

AGRICULTURE: CENTRAL AMERICA

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I. The Agricultural Sector: A Diagnostic Overview

A. Structure

Structurally, the agricultural sector consists of two quite distinct economies--the modern and the traditional. The modern economy consists of a small number of medium-size and large farms producing mostly export industrial crops. Productivity in this economy is generally higher than in other developing countries (coffee, sugarcane) and sometimes exceeds that in developed countries (cotton) (see Table 1). Typically operated as business enterprises, these farms use high levels of fertilizer and agricultural chemicals, and their products are processed in large industrial plants and marketed through national or international firms. There are two important exceptions to this pattern. First, heirs of family lands and land speculators hold many farms without an interest in operating them as commercial enterprises. The result is that extensive land areas are very underutilized relative to their agricultural potential. A favored activity among these non-agriculturalists is cattle ranching. A second exception is that many small and medium sized farms are modern and efficient coffee producers and account for important portions of the region's principal export.

In contrast, the traditional sector consists of tens of thousands of small farms, principally engaged in food production. Basic grains (corn, beans, sorghum) are central to meeting family consumption requirements and generating a cash income. Productivity is low relative both to other developing countries and the

agronomic potential of the region (see Table 2). Few modern inputs are used and processing facilities are small, numerous and dispersed, mainly serving local and domestic markets. The labor market is the principal linkage between these two distinct economies. Small farm families (and the rural landless) constitute the principal work force for the laborintensive operations of planting, cultivating and harvesting the export crops and derive a significant portion of their annual cash income in the form of wages from the modern subsector.

B. Role

Historically, agriculture has served as the major engine of economic growth for the countries of the region. While its relative importance has diminished as a natural function of economic development and the attendant rise of the industrial and service sectors, agriculture continues to generate 68% of the region's foreign exchange earnings, a vital function in the small, open economies characteristic of Central America. Foreign exchange generated by the agricultural sector finances the sector's own import requirements as well as significant percentages of the region's consumer items, industrial goods and intermediate goods. The sector also has served as a sort of primitive, though vital social security system--holding surplus labor pending its absorption in the emerging industrial and service sectors. In the still predominantly rural and agrarian societies of Central America, where up to half of the rural labor force is unemployed or underemployed, the agricultural sector's

performance in providing job opportunities and food security is critically important. Table 3 summarizes the changes the sector has undergone in the last 20 years in its role as "engine of development."

C. Performance

The performance of the agricultural sector deteriorated significantly from the sixties to the seventies. During the sixties, total agricultural production in the region increased by 56%, or 4.5% per year, and food production rose by 59%, an annual growth rate of 4.7% (see Table 4 and 5). In none of the countries was either growth rate less than 3.6%. The fastest rates of growth were in Nicaragua and Panama, and the slowest in Honduras and El Salvador. Per capita output for the sector as a whole and for food increased in all countries, and for the region as a whole the annual growth rates were 1.4% and 1.5%, respectively. As a whole, the sector performed quite impressively throughout the region during the sixties.

This respectable performance was not maintained in the seventies. Total agricultural production rose by only 27% and food production by 28%, not quite half the growth achieved in the previous decade. The annual growth rates fell to 2.4% and 2.5%, respectively. Per capita output of both food and total agricultural production declined over the decade by about 5%, although the 1979-81 averages were still about 10% above those of 20 years earlier.

A closer examination of the figures in Tables 4 and 5, however, shows that the regional averages were dragged down considerably by the poor sectoral performance of Nicaragua and El Salvador. Nicaragua in the latter part of the decade experienced considerable armed conflict which was disruptive, directly or indirectly, to farm output. Both total food and total agricultural production^{1/} in Nicaragua during 1979-81 were only marginally higher than in 1969-71. This was in marked contrast to Nicaragua's top-ranking performance in the region a decade earlier. Due to these slow growth rates, per capita production thus fell back to the 1959-61 levels. In El Salvador, non-food agricultural production, the most seriously affected as total agricultural output over the decade fell in per capita terms by about 10 percent while per capita food production was virtually unchanged. Even in the other Central American countries, performance in the 1970s was not as good as in the 1960s. Per capita food and total agricultural production fell in both Honduras and Panama and expanded only by about half of one percent a year in Costa Rica. Only in Guatemala was sector performance relatively good, though even there, per capita production increased by less than one percent a year.

It is difficult to measure the sector's performance over time with respect to employment creation, but continuing high (and generally rising) rates of rural unemployment and underemployment indicate that the sector has failed to create adequate new job

^{1/} Agricultural production includes both non-food commodities (such as coffee, cotton, tobacco, etc.) as well as food crops.

opportunities in the face of the continuing high population growth rate of almost 3% per year. In its key role as foreign exchange earner, the sector has also faltered; after a dramatic 166% real increase in the positive net trade balance between 1970 and 1977, real net earnings declined by 40% between 1977 and 1981 (see table 6).

D. Principal Problems

Six pervasive problems constrain the sector's contribution to national and regional development: (1) precarious foreign exchange earnings; (2) low productivity of land; (3) natural resource degradation (4) unequal income and asset distribution; (5) underemployment and (6) nutritional deprivation.

1. Precarious Foreign Exchange Earnings

Recent experience and future projections regarding the sector's performance as the region's principal source of foreign exchange earnings (FX) are worrisome. Although the sector accounts for 68% of total FX earnings, its future relative and absolute contributions are threatened by problems of world market prices and disease. Export FX earnings peaked at \$3,306 million in 1977, and measured in real terms, declined by 30% as of 1981 (see Table 6). While this sharp decline is largely a reflection of cyclical phenomena, there is also reason to be concerned about the long-run viability of some traditional exports.

Central America's five traditional agricultural exports (coffee, bananas, cotton, sugar and beef) are all

subject to sharp cyclical price movement, as well as to weather and disease problems that affect export volumes. The price swings are especially volatile for sugar and for coffee, which together account for about half of Central America's export earnings from agriculture (see Table 7). The long-term outlook for the major agricultural exports is not bright. World Bank projections show a decline in the real (inflation-adjusted) prices for coffee and bananas during the 1980s (and beyond in the case of bananas), and only small upward trends for beef and cotton (see Graph I). Sugar prices are projected to rise faster in real terms from very low current levels, but not to reach the peaks attained in 1975 or 1980. The potential for increasing the volume of traditional exports will be constrained by the slow growth of world demand, disease and other production constraints, and/or competition from other countries.

Due to their narrow export base, Central American countries are vulnerable to erratic and undependable foreign exchange earnings from their principal source -- traditional agricultural exports. Table 7 shows that although the combination of crops varies from country to country, in each case the two principal agricultural exports account for between 35% and 72% of total export earnings; the regional average is 44%

Furthermore, the viability of the region's two most important agricultural export crops is menaced. Coffee pests (rust and bean borer) have sharply raised production costs and

reduced yields in recent years, eroding the industry's competitiveness. The banana industry is plagued by retrenchment of the major transnational companies in Central America, increasing competition from South America, continuing problems with cost effective control of the crop's main disease, Black Sigatoka, and the prospect of a long-term secular decline in world market prices.

The sector's performance as a net foreign exchange earner is also a function of food production. Regional per capita food production declined by 5% over the last decade creating pressure to increase food imports which rose from \$182 million in 1970 to \$823 million in 1981 (see Table 6). Among basic grains, corn imports rose most sharply, from 21,500 metric tons in 1970 to 314,270 metric tons in 1980 (see Table 8). Central American countries spent over \$62 million on corn imports in 1980.

