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**AN ASSESSMENT OF THE
AGRICULTURAL SECTOR
IN COSTA RICA**

UNITED STATES AID MISSION TO COSTA RICA

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SUMMARY OF AGRICULTURAL SECTOR ASSESSMENT

A. Introduction

AID programs and projects in agriculture in Costa Rica have not been based upon Agricultural Assessments. The 1970 and 1974 Agricultural Sector Loans were analytically based upon a series of individual studies covering the areas of crop priorities, marketing, provision of agricultural services, credit, agricultural education, cooperatives and land tenure.

This is USAID/Costa Rica's first Agricultural Sector Assessment. The views expressed herein, and the AID/Washington reaction to them, will be incorporated in the Development Assistance Program (DAP) document to be revised in May 1977.

B. Purpose, Methodology and Contributors

The Agricultural Sector Assessment was prepared by USAID/Costa Rica for purposes of meeting program analytic requirements and as a program and strategy document useful to the GOCR, especially the Office of Agricultural Sector Planning of the Ministry of Agriculture and Livestock.

The Assessment contains four Sections. Section I presents an overview of the Costa Rican economy and a macro-economic analysis of the Agricultural Sector. Section II contains a description of the target group, including resource endowment, income, market orientation, production, and socio-economic characteristics of the small farmers as well as characteristics of the non-farm rural poor. Section III contains a description and analysis of the overall Sector and major subsectors. An overview of the land and climate, land tenure, infrastructure and public and private institutions is presented. The production and market situation for various groupings of commodity systems is described and analyzed. Within this group of sectoral and subsectoral characteristics, the major production, marketing, and policy constraints are identified and a discussion is presented on alternative actions to resolve constraints. Section IV deals with specific suggestions for programs and policies to resolve constraints. Implications are that these limiting factors to development represent areas where AID could best place its assistance emphasis, in consort with GOCR resources and perhaps other donor assistance. A strategy for AID assistance in the Agricultural Sector is suggested, stressing rational natural resource utilization, employment, resolution of marketing problems, agro-industry, sectoral planning, crop diversification, land settlement and export promotion.

USAID/Costa Rica accepts responsibility for any errors of fact or judgement in this document.

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C. Contents of Agricultural Sector Assessment

Section I - Overview

Since 1966, real GDP has increased at 6.5% a year, with per capita incomes reaching \$975 in current prices at the end of 1975. This excellent overall performance was achieved in an environment of moderately good income distribution and increasing GOCR commitments to social programs and other services to the poorer classes. Apart from the crisis years of 1973-1975, inflation has been held to around 6%, with unemployment at approximately the same rate. Though agriculture's share of GDP fell from 24% to under 20% in 1975, the economy remains agricultural. Most activity in other sectors derives from agricultural production. In 1973, 57% of all industry was classified as agro-industry; 34.4% of employment was in agriculture; and 65% of all exports were agricultural products. This predominance has made the whole economy sensitive to fluctuations in world market conditions for the principal export crops.

Since 1965 Costa Rica has exhibited the highest agricultural sector growth in the hemisphere. Most expansion has come from strong prices and increasing output in the four principal export commodities; coffee, bananas, sugar and beef. In recent years food grain production has expanded rapidly while agricultural production has begun to diversify, both for domestic and export markets.

Section II - The Target Group

A comprehensive Incomes Study based upon 1973 census data revealed that approximately 60% of rural families were poor according to AID's poverty definition of less than \$150 per capita/annum in 1969 prices. Of these 600,000 rural poor, 375,000 (60,000 families) were non-farmers, and 225,000 (35,000 families) lived on farms. About half the 60,000 families living on farms of less than 20 Has. were poor, and though smaller farms demonstrate a higher percentage of poverty, there were still significant numbers of non-poor families on even the smallest farms. Clearly, the rural target group in Costa Rica cannot be defined predominately as small farmers; farmers with less than 10 Has. make up only 27% of the identified rural poor families.

For all farm size categories, the poor farms have a lower proportion of land in permanent crops, and lower absolute levels and percentages of total family income from off-farm sources. For all farms under 5 Has. nearly half of total family incomes are from off-farm sources. Nearly all farms are market oriented, with no more than a small fraction of total value output consumed on-farm. True subsistence farms outside the market system are rare.

An analysis of production constraints to increasing on-farm income reached the following conclusions:

<u>Farm Size</u>	<u>Farm Level Priority Constraints</u>	<u>Priority Areas For Assistance</u>
0 - 2 Has.	Land availability	Off-farm employment Additional land
2 - 5 Has.	Low value crop mix Low yields	High value crops Improved technology
5 -20 Has.	Underutilization of land Low yields, low value crops.	Increase cultivated area Technology, high value crops.

The landless poor outnumber the poor farm families by about 150,000 people. Most work in agricultural or related occupations. Their unemployment rate is three times the national average.

Section III - The Agricultural Sector

A. General Overview

1. Land Resource and Land Tenure

The country is divided into two basic macro-climatic zones; one tropical, with rainfall and ground moisture year round, and the other semi-tropical with a distinct (and in some areas extended) dry season limiting agricultural activities. Deforestation of water-sheds over past decades has exacerbated conditions in the semi-tropical zones and has led to recurrent droughts in wide areas. Most of the deforestation in the past 15 years is the result of pasture expansion for beef cattle, which has been the major activity on the agricultural frontier. The end of this frontier apparently was reached in the mid-70's. Overall population density is low (less than 40 people per square kilometer), and large areas of the country are sparsely populated and/or still in virgin forest. A wide range of micro-climates allow for the cultivation of an equally wide range of crops.

Under-utilized land of good quality exists in sufficient quantities so that land availability is not considered at this time a major constraint to sector development. However, in areas of high population density and/or severe soil depletion, land availability is a constraint to economic growth, especially for the target group. There is land available for those who are motivated enough to migrate and work for it, though many who demonstrate such motivation do so as illegal squatters. GOCR figures show a high degree of land concentration, though a strong middle-sized farming group has emerged. Nearly all farms are owner-operated.

2. Infrastructure and Institutions

Rural infrastructure is the best in Central America, especially in education and health. Roads are still needed in many areas, along with communications, electricity, and potable water. A high percentage of the national budget and external assistance is focused on these needs.

There are many, perhaps too many, institutions working in the agricultural sector. Overlapping, poorly-defined responsibilities and lack of coordination limits effectiveness at all levels. Regular government ministries vie with autonomous public agencies for responsibilities and funding within the sector. Some of the institutional confusion and non-coordination should be dispelled by the revised National Agricultural Council (CAN) system in which the Minister of Agriculture chairs a small committee of cabinet-level officers with the authority to decide policy. Ministry of Agriculture (MAG) and National Banking System (SBN) operations have been successfully regionalized, unlike those of most other sector institutions. Though the CANcito system of regionalized multi-institutional coordination has not succeeded, some type of regional concept is indicated as necessary. At the canton (county) level there are agricultural committees composed of local citizens which have in certain areas contributed to agricultural development.

For major export commodities mixed public/private commodity organizations maintain efficient production and marketing systems. Private industry is active in production and processing and in some instances working under cooperative arrangements with public entities.

B. Agricultural Commodities: Production and Marketing

1. Export Crops

Coffee, sugar, and bananas together accounted for 57% of total exports in 1975. Coffee is the most important product in Costa Rica, and the coffee economy affects all other aspects of national life. Small and medium-size growers produce the bulk of the crop using levels of technology which have resulted in the world's highest yields. Wages paid during the coffee harvest are a major source of target group income, and the coffee processing and marketing industries are a major year-round employer. The outbreak of coffee rust in Nicaragua threatens production, but Costa Rican coffee growers may be expected to maintain their production despite the costs of rust control.

Sugar and bananas are mainly produced on large plantations. Costa Rica is a major exporter of bananas. Production comes from a mix of foreign and nationally-controlled operations. Sugar production tripled from 1960 to 1976 mostly

on large plantings, though there are thousands of small plots around the country.

2. Basic Grains

Basic grains production has in recent years expanded rapidly, under the stimulus of high guaranteed prices and a vigorous national production program. Corn and beans are typical small farmer crops, grown under traditional technologies with low yields, profits, and risk. There is room for improvement, but the potential economic returns to intensification of the crops are small compared to the potential from other production activities. Rice is basically a large-farmer up-land crop in Costa Rica, and in recent years the country has gone from a net importer to net exporter.

The National Production Council (CNP) sets basic grains prices and maintains them through a nation-wide system of buying stations. The CNP also controls basic grains trade and has seed and milling operations.

3. Fruits and Vegetables

The diversity of climatic zones has resulted in production of a wide variety of fruits and vegetables. Compared to other developing countries the internal marketing system for fresh produce is efficient. However, it still exhibits a high percentage of waste and spoilage, does not provide grades and standards, provides poor service to consumers outside the Central Valley, and responds poorly to new products and production zones.

Potential exists for expanding production of tropical and cool climate produce for export and domestic markets. Export of fresh-frozen produce under U.S. labels already exists.

4. Livestock and Animal Products

Beef production has expanded rapidly in the past 15 years under conditions which included favorable credit policies and a U.S. export market. It is the third most important export commodity, with half of total production sold abroad. Production is generally on extensive pasture lands, whose proliferation during this period is one of the most significant events

in the Sector. There is potential for expanded production on existing pastures through improved management, but market prospects are poor.

Costa Rica has extensive areas well-adapted to dairying, and in some of these zones milk production is an established and efficient activity. Significant imports, an expanding internal market, and excellent target-group production characteristics make dairying a priority development activity.

Swine and poultry production both have potential for expansion, limited largely by the availability of low-cost feeds and concentrates. Fish and seafood, raised under artificial conditions or harvested from the sea, offer economic opportunities much greater than are currently being exploited.

5. Oil Seeds and Specialty Crops

Coastal oil palm plantations supply most of Costa Rica's edible oil needs, though much of the palm oil is traded for lighter oils suitable for margarine. The large mechanized farms of Guanacaste could produce oilseeds, and this year's soybean and cotton programs may be the beginning of such production.

Specialty crops such as macadamia, essential oils, ornamental plants, spices and others offer great economic potential and are labor intensive and profitable at small scale. Though this is said for many tropical countries, in Costa Rica the potential is closer to reality. For example, several hundred acres of macadamia nut trees are being planted. Large-scale ornamental plant and flower seed operations are exporting worldwide. A number of international firms are involved in or seriously planning essential oil and spice production.

Costa Rica's combination of suitable climates, well-educated, technically-sophisticated farmers, and a stable political system make it a very attractive place for promotion of these long-term, high-investment, high-value crops.

6. Forestry

The large areas of the country still covered by virgin hardwood forests will be bare by the end of the century if current cutting rates continue. Poor policies, pasture expansion, and little public control contribute to the problem. Removal of the forest cover leads to soil erosion and the destruction of watersheds. Much of the wood cut is wasted through poor handling. Wood-based industries are an important sub-sector and could be developed further, but only in conjunction with rational forest management. Pulp pine plantations for paper production appear feasible; Scott Paper is investing in such a venture.

C. Constraints and Opportunities

1. Climate, Land, and Land Land Tenure

The land and climate of Costa Rica permit the cultivation of a wide variety of crops, but for certain important categories such as field crops the suitable areas are limited. Market forces and other factors have in some areas led to inefficient and destructive land use patterns which constrain development, especially for small farmers.

Though land availability is not an overall constraint to Sector development, a series of factors limits target group access. Colonization is taking place in remote areas spontaneously and under government direction. It is suggested that the Land Reform and Colonization Institute (ITCO) concentrate on helping highly-motivated target group individuals who want land to find it, and then provide them with basic 'grubstake' services to get them started. Such a program, complemented by tax and other policies, could successfully address the tenure problem. There is indication that the GOCR is seriously moving in this direction.

2. Capital and Credit

The National Banking System (SBN) consists of the Central Bank and four nationalized commercial banks. Through 77 regional offices these banks provide nearly all the agricultural credit. It is a professional and efficient system, well-respected in the rural area. The Central Bank sets interest rates which vary

from 8 to 11 percent on agricultural loans, with small farmers receiving the lowest rates. As interest rates are generally below the market rate, a "tope" system is used to apportion loans between the different crops and farm sizes. Credit to agriculture nearly tripled between 1970 and 1974, with small farmer credit expanding even more rapidly. Most credit has gone in recent years to coffee and cattle. In general, credit is available and not a major constraint on sector development.

Weaknesses in the system are: a) small farmers have a more difficult time finding credit than other groups; b) credit policies are rarely adjusted to account for changing technologies or new non-traditional crops; and c) longer-term credit for slow-maturing tree crops is not available.

3. Labor, Technology, Infrastructure

Though Costa Rica has been lucky in maintaining very low unemployment (4-6%) in recent years, the age composition of the population and decreasing industrial/service employment generation indicate that expansion of agricultural sector employment will be crucial in future years.

The level of technology in certain crops is extremely high. Most farmers are aware of the best technology for their situation and there is no shortage of well-trained/technicians. Adaptive research to new ecological zones, availability of necessary inputs, and feasibility trials for new products are areas which need attention.

Lack of transportation and other infrastructure is still a constraint in many outlying areas. The GOCR in cooperation with other donors is addressing this problem.

4. Institutional Constraints

The major institutional constraint is the number of agencies operating in the sector without coordinating their efforts. The high quality and capabilities of most of these institutions present excellent opportunities for concerted efforts. It is hoped that the new CAN system will encourage such initiatives.

Other constraints are that few of the institutions have regionalized operations, thus limiting their capacity

for field implementation of projects, and an archaic and cumbersome national financial system makes project implementation by GOCR Ministries extremely difficult.

5. Marketing Constraints and Opportunities

Though sophisticated and efficient market systems exist for a number of products, traditional systems for most fresh fruits and vegetables constrain the development of profitable new-crops and/or production zones. Such production will provide the raw material for agro-industrial enterprises which may offer the greatest economic opportunity for meeting Sector and target group goals. Development of agro-industry will generate on-and off-farm employment, backward and forward multiplier linkages, and improved balance-of-payments.

6. Policy

Agricultural sector macro-policy is made by consensus among a number of public institutions, the Legislature, the Presidency, and private sector interest groups. Public sector institutions have made many policy decisions in a vacuum. The CAN/OPSA system should improve on this. An important opportunity for improving policy would be more decentralized, regional control over project design and implementation, with projects deriving from policies set in a coordinated way at the national level.

