

SOURCE: Derived from Table 3

Table 5. NATIONAL LAND USE

Use	Area (km ²)	Percentage	Classification
Cultivated Land (annual crops)	10,278	9.4	I,II,III, IV
Permanent Crops	3,451	3.2	V,VI
Crops and Pastures	14,106	12.9	V
Crops and Forests	10,979	10.1	V
Natural Pastures	5,715	5.2	V
Cultivated Pastures	7,818	7.2	V
Pastures and Forests	9,172	8.4	V,VI
Open Forests	4,495	4.1	VII
Dense Forests	41,407	38.0	VIII
Not Appropriate for Cultivation	1,568	1.5	---
TOTAL	108,889	100.0	---

SOURCE: Memorias del I Congreso Nacional de la Ciencia del Suelo.

Table 6. LAND DISTRIBUTION IN GUATEMALA

Farm Size	Number of farms						Area (hectares)					
	1950		1964		1979		1950		1964		1979	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<u>National Total</u>	<u>348,687</u>	<u>100.0</u>	<u>417,344</u>	<u>100.0</u>	<u>521,636</u>	<u>100.0</u>	<u>3,720,831</u>	<u>100.0</u>	<u>3,457,737</u>	<u>100.0</u>	<u>4,189,246</u>	<u>100.0</u>
Less than 0.7 ha.	74,269	21.3	85,083	20.4	166,732	31.4	28,575	0.8	32,678	0.9	55,430	1.3
0.7 to less than 1.4 ha.	91,581	26.3	98,658	23.6	121,351	22.8	94,554	2.5	95,428	2.8	115,116	2.8
1.4 to less than 3.5 ha.	99,779	28.6	129,115	30.9	123,567	24.2	212,090	5.7	279,693	8.1	267,902	6.4
3.5 to less than 7 ha.	42,444	12.2	52,023	12.5	51,798	9.7	197,911	5.3	242,833	7.0	240,142	5.8
7 to less than 22.4 ha.	26,916	7.7	37,025	8.9	40,378	7.6	310,915	8.4	446,564	12.9	497,858	11.9
22.4 to less than 44.8 ha.	6,125	1.7	6,631	1.6	9,131	1.7	189,916	5.1	203,508	5.9	283,158	6.8
44.8 to less than 450 ha.	6,488	1.9	7,859	1.9	12,297	2.3	813,262	21.9	915,079	26.5	1,281,854	30.7
450 to less than 900 ha.	569	0.2	561	0.1	880	0.2	354,270	9.5	345,739	10.0	535,630	12.8
900 to less than 2,250 ha.	358	0.1	294	0.1	388	0.1	495,508	13.3	387,093	11.2	501,714	12.0
2,250 to less than 4,500 ha.	104	*	56	*	75	*	327,649	8.8	169,747	4.9	227,156	5.4
4,500 to less than 9,000 ha.	32	*	30	*	15	*	196,333	5.3	178,448	5.2	88,663	2.1
9,000 ha. and more	22	*	9	*	4	*	499,848	13.4	160,927	4.6	85,623	2.0

* Less than 0.1

The Census of 1950 eliminated all farms of less than .04 hectare (i.e., una cuerda), whereas the 1964 Census established no lower limit. The 1979 Census recorded all farms irrespective of size, but at the time of the compilation of this study the data for farms of less than .04 hectare had not yet been processed. It is understood that there are approximately 70,000 farms of this size, yielding a maximum estimated total of 3,043 hectares of land.

TABLE 7. AGRARIAN STRUCTURE BY SOCIAL CATEGORIES OF PRODUCERS
(In percentages)

Regions	Campesinos			Small Farmers			Transitional Farmers	Commercial Farmers				Total
	Infra- sub- sistence	Sub- sistence	Total	Sub- Family	Family	Total		Small	Medium	Large	Total	
<u>Western Highlands</u>												
Farms	33.2	11.4	44.6	4.3	2.5	6.8	0.5	0.3	N.S.	N.S.	0.3	52.2
Area	2.5	3.1	5.6	2.6	3.8	6.4	2.1	4.6	3.9	1.0	9.5	23.6
<u>Pacific Coastal Plain</u>												
Farms	7.4	2.4	9.8	0.9	1.3	2.2	0.2	0.4	0.1	N.S.	0.5	12.7
Area	0.5	0.6	1.1	0.5	2.3	2.8	0.8	8.2	10.3	2.7	21.2	26.0
<u>East</u>												
Farms	5.8	5.0	10.8	1.7	1.3	3.0	0.3	0.4	N.S.	N.S.	0.4	14.6
Area	0.5	1.3	1.8	1.0	2.0	3.0	1.3	4.8	2.0	0.7	7.4	13.6
<u>Northern Lowlands</u>												
Farms	5.4	4.1	9.5	2.1	2.0	4.1	0.3	0.3	0.1	N.S.	0.4	14.3
Area	0.5	1.1	1.6	1.3	3.0	4.3	1.2	4.3	5.0	4.2	13.5	20.5
<u>Petén</u>												
Farms	0.4	0.6	1.0	0.4	0.3	0.7	0.2	0.8	0.1	N.S.	0.9	2.8
Area	N.S.	0.2	0.2	0.2	0.5	0.7	1.1	7.5	2.9	1.0	11.4	13.5
<u>Guatemala</u>												
Farms	2.0	0.8	2.8	0.3	0.2	0.5	N.S.	0.1	N.S.	-	0.1	3.3
Area	0.1	0.2	0.3	0.2	0.2	0.4	0.2	1.3	0.7	-	2.0	2.9
<u>TOTAL</u>												
Farms	54.2	24.2	78.4	9.7	7.6	17.3	1.7	2.3	0.2	0.1	2.6	100.0
Area	4.1	6.4	10.5	5.8	11.9	17.7	6.8	30.7	24.8	9.6	65.1	100.0

* Determined by farm size, crop mix and income
N.S. = Not significant

SOURCE: Calculations based on 1979 Agricultural Census data.

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Table 3. PROPORTION OF SOCIAL CATEGORIES* OF PRODUCERS WHO OWN THEIR LAND (In percentages)

Regions	Campesinos			Small Farmers			Transitional Farmers	Commercial Farmers				TOTAL
	Infra-sub-sistence	Sub-sistence	Total	Sub-Family	Family	Total		Small	Medium	Large	Total	
<u>Western Highlands</u>												
Farms	83.1	82.5	83.0	86.9	91.3	88.5	77.5	96.4	93.6	100.0	96.1	83.7
Area	80.5	83.0	81.9	87.0	91.8	89.9	77.1	96.7	91.2	100.0	94.8	88.8
<u>Pacific Coastal Plain</u>												
Farms	52.3	59.7	45.1	75.1	91.3	84.4	89.3	94.6	90.4	100.0	93.9	61.5
Area	46.1	60.9	54.6	75.7	92.6	89.4	89.6	93.8	80.0	100.0	92.8	90.7
<u>East</u>												
Farms	60.0	64.9	62.3	77.7	88.5	82.4	92.9	95.2	91.2	77.8	94.9	68.1
Area	55.5	65.4	62.5	76.5	89.3	85.0	92.2	95.1	91.5	78.9	92.7	86.9
<u>Northern Lowlands</u>												
Farms	55.3	53.8	45.7	63.3	72.0	67.5	90.2	93.8	92.2	97.3	93.6	60.2
Area	49.3	53.6	52.3	63.0	72.9	70.0	90.3	93.9	90.9	100.0	96.7	87.4
<u>Petón</u>												
Farms	75.2	24.2	44.1	24.0	36.6	29.9	88.3	89.9	98.4	9.2	90.3	58.4
Area	48.1	24.0	26.3	24.7	38.2	34.2	89.1	91.8	98.0	83.5	92.7	88.2
<u>Guatemala</u>												
Farms	61.4	67.0	62.9	74.7	91.0	80.8	91.1	96.3	100.0	-	96.6	66.5
Area	55.2	68.8	63.0	72.9	91.4	83.9	91.4	97.2	99.9	-	98.1	91.7
<u>TOTAL</u>												
Farms	72.8	69.8	71.9	76.1	83.2	79.3	86.2	93.2	92.7	95.7	93.2	74.0
Area	68.9	70.6	69.9	76.1	84.3	81.6	86.3	94.1	91.7	99.5	94.1	83.8

* Determined by farm size, crop mix and income

SOURCE: Calculations based on 1979 Agricultural Census data

Table 9. LAND AVAILABLE FOR AGRICULTURAL USES PER CAPITA
(Hectares per person)

Regions and Departments	1964	1973	1982
<u>TOTAL</u>	<u>1.82</u>	<u>1.52</u>	<u>1.11</u>
<u>Western Highlands</u>			
Sacatepéquez	1.43	1.17	0.96
Chimaltenango	0.94	0.78	0.59
Sololá	0.68	0.57	0.48
Totonicapán	0.35	0.29	0.22
Quetzaltenango	0.84	0.74	0.56
San Marcos	0.62	0.53	0.38
Huehuetenango	1.11	0.88	0.62
El Quiché	1.70	1.37	1.01
<u>Pacific Coastal Plain</u>			
Escuintla	2.06	2.21	1.36
Santa Rosa	1.12	1.00	0.72
Suchitepéquez	0.94	0.89	0.62
Retalhuleu	1.76	1.73	1.14
<u>East</u>			
El Progreso	0.86	0.77	0.57
Zacapa	1.19	1.14	0.90
Chiquimula	0.40	0.38	0.28
Jalapa	0.90	0.77	0.58
Jutiapa	1.02	0.85	0.64
<u>Northern Lowlands</u>			
Baja Verapaz	0.99	0.91	0.63
Alta Verapaz	2.14	2.01	1.50
Izabal	6.06	3.55	2.09
El Petén	110.90	35.47	22.37
Guatemala	0.72	0.39	0.35

SOURCE: Dirección General de Estadística/Secretaría General del Consejo Nacional de Planificación Económica. Estimaciones de Poblaciones de 1979 a 2000. Instituto Geográfico Nacional/Secretaría General del Consejo Nacional de Planificación Económica e Instituto Nacional Forestal y Cifras de los Censos de Población.

Table 10. LAND APPROPRIATE FOR AGRICULTURAL USES
AND ACTUALLY IN CULTIVATION

Regions and Departments	Land Use Types I-V	Land in Farms			
		000 Hect.		% of appropriate	
		1964	1979	1964	1979
<u>TOTAL</u>	<u>5,196.0</u>	<u>3,442.5</u>	<u>4,105.3</u>	<u>66.3</u>	<u>79.0</u>
<u>Western Highlands</u>					
Sacatepéquez	32.7	28.9	24.3	88.4	74.3
Chimaltenango	95.2	117.9	109.8	123.8	115.3
Sololá	48.2	37.9	30.2	78.6	62.6
Totonicapán	42.0	37.3	28.6	88.8	68.1
Quetzaltenango	145.0	126.6	134.4	87.3	92.7
San Marcos	182.8	199.5	196.3	109.1	107.4
Huehuetenango	268.9	249.0	223.3	92.6	83.0
El Quiché	368.5	243.7	239.8	66.1	65.1
<u>Pacific Coastal Plain</u>					
Escuintla	422.3	440.7	481.0	104.6	113.9
Santa Rosa	140.8	238.1	340.1	169.1	170.5
Suchitepéquez	125.1	176.6	197.3	141.2	157.7
Retalhuleu	155.3	138.6	131.1	89.2	84.4
<u>East</u>					
El Progreso	41.6	71.5	68.9	171.9	165.6
Zacapa	82.8	124.6	121.5	150.5	146.7
Chiquimula	47.1	95.0	81.1	201.7	172.2
Jalapa	66.1	96.0	103.2	145.2	156.1
Jutiapa	161.0	183.9	191.0	114.2	118.6
<u>Northern Lowlands</u>					
Baja Verapaz	79.9	134.9	128.4	168.8	160.7
Alta Verapaz	495.5	432.2	443.2	87.2	89.4
Izabal	493.5	125.8	251.6	25.5	51.0
El Petén	1,574.8	14.6	561.8	0.9	35.7
Guatemala	126.9	129.2	118.6	101.8	93.4

SOURCE: SGCNPE, IGN, INAFOR, Mapa de Capacidad Productiva de la Tierra y
Censos Agropecuarios de 1964 y 1979

Table 11. SMALL-SCALE IRRIGATION PROJECTS IN OPERATION, CONSTRUCTION AND DESIGN AS OF NOVEMBER 1985.

No.	Districts and Units	Department	Total Area (Ha)	Source of water	Altitude	No. of users
<u>PROJECTS IN OPERATION</u>						
Distrito No. 1						
1	Asunción Mita	Jutiapa	1 000	Río Ostúa	478	93
2	Atescatempa	Jutiapa	300	Agua subterránea,	670	46
3	El Tempisque	Jutiapa	517	Río Atescatempa		
4	Laguna El Hoyo	Jutiapa	450	Río Patulá	557	73
				Rios Quintanilla, Guibila, Laguna El Hoyo	961	188
Distrito No. 2						
5	La Fragua	Zacapa	2 000	Río Grande, Zacapa	190	356
6	Llano de Piedra	Zacapa	1 700	Río Grande, Zacapa	220	266
7	El Gayabal	Zacapa	1 500	Río Grande, Zacapa	210	38
8	Cabañas	Zacapa	1 400	Río Motagua	214	120
9	Oaxaca	Zacapa	423	Río Zapotón	130	26
10	La Palma	Zacapa	150	Río La Lima, Quebrada El Oro	185	20
Distrito No. 3						
11	El Rancho	El Progreso	895	Río Motagua	276	132
12	San Jerónimo	Salamá, B.V.	1 200	Río Salamá	999	396
13	San Cristóbal	El Progreso	250	Río Motagua	250	55
14	El Progreso	El Progreso	150	Río Guastatoya	517	30
15	San Silsay	El Progreso	105	Río Los Platanos	950	33
16	Palo Amatenado	El Progreso	60	Río Motagua	280	35
17	Las Candas	Guatemala	65	Río Los Ocotes	1 340	53
18	Rincón de la Paja	Guatemala	59	Río Bijague	1 440	20
19	Santa Rosa	Sacatepéquez	45	Río Berranca Honda	1 970	42
20	Lo de Ramírez	Guatemala	30	Río San Lucas	1 450	39
Distrito No. 4						
21	Catarina	San Marcos	1 500	Río Cabuz	233	128
22	Nica	San Marcos	700	Río de Tacalapa	170	135
23	La Elanca	San Marcos	1 800	Río Naranja	6	72
Distrito No. 5						
24	Cenilla	El Quiché	340	Río Sajcap	1 215	65
25	Xabulbay	Sololá	65	Río Quiscap	2 220	234
<u>PROJECTS UNDER CONSTRUCTION</u>						
26	Sacapulas	El Quiché				

Table 11. (cont.)

No.	Districts and Units	Department	Total Area (Ha)	Source of water	Altitude	No. of users
PROJECTS AT THE STAGE OF FEASIBILITY						
ANALYSIS						
27	Caballo Blanco	Retalhuleu	1 600	Río Ocosito	250	325
28	Mentúfar	Jutiapa	3 200	Río Paz		290
29	Jicmapa			Q. Bayona y Varrillona	790	30
30	Cuyuta	Escuintla	3 000	Río Achiguate	100	280
31	Olvido y Triunfo Norte	San Marcos	5 000	Río Cabuz		622
32	San Pedro P.	Jalapa	2 200	Río Jalapa	1 100	374
33	Chuaxic	Sololá	50	Río Chuiscalera	2 200	150
PROJECTS AT THE STAGE OF PRE-FEASIBILITY ANALYSIS						
34	Valle de Monjas	Jalapa	7 200	Río Ostúa	1 000	1 500
35	Valle de Salamá	Baja Verapaz	6 500	Río Salamá	1 000	1 500
36	Triunfo y Olvido	San Marcos	5 000	Río Cabuz	250	600
37	Ríos Azul y Lagartero	Huehuetenango	2 800	Río Azul y Lagartero	900	672
PROJECTS AT THE PRELIMINARY STAGE						
38	Valle de Chiquimula	Chiquimula	1 690	Río San José	800	400
39	Valle de Huehuetenango	Huehuetenango	250	Río Ocubilá	1 000	400
40	El Saral	Jutiapa	50	Río Estanzuela	700	26
41	San Diego	Jalapa	100	Río Jalapa	500	60
42	Las Trozas	Escuintla	1 000	Madre Vieja	15	1 000
43	Huité	Zacapa	200	Río Huité	150	100
44	Iguana y Vainilla	Zacapa	1 000	Río Motagua	150	700
45	San Pedro Itzapa	Chimaltenango	50	Río La Virgen	1 800	30
46	El Rosario	Retalhuleu	250			
PROJECTS IN THE CONCEPTUALIZATION STAGE						
47	Los Mixcos	Palencia	23	Río El Molino	1 360	76
48	Sanarate	Sanarate	1 066	Río Los Cubes		
49	Las Perlas	Yupitepeque	306	Río Los Plátanos	850	
50	Chiantla	Chiantla, Huehuetenango	150	Río Atescatempa	800	
51	Biafra	Gualán, Zacapa	3 739	Río Selegua	1 993	100
52	Chichipate	La Unión, Zacapa	42	Q. Chorro de La Pita Q. Mojonal		
53	Talpetate	Sapotitlán, Jutiapa	294	Río Chichipate		40
54	Telmiche	Malacatancito, Huehuetenango	88	S. sin nombre	2 255	50
55	Chimarrana	Cunén	94	Q. El Jutal	2 300	

SOURCE: Ministerio de Agricultura, Ganadería y Alimentación.