2. Low Productivity of Land

With few easily exploitable, potentially productive agricultural frontier lands remaining, and with an annual population growth rate of almost 3%, future increases in agricultural production must be realized largely through greater productivity of the increasingly scarce and finite resource, land. Yield increases for coffee, cotton and sugarcane averaged only 1.6%, 1.0% and 0.6% per year, respectively, over the last decade (see Table 9). While basic grains have actually outperformed the traditional export crops in terms of

productivity gains, they started from a much lower productivity level and still have a long way to go to reach levels commensurate with their agronomic potential. While corn, the region's staple food, made steady productivity gains over the last two decades (28% and 27%), bean productivity stagnated in the seventies and rice and sorghum averaged annual productivity gains of less than 1% (see Table 9). While reasons for the low productivity of basic grains vary by country and commodity, in general the problem is attributable to:

- a. The low quality of production technology utilized (genetic potential, cultural practices, crop protection).

The genetic potential of basic grains (excluding rice) remains low despite some notable advances made in corn. Thanks to "Green Revolution" corn breeding successes in the sixties, yields of improved varieties nearly doubled those of traditional varieties in Central America. However, adoption of these high yielding varieties (HYV) was confined to relatively more favored ecological areas. Where problems of seasonal drought stress, high aluminum toxicity and other adverse conditions prevail, the more reliable, though low-yielding, traditional varieties are still grown. The case of El Salvador is illustrative; two-thirds of the national corn production is produced on lands sown to "Green Revolution," high-yielding varieties. Approximately an equal amount of land is planted in traditional corn varieties but yields are only half those

of the HYV and therefore these lands produce only one-third of the national crop. For beans, there have been no productivity increases in the last decade, indicating that there have been no significantly improved varieties available for adoption.

Similarly, yields have remained low for want of improved cultural practices. Seedbed preparation, plant spacing, mixed cropping patterns and weed control are but a few of the most important cultural practices which can increase productivity.

Not only do disease and pests reduce yields significantly, they also discourage the adoption of new crop varieties with high yielding potential. Plant breeding gains made in high yielding beans have had little impact in Central America because these new varieties are more susceptible to disease problems.

b. The low level of input use (fertilizer, herbicides, pesticides).

Input use levels have been restrained by rapidly rising input prices over the last decade. Dramatic price increases in petroleum have translated into major price increases in petroleum-based fertilizer and in other inputs which are energy intensive in their production and distribution requirements. In the last few years, input use levels have also suffered from low world prices of the major export crops. Coffee producers have reduced or

stopped fertilizing their trees, awaiting higher prices to make such expenditures profitable. Some cotton producers have shifted to basic grain production to avoid the high production costs associated with intensive input use. Macroeconomic crisis in some Central American countries has reduced input availability for want of foreign exchange to import the products or the intermediate goods required to fabricate them locally.

Whatever the cause, lower input use levels means lower productivity due to lower yields and higher field losses than would otherwise be the case.

c. Inadequate production incentives (prices, markets).

Export crop producers and basic grains farmers alike have been discouraged from increasing productivity. Weak world market coffee prices have not only depressed fertilizer use but have also discouraged shade tree pruning and spraying to control coffee rust and the coffee bean borer. The result has been falling coffee productivity in the last few years. Weak world market prices for cotton and sugar have also discouraged high input use levels required to maintain productivity.

With basic grains, the problem is more systemic. Government price policy is partially enforced by cheap food imports which hold down farm gate prices, especially of corn and beans. These prices tend to be erratic and low. The public sector frequently fails to encourage

greater productivity and production by failing to support prices at declared levels, by engaging in foreign exchange rationing that discriminates against imports of agricultural inputs, and by pursuing policies that limit private sector distribution of inputs and farm gate procurement of production.

A corollary to the productivity problem is the low intensity of land utilization relative to potential. About 10% of the land area in Central America (including Belize but excluding Panama) is in permanent pasture, extensive portions of which could yield much more meat, milk or higher value crops.

3. Natural Resource Degradation

With limited nonrenewable natural resources, the region is dependent upon its renewable resources to directly support the key productive sector activities of agriculture, forestry, energy generation and tourism, which together constitute about a quarter of the GDP and are extremely important to continued economic growth and development in the region. Land mismanagement is the single most important natural resource problem. High population densities in some areas of the region, combined with inequitable access to good land, have resulted in attempts to intensively cultivate steep hillsides and other vulnerable lands, thus threatening rapid and permanent degradation of the very resource base that provides the livelihood of a large percentage of the rural

poor. These forces are responsible for an alarming rate of deforestation; in the last 35 years 40% of the entire land base in the region has been deforested. Many of these lands have been placed in annual crops, for which they are unsuited, without utilizing cultivation practices and conservation measures to avoid erosion. The result is extensive and continuing soil loss, destruction of soil fertility, the appearance of localized desertification, excessive water losses, reduced stream and river flow in the dry season and accelerated siltation of reservoirs.

4. Unequal Income and Asset Distribution

Substantial inequalities in income and assets exist both among sectors and within agriculture. Rural incomes lag well behind those for urban populations. Within the agricultural sector, it is reasonable to infer extremely skewed income distribution even in the absence of good empirical data. Land, the scarce sectoral resource and the primary source of both wealth and income in rural areas, is distributed very unequally. Skewed land distribution is aggravated by the lack of land taxes and mortgage credit. There is little incentive for owners to use land to its economic potential, or to sell it to those who will. Consequently, much of the better valley lands are used for pasture, while steeper hillsides are cropped, leading to the deterioration described above. A separate paper prepared for the Commission identifies the three most important land tenure

problems as inequitable landholding patterns, insecure tenure arrangements, and rural landlessness or near-landlessness. Their implications for development and political stability are profound and serious.

5. Underemployment

The agricultural sector has a major role to play in creating employment opportunities. Presently 49% of all jobs are in the agricultural sector.

Rural underemployment is pervasive and serious, reaching levels of nearly 50% in some countries. With the population growing at nearly 3% annually, the sector has been unable to create new employment opportunities apace.

Principal causes of rural underemployment are:

a. One root cause is the skewed distribution of land holdings; between 40% and 80% of the farms have less than 12-1/2 acres to farm and a great number have less than five acres. These micro plots provide only a fraction of family income and produce much less than full-time employment for the family labor force. Even with supplemental off-farm income, many remain seriously underemployed.

b. More than 30% of the rural population has no access to agricultural land. They depend completely on employment for their income. Most are engaged as casual agricultural labor, seasonably employed with the operations of planting, cultivation and harvest. Between seasons, the landless are typically unemployed or underemployed.

c. Slow growth in agricultural production during the last decade (2.4% per year) translated into sluggish performance of the sector in providing new employment opportunities, on-farm and off-farm. The sector's backward linkages with the production and distribution of inputs and equipment and forward linkages with processing and marketing means that the sector's slow growth rate adversely affected the rate of employment creation in the industrial and service sectors as well.

d. Lack of alternative urban employment opportunities keeps a large segment of the rural population trapped in underemployment.

6. Nutritional Deprivation

Malnutrition continues to be a serious problem in Central America. In the northern tier countries of Guatemala, El Salvador and Honduras hunger is the problem; between 30% and 65% of all households consume fewer than the minimum daily caloric requirements. In the southern tier countries of Nicaragua, Costa Rica and Panama, where nutritional deprivation is less serious, the problem is deficiencies of specific nutrients.