The fast growth rates of Costa Rican agriculture are reflected in rapidly changing conditions and opportunities in the Sector. This already rapid pace of change will accelerate as the economy and the Sector continues modernizing. Agricultural policy must accommodate to this pace, and take advantage of new opportunities as they arise; and, just as important, must recognize when formerly profitable activities have begun to decline.

Section IV - Policies, Programs, and Projects

A. Priority Constraints and Opportunities: Policy and Program Implications

1. Resources and Land Use

The most critical problem facing the Agricultural Sector is deforestation and the attendant destruction of soil and water resources. If the process is not halted there will be little resource base left upon which to build future agricultural development. Policies to correct the situation must be integrated with a general revision of land use policies, taxes and credit, land reform, colonization, and conservation of renewable natural resources, all directed towards increasing the efficiency and long-term rationality of land and resource use. Specific policy and program recommendations are:

a) Improved land and resource information systems to provide the accurate and timely information necessary to formulate above policies and programs;

b) Accelerated land settlement programs to get land into the possession of individuals willing and able to make efficient use of it;

c) Coordinated credit and tax policies to discourage wasteful use of resources and encourage efficient land use;

d) Infrastructure investment to stimulate production in new areas; and

e) Forest and renewable natural resource laws vigorously enforced, to halt present destruction.

2. Agricultural Diversification and Agro-industry

Diversification and industrialization of agricultural production are the major opportunities for maintaining Sector growth in the future and meeting target group goals of income and employment. Critical constraints to realizing these

opportunities are to be found in the marketing system. The successful commodity systems operating for coffee, sugar, tobacco and similar products must be replicated. Suggestions for policies and programs include:

- a) National policy determination that diversification and agroindustrialization are priority goals;
- b) Credit and tax incentives for both the production and marketing of new commodities;
- c) Increased information capabilities to take advantage of new markets and determine the economic feasibility of new ventures;
- d) Research and development to adapt production and processing technologies to national conditions; and
- e) Close cooperation with the private sector in the development of new commodity systems.

Specific production opportunities identified as having high potential for meeting both target group and general sector goals are:

- a) Dairying;
- b) Swine and poultry production;
- c) Paddy-rice;
- d) Spices, flavorings, and essential oils; and
- e) Fruits and vegetables.

3. Sector Policy, Planning, and Institutional Coordination

Major modifications of the Sector's policy making, planning, and institutional structure is necessary to permit the solution of the complex problems of efficient resource use, conservation, and land tenure, and the realization of the opportunities offered by product diversification and agroindustry. The Sector must become more flexible and able to deal with rapidly changing conditions. Factors limiting such an ability include :

a) Lack of sufficient information for policy decisions and programming;

b) Fragmented structure impeding policy formulation, the exchange of ideas and information, and the coordination of program implementation.

Specific policy and program recommendations to break these constraints include:

a) Improved information systems;

b) Coordinated policy making and planning;

c) Regionalization of project design and implementation responsibilities; and

d) Greater inclusion of the private sector in planning.

B. AID Strategy and Specific Areas for AID Assistance

U. S. development assistance to Costa Rica, under various agencies, has been continuous since 1942. Programs in the Agricultural Sector have concentrated on institution-building and technology transfer. Consonant with Costa Rica's recently perceived status as a Middle Income Country, and in light of the advanced institutional development of the sector, new AID programs will concentrate on alleviating specific constraints in subject areas where AID has particular expertise and/or interest. A sector-wide program addressing such limiting factors to Sector growth and attainment of target group goals will be presented in FY 78 and FY 79, at a proposed funding level of \$8 to \$10 million for each year's combined loan/grant program.

The FY 78 project, at the PP stage, is a combined loan/grant program addressing post-harvest and marketing problems of traditional crops, the development of complete commodity systems for selected non-traditional crops, and support to an accelerated land settlement program for target group beneficiaries.

Some specific areas for AID assistance envisioned for this and future programs are:

1. Natural Resources Data for forest and land use planning. Possible areas of assistance are in remote sensing; CRIES; technical assistance and training in resource analysis; resource policy; and land use planning. Activities would be focused in the new Vice-Ministry of Agriculture for Natural Resources and OPSA.
2. Marketing, especially the development of local and regional market systems, to provide income opportunities, reduce food losses, improve food quality, and lower costs to consumers. Assistance in the development of grades and standards. MAG, IFAM (Municipal market loans) and OPSA would be likely participants.
3. Agro-industry and Exports. Technical assistance and training in product and market identification, vertically-integrated production systems, and farmer organization. Financing and technical assistance for agro-industrial development. The Ministry of Agriculture, OPSA, CODESA, the Export Promotion Center, and the private sector.
4. Land Titling, Distribution, and Sale. Technical assistance and program support to an accelerated land distribution program. ITCO and MAG.
5. Agricultural Sector Planning, Training, Project Design and Development. Support to an Agricultural Economics research center within the University of Costa Rica, which would train economists, provide feasibility studies to government and private industry, plan and help implement projects, assist the OPSA in sector planning and policy, maintain an agricultural data bank, and perform program evaluations.
6. Research, Development, and Promotion of New Crops. Introduction of new crops and processing materials. Adaptation research. Research on agro-industrial uses. Outreach mechanisms for new activities. MAG, UCR, regional institutions.

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Section I: Overview of the Economy and the Agricultural Sector

Since 1966, Costa Rica's Real Gross Domestic Product (GDP) has grown at an average annual rate of 6.5 per cent, including the comparatively stagnant years of 1974 and 1975 when GDP grew at only 5.1 and 3.1 per cent, respectively. During these 10 years of relatively rapid economic growth, the agriculture sector was a leading sector, although its direct share of GDP fell from nearly 24 per cent in 1965 to less than 20 per cent in 1975. This was accompanied by the increased importance of the manufacturing/industrial and general government sectors. (See Annex E for detailed national accounts during the period 1965-75.) By the end of 1975, GDP was approximately ₡16,500 million (\$1,930 million equivalent or \$975 per capita). However, because of rapid inflation during the past three years, this figure is highly inflated-- in terms of 1973 prices, the 1975 GDP was ₡11,075 million (\$1,297 million), or approximately \$655 per capita.

As stated above, real economic growth slowed significantly in the two years following the 1973/74 international monetary and energy crises. Preliminary figures for 1976, however, show a significant recovery, with real GDP growth at approximately 6 per cent. Also, the Government has brought about significant improvements in the country's balance of payment and inflation situations which will be described in further detail below.

The agriculture sector has traditionally been, and continues to be, the single most important sector in the Costa Rican economy: as of 1975, it accounted for nearly 20 percent of GDP; 65 percent of total export earnings; and 35 percent of total employment. Furthermore, it has provided a significant share of investment resources and raw materials necessary for the country's relatively rapid industrial expansion.

Between 1965 and 1975, Costa Rica had the fastest growing agricultural sector in Latin America, in total and per capita terms.

Indices of Agricultural and Food Production^{1/}
(1961-65=100)

<u>Country</u>	<u>Agricultural Production</u>			<u>Food Production</u>		
	<u>1965</u>	<u>1970</u>	<u>1975</u>	<u>1965</u>	<u>1970</u>	<u>1975</u>
Costa Rica	105	148	171	108	160	185
Guatemala	113	121	156	105	141	184
Honduras	110	127	105	109	127	95
Brazil	116	121	147	115	135	160
Colombia	105	121	149	107	125	158
Panama	117	147	145	119	149	147
Venezuela	114	142	169	115	145	170

^{1/} AID Publication, Food and Total Agricultural Production in LDC's. 1950-75, July 1976.

Most of this expansion had been in export commodities (coffee, bananas, sugar, and beef) until recent years, when dramatic increases occurred in the production of basic grains: e.g., rice production increased from an annual average of 66,000 metric tons in the period 1970-4 to 106,500 metric tons in 1975, while bean production increased from an average of 12,000 metric tons to 16,200 in 1975 and maize production from 69,000 to 91,700 metric tons in 1975. In both the export and foodgrain sectors, increased production has been due to expanded acreage and increased yields -- with increased prices playing an important role in the expansion of area in production and in the adoption of new technology.

Of particular importance to Costa Rica's economic growth are agricultural exports, especially coffee, bananas, sugar, and beef. The historical importance of one of these commodities, coffee, can be illustrated by the effects of a significant reduction in the price of coffee beginning in 1958 (from an average of \$1.35/kg in 1951-57 to \$0.93/kg in 1958-62). Following average annual increases of 7.6 percent for real GDP, 6.6 percent for exports, and 12.2 percent for imports between 1951 and 1957, they fell to 3.9 percent, 2.2 percent, and 2.2 percent, respectively, during 1958-62. A similar influence can be seen today, as high coffee prices^{1/} led to a rapid increase in the value of 1976 exports -- thus redressing a serious balance of payments problem and providing new stimulation to the economy.

The composition of agricultural exports has diversified somewhat during recent years. While bananas and coffee are still the leading crops, sugar and beef have become increasingly important: they increased from less than 10 percent of total exports in 1965 to 16 percent in 1975. This has been an important factor in shielding the economy from price fluctuations for traditional agricultural export commodities, although the over-all economy does remain highly dependent on external market forces.

^{1/} Recent increases in world coffee prices are partly a psychological reaction to the spread of coffee rust to Central America and the potential threat this disease poses to reducing production in the near future in all countries from Colombia to Mexico. Any stimulation to the economies of the coffee producing countries may be short lived as the disease spreads from Nicaragua to other countries in future months.

Although the value of agricultural exports increased more slowly than total exports during the period 1965-75 (an average annual rate of 13.8 percent vs 15.8 percent for total exports), they have played an important role in Costa Rican's balance of payments. The country has had a chronic current account balance of payments deficit, reaching as high as \$266 million in 1974. These deficits have thus far been financed through capital transfers, although there is some question as to **how long Costa Rica can continue to borrow for** such purposes. Therefore, increased agricultural exports play an indispensable role in reducing the current account deficit and in consequently reducing the need for foreign borrowing. This is illustrated by 1976 data -- because of high coffee export prices and a concerted GOOCR effort to hold down imports, the trade deficit is projected at \$180 million, some \$35 million less than last year's deficit.

The other major effect of the 1973/74 energy and international monetary situations was on prices. Until 1973, prices had been increasing at relatively low rates, 5 to 6 percent per year. However, the wholesale index began to increase rapidly by mid-1973: i.e., 16 percent in 1973, 39 percent in 1974, 26 percent in 1975 and 6 percent in 1976. These increases were due primarily to the rapid increase of prices for petroleum-based products, although increased agricultural support prices did contribute to increased food prices: e.g., prices for vegetable origin foods increased by 31 and 45 percent, respectively, in 1974 and 1975.

This has led to relatively high prices for some food items in Costa Rica, although the Consejo Nacional de Producción (CNP) has managed to keep rice prices low.

COMPARATIVE FOOD PRICES - CENTRAL AMERICA
(Aug. 1976 -- Guatemala City = 100)

	White Maize	Red Beans	Black Beans	1st. Class Rice	2nd. Class Rice
Guatemala City	100	100	100	100	100
San Salvador	113	120	104	122	87
Tegucigalpa	82	80	78	128	126
Managua	127	115	-	72	71
San José	152	171	189	88	93

Rapid inflation seems to have been halted although the economy is still vulnerable to external forces. As an example, today's high coffee prices and expected high profits could lead to excessive demand for consumption items, a rapidly increasing money supply and a return to high inflation rates.

The GOCR has been unable to directly tax these expected windfall profits but the Central Bank is promoting the sale of special "coffee bonds" to control the situation.

The more general issue, however, is the importance of the agricultural sector to the over-all economy and the potential effects of high agricultural prices (for either export or domestic crops) on over-all prices. This requires agricultural policy-makers to weigh the effects of high support prices and potential production gains against the eventual effects on consumers and the over-all price index.

Costa Rica's relatively high per capita income figures mask the existence of poverty and, using the terminology of Redistribution with Growth, the country is one of "moderate inequality": i.e., as of 1971, the lowest 40 percent of Costa Rica's population held 14.7 percent of total income compared to 6.5 percent for the same population group in Honduras, 12.2 percent in the Dominican Republic, 11.6 in Philippines, 17 percent in Thailand, and 18 percent in Korea.

While the income share of the middle 60 percent of the population increased from 1961 to 1971 ^{1/} and the share of the top 5 percent decreased, there are indications that the income share of the lowest 20 percent of the population decreased -- i.e., from 6 to 5.4 percent. This is substantiated by data concerning increasing unemployment and increasing land concentration, both of which are likely causes of the apparent worsening of the poorest quintile's position. First, during the late 1960's, the labor force began to increase more rapidly than employment -- thereby leading to increased unemployment, especially for low-wage laborers, and unemployment rates rose to about 7 percent in the early 1970's. The second major ^{factor} ~~was~~ the increased concentration of landholding between 1963 and 1973, resulting in a situation in which 46 percent of the country's farms are less than 5 hectares, while 7 percent of the total number of farms are more than 100 hectares and comprise 67 percent of the total area.

Income distribution in Costa Rica's rural areas is much more equitable than in urban areas or the San Jose Metropolitan Area in particular: i.e., the lowest 40 percent of the rural population holds 18.1 percent of total income compared to the national average of 14.7 percent. Similarly, the top 20 percent holds 44

1/ From 34 to 44 percent.

percent vs. the national average of 50.6 percent. (See Annex E for details.)

As stated above, unemployment increased between the early 1960's and early 1970's, from 4-5 percent to 7.3 percent in 1973. Recent data, however, show an improved national employment situation with a July 1976 unemployment rate of 6.2 percent. Looking at individual sectors and average annual growth rates, we see the following:

EMPLOYMENT BY SECTORS, 1963-1976
(000's of workers and percentages)

<u>SECTOR</u>	<u>1963</u>		<u>1973</u>		<u>1976</u>		<u>1963-73</u>	<u>1973-76</u>
	No.	%	No.	%	No.	%	Average Annual Growth	Average Annual Growth
Agriculture	190	(49.8)	207	(38.2)	215	(34.4)	0.9 %	1.3 %
Industry and Mines	45	(11.9)	70	(12.9)	90	(14.6)	4.6 %	8.7 %
Construction	21	(5.5)	37	(6.8)	40	(8.5)	5.2 %	2.8 %
Basic Services ^{1/}	18	(4.7)	30	(5.5)	34	(5.6)	5.2 %	4.2 %
Commerce	38	(9.9)	80	(14.1)	87	(14.1)	7.8 %	3.8 %
Other Services ^{2/}	70	(18.3)	118	(21.8)	147	(23.8)	5.4 %	7.6 %
Unspecific	-	-	-	-	4	(0.6)	-	-
Total Employment	382	(100)	542	(100)	617	(100)	3.6 %	4.4 %

SOURCE: Ministry of Labor

1/ Electricity, gas, communications, transport, and storage.