DOMESTIC PRODUCT BY SUBSECTOR
(In millions of 1958 Quetzales)

Products	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
<u>TOTAL PRODUCTION</u>	<u>492.7</u>	<u>672.6</u>	<u>699.9</u>	<u>723.3</u>	<u>746.1</u>	<u>767.4</u>	<u>777.8</u>	<u>786.0</u>	<u>764.4</u>	<u>754.4</u>	<u>767.5</u>	<u>759.6</u>
<u>TRADITIONAL EXPORT CROPS</u>	<u>171.4</u>	<u>256.4</u>	<u>262.7</u>	<u>277.5</u>	<u>279.4</u>	<u>292.7</u>	<u>306.8</u>	<u>301.5</u>	<u>276.5</u>	<u>269.3</u>	<u>275.8</u>	<u>273.9</u>
Coffee	108.5	139.2	122.5	127.1	129.2	138.0	143.1	146.0	143.4	144.0	151.4	142.6
Cotton	29.6	56.7	59.4	74.3	80.5	85.7	78.2	63.4	38.1	33.0	33.6	36.8
Bananas	16.8	26.0	32.5	27.3	30.4	28.8	37.5	33.1	39.1	28.9	23.8	34.8
Sugar	13.2	28.7	41.9	40.8	32.3	28.7	31.3	37.1	42.3	37.2	37.2	37.5
Cardamom	3.3	5.8	6.4	8.0	7.0	11.5	16.7	16.9	13.6	26.2	24.7	22.2
<u>BASIC FOOD CROPS</u>	<u>63.7</u>	<u>83.7</u>	<u>77.5</u>	<u>72.5</u>	<u>81.0</u>	<u>81.6</u>	<u>66.3</u>	<u>72.5</u>	<u>80.4</u>	<u>76.9</u>	<u>85.9</u>	<u>84.3</u>
Corn	36.3	43.8	39.7	36.5	42.6	44.2	44.5	46.4	50.6	47.5	54.1	52.2
Beans	25.8	29.1	29.0	26.2	27.9	26.5	11.7	16.2	19.2	17.9	20.3	22.4
Rice	2.5	5.0	2.6	3.0	3.2	4.0	4.6	3.7	5.4	5.0	4.9	4.2
Wheat	4.1	5.8	6.2	6.8	7.3	6.9	5.5	6.2	5.2	6.5	6.6	5.5
Sorghum	N.D.											
<u>NON-TRADITIONAL EXPORT CROPS</u>	<u>80.0</u>	<u>112.5</u>	<u>128.4</u>	<u>135.5</u>	<u>131.3</u>	<u>130.1</u>	<u>143.7</u>	<u>149.9</u>	<u>148.9</u>	<u>147.4</u>	<u>145.3</u>	<u>144.7</u>
Vegetables	19.7	22.9	23.6	24.4	25.1	25.9	31.2	32.1	32.9	33.8	34.7	35.7
Fruits	21.4	24.9	25.7	26.5	27.3	28.2	34.0	34.9	35.7	36.5	37.3	38.1
Rubber	2.3	3.7	4.0	4.0	4.3	4.9	4.9	5.7	5.9	5.9	5.9	6.2
Sesame	0.4	0.7	2.3	1.4	2.1	2.0	1.6	3.1	1.5	1.4	2.4	2.2
Cocoa	0.2	0.5	0.5	2.9	2.3	1.3	0.8	0.2	N.D.	0.9	1.3	0.4
Others	36.0	59.8	72.3	76.3	70.2	67.8	71.2	73.9	72.9	68.9	63.7	62.1
<u>LIVESTOCK</u>	<u>62.4</u>	<u>72.3</u>	<u>73.1</u>	<u>69.7</u>	<u>69.7</u>	<u>71.6</u>	<u>68.7</u>	<u>68.6</u>	<u>65.7</u>	<u>65.5</u>	<u>66.2</u>	<u>64.2</u>
Beef Cattle	30.7	39.1	42.6	41.1	39.5	39.4	35.5	35.0	32.8	33.5	33.9	32.2
Pork	31.0	32.3	29.7	27.8	29.3	31.4	32.3	32.8	32.1	31.2	31.4	31.2
Others	0.7	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.8
<u>POULTRY</u>	<u>17.3</u>	<u>27.4</u>	<u>29.8</u>	<u>39.3</u>	<u>45.7</u>	<u>50.3</u>	<u>53.2</u>	<u>52.9</u>	<u>53.4</u>	<u>54.5</u>	<u>55.9</u>	<u>57.6</u>
<u>LIVESTOCK PRODUCTS</u>	<u>92.9</u>	<u>120.3</u>	<u>128.4</u>	<u>128.8</u>	<u>139.0</u>	<u>141.1</u>	<u>139.1</u>	<u>140.6</u>	<u>139.5</u>	<u>140.8</u>	<u>137.4</u>	<u>134.9</u>

ND = No data available

SOURCE: Estudio Económico y Memoria de Labores, Banco de Guatemala

Table 13. STRUCTURE OF GUATEMALAN AGRICULTURAL GROSS DOMESTIC PRODUCT BY SUBSECTOR
(In percentages)

Products	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
<u>TOTAL PRODUCTION</u>	<u>110.0</u>	<u>100.0</u>										
<u>TRADITIONAL EXPORT CROPS</u>	<u>34.8</u>	<u>38.1</u>	<u>37.5</u>	<u>38.4</u>	<u>37.5</u>	<u>38.1</u>	<u>39.5</u>	<u>38.4</u>	<u>36.2</u>	<u>35.7</u>	<u>36.0</u>	<u>36.1</u>
Coffee	22.0	20.7	17.5	17.6	17.3	18.0	18.4	18.6	18.2	19.1	19.7	18.8
Cotton	6.0	8.4	8.5	10.3	10.8	11.2	10.1	8.1	5.0	4.4	4.4	4.9
Bananas	3.4	3.8	4.6	3.8	4.1	3.7	4.8	4.8	5.1	3.8	3.3	4.6
Sugar	2.7	4.3	6.0	5.6	4.3	3.7	4.0	4.7	5.5	4.9	4.9	4.9
Cardamom	0.7	0.9	0.9	1.1	1.0	1.5	2.2	2.2	1.8	3.5	3.2	2.9
<u>BASIC FOOD CROPS</u>	<u>13.9</u>	<u>12.5</u>	<u>11.1</u>	<u>10.0</u>	<u>10.9</u>	<u>10.6</u>	<u>8.5</u>	<u>9.2</u>	<u>10.5</u>	<u>10.2</u>	<u>11.2</u>	<u>11.1</u>
Corn	7.4	6.5	5.7	5.1	5.7	5.8	5.7	5.9	6.6	6.3	7.1	6.9
Beans	5.2	4.3	4.1	3.6	3.8	3.4	1.5	2.0	2.5	2.4	2.6	2.9
Rice	0.5	0.8	0.4	0.4	0.4	0.5	0.6	0.5	0.7	0.7	0.6	0.6
Wheat	0.8	0.9	0.9	0.9	1.0	0.9	0.7	0.8	0.7	0.8	0.9	0.7
Sorghum	-	-	-	-	-	-	-	-	-	-	-	-
<u>NON-TRADITIONAL EXPORT CROPS</u>	<u>16.2</u>	<u>16.7</u>	<u>18.3</u>	<u>18.7</u>	<u>17.6</u>	<u>17.0</u>	<u>18.5</u>	<u>19.1</u>	<u>19.5</u>	<u>19.5</u>	<u>18.9</u>	<u>19.0</u>
Vegetables	4.0	3.4	3.4	3.4	3.4	3.4	4.0	4.1	4.3	4.5	4.5	4.7
Fruits	4.3	3.7	3.7	3.7	3.6	3.7	4.4	4.5	4.7	4.8	4.8	5.0
Rubber	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.7	0.8	0.8	0.8	0.8
Sesame	0.1	0.1	0.3	0.2	0.3	0.3	0.2	0.4	0.2	0.2	0.3	0.3
Cocoa	*	0.1	0.1	0.4	0.3	0.2	0.1	*	*	0.1	0.2	*
Others	7.3	8.9	10.3	10.5	9.4	8.3	9.2	9.4	9.5	9.1	8.3	8.2
<u>LIVESTOCK</u>	<u>12.7</u>	<u>10.7</u>	<u>10.4</u>	<u>9.6</u>	<u>9.3</u>	<u>9.3</u>	<u>8.8</u>	<u>8.7</u>	<u>8.6</u>	<u>8.7</u>	<u>8.6</u>	<u>8.4</u>
Beef Cattle	6.2	5.8	6.1	5.7	5.3	5.1	4.6	4.5	4.3	4.5	4.4	4.2
Pork	6.3	4.8	4.2	3.8	3.9	4.1	4.1	4.1	4.2	4.1	4.1	4.1
Others	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
<u>POULTRY</u>	<u>3.5</u>	<u>4.1</u>	<u>4.3</u>	<u>5.5</u>	<u>6.1</u>	<u>6.6</u>	<u>6.8</u>	<u>6.7</u>	<u>7.0</u>	<u>7.2</u>	<u>7.4</u>	<u>7.6</u>
<u>LIVESTOCK PRODUCTS</u>	<u>18.9</u>	<u>17.9</u>	<u>18.4</u>	<u>17.8</u>	<u>18.6</u>	<u>18.4</u>	<u>17.9</u>	<u>17.9</u>	<u>18.2</u>	<u>18.7</u>	<u>17.9</u>	<u>17.8</u>

* Less than 0.1

SOURCE: Derived from Table 12

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Table 14. STRUCTURE OF GUATEMALAN AGRICULTURAL GROSS DOMESTIC
DOMESTIC PRODUCT BY SUBSECTOR
(In millions of cwts)

Products	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
<u>TOTAL PRODUCTION</u>	<u>87.2</u>	<u>150.5</u>	<u>194.5</u>	<u>190.0</u>	<u>165.1</u>	<u>153.4</u>	<u>162.9</u>	<u>182.9</u>	<u>200.8</u>	<u>179.4</u>	<u>182.7</u>	<u>184.0</u>
<u>TRADITIONAL EXPORT CROPS</u>	<u>52.9</u>	<u>105.4</u>	<u>149.1</u>	<u>145.2</u>	<u>118.6</u>	<u>107.2</u>	<u>117.6</u>	<u>135.9</u>	<u>152.0</u>	<u>133.5</u>	<u>133.9</u>	<u>135.7</u>
Coffee	2.8	3.5	3.1	3.2	3.3	3.5	3.6	3.7	3.6	3.7	3.8	3.6
Cotton	1.2	2.3	2.4	3.0	3.2	3.4	3.1	2.5	1.5	1.3	1.3	1.5
Bananas	6.3	7.0	8.4	7.4	8.1	7.8	9.7	9.9	10.2	8.1	8.1	9.4
Sugar	42.6	92.6	135.2	131.5	104.0	92.4	101.1	119.7	136.6	120.2	120.4	121.1
Cardamom	N.S.	N.S.	N.S.	0.1	N.S.	0.1	0.1	0.1	0.1	0.2	0.2	0.1
<u>BASIC FOOD CROPS</u>	<u>21.5</u>	<u>27.7</u>	<u>25.4</u>	<u>23.1</u>	<u>26.1</u>	<u>26.9</u>	<u>25.5</u>	<u>27.0</u>	<u>29.3</u>	<u>28.0</u>	<u>31.5</u>	<u>30.7</u>
Corn	16.8	20.3	18.4	16.9	19.7	20.4	20.6	21.5	23.4	22.0	25.1	24.2
Beans	2.9	3.3	3.3	2.9	3.1	3.0	1.3	1.8	2.2	2.0	2.3	2.5
Rice	0.5	1.0	0.5	0.5	0.6	0.8	0.9	0.7	1.1	1.0	1.0	0.8
Wheat	0.7	1.0	1.1	1.2	1.3	1.2	1.0	1.1	0.9	1.2	1.2	1.0
Sorghum	0.6	2.1	2.1	1.6	1.4	1.5	1.7	1.9	1.7	1.8	1.9	2.2
<u>NON-TRADITIONAL EXPORT CROPS</u>	<u>12.8</u>	<u>17.4</u>	<u>20.0</u>	<u>21.7</u>	<u>20.4</u>	<u>19.3</u>	<u>19.8</u>	<u>20.0</u>	<u>19.5</u>	<u>17.9</u>	<u>17.4</u>	<u>17.6</u>
Vegetables	3.3	3.8	3.9	4.1	4.2	4.3	5.2	5.3	5.5	5.6	5.8	5.9
Rubber	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Sesame	0.1	0.1	0.3	0.2	0.3	0.3	0.2	0.4	0.2	0.2	0.3	0.3
Cocoa	N.S.	N.S.	N.S.	0.1	0.1	N.S.						
Others	9.3	13.3	15.6	17.1	15.6	14.5	14.2	14.0	13.5	11.8	11.0	11.1

N.S. = Not Significant

SOURCE: Estudio Económico y Memoria de Labores, Banco de Guatemala

Table 15. NON-TRADITIONAL AGRICULTURAL EXPORTS* AS A SOURCE OF FOREIGN EXCHANGE FOR GUATEMALA

PRODUCTS	1983		1984		1985	
	Qty (MT)	Value FOB (Q Millions)	Qty (MT)	Value FOB (Q Millions)**	Qty (MT)	Value FOB (Q Millions)**
I. FRUITS						
Fresh or Frozen	28,968	5.6	26,865	3.8	15,940	3.7
Processed	1,713	1.5	2,920	2.7	1,155	0.8
II. VEGETABLES						
Fresh or Frozen	71,356	20.9	73,467	18.6	84,939	16.3
Processed	1,825	2.2	1,662	1.9	1,266	0.9
III. NUTS AND SPICES	449	0.5	1,242	1.0	1,748	0.5
IV. NURSERY & SEEDS	5,537	5.8	10,012	8.4	15,823	9.9
V. HONEY	5,664	2.9	3,499	2.3	3,510	2.2
TOTAL NON-TRADITIONAL AG EXPORTS		39.4		38.4		34.3
TOTAL AG EXPORTS		635.2		621.6		622.3
(% Non-traditional)		(6%)		(5%)		(6%)
TOTAL EXPORT EARNINGS		1,152.8		1,122.3		1,020.6
(% Agricultural)		(54%)		(55%)		(60%)
(% Non-traditional Ag)		(3%)		(3%)		(3%)

* This refers to those non-traditional agricultural exports covered in this study. If such products as sesame seed (Q10.1 million) and cardamom (Q5.8 million) were included, the nuts and spices category alone would have increased non-traditional agricultural export earnings to 103.2 million quetzales in 1985. With the addition of fresh and frozen shellfish (Q9.1 million), the other major non-traditional commodity not covered in this guide, earnings from non-traditional agricultural products would have reached 112.3 million quetzales in 1985 -- or 11% of total export earnings. These three products were not included in this study because the magnitude of sales already reached indicates that most exporters of these commodities have established importer contacts.

** The official exchange rate continues to be Q1.00 = \$1.00. Since November of 1984, however, a parallel market exchange system was established for agricultural sales starting at Q1.40 = \$1.00. In 1985, this ranged from Q1.55 to Q3.95 = \$1.00.

SOURCE: Bank of Guatemala

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Table 16. GUATEMALAN NON-TRADITIONAL AGRICULTURAL EXPORTS TO THE UNITED STATES IN 1985, IN RELATION TO OTHER CBI COUNTRIES AND WORLD TOTALS (CIF VALUES)
(In million of dollars)

Country	Vegetables (fresh, frozen)	Fruits (fresh, dried)	Nuts	Spices	Cut Flowers	Orna- mentals	Seeds for planting	Honey	Country Total
Dominican Republic	11.6	4.8	3.7	-.-	0.4	0.5	-.-	0.4	21.4
Costa Rica	4.3	4.2	0.3	0.1	2.1	5.3	4.2	-.-	20.5
Guatemala	10.7	2.2	0.6	1.1	0.8	2.0	2.0	0.4	19.8
Honduras	0.9	7.3	0.3	-.-	-.-	1.3	0.3	0.3	10.4
Jamaica	6.6	1.3	-.-	0.4	0.1	0.9	-.-	-.-	9.3
Haiti	-.-	3.9	-.-	-.-	0.5	0.3	-.-	-.-	4.7
El Salvador	2.1	0.7	0.5	-.-	-.-	-.-	-.-	0.6	3.9
Panama	1.0	1.4	-.-	-.-	-.-	-.-	-.-	-.-	2.4
Bahamas	0.5	0.4	-.-	-.-	-.-	-.-	-.-	-.-	0.9
Netherland Antillas	-.-	-.-	-.-	-.-	0.9	-.-	-.-	-.-	0.9
Leeward and Westward Islands	0.2	-.-	-.-	0.2	-.-	-.-	-.-	-.-	0.4
<u>Total U.S. Non-Traditional Agricultural Imports*</u>									
from CBI Countries	37.9	26.2	5.1	1.8	4.8	10.3	6.5	1.7	94.6
from Mexico and Canada	366.0	86.4	10.0	1.5	24.2	25.6	16.1	23.9	553.6**
from the World	454.2	217.3	367.2	103.3	250.4	104.0	75.8	45.6	1,617.8

* Totals from the categories listed. Other non-traditional agricultural U.S. imports may have appeared under miscellaneous categories or under specific headings, such as oranges or plantains and bananas, and were not included in this table. Values below \$100,000 were not listed.

** Country totals for Canada and Mexico are \$145.5 million and \$408.1 million respectively.

SOURCE: U.S. General Imports/Schedule A.

Table 17. THE RELATIVE IMPORTANCE OF VARIOUS NON-TRADITIONAL AGRICULTURAL EXPORTS FROM GUATEMALA TO THE UNITED STATES (CIF VALUES)
(In millions of dollars)

Commodity	1981	1982	1983	1984	1985
Broccoli, cauliflower	4.6	7.3	5.9	6.5	7.0
Live plants	3.0	2.6	2.5	3.1	3.2
Melons, cantaloupes	0.8	1.6	1.3	2.1	2.6
Flower seeds	1.4	1.7	1.2	2.6	1.8
Brussels sprouts	0.2	0.4	1.1	1.4	1.3
Roses, fresh cut	0.4	0.4	0.7	1.1	1.0
Nuts, edible	0.5	0.6	0.7	0.3	0.5
Honey	0.3	0.6	0.7	0.5	0.5
Plantains, fresh	0.1	--	0.1	0.2	0.5
Okra, fresh or frozen	0.6	0.8	0.4	0.6	0.5
Total Leading Non-traditionals	35.9	43.9	39.6	46.7	42.5
Total U.S. Imports from Guatemala	382.9	358.6	407.2	480.8	437.1

SOURCE: Official statistics of the U.S. Department of Commerce.