Nutritional surveys indicate that all countries in the region, except Panama, experienced moderate or sustained improvements in caloric intake over the last 20 years. This achievement was realized in spite of the agriculture sector. Per capita food production actually fell by 5% in the last

decade. The net regional trade balance in basic grains deteriorated from a positive 10,000 metric tons in 1960 to a negative 400,000 metric tons in 1980 (see Table 8). Large increases in corn imports for food and feed in the last decade undoubtedly contributed to increased availability of the staple food and animal protein.

These nutritional problems have their roots in:

- a. Inadequate increases in food production.
- b. Inadequate income to purchase food.

E. Potential for Change

The solutions to these problems will not be easily achieved, nor quickly. One should not expect significant structural reform of either the production base or the tenure pattern nor major increases in agricultural output in less than five to ten years. The nature of agriculture and the limited options available to influence its course effectively in the near term require continued reliance on the production of traditional export and food crops with slowly improving technology, despite the poor market outlook for these commodities.

The Nature of Agriculture.

Central American agricultural production is the output of several hundred thousand individual farmers, each a private entrepreneur who combines technology, labor, capital, productive inputs, and management with land to produce one or more commodities, with the expectation of an economic return. Theirs is a risky business, where returns are affected by the

natural hazards of weather, insects and disease; by the uncertainty of markets where imperfect transaction information is commonly exacerbated by chicanery and limited ability to move products; and by the hazards of frequently erroneous policies which governments use in attempting to "direct" the efforts of the producers.

Each of these several hundred thousand farmers must make decisions about which commodities to produce, which technologies to use, and how much cost to bear on the basis of their individual perceptions of the market and service environment, the productive potential of their particular properties, and their individual willingness and capacity to acquire technology, bear costs, and accept risks. The diversity of perceptions and capacities leads to slow response to technological improvements and policy changes, and is one reason that annual agricultural growth rates in excess of 4% are difficult to sustained. The other is that Central American growth rates are restricted by effective demand in both external and internal markets; Central American farmers' ability to increase market share is limited by poor technology and inefficiencies in both production and marketing.

2. Limited Options.

Few policies and investments will provide clear incentives to encourage such a large group of farmers of diverse interests and capacities to increase output of a given commodity without discouraging the output of others. It is

even harder for such policies and investments to impact equitably on the many types of agricultural producers.

The principal options for action include:

a. Government Policies. Governments influence the structure of agriculture indirectly through policies and practices which stimulate or discourage investment in agriculture and related service, supply, marketing and processing industries. More directly, they may intervene by setting prices for products, productive inputs (fertilizer, agricultural chemicals), credit, or other services, through regulation, or through direct investment in the sector.

Most government policies, while well-intentioned, have been based on false premises and their impact has frequently been unfortunate. For example, because the cost of sustaining subsidized credit and inputs imposes unbearable financial burdens on governments, such subsidies usually result in reductions in the availability of resources. Price stabilization programs have benefited only those with access and influence, while they have prevented private investment in marketing.

Correction of these distortions will improve the terms of trade for agriculture and enable Central American agriculture and agribusiness to become more competitive.

b. Research and Development. Public and private investment in research and development (the latter

including technology transfer and the other services needed to transform research results into operating practices) is the only secure way for increasing agricultural productivity. Private R & D is particularly effective when there is a tangible benefit to be captured by the investor, e.g., for a commodity such as tobacco or coffee which is marketed by a single investor or association. Public R & D is essential where such capture is prevented by the diversity of outlets, e.g., corn or beans.

c. Services. Technology transfer, input supply (see below), credit, veterinary services, mechanization, harvesting, storage, transportation, and marketing are all services which must be acquired by the farmer. He may provide them himself or, more commonly, acquire them from private or public agents.

d. Productive Inputs. Productive inputs are seed, fertilizers, and agricultural chemicals (fungicides, insecticides, herbicides, etc.) and water. Seed and seed stock incorporate the genetic response to identified agricultural problems, e.g., high yield, disease and insect resistance, adaptability to soil and climatic types. The high yielding varieties of the Green Revolution, like most high yielding crops are responsive to fertilizers, which, being derived from petroleum, have become expensive. A significant share of the decline in

productivity of sugar, coffee, bananas, and other traditional export crops can be traced to a reduction in use of expensive inputs.

Irrigation is a highly productive input in association with seed and fertilizer as part of a technological package. It also reduces the risk of rainfed agriculture. Irrigation is expensive and must be associated with high yielding technology and valuable crops to repay its costs. Irrigation technology is well understood, but farmers must learn it if they are to benefit significantly.

e. Farm Access. Farm roads are essential to permit the transport of inputs and outputs, most of which are bulky and heavy. The benefits of such roads are most readily perceived when they connect to an economic structure of assembly points, tributary towns, and market towns.

Power and Mechanization. Farm power includes both animal and machine traction as well as electric or water power which multiply human effort. Such power may displace or enhance employment, depending upon its nature and application. Farm mechanization improves yields per unit of land when (1) it permits more timely planting or (2) it results in better seedbed preparation, greater precision in seed placement during planting, etc. Under such circumstances, power is not necessarily labor displacing; in fact it may generate additional jobs

associated with producing, marketing and processing the increased production. Farm power may also have significant production benefits when land is not scarce; then it may build morale by relieving drudgery, and increasing receptivity to change by permitting innovation.

II. Recommendations

A. A Strategic Approach

The strategy proposed herein seeks to address the fundamental problems of the sector by laying the basis for sustained economic growth with equity. It is a basic precept of this strategy that rural and, to a large extent, general, economic development in the region must be led by an increase in agricultural productivity of small, commercially-oriented, farmers. In Central America this strategic approach gives rise to four broad program recommendations which, taken together, promise to ameliorate significantly the six underlying problems set forth above. These programs are:

- (1) Export Crop Diversification
- (2) Increased Basic Grains Production
- (3) Improved Land Use
- (4) Improved Access to Land

None of these programs will "solve" all of the problems-- the sector is too broad and complex a system for quick fixes. However, if all four are pursued steadfastly across the spectrum of producers with adequate resources, together they will make a significant impact (Exhibit A).

Exhibit A

Relationships Between Sectoral Problems
and Program Recommendations

<u>Sectoral Problems</u>	<u>Program Recommendations</u>			
	<u>(1) Export Crop Diversification</u>	<u>(2) Basic Grains Promotion</u>	<u>(3) Land Use Management</u>	<u>(4) Improved Access</u>
(1) Reduced Foreign Exchange Availability	X	X		
(2) Low Productivity of Land	X	X	X	X
(3) Degradation of Natural Resources		X	X	X
(4) Inadequate Access to Resources				X
(5) Underemployment	X	X		X
(6) Nutritional Deprivation	X	X	X	X

B. Recommended Programs

Recommended Program 1: Export Crop Diversification

a. Objectives

Diversification of production for export of new crops is expected to:

(1) Reduce the risks of dependency on a narrow and declining export base, while expanding and helping to stabilize foreign exchange earnings.

(2) Improve and intensify land utilization, particularly in the four ecological zones described below.

(3) Generate new job opportunities arising from the labor-intensive production patterns characteristic of many nontraditional crops and from agroindustrial processing, handling and marketing.