2/ Banking, insurance, and other personal services.

The proportion of people working in the agricultural sector has continually declined during recent years and the sector is now absorbing only a small number of new workers. The industrial sector is the fastest growing sector in terms of labor absorption

i.e., 8.7 percent between 1973 and 1976. Much of this recent growth has been due to increased utilization of industrial capacity and is based on investment made in the late 1960's and early 1970's. This recent decrease in industrial excess capacity has disguised relatively labor intensive investment in the industrial sector -- and consequently has not solved potential longer-term problems. The GOCR, however, has begun to address this larger issue. A new law has been passed to stimulate industry in the rural periphery which will promote agro-industrial development opportunities.

Because of the age structure of the population, the number of people in the 15 to 64 age group will increase rapidly during the next 20 years, with the greatest increase by 1983. Excluding migration and looking at different regions of the country, one finds potential labor force increases of close to 5 percent in the Pacífico Norte, Llanuras del Norte, and Pacífico Sur regions of the country. This is particularly dangerous in the Pacífico Norte which, as of 1973, had a comparatively high unemployment rate of 8.1 percent.

The table above shows employment increasing at 4.4 percent per annum between 1973 and 1976. This was a high rate compared to previous trends -- and was based on exceptional growth in the industrial and personal service sectors. If employment in the largest sector, agriculture, continues to grow at low rates and if industrial investment is not relatively labor-intensive, the growth of total employment opportunities will probably not be able to keep pace with labor force growth and there will be rising un-or under-employment.

The Government of Costa Rica recognizes the inequality which exists within the country and has therefore shifted greater attention to narrowing socio-economic differences, with its current objectives best summarized by the expression "redistribution with growth"

To look first at its redistribution efforts, there has been a slight change of focus within the past two years. Previous governments have emphasized urban/rural differences and, in an attempt to narrow differences, have concentrated resources in the rural areas. The present administration, however, has redefined its objective as "narrowing the socio-economic gap" -- thereby calling for a transfer of goods and services to the country's poorest, regardless of where they live.

The Government has initiated a number of programs to redistribute income: e.g., high support prices for basic grains production, minimum wage adjustments favoring low-income workers and inclusion of previously uncovered non-contributors in the Social

Security System (primarily agricultural workers and small farmers). It has also expanded services in health, nutrition, family planning, education, potable water supplies, and low-cost housing -- all of which directly relate to the Congressional Mandate to " (1) increase agricultural production through small-farm labor-intensive agriculture, (2) reduce infant mortality, (3) control population growth, (4) promote greater equality of income distribution, and (5) reduce rates of unemployment and underemployment."

The principal mechanism for the GOCR's redistribution objective is the Social Development and Family Assistance Law enacted in December 1974. The law established a special pay-roll tax and increase in the general sales tax. The revenues from these taxes are to be used to finance a multi-purpose health-nutrition-environmental sanitation program. The program began in July 1975 with a budget of \$14.2 million; \$21.3 million in 1976; and \$32 million in 1977. Up to 20 % of the special tax revenues are used to finance a pension plan for indigent non-contributors under the social security system.

The GOCR has also shown its commitment to narrowing the country's socio-economic gap through a number of other programs. At the most macro level, one can see this commitment in the 1975 Central Budget. Out of total expenditures of \$2,929 million (\$343 million), 28.0 percent went for education, 5.7 percent for health, and 5.8 percent for labor affairs and social security -- or nearly 40 percent of total expenditures for these social services.

In the agriculture sector, the Ministry of Agriculture and associated agencies have concentrated many of their activities on small farmers: e.g., the production-oriented Projects by Campaign program; the cooperative movement which organizes and supports groups of farmers; the national banking system's production credit program for small farmers, the Land Tenure and Colonization program for small farmers; and the National Production Council's program to purchase basic grains at guaranteed minimum prices.

Beyond these longer-term socio-economic objectives, the medium-term GOCR strategy in the agriculture sector calls for changes in land tenure patterns; expanded use of new technologies; expanded and diversified agricultural exports; zoning of principal agricultural activities; and promotion of employment-generating production. In the short-term, emphasis is being given to production needed for domestic consumption -- i.e., for direct consumption (foodgrains) and for use as industrial raw materials -- partly through the strengthening of extension, credit, and marketing services for small and medium farmers. Also, in order to sell exportable surpluses, the Government is trying to develop new export markets.

Section II: A profile of the Rural Poor

Costa Rica has made notable economic progress in the last decade. Respectable national averages of economic growth have been led by a rapidly growing agricultural sector. During this period a progressive government has made a concerted effort to achieve social justice, a fair distribution of the benefits of development, and a reduction in the number of persons below the poverty level. However, an incomes study based upon the 1973 census revealed that more than 600,000 rural people (58% of the rural population) had per capita annual incomes below the AID poverty line of US. \$150.

The rural poor families who depend primarily upon agriculture for their livelihood are AID's rural sector target group. Even though large numbers of rural poor were known to exist, they were not easily identified nor readily located geographically because of the highly complex nature of the agricultural sector and the high degree of diversification that exists within the country. In an effort to demarcate the target group, the USAID undertook an analysis of the rural population based largely upon the 1973 Censuses of Population, Housing, and Agriculture. The Academia study^{1/} combined the three censuses and, adding data from outside sources, developed a wide range of data tabulations designed to be useful in policy and program analysis, planning, implementation, and evaluation. This analysis made it possible for the USAID to look at income patterns, employment, resource endowment and use, living conditions, socio-economic variables, market orientation, production patterns, land use, yield, and technology, and their importance with relation to rural poverty. The more important findings and observations of the analysis are contained in this section.^{2/}

A. Farm/Non Farm Composition of the Rural Poor

According to the USAID's Rural Profiles Study, based upon the AID poverty definition,^{3/} over 600,000 rural people (58% of the total rural population) were poor in 1973. Most (60%) of these poor were members of non farm families, though the incidence of poverty was about the same for both farm families and non-farm families. In approximate numbers, this rural group consists of 35,000 poor farm families (240,000 people) and 60,000 poor non-farm families (375,000 people).^{4/}

1/ Di Mare, et al. La Pobreza en Costa Rica, Academia de Centro América for USAID/CR. 1976

2/ A more complete analysis is attached as Annex A.

3/ Less than \$150 income per capita per annum in 1969 prices.

4/ See Table 3A, Annex B.

B. The Small Farmers

I. Resource Endowment and Use.

The farm poverty problem and the small farm problem are not necessarily the same. A significant number of small farmers on holdings of less than five Has. are not poor. More than 13% of all poor farms have more than 10 Has. of land. Poor farms have a much lower proportion of their land in perennial crops than non-poor farms, in part reflecting the importance of coffee to small farmers. Poor farmers have substantially lower employment rates both on-farm and off the farm, for all farm sizes, though no crop mix on the average small farm would fully employ all the available family labor. Coffee was found to be the most important contributor to employment on small farms and accounts for almost all of the difference in employment levels between poor and non-poor farms, while basic grains appear as a very poor source of employment.

In general, smaller farms are more intensive than larger farms. Both poor and non-poor small farms show a higher profitability per hectare of arable land than do larger farms.

With respect to resource endowment and use, there are two key differences between poor and non-poor small farmers. Small farmers with incomes above the poverty level a) have significantly more land in perennial crops, mainly coffee, and b) are able to utilize a much greater proportion of their available family labor on the farm.

In order for the poor farmer to more efficiently utilize his land resource it appears that he must change his crop mix to one that more fully utilizes his family labor or intensify his present crops through the use of improved technology. The high costs and poor medium and long-term price prospects for coffee limit the possibility of moving poor small farmers into coffee production. Other crops do offer excellent opportunities, however. It should be noted that moving to more intensive crop mixes and/or the use of higher levels of technology will increase capital requirements per land unit.

The labor resource of poor farmers can be more fully utilized in a number of ways. If their own land utilization is intensified as discussed above, additional labor will be required on-farm. If larger farms are encouraged to intensify their operations, it will generate additional employment in agriculture

for underemployed farmers or landless laborers. Agro-industry, marketing activities, services, etc. are the best alternatives for generating permanent non-farm employment in rural areas for both these groups.

2. Income Patterns

As stated earlier, farm size is not directly related to per capita annual income since many very small farm families are not poor, and a significant proportion of farms between 10 and 20 hectares are poor. According to the Rural Profiles Study half of the 61,000 farms under 20 hectares were poor, 63% of the farms under 5 hectares fell in the poor category as did 44% of the farms between 5 and 20 hectares.

Income Classes of Farms Under 20 Hectares
(Numbers and Percentages)

	<u>0-5 Has.</u>	<u>5-20 Has.</u>	<u>All 0-20 Has.</u>
Poor Farms ^{1/}	22,774 (63) _{2/}	7,965 (44)	30,739 (50)
Non-Poor Farms	13,644 (37)	16,936 (56)	30,580 (50)
Totals	36,418 (100)	24,901 (100)	61,319 (100)

SOURCE: Rural Profiles Tables, 11/78; La Pobreza en Costa Rica, Academia de Centro America.

1/ Poor Farms were defined as those whose families enjoy incomes less than 1,400 colones per capita per annum. Non-Poor Farms have incomes greater than 1,400 colones. This 1,400 colones figure was derived using the mixed exchange rate of 7.59 colones per U.S.\$1 and deflating by the mid-1973 consumer price index = \$150 per capita. Depending upon other conversions of 1989 dollars to 1973 colones, the percentage of poor farms varies from 40 to 60 percent.

2/ Numbers in parantheses are percents.

See Annex B for definitions and complete Tables.

It has been difficult to identify geographic areas of concentrated small farm poverty, as the poor farms are generally interspersed with non-poor farms, leaving no large clearly defined areas of small farm poverty. However, the Profiles data base does contain sufficient information for analysis at the Cantón (County) level, and will be used to more accurately locate target group concentrations for program design purposes.

Probably the most important difference between incomes of poor and non-poor farm families is off-farm income. For

farms of less than two hectares the percentage contribution of off-farm income to non-poor farm families is more than fifty percent of their total income. This importance decreases quite rapidly as farm size increases. The percentage of income from off-farm sources to poor farm families is only about one-third that of non-poor farm families.

3. Market Orientation and Subsistence

In a situation where a large number of poor people exist in the rural area one would expect to find a lot of subsistence farms. ^{1/} Except for a very few farms in remote areas this does not appear to be the case in Costa Rica. Certain food crops such as beans and corn are consumed in significant quantities by producers and these might properly be called subsistence crops. As many of these are low value crops per hectare a much higher proportion of the land is normally dedicated to their production than they contribute to the value of output. Poor farms on the average do consume a higher proportion of the value of their total output than do non-poor farms. The national average of this home consumption does not exceed 6.4% of the total value of production for poor farms in any farm size category and is only 5.2% for all poor farms. Non-poor farms (all sizes) consume an average of only 1.3% of their total production. There are some areas or districts that show considerably higher than average consumption, of course. Even in the poorest districts, however, virtually all farms of all sizes are basically market oriented in terms of product sales.

4. Production Patterns

Regional differences in crop mix on small farms are significant. This is to be expected because of the diversity of soil and climate areas in the country. As previously stated, annual crops as a group are not very important as a source of farm income. They are relatively more important on the poor farms. For all sizes of farms the contribution of annual crops to the total value of production averages less than 14%. Non-poor farms are more diversified with respect to annual crops. They have a smaller proportion of their land in all annual crops and a significantly smaller percentage of their land in cereals. Non-poor small farms produce considerably more high value (but higher risk) annual crops such as potatoes, tomatoes, tobacco, etc. than do poor farms. Some of these crops are very important, in terms of value, for the smallest farm group.

^{1/} Subsistence farm is defined here as one which operates principally outside the market economy and produces primarily for home consumption.

Perennial crops and livestock are much more important to farm income than are annual crops. In the coffee production areas this crop accounts for 50-90 percent of the perennial crop value on small farms. Other perennial crops of general importance on small farms are bananas, plantains, cacao and sugar cane. There are wide regional differences in the relative importance of the different perennial crops to small farm income. Differences between poor and non-poor, however, appear to be limited to coffee.

The importance of livestock and livestock products to small farm income is surprisingly great. Even on 2 to 3 hectare farms livestock contributed almost half (49%) the total value of farm production. As would be expected, farm size is directly related to the kind of livestock grown with pork and poultry more important on smaller farms and beef on larger farms.

Except for a few crops, there are essentially no significant differences in yield patterns among small farms. Most of the differences appear to be regional in nature and little related to farm size.

Mechanization and fertilizer use were used as indicators of the level of technology being used by small farmers. Farms below five hectares in size used the greatest number of tractor horsepower per cultivated hectare and this use declined as farm size increased. Small farms also used more draft animal and human power. This result would be expected if calculations were made on the basis of power use per hectare but was not expected on the basis of power use per cultivated hectare. Sufficient data were not available to make any judgement about the efficiency of tractor use which might be an important factor.

Small farms used significantly less fertilizer per hectare than the national average. Only farms of more than fifty hectares use fertilizer at levels above the national average.

5. Production Constraints

An attempt was made to determine whether poor farmers can significantly increase their on-farm income. This could be accomplished by cultivating more land, growing higher value crops, increasing the income yield per hectare or by getting more money for their products. Each of these alternatives were analyzed within the limits of the data available.

Unfortunately the available data do not permit a direct measure of land quality. Therefore, it is difficult

to measure land slack and accurately estimate the relative importance of land as a constraint to increasing the incomes of farmers in the target group. Using pasture and fallow land as indicators of land slack it would appear that there are no significant quantities of land available for increasing cultivation on farms under five hectares. There is significant slack, however, on farms of 5 to 20 hectares. This measure is not reliable enough to use with complete confidence, but it does imply that the possibilities for cultivating more land within the present farm units of the 74% of the target farmers who have less than five hectares are very limited. It appears not to be a constraint on target group farms of more than ten hectares. Because the expansion of cultivation within the present farm for poor farms of less than five hectares is not a viable alternative, others will have to be examined.

Using the present data to analyse the possibility for producing more high value crops on poor farms is quite difficult. Most high value crops in Costa Rica are relatively area specific. In view of the medium and long-term market outlook for coffee, its expansion to any great extent was not considered. There are, however, a wide range of high value crops which can be produced in one or more of the different geographic areas of the country and for which good markets presently exist. The substitution of these crops for basic grains on poor farms of less than five hectares offers a real alternative for increasing target group income. Complexities do exist, however, as many of these higher value crops require higher levels of technology and investment, are more risky and require more marketing skills. It is not quite clear whether livestock could be increased but non-pasture based animal activities, such as swine, poultry, bees, etc., may be possibilities within the land constraint. Potential for increasing incomes through changes in crop mix definitely exists for farms of more than five hectares.