Table 18. LOCATION OF NATIONAL PRODUCTION OF NON-TRADITIONAL CROPS

Crop	Area (ha)	Production (MT)	REGIONAL PRODUCTION (% OF NATIONAL)				
			I	IV	V	VI	VII
Apple (1)	n.a.	11,681	96	---	3	1	---
Asparagus (2)	53	51	30	---	56	14	---
Broccoli	207	1,782	39	---	28	34	---
Brussel sprouts *	24	244	10	---	30	---	---
Cabbage	200	45,133	90	---	10	---	---
Carrots (3)	199	2,850	48	---	52	---	---
Cashew	1,520	n.a.	---	99	---	---	1
Cauliflower	155	5,152	37	---	63	---	---
Chayote (4)	67	6,365	---	---	100	---	---
Citrus: Orange	253	n.a.	---	17	---	---	83
Lemon (5)	127	n.a.	---	47	---	---	47
Garlic	n.a.	4,545	99	---	1	---	---
Honey (6)	---	40	---	---	---	---	---
Lettuce	32	2,986	59	---	41	---	---
Macadamia	22	1	---	100	---	---	---
Mango	156	n.a.	---	92	---	---	8
Melon: Cantaloupe & Honey dew	1,398	18,859	---	26	4	35	35
Okra	415	4,111	---	---	4	---	96
Onion	1,444	30,172	36	---	2	52	10
Ornamentals *	n.a.	n.a.	---	60	46	---	---
Pineapple	463	10,831	---	97	---	3	2
Plantain (7)	n.a.	n.a.	---	56	---	---	44
Root Crops:							
Taro	21	n.a.	---	---	---	---	100
Cassava (8)	100	500	---	---	---	---	100
Sapodilla	22	n.a.	---	23	---	---	77
Snow pea	99	663	---	---	100	---	---
Spices: Ginger	20	5,250	---	100	---	---	---
Curcuma	1	n.a.	---	---	---	---	100
Strawberry	33	300	---	---	100	---	---
Tomato	1,850	51,260	3	2	25	12	59
Watermelon (9)	304	2,610	---	6	34	---	60
TOTAL	9,185	265,354	18	28	22	5	27

- * Combined data from field survey and Ministry of Agriculture statistics.
- (1) Data from report on the Guatemalan Apple Industry, Office of the Agricultural Attaché, Guatemala. March, 1996.
 - (2) Data from the Asparagus Producers and Exporters Guild.
 - (3) These values are low compared to the 1979 Agricultural Census figure of 20,100 MT of carrot production.
 - (4) Chayote production was reported 36,315 MT in the 1979 Census. This is probably a more accurate figure since chayote is a perennial crop.
 - (5) Citrus production was registered as 306,000 MT of oranges and 48,185 MT of lemons in 1979.
 - (6) Honey is produced in every region of the country. Production estimates reach 4,100 MT/year.
 - (7) Plantain production was listed as 4.5 million MT in 1979. Much of the production is handled by the banana companies.
 - (8) This value is extremely low compared to the 1979 production of 69,389 MT. In 1979, approximately 30% of the production was in El Progreso Department (Region V), 25% in Escuintla (Region IV), and 25% in Alta Verapaz (Region II). The survey did not cover this production.
 - (9) Watermelon production reached 1,000 MT in 1979. Total plantings were probably reduced due to lack of market, but 2,610 MT still appears low.

Notes: Root crops grow in all regions but are concentrated in specific areas; if the regional total was less than 1% of the national production, it does not appear in the table.

Sources: All data was derived from the field survey unless otherwise noted. If information was not available, "n.a." is listed.

Table 19. LOCATION OF BASIC GRAIN PRODUCTION

Crop	Country Total	Regions			
		Highlands	Pacific Plain	Coastal	East
<u>Corn</u>					
No. of Farms	320,000	171,808	36,952	60,214	51,836
Area (Ha)	487,244	155,274	99,208	107,167	125,595
% of Area	100.0	31.8	20.4	22.0	25.8
Average Size (Ha)	1.52	0.90	2.68	1.78	2.42
<u>Beans</u>					
No. of Farms	64,768	15,608	10,639	20,078	18,443
Area (Ha)	40,244	6,381	1,840	18,614	13,409
% of Area	100.0	15.8	4.6	46.3	33.3
Average Size (Ha)	0.62	0.41	0.17	0.93	0.73
<u>Rice</u>					
No. of Farms	7,936	1,727	1,898	3,396	915
Area (Ha)	11,765	1,119	3,072	5,373	2,201
% of Area	100.0	9.5	26.1	45.7	18.7
Average Size (Ha)	1.48	0.65	1.62	1.58	2.41
<u>Wheat</u>					
No. of Farms	44,849	44,403	21	424	1
Area (Ha)	26,820	26,229	133	457	1
% of Area	100.0	97.8	0.5	1.7	N.S.
Average Size (Ha)	0.60	0.59	6.33	1.08	1.00
<u>Sorghum</u>					
No. of Farms	3,988	505	944	2,522	17
Area (Ha)	16,933	637	11,975	3,932	389
% of Area	100.0	3.8	70.7	23.2	2.3
Average Size (Ha)	4.25	1.26	12.69	1.56	22.88

N.S. = Not significant

SOURCE: Censo Agropecuario, 1979

Table 20. DISTRIBUTION OF CORN PRODUCTION BY SIZE OF FARM

CORN	NUMBER OF FARMS						AREA HARVESTED (000 Mz)					
	1950	%	1964	%	1979	%	1950	%	1964	%	1979	%
TOTAL	383.547		387.579		468.671		786.5		814.7		991.3	
1. Microfincas (1 cda. a < 1 Mz)	80.032	20.9	69.383	17.9	129.341	27.6	42.5	5.4	40.4	5.0	58.7	6.1
2. Subfam. pequeñas (1 a < 5 Mz)	215.986	56.3	217.539	56.1	233.693	49.9	343.0	43.6	351.7	43.2	338.6	35.2
3. Subfam. medianas (5 a 10 Mz)	45.170	11.8	51.567	13.3	49.810	10.6	131.8	16.8	132.2	16.2	136.0	14.1
4. Familiares (10 a < 64 Mz)	35.139	9.2	42.444	11.0	46.124	9.8	151.2	19.2	196.3	24.1	230.3	24.0
5. Multifam. medianas (1 cab. a < 20 cab)	6.461	1.7	6.459	1.7	9.531	2.0	83.3	10.6	75.4	9.3	176.3	18.3
6. Multifam. grandes (< 20 cab)	459	0.1	187	0.0	197	0.0	34.9	4.4	18.7	2.3	21.4	2.2

	PRODUCTION . (000 qq)						YIELD qq/Mz					
	1950	%	1964	%	1979	%	1950	%	1964	%	1979	%
TOTAL	8 218.1		9 893.6		17 736.3		10.4		12.1		18.1	
1. Microfincas	599.6	7.3	578.7	5.9	1 196.4	6.7	14.1		14.3		20.4	
2. Subfamiliares pequeñas	3 596.6	43.8	4 056.7	41.0	5 437.7	30.7	10.5		11.5		16.1	
3. Subfamiliares medianas	1 224.0	14.9	1 528.1	15.5	2 233.3	12.6	9.3		11.6		16.4	
4. Familiares	1 367.1	16.6	2 270.1	23.0	4 562.6	25.7	9.0		11.6		19.8	
5. Multifamiliares medianas	813.4	9.9	1 084.5	11.0	3 822.1	21.5	9.8		14.4		21.7	
6. Multifamiliares grandes	617.4	7.5	365.5	3.7	484.2	2.7	17.7		19.5		22.6	

SOURCE: Dirección General de Estadística, Censos Agropecuarios.

Table 21. DISTRIBUTION OF BLACK BEAN PRODUCTION BY SIZE OF FARM

BEANS	NUMBER OF FARMS						AREA HARVESTED (000 Mz)					
	1950	%	1964	%	1979	%	1950	%	1964	%	1979	%
TOTAL	90.457		90.493		176.829		106.3		131.8		230.0	
1. Microfincas (1 cda. a < 1 Mz)	7.713	8.5	6.663	7.4	39.397	22.3	3.0	2.8	3.2	2.4	16.3	7.1
2. Subfam. pequeñas (1 a < 5 Mz)	54.322	60.1	52.673	58.2	99.776	56.8	46.9	44.1	59.3	45.0	105.0	45.7
3. Subfam. medianas (5 a 10 Mz)	14.693	16.2	14.810	16.4	21.416	12.1	22.2	20.9	25.1	19.0	39.0	16.5
4. Familiares (10 a < 64 Mz)	11.463	12.7	13.690	15.3	21.007	11.9	23.7	22.3	30.7	23.3	46.5	20.2
5. Multifam. medianas (1 cab. a < 20 cab)	2.154	2.4	2.405	2.7	5.172	2.9	9.0	8.5	12.6	9.6	22.4	9.7
6. Multifam. grandes (< 20 cab)	112	0.1	52	0.1	58	0.0	1.5	1.4	0.9	0.7	1.7	0.7

	PRODUCTION (000 qq)						YIELD (qq/Mz)					
	1950	%	1964	%	1979	%	1950	%	1964	%	1979	%
TOTAL	591.4		679.3		1 135.0		4.7		5.2		4.9	
1. Microfincas	17.6	3.5	16.9	2.5	63.2	5.6	5.9		5.3		3.9	
2. Subfamiliares pequeñas	234.9	46.8	302.2	44.5	449.8	39.6	5.0		5.1		4.3	
3. Subfamiliares medianas	88.8	17.3	115.8	17.0	166.2	14.6	3.9		4.6		4.4	
4. Familiares	96.6	19.3	155.2	22.8	276.5	24.4	4.1		5.1		5.9	
5. Multifamiliares medianas	47.9	9.6	81.9	12.1	171.6	15.1	5.3		6.5		7.7	
6. Multifamiliares grandes	17.6	3.5	7.5	1.1	7.8	0.7	11.7		8.3		4.5	

SOURCE: Dirección General de Estadística, Censos Agropecuarios.

Table 22. DISTRIBUTION OF WHEAT PRODUCTION BY SIZE OF FARM

WHEAT	NUMBER OF FARMS						AREA HARVESTED (000 Mz)					
	1950		1964		1979		1950		1964		1979	
		%		%		%		%		%		%
TOTAL	37.916		33.026		44.856		44.2		33.0		40.1	
1. Microfincas (1 cda. a < 1 Mz)	4.902	13.2	4.615	14.0	10.105	22.5	1.5	3.4	1.2	3.6	2.9	7.2
2. Subfam. pequeñas (1 a < 5 Mz)	21.108	55.7	18.994	57.5	20.754	46.3	17.3	39.1	13.5	40.9	19.4	48.4
3. Subfam. medianas (5 a 10 Mz)	7.078	18.7	5.809	17.6	5.374	11.9	11.0	24.9	7.4	22.4	7.5	18.7
4. Familiares (10 a < 64 Mz)	4.496	11.8	3.415	10.3	2.555	5.7	12.0	27.2	8.2	24.9	7.1	17.7
5. Multifam. medianas (1 cab. a < 20 cab)	239	0.6	193	0.6	125	0.3	2.3	5.2	2.7	8.2	3.1	7.7
6. Multifam. grandes (< 20 cab)	3	--	--	--	3	0.0	0.1	0.2	--	--	0.1	0.3

	PRODUCTION (000 qq)						YIELD % qq/Mz					
	1950		1964		1979		1950		1964		1979	
		%		%		%		%		%		%
TOTAL	359.3		397.5		808.2		8.1		12.0		20.2	
1. Microfincas	14.1	3.9	14.8	3.7	61.6	7.6	9.4		12.3		21.2	
2. Subfamiliares pequeñas	146.5	40.8	151.7	38.2	388.5	48.1	8.5		11.2		20.0	
3. Subfamiliares medianas	86.5	24.1	83.2	20.9	146.9	18.2	7.9		11.2		19.6	
4. Familiares	92.5	25.7	105.3	26.5	159.4	19.6	7.7		12.8		21.2	
5. Multifamiliares medianas	18.5	5.2	42.5	10.7	58.1	7.2	8.0		15.7		18.7	
6. Multifamiliares grandes	1.2	0.3	--	--	2.7	0.3	12.0		--		27.0	

SOURCE: Dirección General de Estadística, Censos Agropecuarios.

Table 23. NUMBER OF CATTLE, LIVESTOCK PRODUCTION AND
EXTRACTION RATE

Year	Number of Cattle (thousands of heads)	Production (millions of lbs.)	Extraction Rate (lbs. per head)
1975	1,974	333.3	16.9
1976	2,063	386.8	18.7
1977	2,157	416.7	19.2
1978	2,087	428.3	21.0
1979	2,009	410.0	20.4
1980	1,929	347.0	18.0
1981	1,960	347.7	17.7
1982	1,991	326.8	16.4
1983	2,055	369.8	16.0
1984	2,084	353.9	16.8
1985	2,153	311.5	14.5

NOTES: Production includes total slaughter and foreign trade in live cattle. Extraction rate is amount registered by alcaldías municipales, plus ten percent for uncontrolled slaughter.

SOURCE: Dirección Nacional de Estadística and Banco de Guatemala.

Table 24. NUMBER OF FARMS WITH CATTLE, NUMBER OF CATTLE AND AVERAGE NUMBER OF HEADS PER FARM BY SIZE OF FARM, 1979

Size	Number of Farms	Number of Head	Average per Farm
Less than 1.4 ha.	37,343	93,754	2.5
1.4 to less than 14 ha.	47,833	191,942	4.0
14 to less than 45 ha.	24,252	330,637	13.6
45 to less than 450 ha.	7,206	638,112	88.6
450 to less than 4,500 ha.	949	722,683	761.5
More than 4,500 ha.	11	30,477	2,770.6
Total	117,594	2,007,605	17.1

SOURCE: Dirección General de Estadística, Censo Agropecuario, 1979.

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Table 25. BEEF AND LIVE CATTLE PRODUCTION AND EXPORTS
IN TERMS OF DRESSED BEEF

Year	Production (millions of lbs.)	Exportation (millions of lbs.)	Exports as % of Total Production
1970	128.1	39.0	30.4
1975	144.4	38.8	24.9
1976	139.4	30.7	22.0
1977	140.0	59.3	42.3
1978	146.9	43.0	29.3
1979	145.6	34.5	23.7
1980	121.6	24.7	20.3
1981	134.8	49.6	36.8
1982	114.5	30.2	26.4
1983	118.8	32.0	26.9
1984	119.8	23.3	19.5
1985	115.8	25.2	21.8

SOURCE: Dirección Nacional de Estadística y Cálculos del Departamento de Investigaciones Agropecuarias e Industriales, Banco de Guatemala.

Table 26. BEEF CONSUMPTION
(In millions of lbs.)

Year	Meat in Canal	Organ Meat	Total Consumption	Consumption per Capita (lbs.)
1975	105.6	30.0	135.6	22.2
1976	108.7	34.8	143.5	23.1
1977	80.7	37.2	117.9	18.4
1978	103.9	36.2	140.1	21.2
1979	111.1	33.2	144.3	21.2
1980	96.9	28.0	124.9	17.8
1981	85.2	26.4	111.6	15.7
1982	84.3	23.1	107.4	14.3
1983	86.8	25.1	111.9	14.7
1984	96.5	27.2	123.7	15.8
1985	90.6	25.5	116.1	14.5

NOTE: Based on 11% of total live animal weight

SOURCE: DIGESEPE, Quarterly Reports

Table 27. INDICES OF AVERAGE PRODUCTION PARAMETERS

Factors	Ratings	
	Guatemala	U.S.
Calving	56	93
Age at first calf (months)	40	30
Calving interval (months)	20	12
Calf mortality	9 - 12 %	1%
Adult mortality	5 %	0.5%
Age at weaning (months)	12	9
Production/cow/day (daily)	2.5 liters	27 liters
Average weight at 24 months		
- Pacific Coastal Plain	340 Kg.	680 Kg.
- Highlands	217 Kg.	
Carcass yield	49 %	54%
Animals per hectare		
- Pacific Coastal Plain	1.6	3.0
- Highlands	0.6	
- Northern Transversal Strip	1.0	

SOURCE: PLANADE, Ministry of Agriculture

Table 28. COWS PRODUCING MILK ON SPECIALIZED AND DUAL PURPOSE FARMS
BY AGRICULTURAL REGION

Region	Specialized Dairy	Dual Purpose	Total	% of Total
<u>Total</u>	<u>66,981</u>	<u>1,493,959</u>	<u>1,560,940</u>	<u>100.0</u>
Region I	4,400	104,967	109,367	7.0
Region II	2,425	33,960	36,385	2.3
Region III	1,888	58,424	60,312	3.9
Region IV	19,988	572,303	592,291	38.0
Region V	12,708	170,347	183,055	11.7
Region VI	16,679	322,111	338,790	21.7
Region VII	6,157	195,421	201,578	12.9
Region VIII	2,736	36,426	39,162	2.5

SOURCE: III Censo Nacional Agropecuario, 1979

Table 29. PRODUCTION, FOREIGN TRADE, AND
CONSUMPTION OF MILK AND DAIRY PRODUCTS
(In millions of Liters)

Year	Production	Imports	Exports	Total Balance	Population (millions)	Per capita consumption (liters)
1970	189.3	27.0	5.1	211.2	5.2	40.2
1975	206.0	12.9	2.7	216.2	6.0	36.0
1976	213.3	12.0	2.7	223.6	6.2	36.0
1977	213.7	40.2	3.5	250.4	6.4	39.3
1978	212.7	46.5	4.2	255.0	6.5	39.0
1979	214.9	44.4	4.6	254.7	6.7	37.8
1980	216.7	67.9	4.4	280.2	6.9	40.6
1981	218.6	49.9	3.1	265.4	7.1	37.4
1982	220.0	55.9	1.4	274.5	7.3	37.6
1983	252.0	48.2	5.7	294.5	7.5	39.3
1984	258.1	60.6	n/a	318.7	7.8	40.9
1985	262.7	125.3	n/a	388.0	8.0	48.5

SOURCE: Marco Cuantitativo y Análisis del Subsector de Productos Pecuarios,
SEGEPLAN/USPADA/FAO/PNUD-GUA/81/001
1984 and 1985: Dirección Nacional de Estadísticas y Banco de
Guatemala

Table 30. TIMBER CUTTINGS

Year	Total	Industry	Fuel Wood
1968	8,422	515	7,907
1969	8,673	518	8,155
1970	8,937	530	8,407
1971	9,197	531	8,666
1972	9,486	556	8,930
1973	9,713	515	9,198
1974	9,902	431	9,471
1975	9,574	546	9,018
1976	10,394	356	10,038
1977	10,809	486	10,323
1978	11,077	466	10,611
1979	11,091	190	10,901
1980	11,403	186	11,217
1981	11,724	182	11,542
1982	12,056	180	11,876
1985	13,800	862	12,938
1990	14,181	881	13,300
1995	14,576	906	13,670
2000	15,020	970	14,050

SOURCE: FAO. Anuario de Productos Forestales, 1979

Table 31. FISHING EFFORT AND HARVEST FROM GUATEMALAN INLAND WATERS

Lake	Effort		Gear	Harvest			Dominant Species (%)
	Fishermen (No.)	No./km ²		Catch/day (Kg)	Total (MT)	Kg/ha	
Atitlan	40 ^a / ₋ 100 ^b / _/	0.5	H/G	1.6	7 ^a / ₋ 30	0.3-1.5	cr -48 ba -46
Amatitlan	100 ^a / ₋ 200 ^c / _/	13.0	H/G	2.5	10-105	6.6 ^a / ₋ 70	gu-51-90 mo-30
Chixoy	60 ^d / _/	0.6	H/L	1.3 ^d / _/	7-10	0.7-1.0	qu-50 gu-25
Izabal	70 ^a / _/ e/ _/	0.1	G/C/H	11	40-70	0.6-1.0	multiple
Peten	?	?	H/C	4.5	?	?	bl-90 mo-90

a/ Lin, 1957; b/ Dorris and Summerfelt, 1967; c/ DITEPESCA; d/ Claverio and Castillo, 1986; e/ Davies, 1973.