(4) Improve income distribution by promoting crops and farming patterns that involve small farmers.

b. Proposed Activities

The benefits of diversification should provide opportunities for both small and large producers and provide a tool for converting near-subsistence farmers to commercial farmers who respond to market incentives. Opportunities for export crop diversification exist in four major ecological zones:

* Low Humid Tropics on the Atlantic Coast: Soil and drainage problems in this zone have restricted its use to plantation tree crops such as banana and oil palm,

and tolerant tree crops such as cacao and plantain. There is still considerable opportunity for developing the latter three crops for export. The area could also be further developed for production of rice, pineapple, and other tropical fruits.

* Temperate Highlands: Fairly extensive, densely populated uplands are found primarily in Guatemala and Costa Rica, but small, marginally temperate sites exist in all Central American countries. The potential for temperate fruit, vegetable, ornamental plants and flower production is only partially realized in Guatemala, with production of all of these crops. The relatively limited area of temperate land in the region assures a significant domestic market for produce of less than export quality.

* Low Tropic Foothills, Primarily on the Pacific Slopes: These are the areas where robusta coffees are grown. Central America's competitiveness in the robusta market has been eroded by the recent outbreaks of rust and continuing problems with bean borer, both of which require expensive chemical treatment. These lands might better be used to produce rubber, subtropical fruits such as mangos, guava, mamey and guanabana and essential oils such as citronella and lemongrass.

Underutilized Arable Lands, along the Pacific Coast and the Intermountain Valleys: Much of this better land is held by large landowners who use it for extensive grazing. Improving pasture composition and management would increase beef for export or reduce the need for some milk imports. Depending on location, a wide variety of field crops can be grown profitably on such lands, including cotton, annual oilseeds such as soybeans, sunflower, safflower and sesame, coarse grains (sorghum and corn) and, at higher elevations, cereals (wheat and barley) and potatoes.

(1) Marketing:

Diversification is a theoretical proposition as long as marketing opportunities remain unidentified. Diversification must be market-led, which requires great commodity-specific expertise regarding type, grade, form, price, quantity, seasonality, and other factors. The U.S. represents the nearest and largest potential market in many instances, and the Caribbean Basin Initiative has removed some of the restrictions on entering that market. Whether that entry will benefit Central America depends on how quickly Central American producers and assemblers acquire the necessary market knowledge. This is not an automatic process. American and transnational firms with large

and diverse markets should be consulted and commercially involved. Central American producers, assemblers and processors must be linked to counterparts on the receiving end.

(2) Research/Extension:

Diversification does not start tabula rasa; the adaptability of many crops, from macadamia nuts and lemongrass to rubber, oil palm and quinine, is known from pilot plantings throughout the region. However, very little accurate data is available about yields, cultural methods, varietal performance and seasonality of these crops. Still less is known about the viability of some of these crops in the low humid tropics. Current knowledge will permit expanded production of some diversified crops, but diversification of extensive areas to these and other crops will require a long-term commitment to research (10 years and beyond) to identify viable commodities and their ecological and cultural requirements, and to select appropriate varieties, soil and water management systems, crop protection technologies and farming practices compatible with existing social and economic realities. Nontraditional research and extension models, possibly organized along commodity lines and drawing upon the experience of the traditional export commodities groups, must be developed.

Historically, most research on traditional export crops has been financed by companies or commodity groups organized to promote production, processing and marketing. This is particularly true of coffee, bananas, and tobacco, and to a lesser extent, of sugar and cotton. The limited public research on these crops has been decidedly subsidiary to that of the private commodity groups. This private research capability was developed over a long period of time and can be expected to continue as long as the investors can maintain a proprietary interest and receive an appropriate benefit. A major question is how to design publicly sponsored research which develops feasibility information that can be expanded and commercialized by private research.

(3) Agroindustry:

The assembly of produce from many small producers and maintaining quality control and meeting appropriate packaging, handling, and shipping requirements is one of the most difficult aspects of diversification. Initial volumes are frequently too limited to interest international dealers or to support an association. These risks are best taken by the private sector in anticipation of a reward; direct government intervention tends to delay private participation. However, some assistance and

encouragement must be provided if businessmen are to find the risks attractive. Moreover, in Central America, the accumulation of uncertainty may exaggerate the appearance of risk, because of deficient knowledge. Businessmen must be provided with better information.

(4) Vertical Integration:

Agroindustry frequently finds that the establishment of a plant to process a product is the easiest part of a process that may require research and extension with contracted producers, transportation of the product from the farm, grading the product and disposing of unacceptable grades, packing or otherwise processing the plant's intended product, and arranging for its sale and international transport. The totally integrated production/assembly/grading/ shipping/ distribution/sales process put together by the banana companies is an example of the kind of coordination which is required to develop, produce and market a new product.

(5) Investment Environment:

Political stability and economic stabilization are the most basic requirements for major investments in crop diversification by nationals and foreigners alike. Policies affecting access to capital and

foreign exchange, business regulations, and other determinants of investment risk will all have to be harnessed to serve the goal of diversification. Notwithstanding the current difficulties posed by these requirements, research can and should commence now, in order to provide the information required to permit this long term transformation to proceed as the investment environment improves.

Recommended Program 2: Increased Basic Grains Production

a. Objectives

Increased basic grains production is expected to:

(1) Increase farm income and improve income distribution, as many small farmers will have only limited opportunities to diversify and will continue to be the principal producers of basic grains.

(2) Improve the nutritional status of both urban and rural populations, particularly the calorie-deficient populations of Guatemala, El Salvador and Honduras, and increase protein consumption directly through higher bean production and indirectly through greater animal protein production made possible by higher feed grain output.

(3) Provide more employment opportunities for both underemployed small-farm families and the rural landless, as labor requirements increase for land improvements, soil preparation, planting, cultivation, harvesting, and the marketing or processing of the increased volume of basic grains.

(4) Improve land use, as appropriate farming systems and land management systems are developed and adapted and more marginal lands revert to forest or are shifted into tree and cover crops.

b. Proposed Activities

(1) Research and Extension:

Significant and sustained productivity increases can come about only through sustained, effective research and

extension. Efforts are unlikely to have a perceptible impact on production and productivity in less than five years and a permanent effort will be necessary to sustain increases and continue to generate new gains. Historically, the central mandate of public sector research and extension services in the region has been basic grains. While investments in agricultural research and extension have been neither commendable nor unusually low relative to other developing countries, the performance of national systems is far from adequate given the needs (see table 10). A just-completed assessment of four of the six countries in the region found the research systems plagued by a set of financial, organizational and management problems. As a result little effective research is conducted, and external resources such as the International Agricultural Research Centers (IARCs) and U.S. expertise are very underutilized relative to their potential contributions.

Public sector extension programs are in even worse shape, frequently immobilized, demoralized and ineffectual in discharging their duties of disseminating research results to farmers. Given these deficiencies, the gap between potential and actual productivity and production is large. Institutional and organizational reform and innovation, secure and stable financial support, improved linkages with the IARCs and better utilization of existing regional resources such as CATIE (the regional research entity with its central station at Turrialba, Costa Rica), all are necessary measures to increase food production. The private sector (e.g., input

suppliers, private voluntary organizations) can and should be encouraged to play a larger role in extension. Bold experiments in private and mixed public-private sector models for conducting, managing and financing basic grains research and extension should be tried.