On all farm sizes there is obvious potential for increasing income with higher productivity through the use of better technology. Yields, especially on small farms, are very low. Improved technology with resulting yield increases appears to be the only on-farm alternative for the smallest farms under two hectares, but the land base severely limits the possible income effects of such technological improvements.

It should be noted that the most important constraints on shifting the crop mix are most likely to be off-farm market system constraints. Also, many of these higher value crops are not familiar to target group farmers and the acceptability by the farmer of making production changes may be a real constraint.

In summary it appears that the most serious constraints and the areas that offer the most potential for increasing the incomes of poor farm families are as follows:

<u>Farm Size</u>	<u>Farm Level Priority Constraints</u>	<u>Priority Areas For Assistance</u>
0- 2 Has.	Land availability	Off-farm employment Additional land
2- 5 Has.	Low value crop mix Low Yields	High value crops Improved technology
5-20 Has.	Underutilization of land Low Yields, low value crops.	Increase cultivated area Technology, high value crops.

6. Socio-economic Characteristics of the Small Farmer Target Group

The average poor, small farmer has had 2-3 years of education and has 6 members in his family. Nearly half of these farmers are over 45 years of age; three fourths are over 35 years of age. About half work off their farms seasonally. Except for 27 percent who use fertilizers, only 5% or less use any modern technology. Use of agricultural machinery is very limited. There has been some out-migration and trans-migration in the peripheral areas of Costa Rica, but most farmers in rural areas have generally been in residence a long time and constitute a stable population. The percentage of heads of families who are women is lower than the national average, probably due to the fact that in agricultural areas it is more difficult for a woman to maintain a family alone (Data from AYTEC-IFAM, Booth, 1975 and Academia Report, 1976).

The Costa Rican farmer has traditionally lived in a dispersed type of community settlement - similar to a township in the U.S. Status is determined in large part by ownership of land, but also by such characteristics as age, sex, and marital status. Higher status is given to an older person over a younger one, to a male over a female, and to a married couple over single people.

Formal social organizations (government, school, church, etc.) are of great importance in the community. They usually have their foundations in family-friendship groups. Much of the success or failure of any new program is dependent upon how it is accepted by these informal groups, where new programs and the people implementing them are discussed and criticized. The extent to which any organization, i.e. cooperative or growers associations, can utilize or at least not conflict with these informal

groups determines in large part its strength and durability. Much of the communication which takes place also follows the lines of the informal groups.

Social interaction tends to take place within different social strata rather than between strata. For example, small farmers owning their own land are one social stratum, landless laborers are another, and large farm owners still another. Interaction between those groups will be limited and formal, thus posing problems in communication. This basic community structure, however, can be an asset to any program providing it is recognized and care taken to include leaders from the informal groups as well as more visible leaders of the formal community structure (i.e., successful farmers who are also informal leaders).

C. The Non-Farm Rural Poor

1. Numbers

As stated above, this group outnumbered the on-farm poor by about 25,000 families and 135,000 people. According to the moderate poverty definition, 54% of the approximately 120,000 non-farm rural families were poor in 1973. This meant 60,000 families and 375,000 people were in the landless poor category. Certain economic characteristics of this group are discernible from the Academia tabulations.

2. Employment

Only 43% (47,400 people) of the rural non-farm poor between the ages of 15 and 64 were economically active during the census week, where economically active was defined as working, looking for work, or not looking for work because of the unavailability of jobs. These three categories accounted for 34%, 6%, and 10% respectively of the active work force. 80% of this active work force was employed as agricultural workers with the rest employed in service jobs or manufacturing.

The unemployment rate for men in this class was 16%, as compared with 4% for the rural non-poor and 33% for the urban poor.

3. Location of the Non-Farm Poor

As is the case with poor farmers, the non-farm poor are dispersed throughout the country. The cantonal level data will permit identification of the zones where this group is concentrated.

4. The Landless Poor and Coffee Harvest

The census data, collected in May, 1973, does not capture the considerable income earned by this group during the coffee harvest of October through January. In section C.1.d. (Labor Constraints) the possible effects of coffee harvest income on poverty and employment patterns are discussed.

5. Socio-Economic Characteristics

The average family size for the landless poor, at 6.7 people, is the same as for poor farm families. 27% of the heads of families have had no schooling, with only 4% having more than a primary level education.

17% of the landless poor families were migrants, the highest for any income category except the non-poor rural landless, with 18%.

The poor landless families tend to be younger, having more children under the age of 15, than the non-poor and farm families. Consequently, the ratio of mouths-to-feed to economically active members of the family is highest for this group.

The housing conditions of this group are not significantly different from other poor groups, be they on-farm or urban.

Section III: Agricultural Sector and Sub-sector Characteristics and Constraints

A. General Overview

1. Land and Climate

Costa Rica's expanse of 51,260 Km² contained in a strip approximately 100 Km. wide and 500 Km. long can be divided into two general areas. The first is Central Highlands and Pacific Lowlands, characterized by rugged mountains and hills, punctuated by relatively large and numerous scattered plains. This area comprises about four-fifths of the country. The second is Atlantic Lowlands, which are predominantly smooth and flat but contain small scattered hills and hillocks. The central north-south mountain chain forms the physical regions mentioned above, which may be further divided into five ecological macrozones:

a. The Central and South Pacific Zones are relatively level humid tropics with elevations from 0 to 500 meters. The rainfall averages 2,500 to 3,500 mm. per year with a three month dry season. Most of the area is best suited for forestry with smaller areas suitable for intensive farming and plantation crops. Current cropping includes banana, some african oil palm, rice, sorghum and citrus. Corn and bean cultivation is of importance in the San Isidro region.

b. Pacific Northwest; this is a relatively level dry tropical zone with elevations that vary between 0 and 500 meters. The area has a long dry season which limits unirrigated agriculture to one crop per year. With the completion of an irrigation project already underway this zone clearly has the highest productive potential in Costa Rica for rice, sorghum, cotton, corn and beans.

c. Transitional Zone to the Meseta Central; this zone is characterized as humid sub-tropical with altitudes varying from 600 to 1,600 meters. The topography is irregular with grades running over 20%. The zone produces most of the country's coffee and sugar cane. There are also small plantings of fruit, vegetables, rice and beans.

d. North Atlantic Zone: this zone is humid tropical and mostly level with elevations reaching to 500 meters. The zone has been used for extensive cattle production and plantation crops, with limited areas for annual crops. Significant area is available for more intensive agriculture and in recent years this has become a zone of rapid expansion. Principal crops are cattle, bananas, cocoa, fruit, cassava, corn and beans.

e. Meseta Central: this zone is temperate to cold with rough topography. Elevation varies from 1,700 to 3,000 meters and rainfall from 1,500 to 3,500 mm. per year with a dry season of from 1 to 4 months. Main crops are coffee, corn, beans, vegetables, dairying and potatoes.

Between 1955 and 1973 the area of the country under production increased by 721,455 hectares, with over 500,000 of the increase in pastures. Thus, the rapidly expanding livestock industry has led the agricultural transition taking place in Costa Rica. Shortages of basic grains and fiber have brought about high incentive prices, causing pasture lands to be diverted to crops. This pattern has been especially evident in Guanacaste. Livestock, bananas, oil palm, and cocoa are spearheading development of the Atlantic lowlands. The region has poor prospects for basic grains other than rice. The Central highlands lead, and have potential

in coffee, fruits, vegetables, and dairying, while topography limits the potential of satisfying additional basic grain requirements from this area.

Overall, land availability and the productive potential of the land is not a constraint in Costa Rica. However, a clear cut set of policies is needed, directed at production distribution, land use, new crops, and a more equitable sharing by small and medium farmers in the benefits derived from increased production.

2. Land Tenure

Costa Rica is still largely a rural economy. According to the 1973 census, 59.39% of the population is rural. The 3,122,456 hectares in farms is divided into 81,562 farm units. A high degree of land concentration is demonstrated by the fact that 45.74% of the farms average less than five hectares each and represent only 1.85% of the land area. On the other hand, farms of over 100 hectares represent 7.3% of total farms but cover 66.98% of the total farm area.

It is noteworthy that a substantial medium farmer group has emerged; farms of 10 to 200 hectares represent 38.86% of the farm units and cover 41.55% of the farm area. Long range GOCR policies can be designed to foster the growth of this group by encouraging the sale of very large holdings and the distribution of lands owned or acquired by government.

Over 90% of the farms in Costa Rica are owner operated. Trends in land use can be seen by comparing 1963 and 1973 census data. The area in farms has grown by 454,380 hectares and the number of farms has increased by 12,377. The majority of the new farms are less than 1 hectare. The number of these small farms has grown by 10,752. Land concentration has increased somewhat in farms from 200 to 1,000 hectares. At the same time land area in 1 to 20 hectare farms has decreased.

Land use patterns have changed rather drastically since 1955 when agriculture was utilizing 26% of the total land area as compared to 40% of the land area was in use. Between 1955 and 1973 the addition of 1,285,108 hectares to the agricultural land base showed an increase of only .4% in cultivated crops and 4% in permanent crops in comparison with a 51% increase in pastures and 44% in uncultivated lands. In 1973, 76% of the area in production (not including uncultivated lands) was in pasture, compared with 10% in permanent crops and 14% in cultivated crops.

These changes have had significant effects upon the rural economy. Although the area in production has expanded greatly the agricultural sector has only generated an average of 1,892 new jobs per year between 1963 and 1973, compared with 2,037 new jobs per year between 1927 and 1950 and 3,493 new jobs between 1950 and 1963. The percentage of rural population employed in agriculture dropped from 61.8% of the labor force in 1927 to 36.4% in 1973. Excess rural labor has either migrated to the cities, colonized new lands, or remained as unemployed or under-employed members of the rural labor force. The man/land situation varies considerably among regions. There appears, however, to be an adequate overall land base to provide farms to as many of the 150,000 landless rural laborers who demonstrate their desire to own land badly enough by migrating.

The Transition Zone to the Meseta Central added only .5% per year to its land base between 1955 and 1973. This is the second lowest growth rate amongst the five regions, and it would appear that most of the area suited for production in this area is already in use. In the past 10 years the area dedicated to permanent crops has increased by 26% while the area in pastures reduced by 2% and cultivated area dropped by 37%. In 1973, 73% of the land in production was dedicated to pasture. With the exception of the Southern Pacific Region, the land distribution in the Transitional Zone is better than in the other regions, with 43% of the land area in farms of less than 100 hectares.

The North Pacific area has experienced considerable out-migration and low employment in recent years. The area has 65% of its land in production, the highest percentage in the five regions, although the majority is in low-intensity beef production. There is little new land available for crop production increases. These increases must come from the 88% of the agricultural land base now in pastures or from increased productivity on existing crop land. There is evidence that this is taking place at an accelerating rate through increased planting of sorghum, cotton, rice, corn and beans. Land ownership is highly concentrated with only 23% of the area in farms of less than 100 hectares. The region produces 48.1% of the country's beef, 39% of the rice, 28% of the corn, 27% of the beans and 22% of the sugar cane.

The Southern Pacific Region has 35% of its land area in production with the possibility of developing still more new lands. The rate of increase for the area in production, 1% per year for the total area from 1955 to 1973, indicates that the region is still in the process of colonization. In 1973 there were 37% more hectares in production than in 1963. Even though the area

in pastures increased by 66%, the cultivated area increased by 21% and permanent crops by 5%. Farms of less than 100 hectares are 45% of the total in this area, compared to 33% in the North Pacific region. With only 11% of the country's area, the region produces 32.3% of the coffee, 52% of the rice, 35% of the beans and 31% of the corn.

The Atlantic Lowlands has only 14% of its area in production. There were 13% less hectares in production in 1973 than in 1963. In the same period, permanent crop area increased by 4%, annual crop area dropped, by 43%, and pastures dropped by 8%. The region produces 83.5% of the country's cacao, 65.5% of the bananas, 20.8% of the plantains, and 11.3% of the corn. Only 27% of the land is in farms of less than 100 hectares.

The Northern Plains Region still has considerable potential for expanding the area in production. Only 32% of the land area is in farms. Expansion of area in production was 1.4% of total area per year between 1955 and 1973 which makes this the fastest growing of the five regions. Heavy migration brought about a 28% expansion of production area between 1963 and 1973. Area in pasture grew by 49% from 1963 to 1973 while area devoted to permanent crops increased by 5%. Annual crops dropped by 32% in the same period. With 13% of the country's land area, the region produces 13.8% of the sugar cane, 13.2% of the cacao, and 15.7% of the beans. Thirty-one percent of the farms in this region have less than 100 hectares.

3. Infrastructure

Rural people depend on their local government (Cantón) to provide them with an array of essential services. They urgently need access roads, transportation and communication in order to secure timely inputs and to market production. They also need electricity to improve the environment and to technify their farms, market facilities and the water supplies for farm and home use. They expect their local community to work with central government institutions to provide their area with health, education, social and recreational facilities and thereby provide their families with a higher quality of life in rural areas. The GOER's long term concern for the well being of its people has been responsible for the development of a basic infrastructure that is the envy of the Central American region. The Costa Ricans realize, however, that much remains to be accomplished, especially in the outlying regions.

The Pan American Highway traverses Costa Rica from Peñas Blancas on the Nicaraguan border to Paso Cabona on the Panama border, a distance of 658 Km. The road is in excellent

condition; probably the best in Central America. From this main artery, roads lead to all provincial capitals and many of the cantons. There are still large areas of the country in which development is being hampered because of poor or no access roads. These areas are currently serviced by air, by railroad, by river or by trails.

Other basic services of great importance to the rural areas are water, electricity and some type of sanitary service. Of the 330,775 occupied houses in Costa Rica when the 1973 census was taken, 13% were obtaining domestic water from rivers, irrigation ditches or rainwater cisterns. In 22% of the houses there was no running water, in 33% there was no electricity and in 11% there were no sanitary facilities. These figures are not alarming when one considers that many of these houses are located in the outlying regions of the country. Compared to other developing countries Costa Rica is very advanced in the availability of basic services.

According to the GOCR, 14% of the 330,000 occupied houses in Costa Rica need replacing, 33% need repairs, 5% are marginal, 14% have earth floors, 4% have thatched roofs and 3% have pole walls. In general the most marginal housing is in remote or frontier areas.