H - hook and line; L - longline; G - gill net; C - cast net.

cr - crappie; ba - bass; gu - guapote; qu - catfish; bl - blanco; mo - mojarra.

SOURCE: Marine and Fresh Water Commercial Fishery and Aquaculture Potential, Status and Development Requirements for Guatemala, September 1986.

Table 32. THE CATCH OF SELECTED FISH SPECIES
BY THE COMMERCIAL SHRIMP FLEET,
(In metric tons)

Year	Lobster	Squid	Corvina	Guavina	Pargo	Lenguado	Tuna	Shark	Other	Total
1975	6.80	1.52	168.17	164.50	55.87	66.88	2.06	---	121.34	586.27
1976	3.28	4.19	211.45	203.89	64.23	90.99	267.10	---	178.56	1,023.68
1977	3.04	5.33	233.25	242.00	58.86	94.12	69.99	12.97	81.46	801.03
1978	3.35	3.65	182.39	197.04	51.55	107.93	142.58	18.64	24.05	731.17
1979	0.85	1.06	151.35	168.70	45.21	97.58	103.67	15.15	3.44	586.93
1980	2.01	9.83	154.18	174.73	58.59	114.15	122.26	23.46	3.18	662.99
1981	1.95	14.28	129.33	149.88	45.60	101.82	209.45	11.29	2.29	665.90
1982	3.79	8.83	123.11	140.00	40.79	95.22	244.41	21.38	0.76	678.30
1983	2.79	11.29	131.77	146.77	43.75	99.43	153.27	9.33	20.51	618.92
1984	8.14	26.46	142.03	164.10	48.25	114.55	---	6.13	2.48	512.13
1985	9.59	28.31	149.30	174.20	54.15	120.39	---	2.46	3.37	541.77

SOURCE: DITEPESCA

Table 33. PRIVATE SECTOR
AGRICULTURAL RESEARCH IN GUATEMALA

Specialty	Sponsoring Institution
COFFEE	National Coffee Growers Association (ANACAFE), Institute for Agronomic Research of the Agronomy Faculty of San Carlos University (IIA)
SUGAR	Sugar Mill Pantaleón
SUGAR PROCESSING	Sugar Technicians Association of Guatemala (ATAGUA)
BANANAS	Banana Company of Guatemala (BANDEGUA)
COTTON	Agreement between the Research Institute of del Valle University, National Cotton Council, and the Guatemalan Integrated Pest Management Association.
BASIC GRAINS (corn, beans, rice, wheat, sorghum)	Institute for Agronomic Research of the Agronomy Faculty of San Carlos University (IIA), Research Institute of del Valle University.
VEGETABLES	Institute for Agronomic Research of the Agronomy Faculty of San Carlos University (IIA), Kern's International
LEMON TEA AND CITRUS TEA (PROCESSING)	Essential Oils Producers Association S.A. (APAESA)
CARDAMOM	Agreement between the Research Institute of del Valle University and the Association of Cardamom Producers (APROCAR)
LIVESTOCK	Directorate General of Livestock Services (DIGESEPE). Veterinary Science Faculty, San Carlos University (USAC). Institute of Science and Agricultural Technology (ICTA).
POULTRY	Directorate General of Livestock Services (DIGESEPE). Veterinary Science Faculty, San Carlos University (USAC).
FORESTRY	National Forestry Institute (INAFOR). Research Institute, San Carlos University (USAC).

Table 34. COMPARISON OF PRODUCTION YIELD AND IMPORTATION
OF BASIC GRAINS IN GUATEMALA
(In thousands of cwt)

Crop	1 9 7 3			1 9 8 3		
	Yields (kg/ha)	Production	Imports	Yields (kg/ha)	Production	Imports
Corn	1,180	14,540	1,588	1,636	22,735	54 <u>a/</u>
Beans	636	1,289	9	986	2,266	-----
Rice	1,600	427	5	2,850	933	3 <u>b/</u>
Sorghum	1,360	1,341	3	2,080	2,183	3 <u>b/</u>

a/ Maize for animal feed

b/ Seed

SOURCE: Banco de Guatemala

Table 35. USES OF ICFA'S BUDGET IN 1980-1982
(In thousands of dollars)

	1980		1981		2092	
	Amount	%	Amount	%	Amount	%
<u>Administration</u>	<u>1,780</u>	<u>41.8</u>	<u>2,323</u>	<u>46.7</u>	<u>1,895</u>	<u>43.4</u>
Production Centers	548	12.9	655	13.2	436	10.0
Technical Services and Coordination	900	21.1	951	19.1	866	19.8
Central Administra- tion	332	7.8	717	14.4	593	13.6
<u>Agricultural Research</u>	<u>1,883</u>	<u>44.2</u>	<u>2,109</u>	<u>42.5</u>	<u>2,013</u>	<u>46.1</u>
Corn	204	4.8	244	4.9	229	5.3
Beans	116	2.7	101	2.0	124	2.8
Rice	82	1.9	95	1.9	75	1.7
Wheat	110	2.6	124	2.5	120	2.8
Sorghum	81	1.9	96	2.0	88	2.0
Vegetables	210	5.0	248	5.0	267	6.1
Fruits	13	0.3	23	0.5	23	0.5
Sesame	31	0.7	35	0.7	34	0.8
Grapes	--	--	--	--	55	1.3
Animal Science	60	1.4	68	1.4	57	1.3
Technology Validation	976	22.9	1,075	21.6	941	21.5
<u>Seed Production and Management</u>	<u>335</u>	<u>7.9</u>	<u>298</u>	<u>6.0</u>	<u>246</u>	<u>5.6</u>
<u>Other Research</u>	<u>257</u>	<u>6.1</u>	<u>239</u>	<u>4.8</u>	<u>214</u>	<u>4.9</u>
Chinese-Guatemalan project	73	1.7	65	1.3	62	1.4
Soils Management	20	0.5	25	0.5	128	0.6
Water Management	164	3.9	149	3.0	24	2.9
<u>T o t a l</u>	<u>4,255</u>	<u>100.0</u>	<u>4,969</u>	<u>100.0</u>	<u>4,368</u>	<u>100.0</u>

SOURCE: Financial and Administrative Unit, ICFA.

Table 36. ESTIMATED INCREASED PRODUCTION OF FIVE CROPS RESULTING FROM PRODUCTION OF "ICTA CERTIFIED" SEED ^{a/}

Crop	"ICTA Certified" Seed Available (tons)	Seed Needed For Planting (Kg./ha)	Estimated Farm Areas Planted (ha)	Increased ^{b/} Yield (Kg/ha)	Estimated Increase In Crop Production (tons)
Corn	804.0	15.2	52,009	912	48,187
Beans	11.7	46.0	238	304	74
Rice	414.0	61.6	6,702	1,216	3,280
Wheat	69.2	90.3	700	1,094	824
Sesame	24.8	3.7	6,702	243	1,656

a/ Not all of the seed developed by ICTA is included in these calculations because some companies and associations produce seed outside the ICTA system.

b/ Increased yields obtained over traditional unimproved varieties.

SOURCE: ICTA (Calculations made by McDermott and Bathrick).

Table 37. USE OF FERTILIZERS DURING THE 1985/86

PRODUCTION SEASON

(In thousands of metric tons)

Crop	Low Technology	Medium Technology	High Technology	Total
Cotton	0.41	78.68	27.50	106.59
Coffee	227.20	49.68	121.18	398.06
Bananas	----	6.31	13.82	20.13
Cacao	----	5.18	1.82	7.00
Rubber	0.77	21.13	5.45	27.35
Sesame	11.23	5.00	----	16.23
Sugarcane	7.54	52.90	41.68	102.12
Melons	-----	8.45	2.82	11.27
Corn	385.80	92.90	61.32	540.02
Beans	23.00	61.95	72.27	157.22
Rice	3.00	12.40	5.68	21.08
Wheat	8.36	16.77	9.68	34.81
Sorghum	5.91	21.54	15.82	43.27
Others Crops	67.30	43.32	37.91	148.53
Total	740.52	476.21	416.95	1,633.68
Percentage by Technology	45.3	29.2	25.5	100.0

SOURCE: DIGESA, Quarterly Reports

Table 38. GUATEMALA: AGROCHEMICAL IMPORTS
(In thousands of Quetzales and metric tons)

Year	Total		Fertilizers		Pesticides	
	Value	Amount	Value	Amount	Value	Amount
1970	12,791	121	9,080	111	3,711	10
1971	12,610	120	8,680	115	3,930	5
1972	15,121	147	10,952	142	4,169	5
1973	20,238	161	13,364	155	6,874	7
1974	43,757	211	35,750	206	8,007	5
1975	54,286	173	44,944	167	9,342	6
1976	26,603	150	18,179	143	8,424	7
1977	44,886	275	31,342	263	13,544	12
1978	46,779	260	28,457	243	18,522	17
1979	65,923	346	38,801	325	27,122	21
1980	59,642	232	43,136	225	16,506	7
1981	67,652	170	50,643	164	17,009	6

SOURCE: Ministry of Economy, Foreign Trade Reports.

Table 39. GOVERNMENT BUDGET BY SECTORS
(In millions of 1958 Quetzales)

Sector	<u>1976</u>		<u>1977</u>		<u>1978</u>		<u>1979</u>		<u>1980</u>	
	Value	%								
Agriculture	43.7	7.6	31.7	5.0	53.6	7.4	47.3	5.4	74.9	6.7
Transport	37.9	6.6	44.4	7.0	51.7	7.2	74.2	8.4	123.9	11.1
Communication	6.6	1.2	6.7	1.1	6.5	0.9	7.5	0.9	9.0	0.8
Education	75.7	13.2	82.6	13.0	91.8	12.7	103.2	11.7	141.9	12.7
Health	49.0	8.5	58.9	9.3	62.3	8.6	74.0	8.4	124.9	11.2
Labor	19.9	3.5	62.6	9.9	113.3	15.7	133.3	15.2	183.8	16.5
Construction	82.0	14.3	35.5	5.6	32.7	4.5	22.3	2.5	15.4	1.4
Energy	35.1	6.1	64.5	10.2	50.4	7.0	80.6	9.2	119.6	10.7
Finance	25.5	4.4	3.5	0.6	6.4	0.9	3.0	0.3	5.7	0.5
Defense	63.0	11.0	85.5	13.5	82.7	11.5	91.7	10.4	109.1	9.8
Justice	5.4	0.9	5.6	0.9	5.6	0.8	7.0	0.8	8.2	0.7
General Administration	105.1	18.3	119.1	18.8	125.7	17.4	195.2	22.2	157.1	14.1
Debt Service	24.4	4.3	32.5	5.1	37.7	5.2	40.3	4.6	43.6	3.9
Total Combined Budget	573.3	100.0	633.1	100.0	720.4	100.0	879.6	100.0	1,117.0	100.0
Agriculture Budget as % of Total Budget	7.6		5.0		7.4		5.4		6.7	

Table 39 (Cont'd)

Sector	1981		1982		1983		1984		1985	
	Value	%								
Agriculture	57.3	4.2	48.1	4.2	51.4	4.9	42.5	4.1	33.9	3.2
Transport	159.2	11.5	126.9	11.2	93.3	8.9	87.3	8.5	70.5	6.6
Communication	7.6	0.7	8.2	0.8	7.4	0.7				
Education	154.8	11.2	141.7	12.5	134.3	12.9	133.7	13.0	137.5	12.9
Health	98.1	7.1	75.3	6.6	69.7	6.7	81.4	7.9	76.6	7.2
Labor	193.4	14.0	195.7	17.2	222.0	21.3	235.2	22.9	270.0	25.3
Construction	15.3	1.1	13.1	1.2	10.3	1.0	8.9	0.9	4.1	0.4
Energy	211.3	15.3	177.3	15.6	114.6	11.0	57.2	5.6	77.2	7.2
Finance	10.1	0.7	5.3	0.5	---	---	---	---	---	---
Defense	108.4	7.9	120.9	10.6	134.7	12.9	140.4	13.7	160.8	15.1
Justice	8.2	0.6	5.5	0.5	5.4	0.5	5.5	0.5	5.5	0.5
General Administration	305.8	22.2	145.0	12.7	120.8	11.6	145.1	14.1	147.9	13.8
Debt Service	48.8	3.5	74.2	6.5	78.4	7.5	82.7	8.0	76.5	7.2
Total Combined Budget	1,380.3	100.0	1,137.6	100.0	1,042.5	100.0	1,028.1	100.0	1,067.9	100.0
Agriculture Budget as % of Total Budget		4.2		4.2		4.9		4.1		3.2

SOURCE: Ministerio de Finanzas Públicas

Table 40. PRIVATE BANKING SYSTEM DISTRIBUTION OF NEW LOANS
BY ECONOMIC ACTIVITY
(In billions of Quetzales)

Economic Activity	1980	1981	1982	1983	1984	1985
Agriculture	150.5	161.5	153.4	179.6	187.6	148.7
Livestock	28.2	27.9	23.0	27.3	32.9	38.2
Forestry and Fisheries	2.4	2.5	4.1	2.9	5.9	2.5
Mining	4.8	4.0	1.0	0.6	17.8	1.4
Industry	247.9	242.2	251.9	276.4	342.7	391.5
Construction	69.9	69.2	63.3	62.9	78.9	59.0
Commerce	138.5	166.0	169.3	213.2	265.0	283.3
Transport	4.9	3.7	4.7	9.6	3.1	3.5
Services	32.3	31.2	34.0	43.3	77.5	62.8
Consumption	39.2	38.3	58.6	47.8	45.8	50.4
Transfers	47.1	59.3	62.5	109.5	135.3	110.3
Others	11.5	4.9	2.9	4.3	5.2	0.2
TOTAL	777.2	810.7	828.7	977.4	1,197.7	1,151.8

SOURCE: Bank of Guatemala

Table 41. NEED FOR FINANCIAL RESOURCES ACCORDING TO THE TYPE OF FIRM
(In thousands of Quetzales and dollars)

TYPE OF FIRM	WORKING CAPITAL				FIXED ASSETS				TOTALS			
	Q.	%	\$	%	Q.	%	\$	%	Q.	%	\$	%
Perishables	29,436	44.9	16,630	75.7	7,140	18.7	9,720	37.5	36,576	35.3	26,350	55.0
Processed Products	11,181	17.0	725	3.3	12,681	33.3	6,700	25.8	23,862	23.0	7,425	15.5
Non-food Articles	11,207	17.1	2,907	13.2	7,995	21.0	3,080	11.9	19,203	18.5	5,987	12.5
Raw Materials and Semi-Processed Goods	9,955	15.2	1,095	5.0	7,565	19.8	5,300	20.5	17,520	16.9	6,395	13.3
Furniture and Other Articles	3,823	5.8	625	2.8	2,725	7.2	1,125	4.3	6,548	6.3	1,750	3.7
TOTAL	65,602	100.0	21,982	100.0	38,106	100.0	25,925	100.0	103,709	100.0	47,907	100.0

SOURCE: Gremial de Exportadores de Productos No Tradicionales
Informe del Estudio de Oferta Exportable de Guatemala, 1986

Table 42. MEMBERSHIP OF THE FARMERS ASSOCIATION
AND THE CHAMBER OF AGRICULTURE

FARMERS ASSOCIATION

Asociación Nacional de Avicultores
Asociación de Criadores de Ganado Registrado
Asociación de Productores de Cardamomo
Asociación Experimental Cafetalera
Gremial de Hueleros de Guatemala
Asociación de Ganaderos de Sur-Occidente
Asociación de Ganaderos de Izabal
Union de Cañeros del Sur
Gremial de Productores de Arroz
Asociación de Productores de Banano
Gremial de Paneleros
Gremial de Importadores y Distribuidores de Maquinaria
y Equipo para la Construcción, Agricultura y Afines
Cooperativa de Producción Integral Palo Verde, R.L.
Gremial de Caficultores
Gremial de Ganaderos
Gremial de Cañeros
Gremial de Granos Básicos
Gremial Forestal

Socios Individuales = 155

Empresas, Sociedades Agrícolas, Compañías = 24

CHAMBER OF AGRICULTURE

Consejo Nacional del Algodón
Asociación Nacional del Café (ANACAFE)
Cooperativa El Fruto
Asociación de Caficultores de Oriente (ACOGUA)
Asociación de Ganaderos de Escuintla
Asociación de Ganaderos del Norte
Asociación de Productores de Aceites Esenciales
Asociación de Caficultores Unidos
Asociación de Ganaderos de Oriente
Asociación de Productores de Cardamomo
Asociación de Hueleros de Guatemala

Table 43. SUPPLIERS OF FERTILIZERS AND PESTICIDES

<u>Agencias Agrícolas</u>	Mr. Jorge Pontaza, Manager
<u>Agro-Químicas de Guatemala</u>	Mr. Raimundo Riojas, Manager
<u>Agrovet, S. A.:</u>	Mr. Fernando Méndez, Sales Manager Mr. Viter Nothelohn, President
<u>Química Hoechst de Guatemala</u>	Mr. Harry Kamp, Manager Department of Agriculture
<u>Nordic Representaciones</u>	Mr. Harold Johannessen, Manager
<u>Síntesis Química, S. A.:</u>	Ing. Alfredo Rodríguez, Manager
<u>Tecún, S. A.</u>	Mr. Jorge Utrera, Manager
<u>Distribuidora Martínez</u>	Mr. Augusto Martínez, Manager
<u>Difersa</u>	Mr. Roberto Dalton, Manager
<u>Profesa</u>	Mr. Pedro Juan Laboy, Manager
<u>Bayer de Guatemala, S. A.</u>	Mr. Volker Von Holleben, Manager
<u>Monsanto de Guatemala, S. A.:</u>	Mr. Carlos Méndez, Manager
<u>Técnica Universal, S. A.:</u>	Ing. Rodolfo Lambour, Manager
<u>Servicio Cafetalero y Algodonero</u>	Mr. Luis Torselli, Manager
<u>Agrícola Veterinaria El Surco</u>	Mr. Edgardo Estrada A., Manager
<u>Agrícolas Pesticidas</u>	Ing. Carlos A. Berger, Manager
<u>Compañía Agro-Comercial, S. A.</u>	Mr. Thomas Nottebonn, Manager
<u>Ciba-Geigy Ltda.</u>	Mr. Werner Weder, Department of Agriculture

Table 44. PRODUCT PROCESSORS

A. MEAT PACKING PLANTS

1. MEAT PLANTS

El Ganadero, S. A. /Productos Alimenticios Agropecuarios, (PAASA)

Mr. Antonio Chemá, Manager

EXGUAPAGRA, S. A.