(2) Policy Reforms:

Price policies should be promoted which encourage increased production. This may include the establishment of an effective floor price for producers that encourages input use and puts additional acreage into basic grains production. Policy execution will be as important as formulation. In the past, procurement prices have not been honored because farmers offered to sell more than government could buy and/or store. Policies should encourage active private sector participation in procurement, storage and marketing of grains by allowing adequate seasonal and spatial marketing margins.

Credit policies also have an important role to play in promoting basic grains production. Interest rates need to be set high enough to mobilize savings and cover operating costs of the banks. Policies of the past have frequently resulted in decapitalizing public sector agricultural development banks intended to serve small farmers with the result that real resources available for small farmer lending have diminished over time and frequently have been diverted to large farmers where the subsidized credit can not be justified on either production or equity grounds. Lending

policies have frequently tied credit to the physical provision of fertilizer and other inputs with the result that these inputs have arrived late or not at all. Such credit policies require revision, freeing public sector agricultural banks to perform their intended function -- mobilizing adequate resources to lend to small farmers and recover the same without engaging in input distribution or procurement of basic grains production. Private banks should also be encouraged, via interest rate and other policies, to also serve basic grains farmers.

Intra-regional trade in basic grains should be encouraged by reducing trade barriers, thus permitting Central American production to be substituted for extra-regional imports.

(3) Marketing.

Improved marketing facilities, private as well as public, and improved marketing effectiveness in terms of grades, standards, marketing margins, and other characteristics will be necessary to translate improved policies into actual production incentives for farmers.

(4) Credit and Inputs.

Domestic financial institutions will have to develop the capability to mobilize significantly increased savings and make them available through much more effective procedures for retailing and recovering small farmer production credit. Improved efficiencies and extended coverage in the distribution of agricultural inputs to small farmers will have to be realized. Private sector channels for distributing inputs should be encouraged.

Recommended Program 3: Improved Land Use Management

a. Objectives:

Improvements in land use management will contribute to:

(1) Preservation of the natural resource base that directly supports productive activities accounting for about a quarter of the GDP.

(2) Rationalization of land use by promoting utilization patterns consistent with physical potential and long-term preservation, e.g. forestry, pasture, permanent cover crops and seasonal crops.

(3) Increased long-term economic returns associated with more efficient exploitation of land and water systems.

b. Proposed Activities:

(1) Improve Technology.

Research and the attendant extension, marketing, and input supply services which promote the adoption of appropriate technologies will have a long-term salutary effect.

Environmentally-sound production systems for high-value, non-traditional crops will provide an alternative to destructive basic grains cultivation on vulnerable soils. Research on watershed management, management systems for less-favored natural resource areas and agroforestry systems promises to develop alternatives to the destructive traditional cultivation practices of slash-and-burn agriculture. Such research is a long-term proposition with measurable impact unlikely in less than five to seven years.

Development and adoption of cost-effective soil and water conservation practices and structures by hillside farmers will slow environmental degradation while the development process moves forward, ultimately absorbing marginal farmers into more lucrative urban employment. Improvements in pasture management can relax the pressure on forests as sources of fodder while more compatible forestry-livestock farming systems are developed and adopted. Protection of environments containing endangered species must be undertaken to maintain the genetic diversity required for future research and breeding.

(2) Improved Forestry.

Improved forest management, harvesting and replanting practices must be promoted through appropriate policies and encouraged with necessary regulation. Forest industries must be encouraged which create markets for forestry products, thus providing incentives for farmers to divert marginal lands to more ecologically sound tree crops.

(3) Regulation and Policy.

Public policy on such matters as research priorities, manpower training, land use zoning and land tenure will significantly effect the quality of land management in future years. The capability to regulate and enforce laws intended to protect forests, crucial watersheds, unique ecozones, and fragile shorelines must be developed and sustained.

Recommended Program 4: Improved Access to Land

a. Objectives:

Over the long run, improved access to land can be expected to:

- (1) Increase land productivity;
- (2) Expand and alter the composition of agricultural production;
- (3) Provide incentives for more rational land use, conservation of environmentally vulnerable lands, investment in conservation structures and land improvements and a shift to more ecologically sound tree and cover crops;
- (4) Improve incomes and income distribution with a resultant increase in aggregate domestic demand, while reducing unemployment and underemployment;
- (5) Improve the nutritional status of beneficiaries and, indirectly, of other people by increased food supply, lower food prices, and increased income.

b. Options:

A separate paper (Land-Related Problems: Central America) deals with the subject in some detail. That paper identifies three separate problems -- concentration of landholdings, insecurity of tenure arrangements, and rural landlessness and near landlessness. There are a number of options available for dealing with each of these problems. The selection of any option depends upon country-specific political, economic and tenure conditions. The generic alternatives available to countries include:

(1) Problems of concentration of land ownership may be dealt with through development of effective land markets with credit and titling services, by applying progressive taxes to agricultural land, or through traditional redistributive land reform programs. The latter typically establish a legal ceiling on acreage and redistribute lands in excess of that ceiling. (El Salvador's and Nicaragua's reforms are current examples.)

(2) Options for dealing with the problem of insecurity of tenure arrangements include:

(a) Land-to-the-tiller reforms that convert renters and sharecroppers to owners of the parcels they have been cultivating. (Phase III of El Salvador's land reform is of this type.)

(b) Titling the usufruct rights of squatters on public or private land. (Costa Rica and Honduras are presently conducting such titling programs.)

(c) Providing legal guarantees and specific leaseholding provisions which protect the rights of renters and sharecroppers. (These have seldom been effective in the Central American environment.)

(3) Options for dealing with the problem of landlessness are more difficult, since the beneficiaries lack even usufruct rights. The most commonly applied options are the following:

(a) Redistributive reforms to provide the landless with land under various tenure arrangements, including group farming and individual, family-size, owner-operated plots.

(Honduras' asentamiento program was based on this model.) Fragmentation induced by population pressure and reconsolidation of reform parcels by larger farmers are two strong forces that tend to limit the permanent value of distributing small, family farm size plots. Nevertheless, its short and medium term production and political benefits should not be dismissed.

(b) Colonization and land settlement programs are unlikely to offer a viable, cost-effective alternative for the landless, except on a limited scale and over long time periods. (Guatemala, Honduras, and Costa Rica have all tried colonization programs.) The high costs of providing the infrastructure and services which such programs require are beyond the financial capacity of Central American countries.

(c) Employment generation strategies which create significant numbers of additional rural and urban jobs through private investment offer the best long-term hope for the rural landless.

ANNEX A

Current Sector Activities

A. General Focus of Activities

To alleviate constraints and facilitate the rural development process, donors and host countries are supporting activities in the broad, cross-cutting areas of policy improvements, institutional development, technology generation and transmittal, private sector promotion and rationalized resource use. Within these broad areas, assistance is being provided to improve or expand host-country activities in sector planning, organization and administration, both public and private; agricultural research and extension; crop diversification and agro-industry; credit; marketing; rural infrastructure; education and training; natural resource use and conservation; and agrarian reform.

B. Policy Improvement

1. Sector Analysis, Planning, Organization and Administration

A long-term effort of support to agricultural sector planning units, to build their capacity to collect and analyze data, determine priorities (policy analysis) allocate resources, and in general improve sector organization and administration continues to be a major activity in the region. One of the major foci is on improved data collection and analysis. Support is being given to establish and utilize statistical sampling procedures and information management systems in all Central

American countries. Donor projects provide technical assistance, training, commodities and funding for operational costs. Additional activities seek improvement in the organization and administration of other sectoral institutions which help determine or implement policy, such as research and extension agencies, agricultural credit banks, marketing agencies and private farmer organizations such as cooperatives and credit unions.