In all of Costa Rica only 9% of the population over 10 years old cannot read or write. The percentage is 4% in the metropolitan area but reaches 19% in the northern plains region. In 1963 the level of instruction averaged 4.1 years; by 1973 this had risen to 5.7 years. These figures reflect the GOCR's constant stress on education.

Emergency health services are located throughout the country, with medical attention only a few minutes or a few hours away even in remote areas of the country. The Rural Public Health System will be providing excellent health services to all rural families by 1978. Recreational facilities are also widespread and include sports fields, libraries, community halls and parks. From the private sector large numbers of communities have bars/cantinas, dance halls, pool halls and movies.

There also exists a wide range of government services from the Ministries of Agriculture, Public Works, Housing, and Industry, plus the semi-autonomous institutions responsible for land titling and colonization, community development, social assistance, and cooperative development.

4. Institutional Structure - Public

In Costa Rica the most serious organizational and administrative problems for rural development result from conditions found in the entire public sector, not merely in the agricultural agencies. For example, there is a proliferation of organizational units, and their relationships with one another often lack clarity as to functions, required interactions and lines of authority.

The public sector is composed of the central government and the autonomous (or decentralized) institutions. The central government consists of the ministries, as well as other constitutional bodies. The budgets of the ministries are approved by the President of the Republic and enacted into law by the Legislative Assembly; their budget execution and personnel management are subject to procedures and controls described below.

The autonomous institutions are headed by boards of directors, and in many of the more important ones the board is appointed by the Council of Government (that is, by the President of the Republic) and includes no members who represent ministries or other special agencies or interests. This system rather effectively assures that coordination of effort cannot be enforced at the ministerial level. The Agencies' operating budgets are adopted by their boards with the approval by the Contraloría General, and, in the case of investment or capital expenditures, by the Ministry of Planning (OFIPLAN). Most autonomous agencies are exempt from many or all of the administrative requirements to which the ministries are subject.

The Ministry of Agriculture (MAG) has the major responsibility for agricultural and rural development. These responsibilities include research, extension, plant and animal sanitation, pest-control campaigns, regulatory activities, forestry and conservation, irrigation and drainage, wildlife and fisheries, national parks, and the national weather service. Other public agencies, however, also share many of these responsibilities with lines of authority and budgets stemming from the Presidency rather than from the Ministry of Agriculture. The National Agricultural Council (CAN), responsible for overall coordination of rural sector development activities, was formerly composed of the heads of most of the ministerial and autonomous agencies involved in the rural sector (19 members) with the Minister of Agriculture as chairman. This unwieldy body became an ineffective forum for discussion and was recently reduced to seven members from key agencies.

The new CAN is chaired by the Minister of Agriculture and consists of himself and the:

- Minister of Planning (OFIPLAN),
- Minister of Economy, Industry and Commerce (MEIC),
- Minister of the Presidency (the First Vice-President),
- Executive President of the National Production Council (CNP),
- President of the Central Bank, and the
- Executive President of the Institute of Lands and Colonization (ITCO).

This group meets at least once a month to discuss and decide policy in the agricultural sector. Given their status and ability to commit their respective institutions, these decisions become policy.

Much of what CAN discusses are plans for studies, projects, and plans submitted by the Agricultural Sector Planning Office (OPSA), a group of thirty technicians with specialties in planning, agricultural economics, agronomy, resources, meteorology, statistics, etc. This group is by the Executive Secretary of the CAN, who is directly responsible to the Minister of Agriculture. OPSA's work can be self-initiated or in response to direct requests from the CAN. The project plans submitted are complete implementation plans, with background, analysis, resource requirements, institutional responsibilities, inputs, and budgets.

If the CAN approves a plan it is passed on to the Technical Committee for Agricultural Sector Planning (COTEPSA), and consisting of the heads of the planning departments of each sector institution. COTEPSA implements the plans formulated by the OPSA and approved by the CAN. It defines technical requirements and assigns responsibility, refines plans and budgets, designates working groups, and sets projects in motion.

The system has been in full operation since Mid-1976, and already has achieved notable success with a coordinated cotton production project and some smaller research and survey activities.

The CAN is supposed to function at the regional level through CANcitos under the leadership of MAG's regional agricultural directors. These CANcitos have been as yet largely ineffective, due to a series of causes. One essential cause is that only the MAG has truly regionalized operations. The country is divided into eight agricultural regions, each with a Regional

Agricultural Center (CAR) provided over by a director responsible to one of the Vice-Ministers. All Ministry operations in a region are under the control of the CAR director. Most of the other institutions have highly centralized operations, with the San José office controlling all policy decisions.

A local-level semi-public institution existing in certain areas is the Cantonal Agricultural Committee. Composed of community members concerned with agricultural development, these committees can be funded, according to the current law, out of a specific tax on sugar cane production in each Cantón (county). The few cantones where these committees work vigorously are, not suprisingly, those with significant sugar production. The committees in these areas work closely with the MAG and other institutional staffs to promote agriculture in their areas. Activities include experimental farms, nurseries, demonstration projects, agricultural scholarships, and fish ponds.

These committees are permitted by law to receive and disburse funds from private and public sources, national and international, and to sell the products of their activities to finance operations. They could be used as a means for planning and implementing local-level projects.

The Minister of Agriculture is assisted by three Vice-Ministers. The Vice-Minister for operations supervises the seven Regional Directors through whom the MAG is now trying to decentralize its operations. The technical Vice-Minister supervises a group of directorates and other central office units with different degrees of direct responsibility for field services. The newly appointed Vice-Minister of Natural Resources is expected to assume direction of technical areas involving renewable and non-renewable natural resources.

The agency with broadest responsibility for price stabilization and marketing of agricultural products is the Consejo Nacional de Producción (CNP), an autonomous institution. CNP buys basic grains and some other products from producers, processes and stores them, and sells them at wholesale. It also sells them, along with a range of other staples, at retail through a nation-wide system of sales outlets. It sets support prices for these and some other products, but retail (and indirectly wholesale) prices are set by the Ministry of Economy (MEIC). There is consultation between the agencies for this purpose, but coordination is not as close as would be desirable.

Costa Rica has assigned its programs of rural resettlement and land distribution to the Instituto de Tierras y Colonización (ITCO), an autonomous agency. In recent years

its main activities have been the granting of titles to land occupied by squatters on either public or private property, and the organizing of its beneficiaries into empresas comunitarias or other associative structures. It has never been very aggressive in attacking the fundamental land tenure problems of Costa Rica, but neither has it been financed on a scale which would allow it to do so.

General commercial banking in Costa Rica is provided only through government-controlled (autonomous) institutions, grouped in the National Banking System (SEN) under the general control and direction of the Central Bank. The four banks in the SEN all provide credit to agriculture. The largest bank in this group, and also the one with the greatest proportion of its portfolio in agricultural loans is the Banco Nacional de Costa Rica (BNCR). The public sector also includes the Banco Popular y Desarrollo Comunal, which gets much of its capital through a payroll tax and is at present interested in expanding its lending to farmers. Private financial institutions (known as financieras rather than banks) are restricted from accepting demand deposits and their resources for providing agricultural credit are therefore limited.

The Costa Rican Development Corporation (CODESA) was created to foster national economic development by supporting private enterprises through loans and equity investments. It is important in the present context because it is the only public agency which can invest in agro-industrial enterprises. CODESA was intended to have a "mixed" capital (two-thirds from the public sector, one-third from private business), but to date almost no private money has been invested in it. It is therefore administered as if it were an autonomous institution of the government.

Another autonomous institution, the Instituto Nacional de Fomento Cooperativo (INFOCOOP), is responsible for promoting the cooperative movement, giving advice and guidance to cooperatives, and channeling credit to them. However, the legal function of registering cooperatives and granting official recognition is performed by the Ministry of Labor.

The public sector includes a group of institutions concerned with the production and marketing of particular export crops. These agencies are administered jointly by the government and private sector and are financed at least partially by taxes on the respective products, which are coffee, sugar, bananas, tobacco, and beef.

The public sector also includes a great number of commissions, councils and other collective national entities which have functions related to agricultural development. Some of these bodies were created by law and may have definite finan-

cial support and a stable institutional character. Many, however, were established less formally, by executive decree or administrative order, and have no separate budgets. Typically their assigned functions are planning, programming, the interchange of information, and "coordination". Most of them do not have functions of execution and they seldom have power to issue binding orders or instructions. Boards and councils are also numerous at the regional and local levels.

5. Institutional Structure - Private

The private institutional structure is dominated by autonomous government or quasi-government organizations. Many of these organizations act as private agencies while others are jointly managed by the public and private sector, for example. SBN is fully a public sector, for example, while CODESA is intended to have mixed capital between the public and private sectors. Agencies specialized by commodities such as coffee, sugar, tobacco and bananas also have strong private sector participation.

The Costa Rican Association of Food Industries (ACIA) was organized in 1973 through the initiative of members of the Chamber of Industry and the Director of the University's Food Technology Laboratory (CITA). As of February 1975, some fifty seven food processing enterprises (the most economically important) made up ACIA's membership. It displays both an acute awareness of the problems facing the food industry as a whole and, more especially, a pragmatic approach in seeking to provide corrective action and solution.

Private enterprise plays a major role in agricultural development. Major investments have been made by outside private enterprise such as United Brands, Standard Brands, Scott Paper and numerous other large firms to promote production and marketing of export crops and products for internal consumption. Numerous small firms have been started in food processing, transport, miscellaneous processing of agricultural products, fishing, ornamental plant, flower and seed production and similar enterprises. Some joint venture operations between public and private enterprise have also begun. The private sector thus is playing a major role in agricultural development.

B. Production and Marketing Situation

1. Basic Grains 1/

Basic Grains in Costa Rica are defined as rice, corn, beans, and sorghum. In 1975/76 nearly 200,000 Has. were planted in these four crops, up one third over the 150,000 Has. planted in the same crops in 1973.

a. Rice production has risen dramatically in recent years. In 1973, average yields of 1,588 kg/ha on 65,000 Has. provided 103,220,000 kgs, more than sufficient to meet internal demand estimated at 47.7 kg. per capita. In 1975/76 area planted was 87,100 Has., yields were down slightly to 1,403 kg/ha., and total production at 122.2 million kg.

More than three-quarters of the rice grown in 1973 was produced on farms of 50 Has. or more. Yields on larger farms averaged significantly higher than they did on small and medium farms with yields on farms of 50 Has. or more approximately 50% than for farms of 10-50 Has. and 80% higher than for farms of less than 10 Has. The record 1975/76 crop left approximately 25,000 M.T. available for export.

b. Corn is an important basic food crop with annual per capita consumption estimated at 27.3 Kg. Only about sixty percent enters commercial channels with the balance consumed on the farm or utilized for seed. In 1973 about two-thirds of the acreage and production of corn was on small and medium farms (less than 50 Has.). Yields were extremely low averaging about 1,010 Kg/ha. (16.1 bushels per acre) for all farm size. Only on very large farms (over 2,000 Has.) were yields significantly higher, almost two and one-half times the national average. Total plantings were 51,900 Has., and production 52.5 million Kg.

In 1975/76 yields were up to 1,415 Kg/ha., area planted to 64,800 Has., and total production to 91.7 million Kg. This still didn't meet national consumption (6.2 million Kg. were imported) requirements, and important and increasing share of which goes into animal feeds.

1/ 1973 production estimates from 1973 Agricultural Census. 1975/76 estimates from The Central American Basic Food Grains Situation, AID/ROCAP Guatemala, January, 1977

Per capita consumption from Céspedes, Víctor Hugo, Costa Rica: Distribución de Ingresos y El Consumo de Algunos Alimentos, San José, 1973

The Ministry of Agriculture and Livestock (MAG) recommends two improved hybrid corn varieties, which are utilized on only about five percent of the total acreage planted. Improved open pollinated varieties have not been adapted to the wide range of soil and climate areas and little fertilizer is used on corn. It is often grown as a follow-on crop in a rotation, interplanted with beans or other crops or grown as a catch-crop on poor land areas of small and medium farms. About 60% is grown during the "Winter" season (June-September) and the rest during the "Summer".

c. Bean production is largely carried out on small and medium farms with 70% of the production in 1973 on farms of less than 50 Has. Per capita consumption is about 25.9 Kg/year and more than forty percent of the total production is consumed on the farm by producers. Most beans are interplanted with corn, potatoes or other crops. Yields are extremely low with significant difference between small, medium and large farms. The average yield in 1973 was only 414 Kg./Ha. (less than 6.6 bushels/acre). Area planted was 26,680 Has. Total production was 11.0 million Kg.

In 1975/76, yields had risen slightly to 456 Kg/ha., area planted to 35,500 Has., and total production 16.2 million kg. Imports were 13.9 million kg., or 46% of total consumption.

New varieties have not been widely adapted to the different soil and climate areas suitable for bean production and this fact is often blamed for the extremely low yields. In addition to the need for better varieties, however, the availability of virus-free seed of the varieties now in use could give twenty-five to forty percent greater production on the same area and with the same practices.

In Costa Rica as in many other countries in Latin America, more adaptive research is needed on the interplanting of the important food crops. A large proportion of the corn and beans grown in Costa Rica are interplanted with each other and with other crops. Little information is available concerning the effect of this practice in the different soil and climate areas.

d. Sorghum production is relatively new to Costa Rica. 7.7 million kg. were produced on 3,752 Ha. in 1973, mainly on livestock farms in the Pacific Coast region. The average yields of over 2,000 kg/Ha. were nearly double that of corn, though using equivalent technology the two crops yield about equally. In 1975/76 area planted had risen to 10,800 Ha., average yields had dropped to 1,480 Kg/Ha., and total production was up to 19.8 million kg. 2.3 million kg. were exported. Nearly all sorghum is used for animal feed.