Lic. Carlos Enrique Blanco, President
Ing. Roberto Linde, Manager

EXGAVAL

Lic. Rodolfo García Valdez, Owner

PEGUSA

Mr. Adrián Rosales Chávez, President

PROCASA

Lic. Rafael Ortiz, F., Manager

2. PROCESSORS OF HAM; SAUSAGE; ETC:

Salchichoneria Astoria

Mr. Ricardo Remmele, Manager

Empacadora La Blanca

Mr. Jorge Matheu, Manager

Empacadora Perry

Mr. Jaime Perry, Manager

Empacadora Centroamericana (EMPAC)

Mr. Walter Moll, Manager

Alpina, S. A.

Mr. Henry Gabet, President

Delicia

Mrs. Elvira Bolgen, Owner

Empacadora Toledo

Mr. Francisco Pérez de Antón
Manager

Cinco Pueblos

Mr. Robert E. Merrick
Owner

Productos Riko, S. A.

Lic. Rafael Ortiz, Manager

B. MILLS (Cornmeal)

Productos de Maíz y Alimentos, S. A.	Mr. Rainer Mimerberg, Manager
Alimentos para Animales, S. A. (ALIANSA)	Mr. Konrad Iosen, Manager
Cooperativa Madre y Maestra	Mr. Augusto Contreras, Manager
Molino Central de Guatemala	Mr. Luis González Bauer, Manager
Industria Harinera Guatemalteca, S. A. (INHSA)	Mr. Arthur Fiscner, Manager

C. ANIMAL FEED

Aliansa Alimentos para Animales, S. A.	Ing. Edgar Rodas
Concentrados El Pollo	Mr. Oscar Orellana, Manager
Concentrados La Joya	Mr. Jorge Cobos Gómez, Manager
Empresa de Forrajes y Cereales, S. A.	Mr. Oscar Segovia, Manger
Concentrados Santa Ana	Mr. Samuel Padilla F., Manager
Molino Central de Gutemala	Mr. Luis González Bauer, Manager
Purina de Guatemala	Ing. Carlos Castillo
El Avicultor	Mr. Emilio Trujillo, Manager
Cooperativa Madre y Maestra, R. L.	Mr. Augusto Conteras Godoy, Manger
Industrias Kaspe de Centroamerica, S. A.	Mr. Miguel Castro Gómez, Manager
Nutrición Animal	Mr. Alfredo Gándara, Manager

D. SUGAR MILLS

El Salto, S. A. Arturo Hegel	Roberto Alejos
Concepción, S. A. Roger Dubiel	Walter Widmann
Palo Gordo	Alfredo de la Hoz
El Baúl, S. A.	Arnoldo Berger
Los Tarros	Similiano García C.
Madre Tierra	Ing. Ramón Campollo C.
Tulula Ing. René Bouscayrol	Ing. José Luis Bouscayrol
San Diego Luis Recinos	Fraterno Vila
Santa Teresa	Oscar Escamilla Santos
Mirandilla	Luis González Bauer
La Sonrisa	Luis Fernando Pivaral
La Union	Lic. José Molina Calderón
Santa Ana Lic. Andrés Botrán	Ing. Luis Fernando Leal
Magdalena	Ing. Klaus Rotter P.
El Pilar	Rudy Weissenberg
Trinidad Mr. Roberto Mena	Lic. Jorge René Aristondo
Tierra Buena	Ing. Eugene González
Guadalupe	Ing. Ricardo Schippers

E. COTTON GINS

Agroindustriales de Guatemala, S. A.

Algodonera Guatemalteca, S. A.

Desmotadora del Sur, S. A.

Desmotadora La Garrucha, S. A.

Desmotadora Las Acacias, S. A.

Guillermo Monor & Cía. Ltda.

F. COFFEE PROCESSORS

COEX (Guatemala), S. A.

Cafe Pamaxan

Cafe y Alimentos Varios Ltda.

Eposic de Cafe Corona Extra

Flora Ltda.

Jimenez Erkelens y Cia. Ltda.

Tostaduria Camec

Tostaduria de Café Boutique

Tostaduria El Quetzal, S. A.

Incasa, S. A.

Tostaduria de Café Familiar

Tostaduria El Cafetalito

D

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G. SAWMILLS

Aserradero Alemán	Aserradero Guatemala
Aserradero Concepción	Aserradero Italiano y Carpinteria
Aserradero Contenti	Aserradero La Providencia
Aserradero El Angel	Aserradero Los Pinos
Aserradero El Cerrito	Aserradero Maselli
Aserradero El Esfuerzo	Aserradero San Martín
Aserradero El Porvenir	Aserradero Santa Elisa, S. A.
Aserradero El Trébol	Aserradero Santa Inés
Aserradero Fagiana Hnos.	Aserradero Santa Margarita
Aserradero Vasconia Luciano Garin e Hijos Cia.	Maderas de Guatemala
Maderas Industriales	Maderas Río Hondo, S. A.
Maderas San Miguel	

H. FLOUR MILLS

Modernos	Alberto Garita
IHNSA	Francisco Gamez
Excelsior	Jorge Arroyo
Elvira	Tulio Ovalle
San Carlos	Carlos Hernández
Quatro Aspas	Alberto Garita
Venecia	Pablo Duchez
San Francisco	Oscar de León
Central de Guatemala	Luis González
INA, S. A.	Luis Miguel Pando
El Quetzal	Julio Weissenberg
Helvetia	Eduardo Herreria
San Rafael	Juan Bagur
Expro	Alfredo Bensites
El Progreso	Carlos Hernández
San José	Julio Weissenberg
Atlas de Occidente	Alberto Garita
La Sierra	Rodolfo Castillo
Fenix	Luis Pedro Barrientos
El Tesoro	
Belén	Julio Weissenberg
J.E.L.C.	
San Miguel	Andrés Sedano
La Providencia	Alberto Garita
EMCECO	Eduardo Herrerias .

I. DAIRY PROCESSING PLANTS

La Pradera	Mr. Nery Aldana Marroquín, Manager
La Modesta	Lic. Mario Porras González, Manager
La Palma	Dr. Juan Jacobo Erdmenger, Manager
La Moderna	Lic. Mario Porras González, Manager
Foresmot Dairies de Guatemala, S. A.	Mr. Arturo Pichardo, Manager
San Francisco	Mr. Mario Santizo, Manager
La Joya	Mr. Angel Parras, Manager
Prolac	Lic. Genaro González Monzón, Manager
Leche Freskita, Hacienda 7 Colinas	Mr. Armando Rossbach, Manager

J. OILSEED CRUSHING AND/OR OIL REFINING PLANTS
AND STORAGE CAPACITIES

Ind. Guat. de Aceites y Grasas, S. A. (IGAGSA)	Eduardo Aguilar Salazar
Industria de Oleaginosas de Escuintla, S. A. (IODFSA)	Carlos Monzón
Nacional Agro-Industrial, S. A. (NAISA)	Arturo Alvarado Pérez
Agroindustrias Boca Costa, S. A.	Carlos Raúl Montes
OLMECA	Rodolfo Espinoza
Algodonera Guatemalteca, S. A. (AGSA)	Gustavo Adolfo Sosa
Punto Fijo	Fermín Menes M.
Grasas y Aceites, S. A.	Alfonso Gadala-María

Table 45. IMPORTANT EXPORTERS BY TYPE OF PRODUCT

Cardamom Oil

Asociacion de Productores de Aceites Esenciales S.A. (APAESA)

In addition there are 3 producers who also export.

Garlic

Agencia Rochevez

Exportadora Agrícola Guatemalteca, S.A. (EXPAGRO)

Fecunda

Representaciones Soje, S.A.

In addition there are 12 producers who also export.

Sesame

Alpine Export Company

Compañia Exportadora Los Ramos, S.A.

Exportaciones Importaciones Diversificadas S.A. (EXIM'S)

Exportadora Bornholt, S.A.

Exportadora de Ajonjolí Ltda.

Fecunda

Intercambio Tropical, S.A.

Representaciones Soje Ltda.

Transcafe, S.A.

In addition there are 17 producers who also export.

Cotton

Geo. H. Macfadden & Bro.

Werner Ruesch

In addition there are 20 producers who also export.

Arveja China

Importadora San Pablo

Frutas Tropicales de Guatemala, S.A. (FRUTESA)

In addition there are 7 producers who also export.

Sugar

Asociación de Azucareros de Guatemala

Transcafe, S.A.

In addition there are 5 producers who also export.

Cocoa

Compañía Exportadora Los Ramos

Exportadora Bonholt, S.A.

Loma Verde, S.A.

Control Integrado, S.A.

In addition there is 1 producer who also exports.

Coffee

Asociación Nacional del Café (ANACAFE)

Casa Agrícola Mercantil y Exportación de Café, S.A. (CAMEX)

COEX Guatemala, S.A.

Colón y Cía. S.A.

Comercial Exportadora Agrícola, S.A. (COMEXA)

Comercial Vellela Rosa, S.A.

Exportaciones Importaciones Diversificadas, S.A. (EXIM'S)

Exportadora Bonholt, S.A.

Exportadora Café Panchoy, S.A.

Exportcafé, S.A.

Flora Ltda.

Ibero de Guatemala

Jimenes Erkelens y Cía. Ltda.

Juan Waelti Sucs. S.A.

Sr. Delgado y Cía. Ltda.

Transcafé, S.A.

Usicafé de Centroamérica, S.A.

In addition there are 32 producers who also export.

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Cardamom

Alpine Export Company

AMPEX, S.A.

CANOL (Guillermo Molina Abarca)

Casa Agrícola Mercantil y Exportación de Café, S.A. (CAMEX)

Comercial Villela Rosa, S.A.

Compañía Exportadora Los Ramos, S. A.

Exportaciones Importaciones Diversificadas, S.A. (EXIM'S)

Exportadora Bonholts, S.A.

Exportadora Radha, S.A.

Intercambio Tropical, S.A.

Loma Verde, S.A.

Representaciones Comerciales F. Mansilla y Cía. Ltda.

Transcafé, S.A.

In addition there are 30 producers who also export.

Onions

Exportadora Agrícola Guatemalteca, S.A. (EXPAGRO)

Fecunda

In addition there are 2 producers who also export.

Fresh Fruits

Compañía Distribuidora, S.A. (CODISA)

Tesoro Trading

Verduras y Frutas de Exportación, S. A. (VERDUFREX)

Melons

Agropecuaria Griffin & Brand

Frutas Tropicales de Guatemala, S. A. (FRUTESA)

In addition there are 7 producers who also export.

Table 46. NUMBER OF COOPERATIVES AND MEMBERSHIP
BY PRIMARY ACTIVITY

Primary Activity	Cooperative		Membership	
	Number	%	Number	%
Agriculture	430	48.3	49,134	23.5
Savings and Loan	182	20.4	126,140	60.2
Production	62	7.1	2,878	1.4
Consumer	109	12.2	20,707	9.9
Housing	70	7.9	6,817	3.6
Transportation	34	3.8	3,423	1.2
Multi-Service	3	0.3	214	0.1
TOTAL	890	100.0	209,313	100.0

SOURCE: INACOP

Table 47. DETAILS OF COOPERATIVE FEDERATIONS, 1984

Federation	Type	Year of Organization	Affiliated Cooperatives	Membership	Total Assets (Q000)
FENACOAC	Credit Union	1963	77	95,863	12,562
FEDECOAG	Agriculture	1968	54	8,302	1,877
FEDECOAGUA	Coffee	1971	52	4,467	2,854
FEDECOG	Consumer	1972	30	5,313	N/A
FECOAR	Agriculture	1973	6	15,878	8,085
FEXOMERQ	Agriculture	1975	11	9,024	3,020
ARTEXCO	Handicrafts	1976	21	1,725	58
FEDEPESCA	Fishing	1977	3	68	N/A
FEDECOVERA	Coffee Marketing	1976	29	5,081	804
FENACOVI	Housing	1977	20	3,213	N/A
TOTAL	-----	-----	303	148,934	30,260

SOURCE: INACOP

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Table 48. MEMBERSHIP OF THE DIRECTORATES AND
BOARDS OF THE PRINCIPAL SEMI - AUTONOMOUS AGENCIES
OF THE PUBLIC AGRICULTURAL SECTOR

A. National Development Bank (BANDESA)

MEMBERS OF THE BOARD

Minister or Vice-Minister of Agriculture (Presides)
Minister or Vice-Minister of Public Finance
Minister or Vice-Minister of Economy
President or Vice-President of the Bank of Guatemala
Secretary of Economic Planning

ADVISORS

General Manager, BANDESA
President, INTA
General Manager, INDECA
Director, DIGESA

B. Institute of Agrarian Transformation (INTA)

MEMBERS OF THE COUNCIL

The two Vice-Presidents of INTA
Member of the Ministry of Agriculture

Member of the Ministry of Economy

Member of the Ministry of Health

Member of the Ministry of Communications, Transportation, and Public Works

C. National Forestry Institute (INAFOR)

MEMBERS OF THE BOARD

Minister or Vice-Minister of Agriculture (Presides)

Minister or Vice-Minister of Economy

Minister or Vice-Minister of Public Finance

Minister or Vice-Minister of National Security

Secretary or Sub-Secretary of Economic Planning

ADVISORS

Representative, Chamber of Industry

Representative, Chamber of Agriculture

Representative, Agronomist Association

Representative, Friends of the Forest Association

D. Agricultural Science and Technology Institute (ICTA)

MEMBERS OF THE BOARD

Minister or Vice-Minister of Agriculture (Presides)

Minister or Vice-Minister of Economy

Minister or Vice-Minister of Public Finance

Secretary of Economic Planning

Representative, Agricultural Private Sector

Dean, School of Agriculture, University of San Carlos

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ADVISORS

General Manager, ICTA
Director, DIGESA
General Manager, INDECA
General Manager, BANDESA
General Manager, INTA

E. National Agricultural Marketing Institute (INDECA)

MEMBERS OF THE BOARD

Minister or Vice-Minister of Agriculture (Presides)
Minister or Vice-Minister of Economy
Minister or Vice-Minister of Public Finance
Secretary or Sub-Secretary of Economic Planning
President, Municipal Development Institute (INFORM)

ADVISORS

General Manager, INDECA
General Manager, BANDESA
President, INTA
Director, DIGESA

Table 49. AGROECOLOGICAL REGIONS OF GUATEMALA

Characteristics	I	II	III	IV	V	VI	VII	VIII
Land Area (km ²)	14,960	10,268	35,854	12,921	9,057	8,237	9,268	8,809
Percent of Total	13.7	9.4	32.8	11.8	8.3	7.5	8.5	8.0
Average Altitude (meters above sea level)	1,500-3,000	1,100-2,700	50-275	0-1,000	300-2,000	0-1,500	200-1,000	1,000-2,700
Topography	Irregular; some valleys	Rugged mountains	Soft	Valleys to irregular mountains	Rugged mountains; some small valleys	Rugged mountains; small valleys	Flat to irregular	Undulating to rugged
Rainfall (mm/yr)	1,344-2,500	2,284-4,100	1,700	2,000-4,300	1,000-2,000	500-1,500	1,000-2,500	3,000-6,000
Temperature (C)	11-26	16-23	22	22-38	16-26	25-35	28-40	15-25
Predominant Crops	corn wheat vegetables fruits beef dairy sheep goats	coffee banana corn beans beef pork	forest wood	coffee cotton sugarcane tea beef	coffee corn beans tobacco vegetables	coffee corn beans sorghum tobacco sugarcane vegetables beef pork	rice corn sorghum tobacco banana beef	coffee cocoa rubber citrus nuts

SOURCE: Censo Agropecuario 1979 and 1981

Table 50. PERCENTAGE OF CHILDREN LESS THAN FIVE YEARS OLD WITH SOME DEGREE OF MALNOURISHMENT, 1980

Region	Total Non-retarded Children	Total Mal-nourished Children	Malnourished		
			6-10% Retarded	11-15% Retarded	More Than 15% Retarded
<u>TOTAL</u>	<u>24.1</u>	<u>75.9</u>	<u>30.9</u>	<u>27.9</u>	<u>17.1</u>
Metropolitan Area	37.2	62.8	36.6	19.3	6.9
Pacific Coastal Plain	21.6	78.4	35.0	29.1	14.3
Central Area	25.9	74.1	31.6	26.3	16.2
Western Highlands	14.7	85.3	21.6	31.3	32.4
East	24.4	75.6	29.6	31.8	14.2
Northern Lowlands	18.6	81.4	28.2	31.6	21.6

SOURCE: Regionalization of Nutritional Problems in Guatemala, SGCNPE/INCAP, 1980.