2. Policy Dialogue and Focus

Short-run efforts to improve policy consist primarily of leveraged policy dialogues carried out in conjunction with the negotiation of the terms and conditions for the granting of development assistance, balance-of-payments support and food aid. To the extent possible, donors support each other in these efforts. AID, the World Bank and the Inter-American Development Bank (IDB) are collaboratively seeking agricultural credit policy changes which will lead to positive real interest rates (net over inflation) for agricultural credit and thereby encourage mobilization of local savings, improve recoveries of loans, and reduce decapitalization of credit institutions. In addition, changes are being sought in other policies which limit the access of small farmers to credit, such as policies related to collateral requirements and processing of loan applications. Other major areas of focus are policies related to pricing of basic grains and other staple products; fiscal

management, including revenue generation and budget allocations; natural resource use and conservation; public sector personnel policy; divestiture of government-owned processing, manufacturing and marketing operations; and the production and export of non-traditional agricultural production.

C. Crop Diversification and Agro-industry

Efforts to encourage diversification into higher value, labor-intensive export crops are being initiated with donor support. Marketing and processing problems are the major constraints, along with inadequate production technology. Activities to alleviate the marketing and processing constraints include donor-supported feasibility studies and financing (credit) for private sector investment in marketing and processing. The IDB has several active loans in Central America to finance agro-industry. Studies to identify non-traditional crops which can be produced efficiently in Central America, and for which long-run economic prospects are particularly favorable, are also being financed by donors. Current efforts to promote diversification include AID assistance in Guatemala, Honduras and Costa Rica to establish an institutional capacity for development and transmittal of diversified crop technology.

D. Agricultural Research and Technology Transfer

The bulk of donor assistance to support the development, adaptation and dissemination of improved technologies is

provided through activities to build the public sector's institutional capacity to carry out these processes. However, considerable assistance is also being provided to develop private sector farmer cooperatives and other types of farmer associations, to facilitate the dissemination of technologies to their members as well as the provision of credit and other inputs required by the new technologies. In addition, the use of other private sector initiatives for these purposes is being investigated, particularly in the area of technology transfer. For example, in many of the Central American countries, AID is providing support to PVOs to augment their capacity to train farmers in the use of new inputs and methods of production. On a regional basis, donors are supporting the Tropical Agricultural Research and Teaching Center (CATIE) in Costa Rica.

As indicated above, the primary objective of donor assistance in this area is to improve the institutional capacity to carry out research and technology transfer activities in an effective and efficient manner. However, in the process a second objective--the actual development and adaptation of new technologies to local conditions, and their transfer to farmers--is also achieved. A third objective of country initiatives and donor assistance is to improve linkages between host country technology development and transfer agencies, as well as between these agencies and other international research centers and U.S. universities.

Basic grains have been and continue to be the primary focus of research and extension activities. However, new initiatives have begun in such areas as diversified crops (for both temperate and tropical climates), forestry and other national resources, and light-capital/labor-intensive technologies. In addition, assistance is being provided to support the transfer of intensified coffee production techniques to help small producers control coffee rust disease, which was recently introduced into the region. Central American countries are also beneficiaries of projects to facilitate technology transfer for livestock production.

AID assistance is provided primarily to finance technical assistance and training, along with some minor facilities, equipment, vehicles and other functional costs. The World Bank and the IDB have been relied upon to finance major facilities and other infrastructure requirements related to research and extension. The FAO, Canada and other donor countries also provide technical assistance and financial support for research and extension activities.

E. Access to Resources and Influence^{1/}

A major focus of assistance in this area is the development of appropriate institutions (public and private) through which small producers can gain access to productive resources and markets, as well as to exert their influence on the decision-making processes which affect their well-being.

^{1/} Access to land is treated separately in the AID briefing paper titled "Land-Related Problems: Central America."

Public agricultural development banks have been the principal target of this assistance, primarily in the form of technical assistance and training to improve their organization, administration and management. Where appropriate, changes in credit policies and lending procedures are also sought. Assistance to cooperatives, credit unions and other farmer organizations is provided to increase their capacity to channel productive resources (e.g., credit and input supplies) to the farmers and facilitate the marketing of their production. These organizations have also been effective in allowing small producers to have some influence on the allocation of resources and policy decisions. Private banks and other financial institutions are also being strengthened to improve their capacity to service small producers. Public agencies responsible for rural infrastructure, such as access roads, irrigation facilities, electricity, and market facilities are emphasized in government programs and are also recipients of donor assistance.

1. Credit

Institutional strengthening and policy improvement have been the primary objectives in the area of credit. However, assistance for this purpose has been accompanied by considerable financing to provide funds for sub-lending in the following major categories: crop and livestock production credit, including diversified crops; farm improvements, including

irrigation and soil conservation infrastructure; cooperative marketing facilities; and agro-industrial investments. The IDB, the World Bank and AID are the major sources of external financing for sub-lending activities.

2. Markets

Assistance to improve small producers' access to markets in the form of policy improvements, institutional strengthening, and credit financing have been mentioned above. In addition, assistance is being provided to: (1) carry out feasibility studies for the export marketing of non-traditional crops, (2) promote increased private sector participation in processing, storage and distribution, and (3) reduce intra-regional and interregional trade barriers.

3. Rural Infrastructure

The lack of all-weather roads to provide access to essential production resources, markets, education and health facilities, and other services continues to be a major constraint in Central American countries. Therefore, donors, including AID, continue to provide support for road construction and upgrading, particularly as part of programs of land settlement and agrarian reform or where access roads are the primary constraint to an integrated approach to the development of a region. Where appropriate, labor-intensive construction methods that maximize employment are encouraged. Other types of rural infrastructure include municipal markets, grain storage

facilities, slaughterhouses and distribution systems for rural electrification. Small-scale irrigation systems and soil conservation structures have been demonstrated to be very appropriate technologies for improving productivity. Funding is being significantly increased for these activities, particularly in Guatemala and Honduras. Again, the IDB and the World Bank, followed by AID, are the major sources of external financing.

F. Education and Training

Participant and In-Service Training

The training of personnel of agricultural sector institutions continues to be a major focus of assistance and is the principal means of strengthening institutional capacity. Most bilaterally-funded projects include financing for participant training, both long-term academic training and short-term specialty training. The bulk of participant training is provided through U.S. institutions, principally universities. However, due to language barriers, this training is performed frequently in Mexico and other Latin American countries and occasionally in host country institutions. In addition to participant training, assistance activities include support for in-service or on-the-job training. This training is provided in-country in the form of short courses and seminars conducted by host country professionals, expatriate advisors or a combination of both. Also, local technicians receive on-the-job training from expatriate advisors during the course of project implementation.

2. Institution Building

Due to political constraints and a strong sense of nationalism in Central American universities, the opportunities for support to strengthen local agricultural training programs at the university level have been extremely limited. However, the Honduran AID mission is presently providing support for the upgrading of the Agricultural University and the secondary-level National Agricultural School. CATIE, which provides graduate training in tropical agriculture, is also receiving donor support. The Pan-American Agricultural School in Honduras, which provides three years of training at the junior college level, receives substantial amounts of AID assistance as well as support from other donors. Finally, many donors are funding programs to support private and voluntary organizations (PVOs) which provide considerable training for para-professionals at the community level.