In an effort to reduce the growing deficits of corn, beans and sorghum the government has initiated a National Program for Basic Grains. The objective is to become self-sufficient in these crops by 1978. This program attempts to focus on the availability of credit, technical assistance, support prices and infrastructural improvements in selected areas to encourage the increased production of the desired commodities adapted to that area. Bean and corn production increased by 61 and 71 percent respectively in 1975 over 1974 which may indicate some early progress toward the desired objectives. Production will have to continue increasing in order to keep pace with the growing demand. Rice production reached domestic demand levels in 1973 and is expected to continue to exceed demand beyond 1985. Bean consumption still exceeds production. Deficits have varied widely each year but in general have been declining. With the exception of one year, total corn production has decreased every year from 1967 to 1974, while domestic consumption has grown rapidly. The annual deficit has increased until it is nearly fifty percent of yearly consumption. The following indicates the projected domestic demand for 1980 and 1985 compared to actual consumption in 1974. 1/

Projected Demand of Basic Grains

	<u>Actual</u>	<u>Projected</u>	
	<u>1974</u>	<u>1980</u>	<u>1985</u>
		<u>(Metric Tons)</u>	
Rice	69,682	82,700	95,800
Corn	147,181	179,700	212,900
Beans	31,580	37,700	43,900
Sorghum	17,935	28,000	41,800

1/ M.J. Lord- "Market Trends and Prospects of Agricultural Commodities"
IDB/IBRD/AID Agr. Sector Survey - Draft-Oct. 1976

If grain production is to reach these amounts for the 1980-1985 period it will require an average annual increase in output of 12.6 percent for corn, 6.9 percent for beans, and 8.3 percent for sorghum. Rice has reached self-sufficiency levels and is expected to continue to exceed demand.

The domestic demand for basic grains has grown fairly rapidly. Since 1960 the demand for corn has increased at an average annual rate of 8.2 percent, for beans 4.4 percent and for rice 3.4 percent. Only rice production has increased sufficiently to meet the growing demand.

The marketing of basic grains is regulated by the National Production Council (CNP), a public entity. Through the CNP the government attempts to stabilize producer prices and stimulate production by maintaining minimum prices. In order to stimulate output the CNP purchases directly from producers when farm prices fall below support levels and sells either to wholesalers, or directly to consumers. On the consumption side the CNP cooperates with Ministry of Economy in setting ceiling retail prices for grains.

When domestic production falls short of demand the CNP can import to maintain domestic prices. When in excess, they can export the surplus. Most of the CNP's efforts are devoted to direct intervention in the grains market. Regulatory and service functions -- grain inspection and grading, research and education, market news -- are less well-developed or non-existent.

It is difficult to determine whether the increases in CNP support prices have been directly passed along to farmers, or whether the price support program has reduced seasonal price fluctuations for the farmers. The recent increases in rice production (and reduced rice imports) would imply a positive response to higher price supports. Growing imports of corn and beans despite higher support prices, however, indicate that these crops have not responded sufficiently. This contradiction may be explained by factors other than prices. Corn and beans are largely small and medium-farmer crops grown with low levels of technology and production is often based on family food requirements rather than price.

The situation that exists with respect to achieving and maintaining self-sufficiency in basic grains carries some important implications for agricultural policy makers. In developing production targets and planning future programs the following should be considered:

The rapid increase in rice production probably results from the fact that three-fourths of the production

is on larger farms utilizing relatively high levels of technology, and that high support prices have been sufficient to subsidize the clearing and development of new rice land thereby increasing rice acreage. Such subsidies are often justified in order to achieve self-sufficiency or to bring new land into production. Once production fulfills demand, however, the subsidy can no longer be justified

unless this surplus rice can be disposed of on the world market at a price equal to or above the domestic price. An additional factor of key importance to Costa Rica is the kind of technology being used to achieve the present production. Large farm production of rice usually requires much higher levels of machinery use and greater consumption of petroleum products. Both machinery and petroleum have high foreign exchange costs. Small and medium farmers can be as efficient rice producers as larger farmers using less machinery and less petroleum. It is likely that much of the rice production could be shifted over time to small and medium farmers at lower prices, while maintaining self-sufficiency and avoiding large surpluses.

Increased bean production, sufficient to meet domestic demand over time, will likely require increased plantings, improved varieties adapted to the different production areas and the careful control of bean viruses. Bean viruses are transmitted through the seed. Virus-free seed could result in a twenty-five to forty percent increase in production with present varieties. Improved varieties (also virus-free) could further increase yields per acre. The higher yields resulting from better, disease-free bean varieties, with little or no addition to production costs, would probably make beans sufficiently profitable to stimulate significant increases in plantings perhaps at a lower price to the consumer. Improvements in on-farm drying and storage could also increase the quantity and quality of beans marketed. There are wide differences by region but some areas estimate storage losses as high as 20-25% of production.

Increasing the production of corn sufficient to meet growing demand will be extremely difficult. Costa Rica does not have any soil and climate areas particularly suited to corn production. Most areas where corn grows reasonably well have distinct comparative advantages for other crops and commodities. Consideration should be given to stimulating the production and export of commodities for which Costa Rica has a comparative advantage so that sufficient foreign exchange will be generated to purchase corn requirements on the open world market. Small farmers should not be discouraged from producing corn for their own consumption where this is economically feasible. New varieties (especially open-pollinated varieties for small farmer use) should be adapted to the

various production zones to increase as much as possible the yields of those farmers continuing to grow corn.

Sorghum Production can substitute for corn to a great extent in livestock zones. Much of the dry Pacific zone is suited to sorghum production. It is unlikely, however, that sorghum and corn will be able to meet the feed concentrates requirements for livestock over the next ten years. Given the natural advantages that Costa Rica has for the production of milk and milk products it is anticipated that the demand for feed concentrates will require determination of the feasibility of developing other sources of feed concentrates (such as citrus pulp, pejiabaya, etc.) more suited to tropical production.

2. Fruits and Vegetables

The wide range of soil and climate give Costa Rica a comparative advantage for the production of many fruits and vegetables. Production of these commodities for the domestic market is in the hands of thousands of small and medium farmers concentrated in the central plateau near San José. Production and marketing technology varies, but the general level of production know-how is fairly high for most crops. Prices and availability in the marketplace show wide seasonal fluctuations. Compared to other developing countries, the efficiency of the marketing system is fairly high. Studies indicate that farmers receive more than forty percent of the retail price on some of the products studied. ^{1/} However, market losses to the consumer in terms of quality of spoilage are quite high, and this results in high prices paid for the edible portion in most cases. The system is especially inefficient in dealing with new products and/or new production zones.

Only recently has serious attention been given to the production and packing of fruits and vegetables for the export market. The price and quality of cans makes canning of most products uneconomical, but freezing appears to be competitive. Although production for export of many crops is risky and markets may be limited initially, the possibility of development in this area should be given serious study and consideration. Costa Rica has soil and climate areas extremely favorable to the production of cole crops (broccoli, cauliflower, cabbage, etc.), beets, carrots, tomatoes, peppers, okra and snap beans. It may also have areas well suited to asparagus and artichokes. Fruits that offer possibilities for development are citrus, pejiabaya (peach palm), avocado, mango, papaya, pineapple, guava, watermelons and guanabana (anons). ^{2/} Fruit production is presently scattered and at more or

^{1/} Claudio Gonzalez V., Eduardo Lizano F., R.C. Vogel - "The Marketing of Agricultural Products in Costa Rica", prepared for AID by MASMA, CA. Field Program and Institute of Economic Investigations, Univ. of Costa Rica, San José, CR, 1970.

^{2/} Bananas and plantains are discussed separately.

less backyard production level. There are few orchards of commercial fruit plantings although the increasing number of plantings of oranges and papaya indicate a move in that direction. Some areas, properly developed, could provide sufficient fruit production to support a wide range of processing enterprises. Many of the items that could be produced such as fruit juices, pastes, nectares, canned fruit and fruit cocktail are currently in demand in the world market. It is unlikely that Costa Rica holds sufficient competitive advantages to profitably develop fresh fruit and vegetable exports. Much can be done, however, to expand the limited domestic market for these products.

Fruit and vegetable production is the kind of labor intensive, high income producing enterprise that is particularly suited to the small and medium farmer. In most cases these crops are also well suited to the rainfall patterns, soil types and steep slopes that exists on so many of the farms in Costa Rica. In addition, the agro-industrial enterprises associated with fruit and vegetable processing and marketing are labor intensive and have high net foreign exchange earnings.

3. Bananas and Plantains

Bananas rank with coffee at the top of the list of agricultural exports from Costa Rica. Production is concentrated in two areas: the Atlantic near Limón and the Pacific near Golfito. Plantains are grown in the same zones as bananas. In total, almost seven percent of the national area in annual and perennial crops is planted to bananas and plantains. Bananas are produced primarily for export. About 96 percent of the production is from larger farms using very high levels of technology and labor. Plantain production has been more widely dispersed among a greater number of small and medium farmers. Recent increases in plantain exports, especially to the United States and Europe, has tended to encourage increased production by larger growers as exporters prefer to buy higher quality fruit produced under higher levels of technology.

The export marketing of bananas and plantains utilizes the highest levels of technology. Domestic marketing, however, leaves a lot to be desired, perhaps because lower quality fruit sometimes is used to fulfill domestic demand. (This is not an unacceptable practice but internal marketing needs to be improved). The limits on export demand and Costa Rica's ability to compete in the international market are the only practical limits to the increased production of bananas and plantains.

4. Root Crops

The most important root crops grown in Costa Rica are potatoes and cassava. Potatoes are grown principally

in the central plateau region. Production is in the hands of only about one thousand farmers and evenly distributed among small, medium and large producers. Yields are extremely low with little difference in relation to farm size. The average yield in 1973 was only about ten metric tons per hectare. Insect and disease problems are the principal reasons for the low yields. Better varieties and the use of higher levels of technology could increase yields significantly.

Cassava is produced on three times as many farms as are potatoes. Production is much more scattered and yields relative to potential are even lower than potatoes. Eighty percent of the cassava is produced on small and medium farms and almost ten percent of the total production is consumed on the farm.

The marketing of potatoes and cassava is quite different. Potato producers are relatively specialized and concentrated in two small areas geographically. Most sell to wholesalers and truckers rather than directly to retailers. Most of the potatoes are washed and graded before reaching the retailer. The cassava marketing system is not well developed. Almost ninety percent of the producers sell their ungraded produce directly to the retailer or consumer. Cassava production is more evenly distributed throughout the year than potato production; thus there is much less seasonal price fluctuation.

Several other root crops are produced in lesser amounts. Sweet potatoes, ñame, yautia and malanga are the more common of these. Most are produced by small and medium farmers as self-sufficiency crops with the surplus marketed. There are a few commercial plantings. Two or three of these products have market demands in Puerto Rico and the U.S. that are not being fulfilled and may offer limited opportunity for development of small farmer production for export through existing export channels.

5. Industrial Crops

Industrial crops, as used here, are a loosely defined group of crops that generally require considerable processing before being exported or before entering the domestic wholesale market.

a. Coffee

Coffee has long been considered Costa Rica's most important agricultural product. Although bananas surpassed coffee in export earnings in 1975, the importance of coffee as a small and medium farmer crop has not diminished. In 1973 more

than sixty-five percent of the coffee was produced on farms of less than fifty hectares. Approximately seventeen percent of the total area under cultivation in Costa Rica is devoted to coffee. A wide range of varieties are grown and production is widely dispersed within the areas suitable for coffee growing. Coffee's relative contribution to the total output of the agricultural sector declined steadily in the 1980's as the average annual growth rate of coffee was much lower than the growth rate of the sector as a whole. The relatively slow growth in coffee production can probably be attributed to the sluggish world market for coffee between 1980-1974 and the fact that government policies during that period did not encourage the expansion of plantings. During this same period domestic consumption increased at more than double the rate of coffee exports.

Control of coffee exports and the allocation of supplies between the domestic and exports markets is in the hands of the Oficina del Café (Office of Coffee). Allocations are made on the basis of anticipated harvest and domestic needs. This office also sets advance payments to producers, regulates exports, strongly influences domestic prices and, when annual coffee transactions are completed, determines the actual price to be paid to producers for that year.

The market prospects for coffee in Costa Rica appear favorable in the short-term but much less favorable over the medium-term. When Brazil resumes its normal level of output the world situation will likely return to the production-consumption balance that existed prior to the Brazilian coffee freeze at much lower than present prices. Increasing internal demand is also likely to cut down on future exportable surpluses and consequent foreign exchange earnings : e.g., per capita consumption rose from 3.0 kilograms in 1960 to 5.0 kilograms in 1974. This is projected to reach 7.0 Kg. in 1980 and 8.4 Kg. in 1985 or 17 percent and 23.7 percent respectively of total production. This will result in a decline in supplies available for export from 86,100 metric tons in 1973/74 to 75,900 metric tons in 1979/80 and 70,900 metric tons in 1984/85.

The recent outbreak of coffee rust in Nicaragua may have disastrous effects on coffee production throughout Central America in the next few years. Though Costa Rica is better-equipped to combat Roya than the other Central American republics, the consequences for the national economy as a whole and the rural economy in particular can be grave.

b. Sugar

Sugar cane is grown on approximately eight percent of the crop land in the country. Almost three-

quarters of the total production is from larger farms (over 50 Has.). These larger producers use high levels of technology and receive approximately fifty percent higher yields than small and medium farmers. Improved varieties have been introduced and better cutting and transportation practices are being used, but poor cultural practices still prevail and yields are not as high as they could be.

The volume of sugar production in Costa Rica has nearly trebled since 1960, equivalent to an average annual growth rate of 8.0 percent. The rate of growth averaged about ten percent in the sixties but declined in the 1972/74 period to only 4.9 percent.

The production and marketing of sugar is regulated by the Liga Agrícola Industrial de la Caña de Azúcar, a public institution. The League fixes production quotas, determines the level of advance payments to be made to producers by the mills, and at the end of the season, calculates returns from domestic and export sales, subtracts costs and prorates the net-returns between the mills and the producers. There are no major problems with the physical marketing of sugar and sugar products. Good coordination exists between the different entities in the production/marketing chain. Government pricing policies have created some problems, however. Prices are regulated by the Sugar League. The price received by sugar cane producers is strongly influenced by the domestic price level. Domestic consumption has ranged from 40 to 60 percent of production for the last fifteen years. A problem arises because the Ministry of Economy, Industry and Commerce (MEIC) has kept the domestic retail price of sugar constant and well below world market prices. This has encouraged domestic consumption (home and industrial consumption) which has increased from 33 kilograms per capita in 1963 to 52.2 kilograms per capita in 1974. The higher proportion of production going into the domestic market has meant lower producer prices and the net result may have been to discourage sugar production.

Another problem of the sugar industry is the maldistribution of mill capacity in relation to cane production. In recent years this has contributed to the underutilization of one-third of the installed mill capacity. In some areas where a high percentage of mill capacity is not utilized the high unit cost of operation may force some mills to discontinue operations if sugar prices continue to decline.

Sugar exports have been almost entirely to the U.S. market. By the end of the U.S. Sugar Act in 1974 Costa Rica's quota was more than 100,000 metric tons.