Table 51. AGRICULTURAL WORKERS COVERED BY IGSS

Year	Agriculture	Total IGSS Covered Labor Force	% In Agriculture
1975	260,065	528,696	49.2
1976	283,904	577,920	49.1
1977	368,342	708,815	52.0
1978	395,305	769,045	51.4
1979	374,609	756,171	49.5
1980	373,469	755,542	49.3
1981	225,688	591,019	38.2
1982	215,709	609,144	35.4
1983	199,847	583,548	34.2
1984	205,514	594,936	34.5
1985	233,572	631,654	36.9

SOURCE: Boletín Estadístico, Banco de Guatemala, enero-marzo 1986.

Table 52.

INDECA STORAGE CAPACITY



No	INSTALACION POR REGION	SILOS	TOT SILOS	RODERA	TOT SILOS	TOTAL	1%
REGION I							
1	SILO QUETZALTENANGO	169,300		29,200			
2	E.V. SOLOLA			560			
3	E.V. QUICHE			560			
4	E.V. TEJUTLA			560			
			169,300		30,560	219,860	6.2
REGION II							
5	SILO TAC-TIC	97,000		20,000			
6	E.C. FRAY BARTOLOME	57,000		14,000			
7	E.C. TELENAN	57,000		14,000			
8	E.V. SALAMA			560			
			211,000		48,560	259,560	10.1
REGION III							
9	E.C. SAN LUIS			12,000			
10	E.C. SANTA ELENA			24,000			
11	E.C. SAYAXCHE			12,000			
				48,000		48,000	1.5
REGION IV							
12	SILO RETALHULEU	195,000		20,000			
13	E.C. LA DEMOCRACIA	11,000		6,000			
14	E.C. MONTERREY	4,000		2,000			
15	E.C. NUEVA CONCEPCION	25,000		7,000			
16	E.C. LA MAQUINA I	57,000		14,000			
17	E.C. LA MAQUINA II			37,000			
18	E.C. CABALLO BLANCO	8,000		4,000			
19	E.C. COATEPEQUE	11,000		6,000			
20	E.C. LAS PALMAS	8,000		4,000			
21	E.C. LA BLANCA	4,000		2,000			
22	E.C. CATANINA	8,000		4,000			
23	PLANTA SAN SEBASTIAN	125,000					
			460,000		106,000	566,000	22.1
REGION V							
24	SILO GUATEMALA	259,000		20,000			
	BODEGA 1976	106,000					
	BODEGA 1977			30,000			
	BODEGA 1978			30,000			
	BODEGA 1979			560			
25	E.V. SANARATE			560			
			365,000		60,560	445,560	17.4
REGION VI							
26	SILO JUTIAPA	97,000		13,500			
27	E.C. JALPATAQUA	14,000		3,500			
28	E.C. TRICAL	8,000		2,500			
29	E.C. MONJAS	8,000		2,500			
30	E.C. MONTUFAR	14,000		3,500			
31	E.C. CHIQUIMULLA	11,000		6,000			
32	E.C. JUTIAPA	11,000		6,000			
			163,000		57,500	201,200	7.8
REGION VII							
33	SILO LOS ANATES	95,000		20,000			
34	E.C. SEJA	6,000		2,000			
35	E.C. NAVAJOSA	25,000		5,000			
36	E.C. SAN ESTEBAN	8,000		2,000			
37	E.C. IPALA	8,000		4,000			
			140,000		23,000	175,000	6.7
REGION VIII							
38	INST. ARRONDAS SANTA ELISA (GUATEMALA)			650,000	650,000	650,000	25.4
TOTALES			1,528,300	104,560	2,556,860	2,556,860	100.0

ANNEX II

FIGURES

Figure 1
LAND FORMATIONS

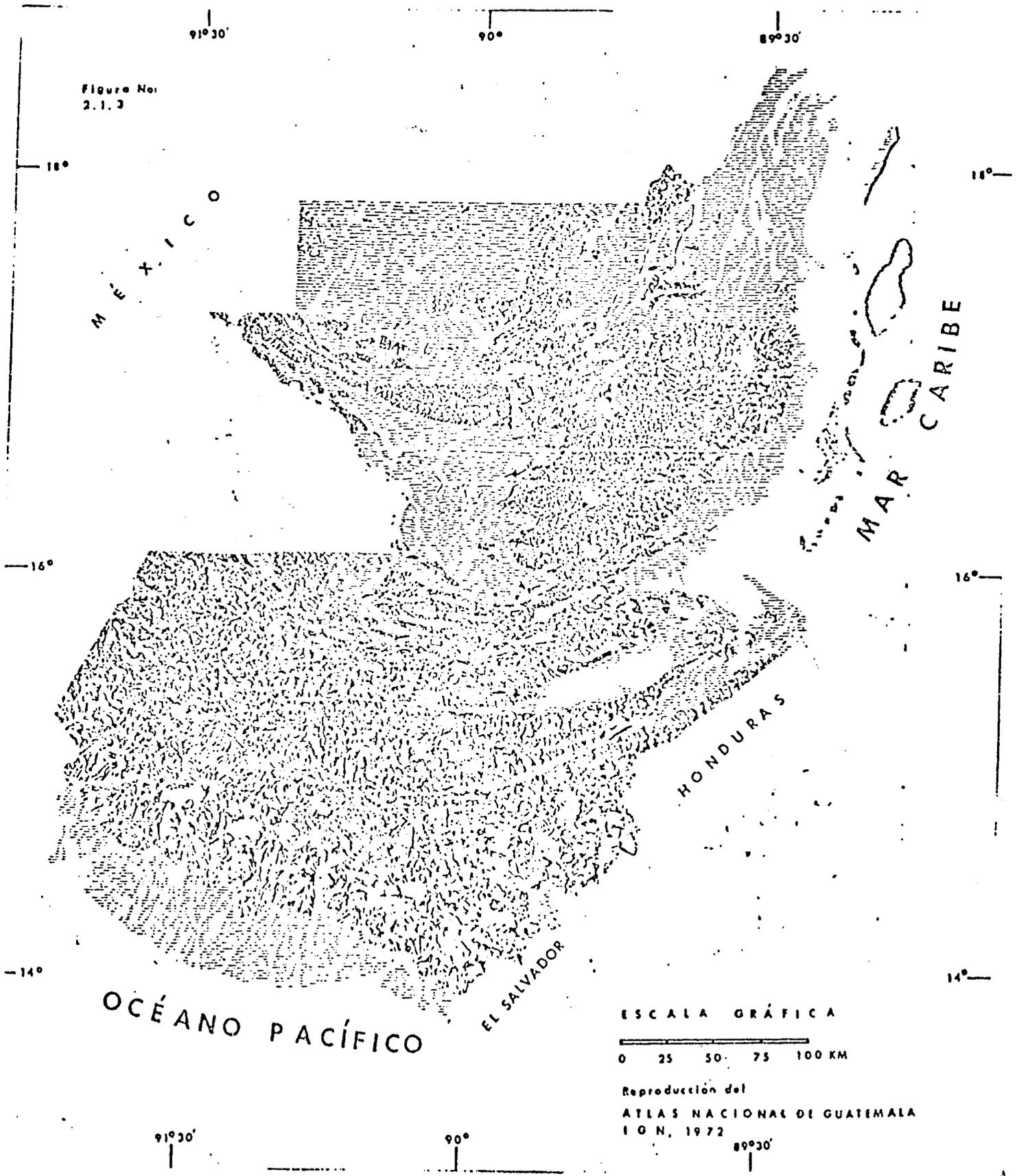
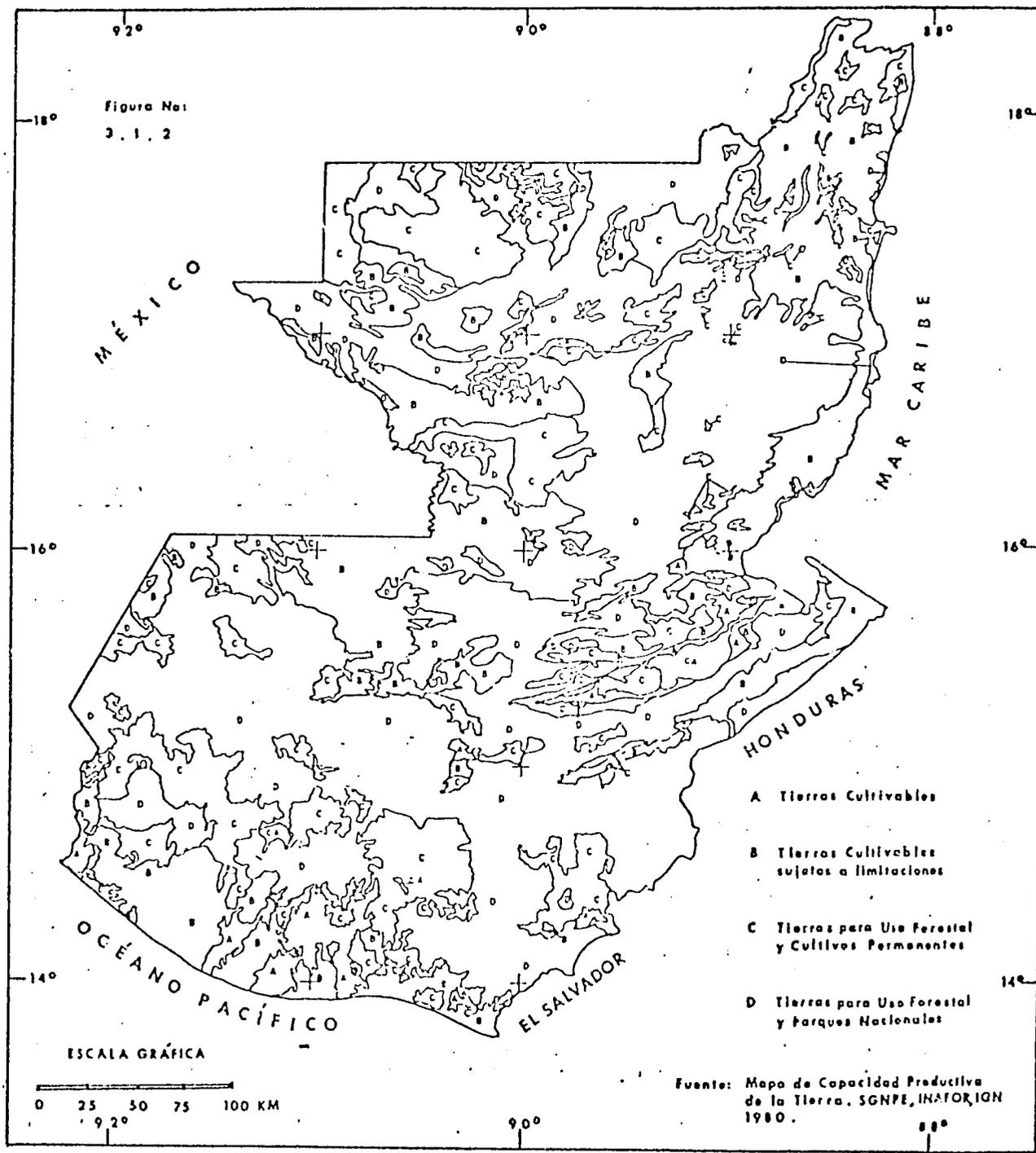