G. Environment/Natural Resources

The largest donor of assistance for environmental and natural resource activities in the region is AID. This is a relatively new sector and the United States is recognized as the unchallenged leader. Other donors simply do not have the same capability to work extensively in the sector.

The current AID portfolio for Central America is almost \$60 million. The bulk of this funding is concentrated in projects in Honduras, Costa Rica, Panama and those monitored by AID's Regional Office for Central America and Panama (ROCAP) These

projects are varied and include activities in watershed management, soil conservation, forest management, conservation of natural areas, support to indigenous environmental private voluntary organizations, sector assessments and integrated pest management.

Other donors are placing their money primarily in forest production projects. These donors include the Inter-American Development Bank (IDB), the World Bank (IBRD), the Food and Agriculture Organization (FAO), Canada (CIDA), the FRG (GTZ), Switzerland, the U.K. and a few private donors.

The Organization of American States funds regional planning activities which include some aspects of environmental management.

K. PL 480 Food Assistance

Food assistance under PL 480 is being provided to all of the Central American countries except Belize. Maternal and child nutrition programs for those living at or below the subsistence level are receiving the bulk of Title II food donations region-wide. In addition, Title II donations are being provided for feeding displaced persons and earthquake and flood victims in El Salvador.

Title I and Title III concessional sales are being utilized to provide balance-of-payments relief for the importation of essential foods, to support development programs, and to encourage agricultural sector reforms. This food aid is being used to encourage and support agrarian reform in El Salvador and

reform of the government basic grain marketing program in Honduras. Guatemala and Costa Rica are also using food aid to assist in agricultural sector reforms. Local currency generations are used to support development programs such as: (1) small farmer credit and reforestation in Guatemala; (2) small-scale irrigation and agriculture diversification in Honduras; (3) rural public sector employment generation in El Salvador; and (4) self-help programs to generate employment in several of the Central American countries.

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Average Yields for Principal Export Crops Grown in Central America, 1959-61, 1969-71, 1979-81
(Kg./Ha.)

	Coffee			Sugar Cane			Cotton		
	1959-61	1969-71	1979-81	1959-61	1969-71	1979-81	1959-61	1969-71	1979-81
Costa Rica	NA	900	1300	NA	55900	53200	NA	1600	1500
El Salvador	NA	1100	900	NA	53200	73400	NA	2400	2100
Guatemala	NA	500	600	NA	71700	68900	NA	2500	3900
Honduras	NA	400	600	NA	27800	33700	NA	2100	2200
Nicaragua	NA	500	600	NA	58100	72600	NA	2100	2000
Panama	NA	200	200	NA	68600	54200	NA	NA	NA
Average for Central America	NA	600	700	NA	55900	59300	NA	2100	2300
U.S.	NA	1300	1000	NA	89800	84200	NA	1300	1500
Developing Country Average	NA	500	500	NA	50900	53700	NA	900	1000
Developed Country Average	NA	1300	1000	NA	81400	79900	NA	1800	2100

Source: FAO Production Yearbook, 1961, 1972, 1981.

NA Not Available

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Table 2

Average Yields for Principal Domestic Food Crops Grown in Central America, 1959-61, 1969-71, and 1979-81
(Kg./Ha.)

	Corn			Beans			Rice			Sorghum		
	1959-61	1969-71	1979-81	1959-61	1969-71	1979-81	1959-61	1969-71	1979-81	1959-61	1969-71	1979-81
Costa Rica	NA	1100	1600	400	400	500	1100	2000	2700	NA	1600	2100
El Salvador	900	1700	1900	500	800	800	1800	3000	3800	900	1200	1200
Guatemala	800	1100	1500	600	700	700	1300	2200	3000	NA	900	1500
Honduras	800	1000	1000	400	500	500	1700	1300	1700	800	1300	700
Nicaragua	800	900	1100	600	900	800	1500	3000	2100	800	1000	1200
Panama	900	900	1000	300	300	300	1200	1400	1800	NA	NA	NA
Average for Central America	800	1100	1400	500	600	600	1400	2300	2500	800	1200	1300
U.S.	3300	5200	6500	1300	1400	1600	3700	5100	5200	2300	3300	3600
Developing Country Average	NA	1500	1900	NA	500	500	NA	2200	NA	NA	800	1100
Developed Country Average	NA	4000	5300	NA	600	1000	NA	5200	5200	NA	3100	3300

Source: FAO Production Yearbook, 1961, 1962, 1981.

NA Not Available

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Table 3

Role of the Agricultural Sector
in the Central American Economy, 1960 and 1981

<u>Contribution of the Agricultural Sector</u>	<u>1960</u>	<u>1981</u>
% of GNP	29%	23%
Employment	63%	49%
Foreign Exchange Earnings	95%	68%
Per Capita Trade Balance	+\$28	+\$122 <u>1/</u>

Source: FAO, Trade Yearbook, 1981 and

1/ Three-year average, 1979-1981.

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TABLE 4-A

Indices of Total Agricultural Production,
by Country, for 1959-61, 1969-71, 1979-81
(1959-61 = 100)

	<u>1959-61</u>	<u>1969-71</u>	<u>1979-81</u>
Costa Rica	100	149	201
El Salvador	100	147	178
Guatemala	100	156	227
Honduras	100	147	199
Nicaragua	100	179	182
Panama	100	169	214
Central American Average (unweighted)	100	156	198

Source: USDA

TABLE 4 B

Indices of Per Capita Agricultural Production,
by Country, 1959-61, 1969-71, 1979-81
(1959-61 = 100)

	<u>1959-61</u>	<u>1969-71</u>	<u>1979-81</u>
Costa Rica	100	108	113
El Salvador	100	103	93
Guatemala	100	118	129
Honduras	100	108	105
Nicaragua	100	135	100
Panama	100	128	119
Central American Average (unweighted)	100	115	109

Source: USDA

TABLE 5 A

Indices of Food Production, by Country, for
1959-61, 1969-71, 1979-81
(1959-61 = 100)

	<u>1959-61</u>	<u>1969-71</u>	<u>1979-81</u>
Costa Rica	100	156	211
El Salvador	100	149	204
Guatemala	100	164	231
Honduras	100	143	176
Nicaragua	100	172	179
Panama	100	172	217
Central American Average (unweighted)	100	159	203

Source: USDA

TABLE 5 B

Indices of Per Capita Food Production, by
Country, for 1959-61, 1969-71, 1979-81
(1959-61 = 100)

	<u>1959-61</u>	<u>1969-71</u>	<u>1979-81</u>
Costa Rica	100	112	118
El Salvador	100	104	105
Guatemala	100	123	132
Honduras	100	104	93
Nicaragua	100	132	99
Panama	100	132	122
Central American Average (unweighted)	100	116	110

Source: USDA

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Table 6

Agricultural Trade, 1970 and 1976-1981 1/

A. Million of Current U.S. Dollars

	1970	1976	1977	1978	1979	1980	1981
Exports	889	2313	3306	3210	3661	3550	3213
Imports	182	387	432	572	744	880	823
Trade Balance	707	1926	2869	2638	2917	2770	2390

B. Million of Constant (1981) U.S. Dollars 2/

Exports	1900	3423	4622	4182	4398	4023	3213
Imports	389	573	604	745	894	970	823
Trade Balance	1511	2850	4018	3437	3504	3053	2390

Source: FAO, Trade Yearbook 1975 and 1981.