It is anticipated that the U.S. will continue to be Costa Rica's principal sugar market even in a free market situation because of locational advantage. Estimates are that production will rise to about 255,000 metric tons by 1979/80 and remain at this level through 1984/85. This would be equal to about 80 percent of the present mill processing capacity. If domestic consumption continues to increase in line with past growth patterns this would mean that supplies available for export would increase to 105,000 metric tons by 1980 and decline to 43,000 metric tons by 1985.

c. Cacao

Cacao is Costa Rica's fifth largest agricultural export commodity. The many cacao plantations established in Limón province in the 1930's started to decline in importance in 1960 when world cacao prices began to fall and bananas became a more profitable enterprise. During the 1960's output declined at a rate of 2.0 percent per year. In 1970 a hurricane severely damaged cacao trees in the Atlantic Coast zone (where 85 percent of the production is located) and output dropped by more than half. Since then there has been only moderate recovery in output. In the face of a sometimes widely fluctuating world market price, renovation of the damaged plantations appeared less attractive an investment than alternative opportunities such as bananas and plantains. The long-term decline in cacao production has been entirely due to reductions in area planted. Average yields have remained at the extremely low level of .28 metric tons per hectare. Low yields are attributed to three factors. In the Atlantic Coast Zone where most production occurs about seventy percent of the growers have less than fourteen hectares of land and operate at very low levels of technology. Secondly, some of the growers in this area lease their land with a prior notice of cancellation of three months. Although many of these renters have recently been given the option to purchase, there is no long-term credit available. Under such an arrangement there is little incentive to make the investment necessary to increase yields. Thirdly, because of the landholding situation and the instability of cacao prices there has been little credit extended by banks to cacao producers. ^{1/}

The medium-term prospects for cacao in Costa Rica are difficult to assess. Full recovery from the hurricane damage should occur in the latter 1970's for those plantations that have not been abandoned. Even though most producers on leased land now have the option to buy, the paucity of long-term credit for land purchase and plantation renovation will limit production

^{1/} Cacao has the highest index of export price fluctuations among Latin America's primary commodity exports.

increases. Also, recent high prices on the world market are expected to result in reduced demand as well as in increased plantings in other producing countries and lower world prices for the 1980-85 period and beyond.

d. Tobacco

Costa Rica is basically self-sufficient in tobacco production and processing. Limited quantities of cigarettes (mostly U.S.) and some aromatic leaf tobaccos are imported. Also, relatively small amounts of elaborated tobacco are exported from time to time.

Most of the tobacco production is limited to selected areas to the southeast and southwest of San José. Two-thirds of the tobacco production is on farms of less than 20 hectares. All production is done on contract with a selected group of farmers using high levels of technology under close supervision.

Production is limited each year to the anticipated demand. Quotas are established by the Tobacco Board (Junta de Defensa del Tabaco), an autonomous entity which includes representatives from various central government entities and from the private sector. Prices paid to farmers are established by the CNP, based upon recommendations by the Junta.

Two tobacco companies control the market and neither predominates. Although the value of tobacco marketed has increased from 8.2 million current colones in 1968 to an estimated 40.1 million current colones in 1974, this increase is more representative of inflation than of real growth of the industry. Most of the real increase has been due to population growth.

Costa Rica does not have an apparent competitive advantage for tobacco over other Central American countries. Neither is there great potential for competing in the world market. It is generally agreed, therefore, that the future growth of the tobacco industry will very closely parallel the population increase.

e. Edible Oils

Much of the edible oil consumed in Costa Rica is imported either as oil or oil seeds, and balanced by a roughly equivalent export of African palm oil produced in the coastal regions. Actual production, mostly by large companies using fairly high levels of technology, is reported being about 60 million

pounds per year. Three extraction plants are operating at approximately 60-70 percent of total capacity. Palm oil is unsuitable for use in the production of margarine. However, an oil fractionating plant is presently being installed which will separate a light constituent from palm oil that will be suitable for margarine. If successful it is hoped that production can be expanded within three or four years to eliminate dependence on other oils. Currently large amounts of cottonseed or cottonseed oil are imported for margarine production.

Some cotton is being produced in the Dry Pacific region of the country. The development of this crop received a setback in 1967/68 when adverse weather and floods in the producing area caused crop losses, low yields, and low quality cotton. Until this year cotton production had almost disappeared, but a GOSR/MAG program stimulated increased plantings in 1976 which should expand in coming years.

Cocoanuts are produced commercially on almost four thousand farms. Two-thirds of the producers have farms of fifty hectares or less and all but six have less than twenty hectares of coconuts. Most of the production is in areas that make transportation difficult with respect to market alternatives. As a result producers find it hard to take advantage of the best market opportunities and tend to produce for a specific nearby market, often at a lower price.

Coconut production practices are very poor. Disease and insect problems contribute to very low yields. Despite this, the Malayan Dwarf variety which is disease resistant, more suited to pest control and higher yielding is not being widely used.

Except for coconuts in some areas, the marketing system for oilcrops is not a problem. The prospects for increasing edible oil production sufficiently to meet domestic consumption are excellent over the medium-term. It is likely, however, that these increases will come from palm oil and cotton produced on larger farms.

f. Forestry

Costa Rica has approximately 2.2 - 2.5 million hectares of forests (almost half of the land area)

of which more than two-thirds are still in the virgin state. These forest sources, however, are being diminished at an estimated rate of 40-60,000 hectares per year.

Some of the deforestation is related to commercial logging and to the wood products and lumber industries. The main cause, however, is the expansion of grazing lands, and the pressure of illegal squatters. The government has encouraged this expansion through laws which favor cattle over forest use, through its favorable credit policies for cattle expansion and through the activities of such institutions as ITCO. No less important has been government's failure to provide the authority and the support required to move ahead with the implementation of a national forestry program.

Costa Rica has a fairly comprehensive forest law, passed in 1969, which is not being implemented. The principal agency responsible for administering the law is the Dirección General Forestal (DGF) of MAG, though a number of other public institutions have gotten involved. ^{1/} The DGF is admittedly weak, understaffed, inexperienced and inadequately budgeted to carry out its statutory responsibilities.

Of the total land in forests about 1.4 million hectares are believed to be well suited to forestry. It is estimated that at least 400,000 hectares of this should be maintained in forest strictly for protection purposes because of slope, soil type, rainfall or combination of factors. Since about thirty percent of the total forested area is in private ownership, only fully-enforced, clearly-defined land use policies can avoid costly deforestation.

Deforestation is not just destroying the nation's timber resources, which, at current cutting rates, will be exhausted by the end of the century. It is also destroying the soil resources protected by forest cover and destroying forest-protected watersheds. Recurrent drought conditions in many areas would be much less severe if forest in upstream watersheds had not

^{1/} OFIPLAN is involved in forestry planning, ICE is involved with re-forestation of watersheds related to hydro-electric projects, ITCO desires to develop permanent forestry areas as a compliment to land settlement and JAPDEVA controls 160,000 hectares of forest land in Limon Province.

been removed. Continued deforestation will seriously threaten future agricultural sector development by destroying these basic soil and water resources.

Much of the valuable wood that is cut is wasted through inefficient marketing and processing. A large number of commercial species are found, many of which are acceptable to the world market. About 120 species are presently accepted in the domestic market. There are virtually no timber plantations and, except for studies done by CATIE and FAO in the Turrialba area, there is no reliable information available on site-growth relationships for the various hardwood.

In addition to the hardwood forest that presently exists, Costa Rica has some potential for the production of long fiber species suitable for pulp and paper. Work done by CATIE at Turrialba indicates that at least one pine species is sufficiently adapted to the area and has adequate growth rates to provide a base for a pulp and paper industry. The extent of the area that might economically produce long fiber trees has not yet been delimited, and trials must be expanded to other areas. If the production of fast growing long fiber trees can compete favorably with extensive grazing, this may provide a sensible and economically advantageous solution for at least some deforested areas.

Wood products and paper and paperboard accounted for 14.3 percent of the GDP in 1974, up from 12 percent in 1973. These products comprise only 6 percent of industrial exports and an insignificant percentage of total exports. Wood and board imports are small but the importation of paper and paper products including cartons amounted to U.S. \$54.2 million in 1974. The value of pulp and paper imports has been growing rapidly due to price increases for these products, while the volume of imports has remained fairly stable.

Wood and wood products offer an excellent possibility for increasing exports. The wood industry requires relatively high levels of employment and is one that can be dispersed widely throughout the country. The products are not perishable and much of the labor required is at the semi-skilled level. Sufficient high-quality timber exists to provide virtually unlimited raw material for such an expanded industry in the medium-term. Predictions concerning the long-term would be meaningless without further information concerning the Government's willingness to take quick action on some of the key factors that will affect long-term production.

g. Specialty Crops

A wide variety of "specialty crops" offer good possibilities for expanding exports, import substitution, generating additional on-farm employment or providing a base for profitable agro-industry. Many of these would require high levels of technology at the production and/or marketing levels, while some need additional study or trials to determine adaptability by area, cost-return expectations, etc. A few of the more interesting ones are:

(1) Macadamia - Large areas of the country have soil and climate exceptionally well suited to the production of Macadamia nuts. Existing plantings indicate that the better Hawaiian varieties are well adapted to Costa Rica. Budget analyses in 1975 indicate that on-farm cost-of-production are less than one-third the production cost per pound in Hawaii, and compare favorably with other countries where wage rates are low. 1/

The projected world demand for macadamia in 1985 indicates the need for more than 46,000 acres of producing orchards by that date. The acreage of developed and new orchards presently existing in the world is estimated at not more than 20,000 acres. Costa Rica's natural advantages would imply that 4,000-5,000 acres of new plantings could be established here with very good assurance of profitable markets.

Macadamia is well suited to small and medium farm production. It requires high investment, relatively high levels of technology and four or five years from planting to first crop.

(2) Essential Oils - Several essential oil-producing plants grow well in some regions of Costa Rica. Oil of citronella, lemon grass oil, ginger grass oil and oil of vetiver can all be produced here. The constraint to the development of these crops is in processing and marketing.

1/ S. Scott Jr., "The Economic Feasibility of Establishing a Macadamia Nut Industry in Costa Rica", Mimeo, 1975.

(3) Flowers and Ornamental Plants

A considerable amount of flowers and ornamental plants are already being exported from Costa Rica, along with more than US \$1.2 million worth of flower seeds that were exported in 1974. The wide range of soil and climate areas and the high capability of labor available would permit a significant expansion in this area. A much broader group of horticultural plants could find a market than is presently being produced. In addition to expansion of the seeds and plant materials currently being grown, the feasibility of producing a variety of flower bulbs should be studied.

The production of flowers, plants, bulbs and flower seeds requires little land, relatively high investment and high levels of technical skill. It also requires high levels of labor, some of which is seasonal. The establishment of reliable market outlets and a complete knowledge and understanding of market requirements are critical to success in these areas.

(or achiote)

(4) Annatto/(Bixa orellana)

This is a perennial crop whose seeds are used to make a yellow or orange coloring used in food industry. It is a traditional crop in a few areas of the country. Production techniques are antiquated and yields per unit area are low. The marketing system was recently transformed when a marketing cooperative was organized in two of the principal producing areas.

The market demand for achiote is not presently being fulfilled. Export prospects are excellent although more study is needed to determine the depth and elasticity of demand in the international market. Additional study of the domestic market and of the product itself might help to identify new market possibilities. As an illustration - the local poultry industry recently discovered that achiote added to the poultry ration in very small amounts is the most economical way to maintain acceptable yolk color in eggs, thus providing a low-cost substitute for imported alfalfa meal or other additives.

Achiote is almost entirely a small farmer crop well suited to remote areas, for the harvest consists of a dried extract from the seeds resulting in a small amount of high value product per hectare. The extraction is

done on-farm and therefore that portion of the marketing costs accrues to the farm family.

The extent of the development possibilities for achiote are not known. It is believed, however, that production could be increased several-fold without difficulty. By the time this increase has been achieved additional knowledge will have been obtained concerning these limitations.

(5) Pejibaye and Palmito - The pejibaye palm (or peach palm) produces a highly nutritive and delicious fruit and the heart of the growing tip can be used for palmito (heart of palm) as well. In the past this palm was the most dependable source of food for indigenous tribes that lived in the humid tropics of Central and South America. In Costa Rica the palm fruit is harvested and sold to street vendors who cook the fruit and sell it on the street for immediate consumption. The palmito can be eaten fresh, cooked or canned.

Pejibaye most often is harvested in the wild state but some growers have begun to plant it as a regular crop. It does well in solid stands or interplanted with a variety of crops. Yields per hectare can be very high, up to 100,000 kilograms per hectare of fruit. The palm normally has 3-6 trunks from each plant with each producing 2 to 15 bunches of fruit per year. When a trunk is cut for the palm heart a new one normally sprouts in its place.

The market for pejibaye fruit is quite limited at present because the fruit is not well known outside its natural habitat. The market for palm heart is considerably broader and it is in good demand as a canned product. The fruit of pejibaye is high in vitamins, contains more than 5 percent protein, 9 percent oil, 2 percent fiber and about 80 percent carbohydrates (all dry weight). There are 180 calories per 100 grams of the fruit. These nutritive values, coupled with the high yields obtainable, might open up new market possibilities as a feed concentrate for livestock. Some studies have been done in this area but more information is needed on production and animal feeding before action programs are initiated.

Pejibaye is best adapted to small and medium farms. It can be grown with low to moderate levels of technology and a reasonable level of inputs. Although the first crop takes six or seven years, it can be interplanted with other income-earning crops during this time.

(6) Passion Fruit - Results from experimental plantings and a few commercial plantings have shown that passion fruit can be a promising crop in some areas of Costa Rica. There is a large export market (especially to the US) that is not being fulfilled since Hawaiian production was reduced by the loss of agricultural lands to urbanization.

The production of passion fruit is a high investment/high technology enterprise. There are high-yield hybrid varieties with potentially excellent returns per hectare. Labor requirements are fairly high, especially in the first year of planting. The marketing of the product is not expected to pose a serious problem.

(7) Spices - There are several spices that are well suited to one area or another of the country. Black pepper is probably the most promising. Experiments conducted in Limon province and laboratory tests at McCormick Spices Co. indicate that high-quality pepper of large size can be produced there using a variety well adapted to the area.

Black pepper requires a high investment but also yields high returns under good conditions. It can be produced by either small, medium or large farmer. The labor requirement is high because harvesting must be done each week. Drying is fairly easy. Cash flow is excellent once in production as there is a steady income from regular sales. The crop is also well suited to small, backyard plantings.