Figure 2

SOIL PRODUCTIVITY



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Figure 3

PRELIMINARY DESCRIPTION OF LAND
USE POTENTIAL

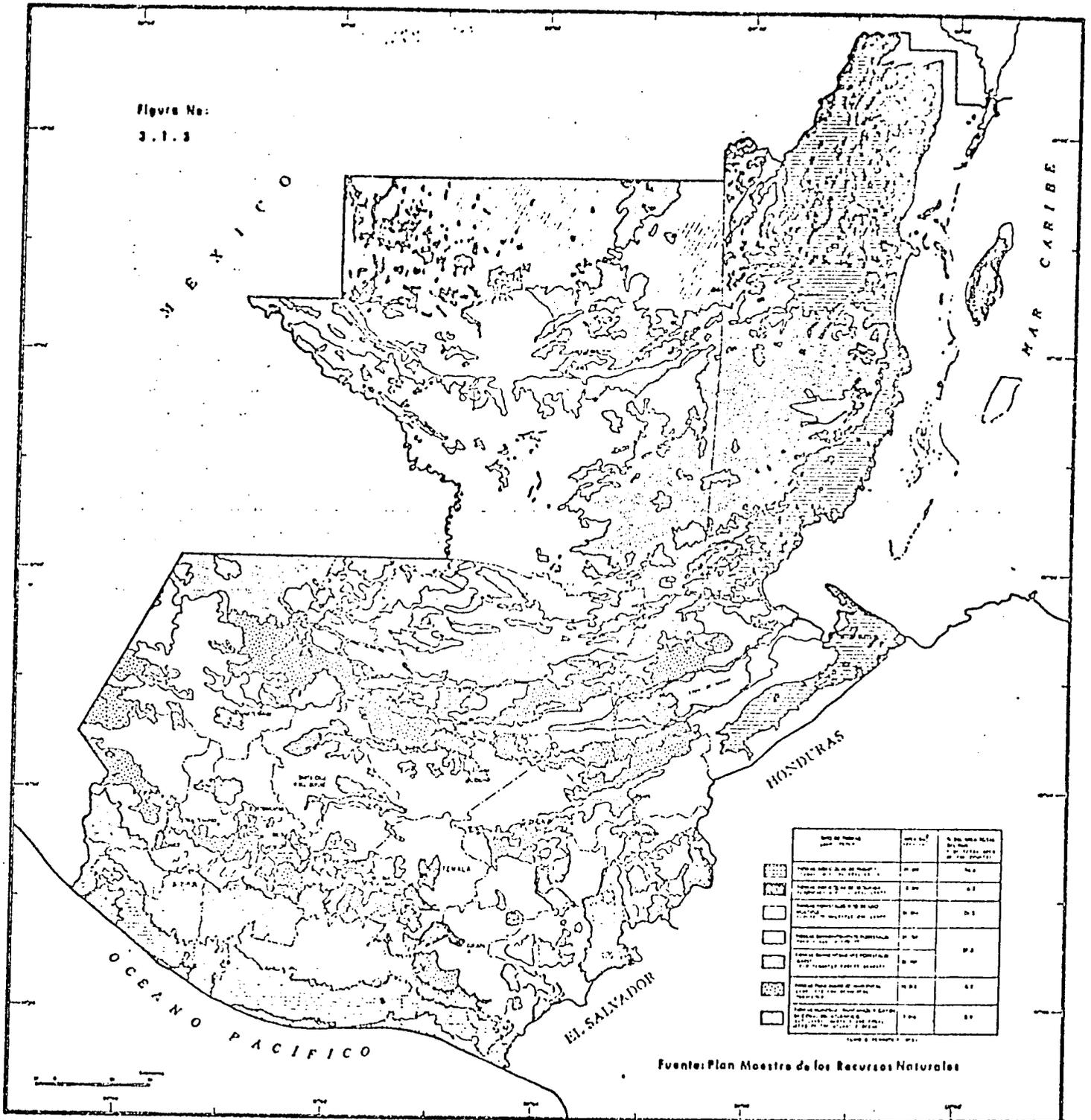


Figure 4

LAND USE

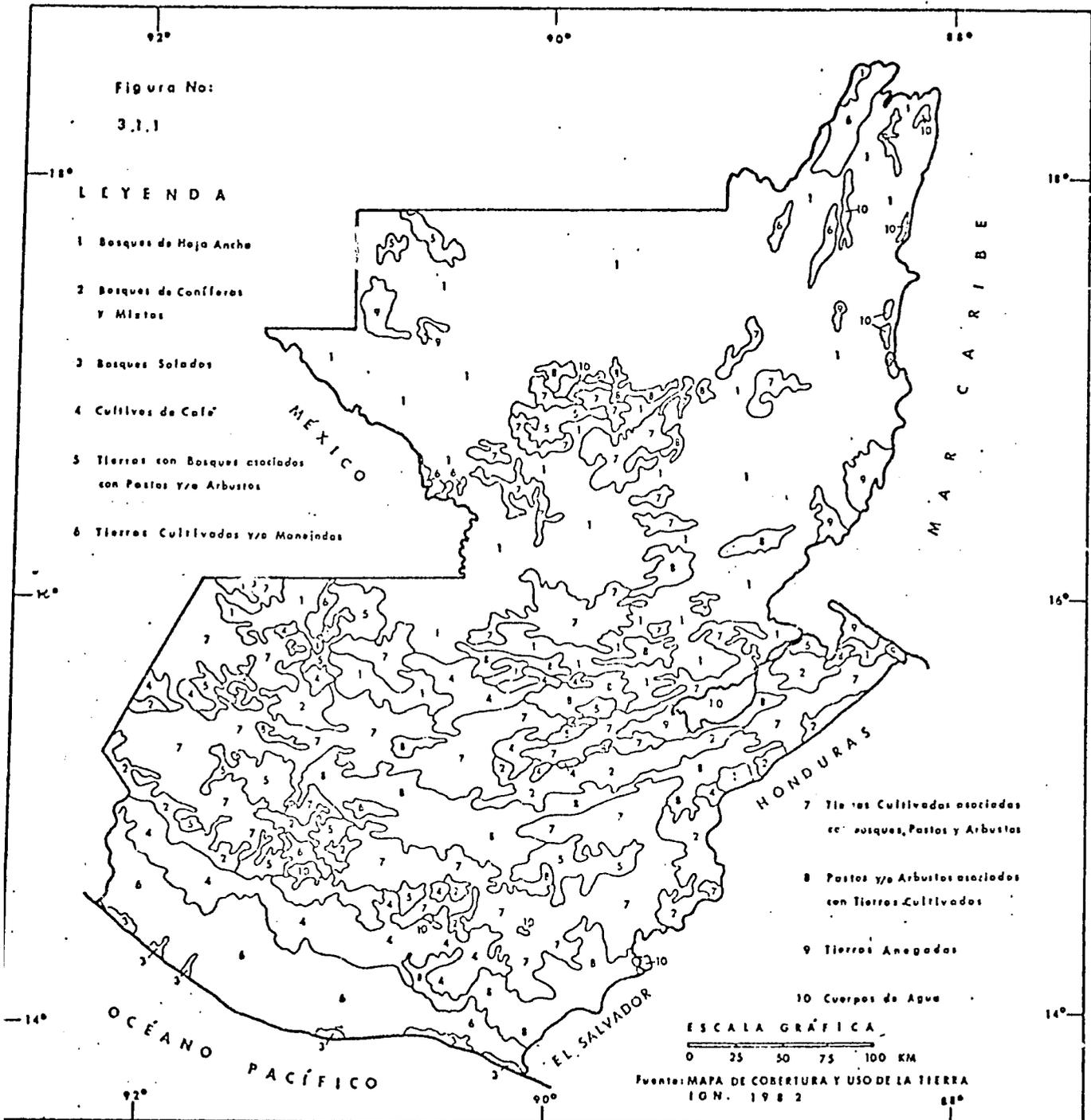


Figure 6

SOIL SUSCEPTIBILITY TO EROSION

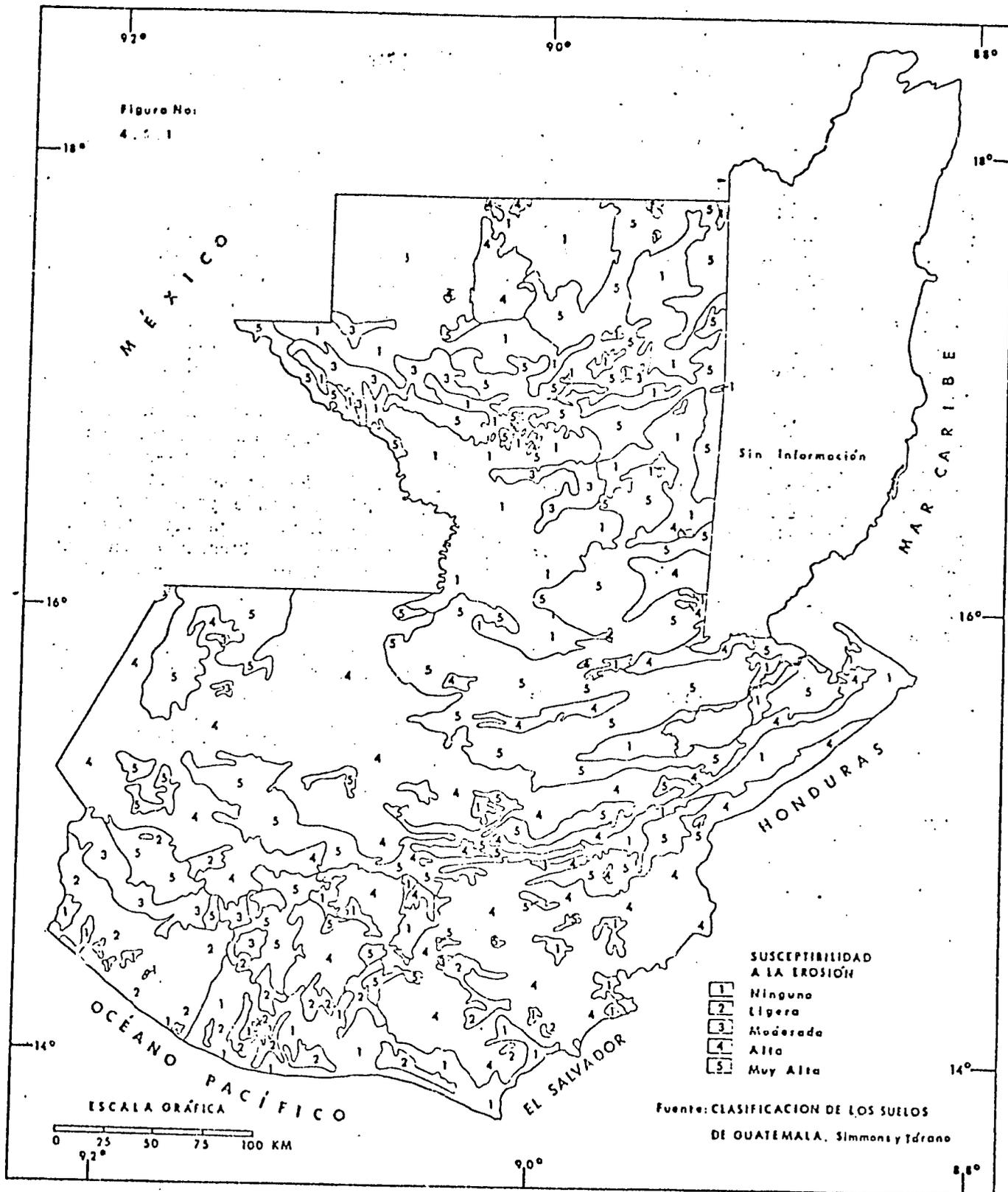


Figure 7

LOCATION MAP FOR IRRIGATION PROJECTS

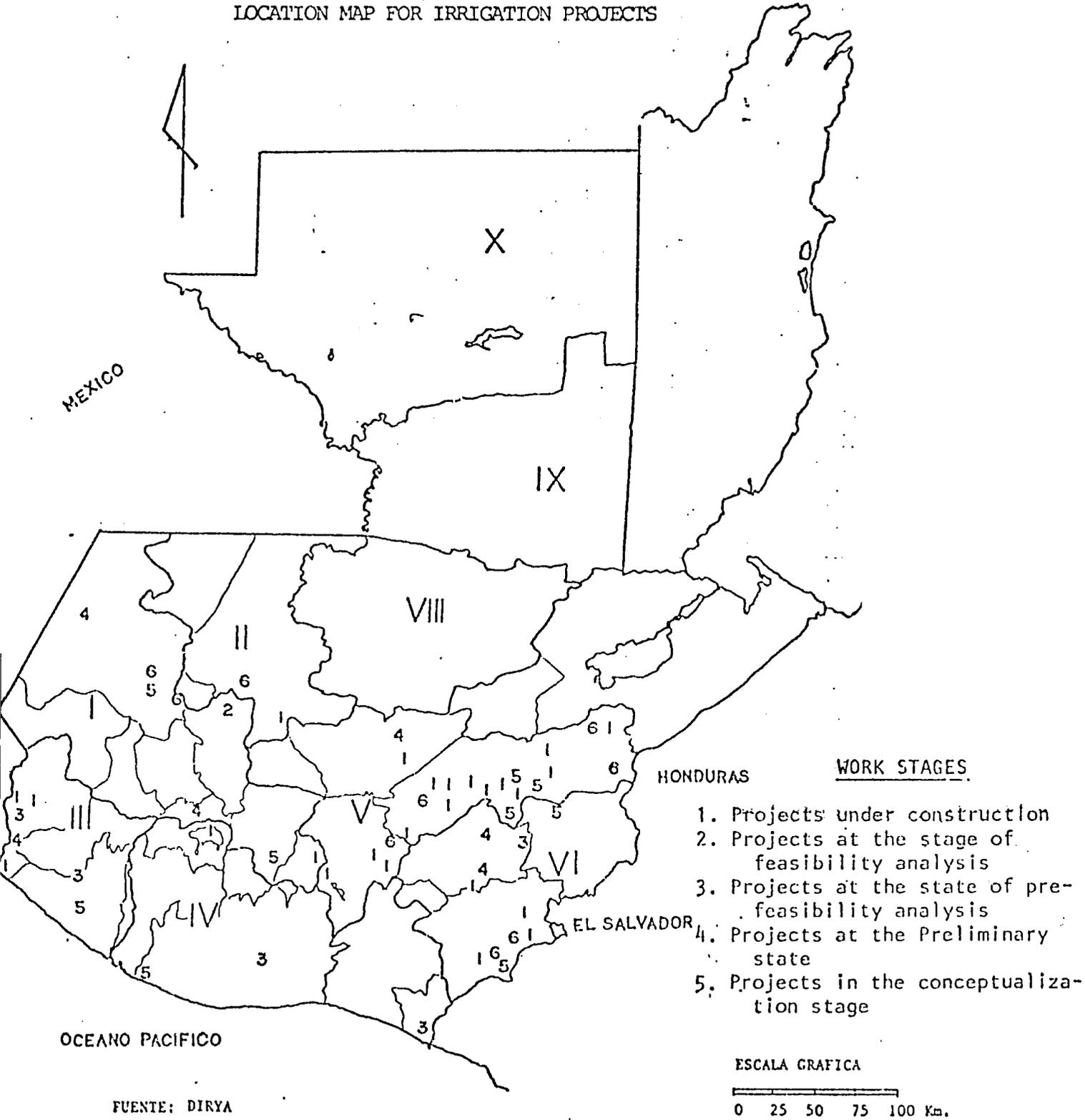
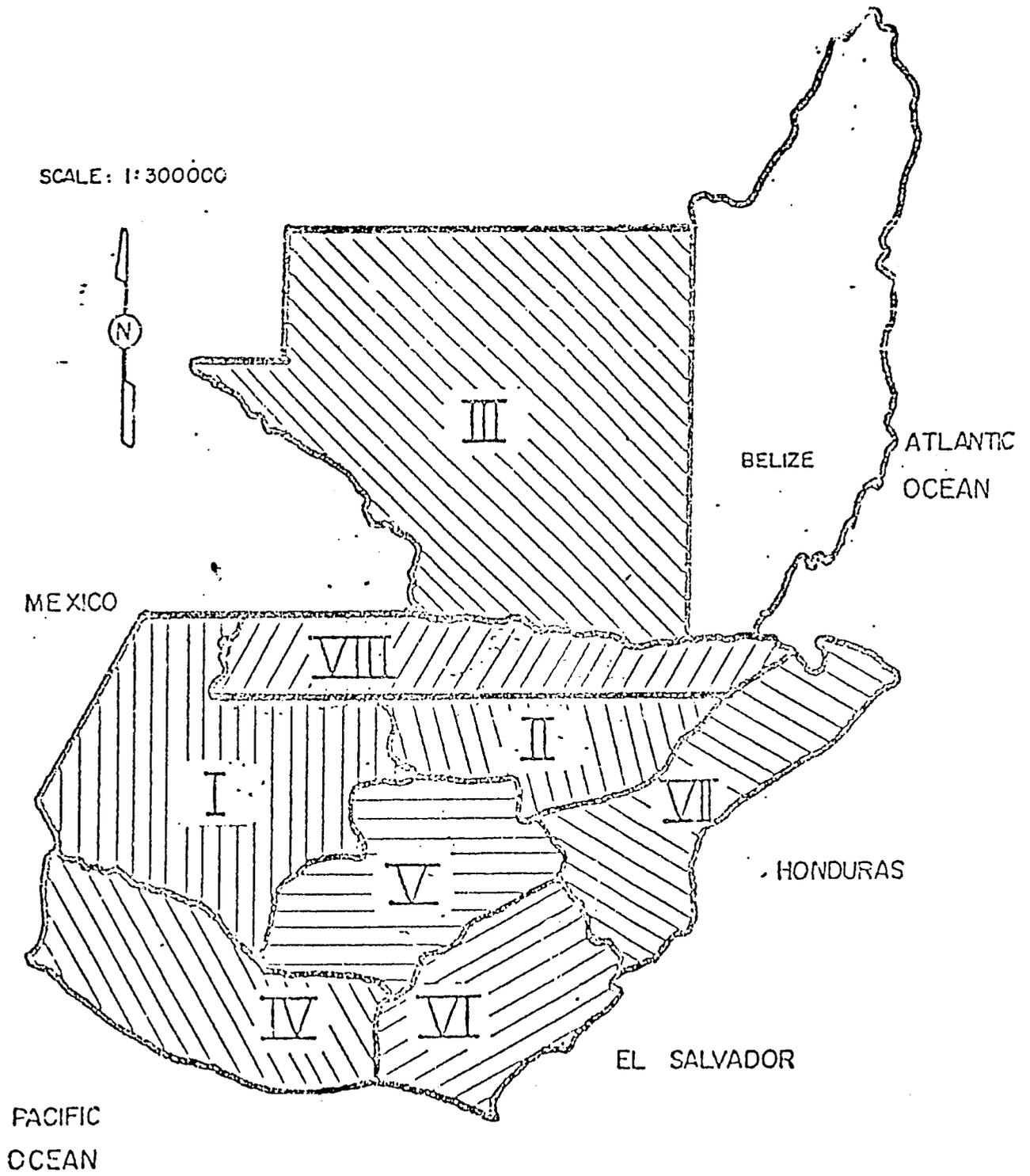


Figure 8

GUATEMALA

MINISTRY OF AGRICULTURE
REGIONS



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Figure 9
FOREST REGIONS

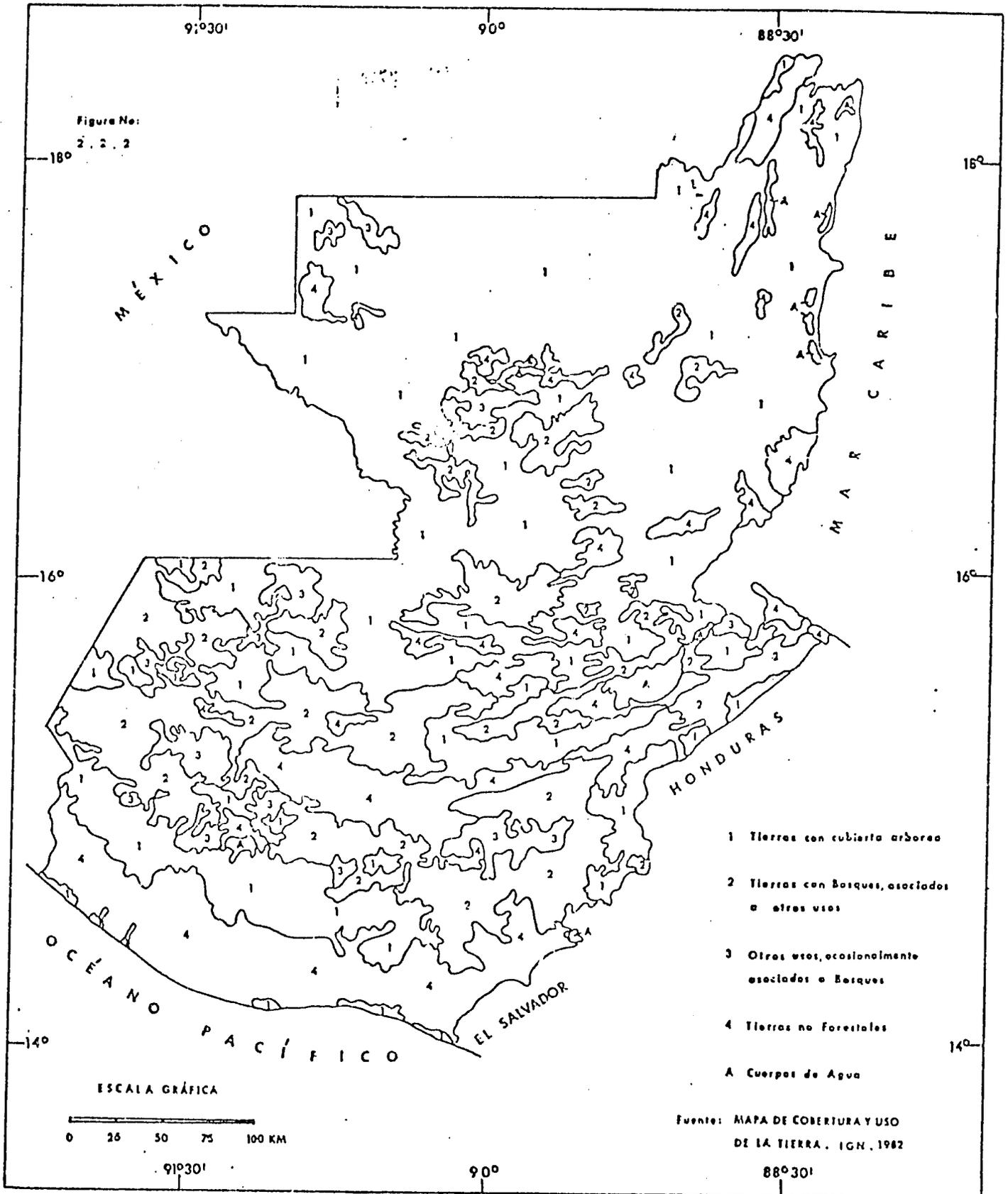
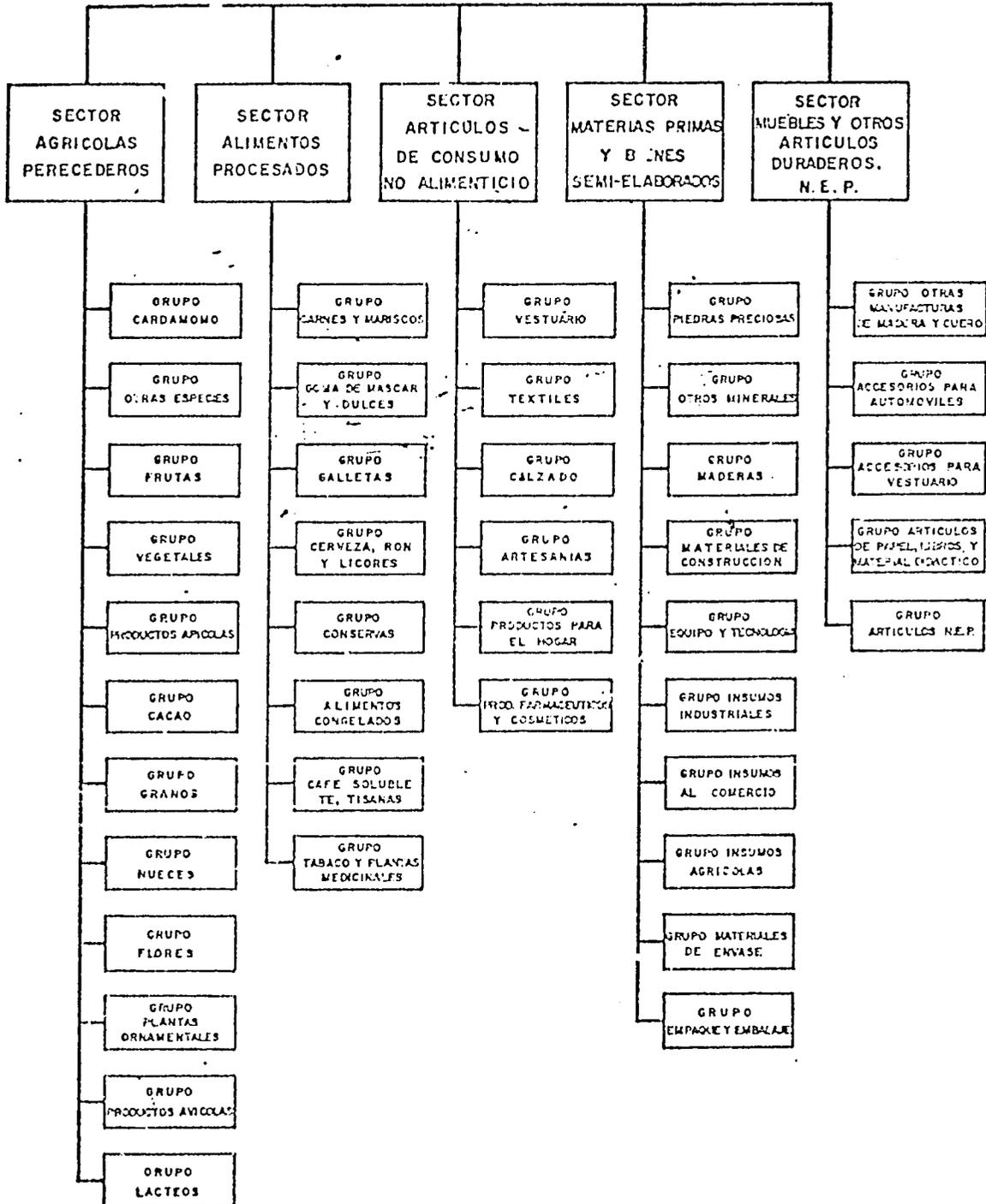