1/ Central America, Panama and Belize; excludes forestry and fisheries.

2/ Current dollars deflated by the implicit price deflator for the U.S. GNP.

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Table 7

Relative Importance Among Traditional Agricultural Exports, 1980
(% of total export earnings)

	Coffee	Bananas	Cotton	Sugar	Beef	Total Traditional Agricultural Exports	Top two Traditional Exports as a % of Exports	Other Agricultural Exports	Non- Agricultural
Costa Rica	24	22	0	4	7	57	<u>46</u>	9	34
El Salvador	64	0	8	1	0	73	<u>72</u>	5	22
Guatemala	29	3	11	4	2	49	<u>40</u>	13	38
Honduras	25	28	2	3	7	65	<u>53</u>	11	24
Nicaragua	37	2	7	4	13	63	<u>50</u>	8	29
Panama	3	17	0	18	1	39	<u>35</u>	8	53
Weighted Average	33	11	6	4	4	58	<u>44</u>	10	32

Sources: IMF, Direction of Trade Statistics Yearbook, 1983
FAO, Trade Yearbook, 1981

Table 8

Net Regional Trade Balance for Basic Grains, 1960, 1970, 1980 1/

(100 metric tons)

<u>Commodity/Year</u>	<u>1960</u>	<u>1970</u>	<u>1980</u>
Corn	6,400	- 21,500	-314,270
Rice	300	- 3,300	- 39,250
Sorghum	300	- 3,600	- 25,935
Beans	3,800	-281,800	- 28,400
Total	10,800	-309,200	-407,855

Source: FAO Trade Yearbook 1961, 1971, 1981.

Figures are aggregates of national trade balances irrespective of source (intra-regional or external to the region).

Table 9

Indicies of Agricultural Productivity, 1959-61, 1969-71, and 1979-81 1/
(yields per hectare; 1969-71 = 100)

	<u>1959-61</u>	<u>1969-71</u>	<u>1979-81</u>
<u>Export Crops</u>			
Coffee		100	116
Cotton		100	110
Sugar Cane		100	106
<u>Basic Grains</u>			
Corn	72	100	127
Beans	83	100	100
Rice	61	100	109
Sorghum	67	100	109

Source: Derived from data found in the FAO Production Yearbook, 1961, 1962, 1981.

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Agricultural Research Intensity, 1980

	Agricultural Research Expenditures as % of Agricultural GDP (%)	Agricultural Research Expenditures per 1000 ha. Agricultural Land (U.S. \$)	Agricultural Research Expenditures per 1000 Agricultural Workers (U.S. \$)
(Simple Means)			
Central America	0.27	1,003	4,401
Latin America	0.48	728	4,978
Asia	0.32	889	872
Near East	0.60	1,906	5,827
U.S.	2.10	3,193	368,961

Table 10-B

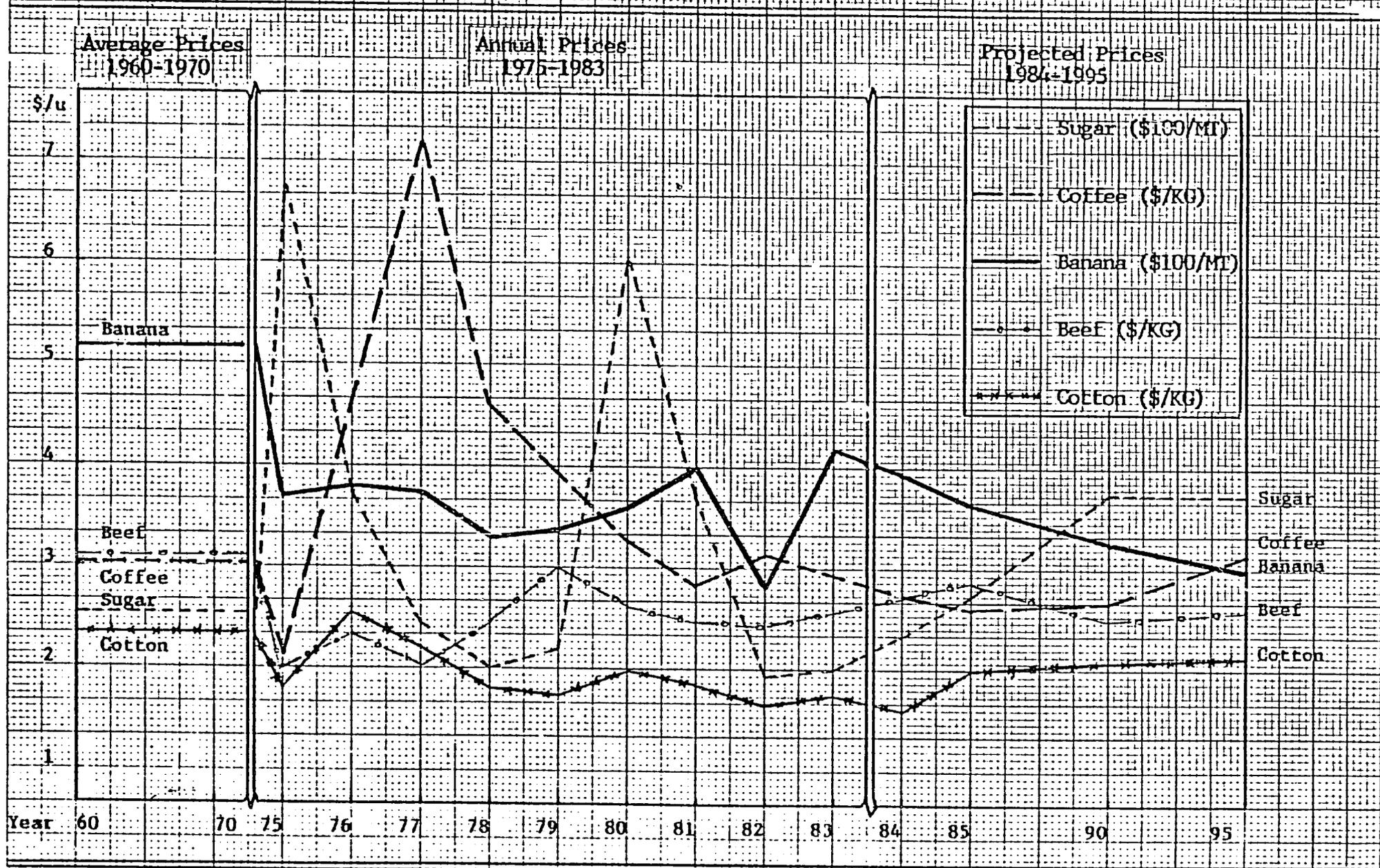
Agricultural Research Intensity, 1980

	Ag. Research Scientists per 1000 ha. ag. Land	Ag. Research Scientists per 1000 ag. Workers	Extension Staff per 1000 ha. ag. Land	Extension Staff per 1000 ag. Workers
(Simple Means)				
Central America	0.04	0.18	.16	.62
Latin America	0.03	0.19	.03	.536
Asia	0.09	0.08	.724	.843
Near East	0.19	.35	.242	1.395
U.S.	.026	3.05	.063	7.29

Source: Indicators of Agriculture in AID Assisted Countries. AID/DIU. 1982.

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Graph I - Average, Annual, and Projected Prices for Traditional Export Commodities, 1960-1995, in Constant 1981 Dollars



Source: World Bank, Economic Analysis & Projections Dept., Commodities & Export Projections Division.