Figure 10

SECTOR AND SUB-SECTOR CLASSIFICATION (GROUPS)

GREMIAL DE EXPORTADORES DE PRODUCTOS NO TRADICIONALES



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Figure 11

THE MINISTRY OF AGRICULTURE AND THE PUBLIC AGRICULTURAL SECTOR

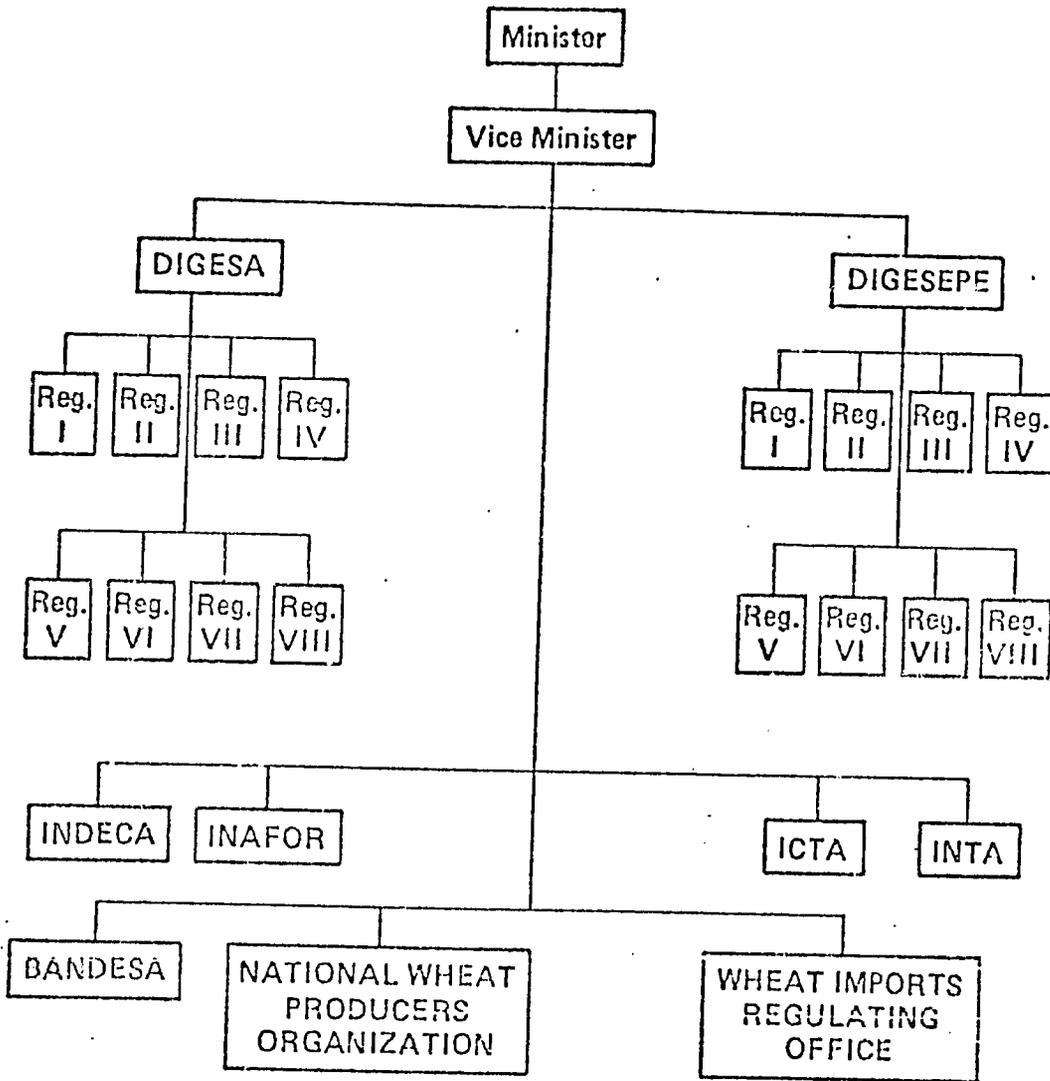
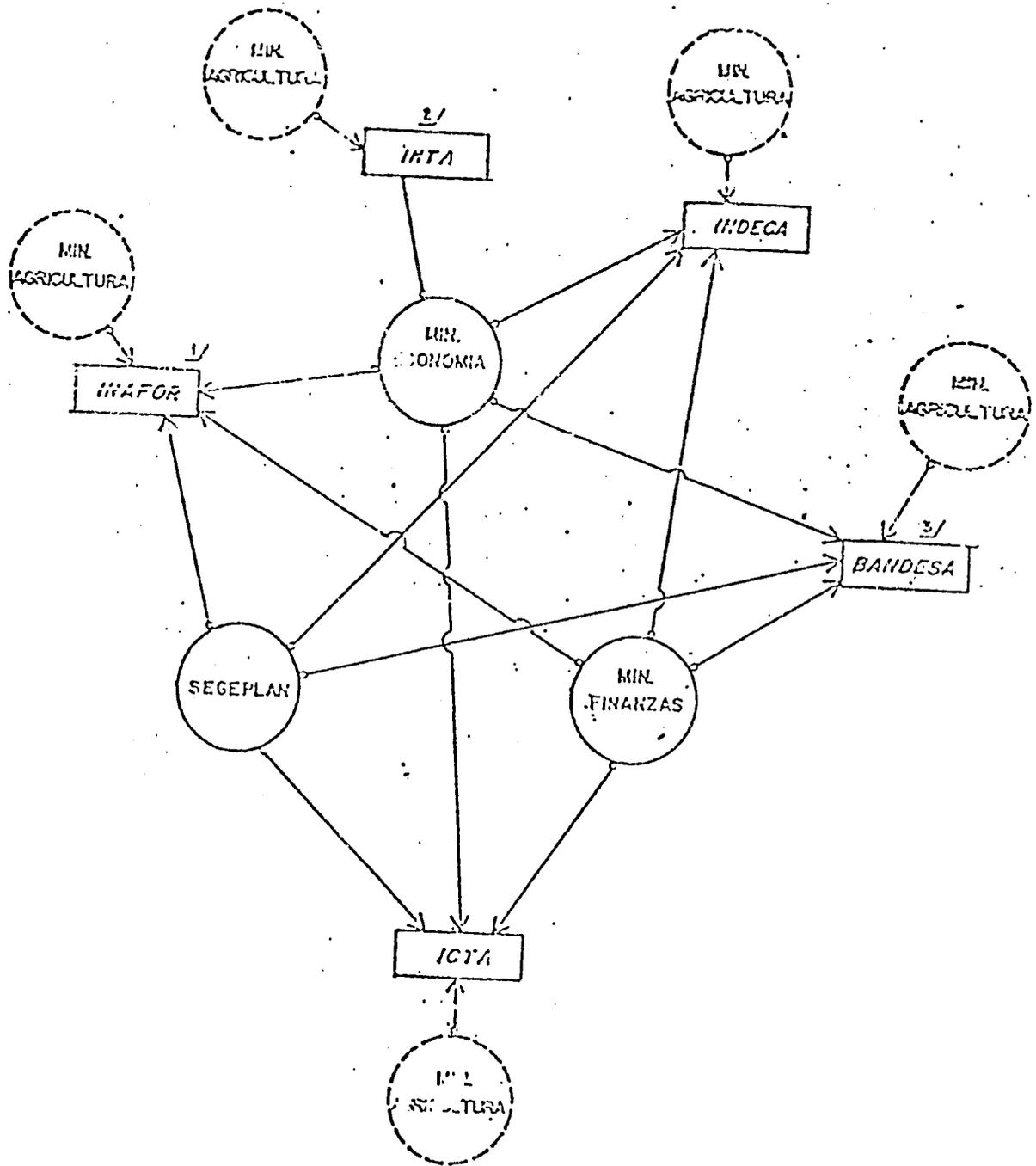


FIGURE 12

INFLUENCE EXERCISED BY NON-AGRICULTURAL AGENCIES ON IMPORTANT INSTITUTIONS OF THE PUBLIC AGRICULTURAL SECTOR



- 1 TAMBIEN MINISTERIO DE LA DEFENSA
- 2 TAMBIEN MINISTERIO DE COMUNIC. TRANSP. Y OBRAS PUBLICAS Y MINISTERIO DE SALUD PUBL. Y ASIST. SOC.
- 3 TAMBIEN BANCO DE GUATEMALA

Figure 13

INSTITUTIONAL INFRASTRUCTURE OF THE
GUATEMALAN PUBLIC AGRICULTURAL SECTOR-1987

ADMINISTRATIVE CONTROL
COORDINATION
PLANNING, BUDGETING,
FINANCING

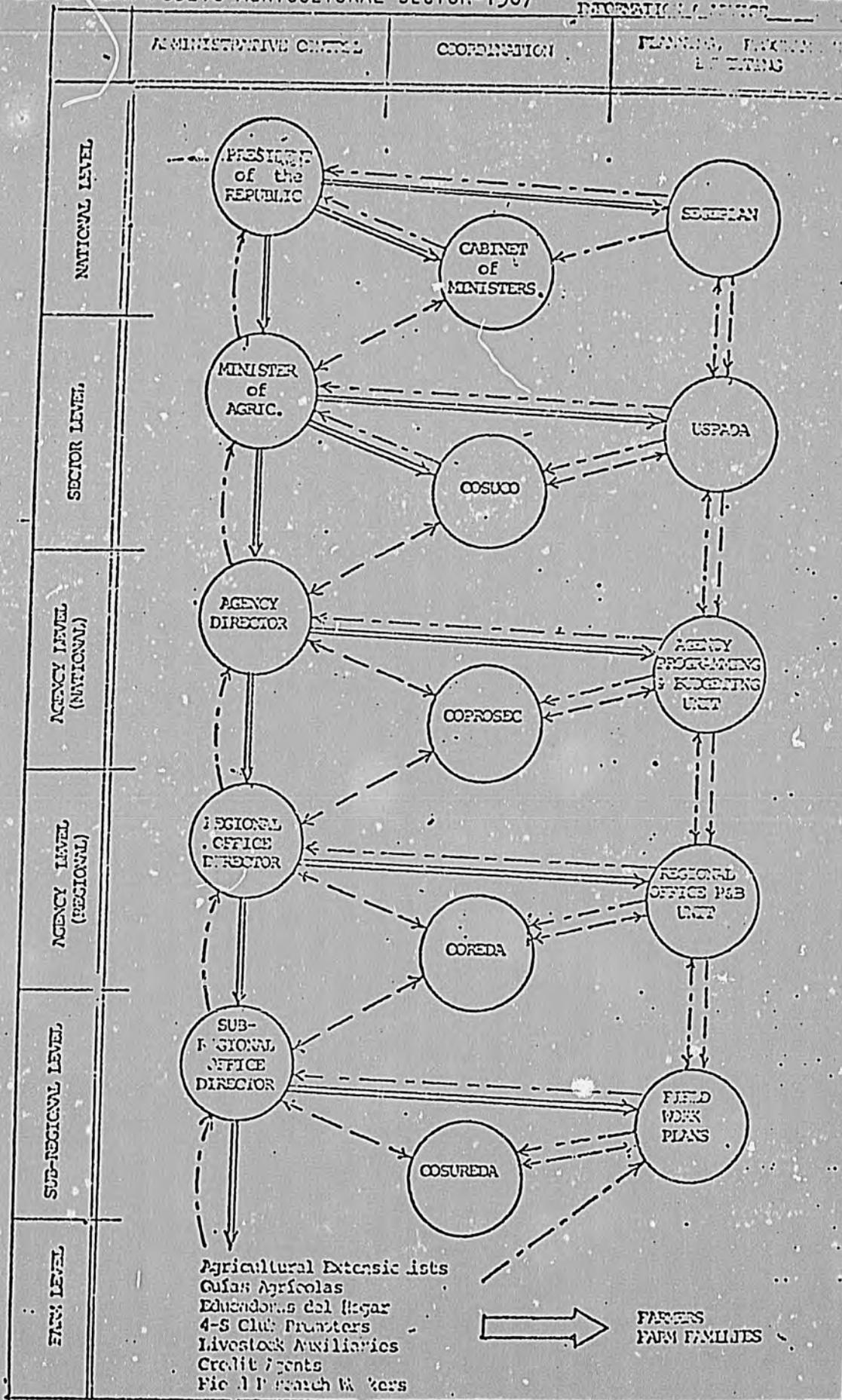
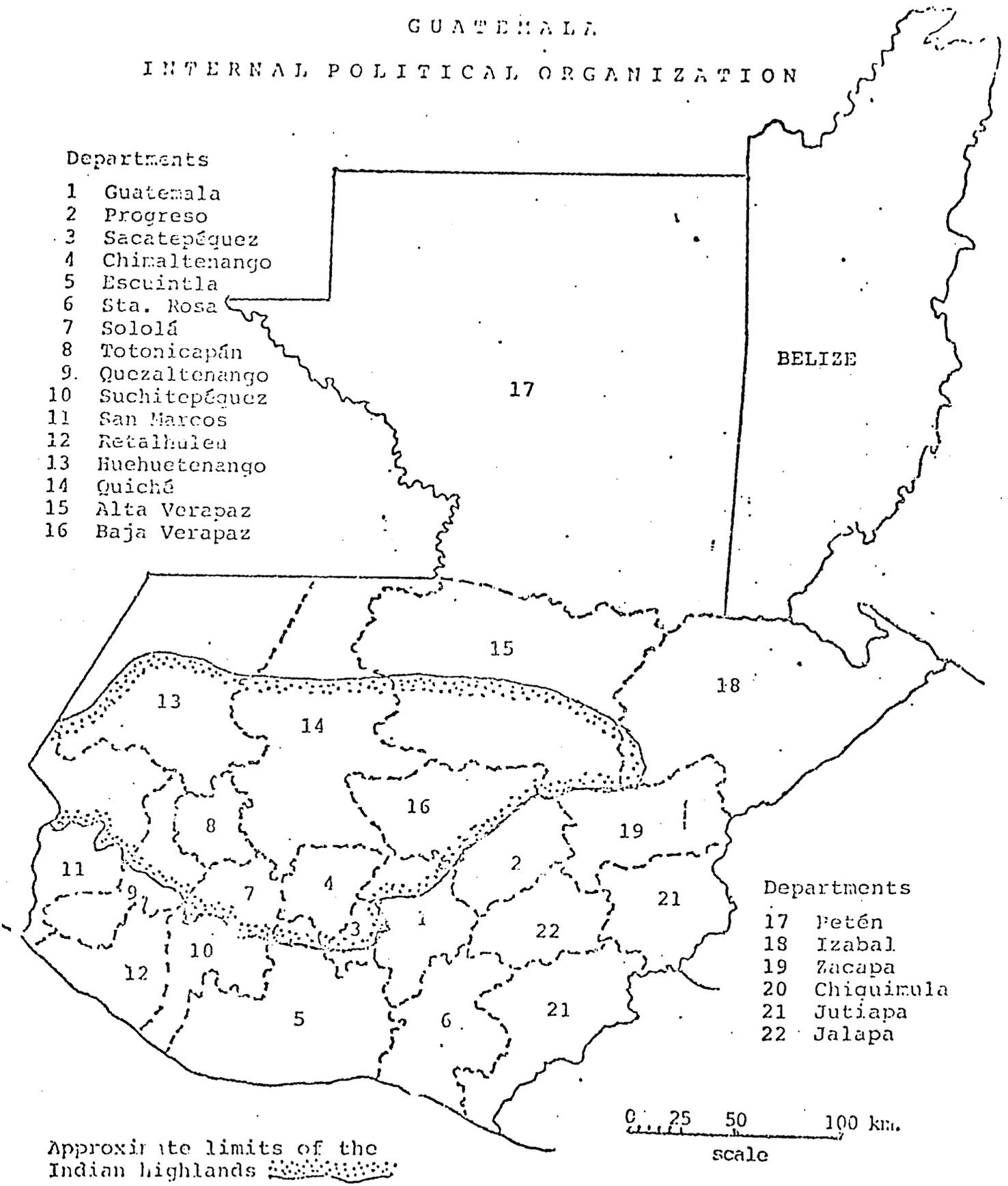


FIGURE 14

GUATEMALA
INTERNAL POLITICAL ORGANIZATION



Departments

- 1 Guatemala
- 2 Progreso
- 3 Sacatepéquez
- 4 Chimaltenango
- 5 Escuintla
- 6 Sta. Rosa
- 7 Sololá
- 8 Totonicapán
- 9 Quezaltenango
- 10 Suchitepéquez
- 11 San Marcos
- 12 Retalhuleu
- 13 Huehuetenango
- 14 Quiché
- 15 Alta Verapaz
- 16 Baja Verapaz

BELIZE

Departments

- 17 Petén
- 18 Izabal
- 19 Zacapa
- 20 Chiquimula
- 21 Jutiapa
- 22 Jalapa

Approximate limits of the Indian highlands

0 25 50 100 km.
scale