(8) Ginger is another spice appropriate to small farm or backyard production. It requires fertilization and crop rotation. Some experiments have been done on ginger at Los Diamantes in the Atlantic Zone. These have been quite favorable and results indicate the crop will do well in that area. Favorable markets in the US make the prospects for both fresh and dried ginger very attractive. Some small plantings already exist in the Limon area.

(9) Isolated Nutmeg trees are found in Limon province, and tests show it to be of good quality. Nutmeg is normally produced in plantations and is probably not suited to small farm production because of an inherent risk in the crop's botanical characteristics. Production comes only from female trees and the sex of the trees cannot be determined until flowering, usually after six or seven years.

6. Livestock and Livestock Products

a. Beef

Beef ranks third behind coffee and bananas in value of production in the agricultural sector and until 1975 had also ranked third among agricultural exports. In 1975 the value of sugar exports exceeded that of beef due to the exceptionally high price of sugar (volume of exports was about the same) and the low beef prices in the first six months of the year. Beef exports were down slightly in 1975 as compared to the previous five years in which volume had been increasing significantly each year.

Costa Rica has more than 1.5 million hectares of land in pasture, approximately 62 percent of the total land in crops and pasture. Slightly less than half of this pasture was classified as improved pasture in 1973 agricultural census. Much of the unimproved pasture could be classified as marginal. Government policies including relatively abundant credit favoring the expansion of beef production have resulted in a rapid growth of the industry. Comparison of census figures for 1963 and 1973 indicate that about 613,000 hectares were added to pastures during the decade. Beef cattle numbers grew 4.8 percent annually during the same period and were estimated at 1.8 million head in 1975. Beef production has grown much faster than dairying. In 1973 beef farms comprised 79.8 percent of all cattle farms with milk production on 8.9 percent and dual purpose (meat and milk) on 11.3 percent.

An analysis of the growth of the beef and dairy industries in relation to expansion of the cattle numbers and the area devoted to cattle indicates that all of the increased production in the 1963-73 decade has come from addition to stock. There has been no significant increase in productivity. Beef production is heavily concentrated in the northwest half of the country. Of the total, Guanacaste province has 37.1 percent, Alajuela 22.0 percent and Puntarenas 20.2 percent - a total of 79.3 percent. Beef cattle numbers are growing most rapidly percentagewise (6.3% annually) in Limon province in the Atlantic zone although numbers there are still very low. Most of the increase in cattle numbers in Limon is believed to result from the displacement of cattle by higher value enterprises in the areas around San Jose. Land values in the Central Plateau region have increased to the point that beef production no longer provides sufficient returns per unit area.

The quality of beef cattle in Costa Rica is quite good, due mainly to the regular importation over a long period of time of high quality breeding stock and the use of

artificial insemination to upgrade native animals. Most of the animals now contain some Cebu characteristics. There are also a number of Charolais and Santa Gertrudis herds.

In general, beef production is a land-extensive enterprise. Pastures average only .6 to .8 animal units per hectare. Although more than twenty percent of the beef is produced on one percent of the farms (of 500 hectares or more) 47 percent is produced on farms of less than 100 hectares. More than 92 percent of the farms producing beef had 100 hectares of land or less.

Since 1973 more than half of the cattle slaughter has been for export. Export sales in 1974 amounted to 78.4 million pounds, mostly to the United States, valued at US\$34.2 million. 1/

Nine livestock slaughter and/or packing plants are approved by the US Department of Agriculture for exporting to the U.S. All exports slaughter and processing is done by these plants. Three of them are boning operations that do no slaughtering. In these plants sanitary standards are high. Approximately 20 percent of beef slaughter for domestic consumption takes place in a variety of small plants without veterinary inspection in towns scattered around the country.

Per capita beef consumption in Costa Rica is low; about 22.5 pounds in 1975. Consumption dropped from 1971-74 due to increasing beef prices. Price controls on popular beef cuts effectively applied in 1975 may have reversed the declining trends as per capita consumption rose from a low of 18.3 pounds in 1974. Beef supplies in 1976 were sufficient to provide a surplus over the voluntary U.S. quota plus domestic consumption.

The prospects for beef production are good. Large increases could be obtained through increased productivity. In the short and medium-term, at least, the availability of markets are likely to be the critical factor for the beef industry in Costa Rica. If beef exports continue to increase at a rate nearly equal to that achieved from 1970-75 it is doubtful that this demand could be met by further expanding stock and pastures. 2/

1/ U.S. Agr. Attache reports on Agr. Situation, January 1976 and Livestock and Meat Situation, February 1976

2/ Beef exports increased from 51.3 million pounds in 1970 to 85.2 million pounds in 1975--approximately 62.3 percent in six years.

Recently there has been considerable pressure on the GOCR to reduce the rate of deforestation, estimated at 30,000 to 50,000 hectares per year. ^{1/} Much of this has taken place in order to expand pastures and beef cattle production. A critical review of land-use policies may soon be necessary in order to reduce deforestation in areas suitable principally for tree crops. Some of the land already cleared for pasture should probably also be replanted to trees to prevent more serious erosion damage and permanent loss of use. A more orderly and controlled move from forest to pasture to crops would certainly improve long-term development prospects without posing a serious land constraint for the livestock industry.

b. Dairying

Costa Rica has large land areas adapted to dairying. The small farmers as a group are intelligent and industrious and thus well suited to this labor-intensive enterprise. Basic herds of excellent quality provide a sound base for more rapid expansion of the industry. In-country and world demand for milk and milk products far exceeds supply. About 8,694 farms, including dual purpose enterprises, milk approximately 131,500 cows. Distinctions between dairy cattle (or farms) and beef cattle (or farms) sometimes can not be drawn clearly. Dual purpose herds are more prevalent outside of the central plateau, where beef production is an alternative to milk production. The balance between the two enterprises depends on relative prices, and some shifting to beef has taken place in recent years, in response to favorable beef prices. Now, with US beef quota problems and an uncertain world market outlook for the next few years, the GOCR has an excellent opportunity to stimulate a more rapid increase in dairying to the point of self sufficiency and export. Small farm operators with exceptional skill in managing a dairy herd have a competitive advantage in milk production. The most intensive dairy production is located in the higher levels of the Meseta Central, with the provinces of Cartago, San Jose, and Alajuela producing the bulk of the country's milk supply. This is partially due to the natural climatic advantage but is influenced greatly by population concentration, location of processing facilities and access roads. As the GOCR advances into the outlying provinces with its aggressive road building program new milk-sheds will extend even to the coastal areas.

^{1/} The rate may have been greater than this in 1963-73 when an additional 613,000 hectares were added to pastures.

Although Costa Rica's national dairy industry includes purebred and high-grade herds of the principal dairy breeds, Holstein, Jersey, Guernsey, Brown Swiss, and Ayrshire, a recent survey indicates that only 20% of the animals are purebred. Inadequate genetic potential limits the productivity of many herds in the traditional milk producing areas.

Artificial insemination (AI) with both domestic and imported semen is widely used. The service is provided by El Alto Experiment Station of MAG and by several private AI services. Some farmers have learned to do AI themselves using purchased semen or semen from their own bulls. Poor roads and communication are a handicap to adequate AI service for many farms. The supply of high-quality dairy helpers does not seem adequate for replacements and to accelerate expansion of milk-cow number, as current prices for dairy cattle are several hundred dollars above the cost of importing animals of equivalent quality.

Feeding presents a number of problems for Costa Rican dairymen. The base of the system is green forage, grazed or cut and fed, and supplemented with concentrates. Throughout the intensive milk zone it rains almost daily most of the year. Similar conditions prevail in the dairy areas of the Atlantic slope. In the north Pacific zone there is a dependable dry season, but the practice of growing hay is not common. Under prevailing climatic conditions, forage is lush, high in moisture, generally low in protein and low in fiber. Even by consuming all the rumen will hold, a cow fails to obtain sufficient intake of either calories or protein to sustain her genetic capacity for milk production and the fiber content falls short of the physiological optimum for the species. The result is that unless this diet is supplemented with the quality concentrate, less production must be expected, and heifers tend not to mature as early or at as large a size as would be desirable.

It is interesting to note that 65.99% of the dairy farmers have two or less hectares of land while 71.79% of the dual purpose have less than 20 hectares. Over 90% of both dairy and dual purpose farmers have less than 100 hectares. The 1974 milk production was estimated at 257 million liters. Two cooperatives, Dos Pinos and La Cooperativa Coronado, are the country's two main milk processing plants. In 1974 Dos Pinos handled over 65 million liters and Coronado handled about 10 million liters. The balance of 182 million liters was consumed or processed into cheese, without pasteurization.

In approximately one-third of the country, milk production is a going enterprise. Within the area that has high dairy potential, milk production now occupies only about 100,000 hectares. One may identify several additional areas encompassing over 1/2 million hectares within which dairying offers

a high potential. Thus, the expansion of Costa Rica's dairy industry will be limited by factors other than land availability; among which are marketing and infrastructure, pasture improvement, developing national sources of concentrated feed, genetic improvement, and technical assistance to both new and traditional producers

c. Swine

Hog production is insufficient to meet domestic demand. Live hog imports in 1974 amounted to US \$ 2.1 million. An equivalent amount of processed meat and meat products was imported, much of which contained pork but which cannot be separated by type of meat. Pork consumption is very low and has been declining slightly for a number of years. CAN reports that swine production was 9,089 metric tons and that per capita consumption was 4.74 Kilograms in 1972. CAN estimates that the consumption potential for pork, if readily available, is more than 50 percent higher than at present.

The potential for swine production will be limited by the availability of suitable feeds. In the foreseeable future the price of feed grains is expected to be too high to encourage expanded swine production. Most swine are produced in Costa Rica using very low levels of technology. There are several crops widely produced in the country that could substitute for a significant part of the feed grains in a swine ration. Reject bananas, cassava and malanga probably offer the best possibilities. Experiments have shown that banana meal without the skin can substitute for 60% of the corn in swine feeding. It is estimated that more than 3 million pounds of bananas annually do not meet export requirements in Limon province alone. According to local technical experts these rejects could feed more than 40,000 hogs per year.

More information and trials are needed and should be initiated as soon as possible, although limited commercial enterprises using these feed sources are already in production near Guapiles.

d. Poultry

Commercial production of broilers and eggs began in 1955, with most producers specializing in one or the other. The poultry industry is concentrated around San José and thus has ready access to feed and baby chicks as well as to the principal market outlets. One firm dominated the poultry market

for several years during the late sixties and early seventies. At its peak, it supplied approximately 85% of the broiler market and 20% of the egg market. The firm was highly successful because it was able to reduce unit costs by employing economies of scale, innovative and aggressive merchandizing policies such as packaging broiler parts and sales promotion.

Feeds costs have risen steadily over the past decade as support prices were raised to stimulate local production of basic grains. The increasing cost of imported concentrates (20-30% in the past two years) has forced the industry to seek all possible economies and efficiencies. It is expected that at the "stabilised" consumer price of \$5.0 per pound, a progressive increase in the consumption of broiler meat should occur. There is no control price on eggs but production and consumption are expected to remain fairly stable. Any real breakthrough in expansion of the poultry industry must depend upon cheaper feed. This is not likely to come from domestically produced basic grains although the production of grain sorghum could increase substantially in the northern Pacific zone.

e. Hides and Skins

At least fifty tanneries are reported to exist in Costa Rica. They are mostly rudimentary and provide little for the owner-operators. Of the nine or ten establishments functioning at the industrial level no more than three have modern installations and use sufficient processing technologies. One tannery, opened in 1974, has a fixed investment of over a million dollars. Its installed capacity is around 600 cattle hides per 10 hours and break-even performance is about 50% of installed capacity. The major difficulty facing the industry is the poor quality of national hides caused by excessive numbers of brand markings, skin parasites and knife cuts in the flaying process. This situation, further aggravated by a total lack of selection or sorting by suppliers, effectively down-grades a potentially valuable raw material and obliges some of the more exacting leather users to depend upon imported material. With an annual availability of over 250,000 skins, Costa Rica is a net importer of leather. Improved handling and less waste of this valuable product could easily place the country in a net exporting position and create numerous new jobs in the leather industry. USAID sponsored consultants have been extremely valuable to the leather industries of Colombia and Uruguay, and could meet with equal success here.

f. Fish

Costa Rica is self-sufficient in fish, and exports (mostly shrimp) amounted to US \$ 3.5 million in 1974. Almost all commercial fishing activities are in Pacific waters. Three fish processing factories, separately owned, are located in Puntarenas, with each factory operating its own fishing vessels. The principal products are canned sardines and tuna, and frozen shrimp. The canned products generally go into the domestic market and the shrimp are exported. One of the processors plans to develop an export business of frozen fillets, soup stock, etc.

There are a number of small scale fishing and drying operations located in places other than Puntarenas, specially in and around Port Limon on the Atlantic coast. Two processing plants in Limon are involved in the slaughtering and processing of green turtles. In 1972 these two plants processed approximately 1000 turtles and it was estimated that an additional 1000 were slaughtered by local poachers. The undershell of turtle is use for glue production, the carapace or top shell is exported and the meat is packed in five pound boxes and exported to Europe. Approximately fifty pounds of meat is obtained from each turtle. The two processing plants in Port Limon are only involved in turtle processing about three months per year. During the remaining months they are used to process beef, lobster and shrimp.

There appear to be a number of possibilities for expansion of the fishing industry. A pilot project on Tilapias production in fresh water ponds conducted at Turrialba was quite successful. However, private farmers participating in the Tilapia work have not achieved the same level of success as the demonstration program, and more work needs to be carried out in a wide range of geographic areas. Oysters might also be developed as a profitable marine farming industry. The Atlantic coast appears to offer many ideal areas for the establishment of oysters beds: some beds formerly existed in the Moin River area but have since disappeared. Foreign Investors are developing shrimp production in brackish-water tanks near Puntarenas starting with a several million dollar investment. The Corporación Financiera de Tortuguero has plans to organize a fishing industry near the mouths of the many rivers in the Atlantic region. The fish will be iced and transported to Port Limon for marketing.

C. Constraints and Opportunities

The term 'Sector Constraints' has little meaning in the absence of defined Sector goals. We envision two sets of goals: a) general Agricultural Sector development goals, and b) AID's Congressional Mandate goals for the target group. As elsewhere, the two are not entirely congruent.

- Agricultural Sector Development Goals:

That the agricultural sector continue to expand in value output as it has in previous years; that it maintain its contribution to GNP and export earnings; and that it maintain or increase its share of employment and employment generation.

- AID Mandate Target Group Goals: That both

components of the Rural Target Group (poor small farmers, and landless rural poor) receive higher real incomes from farming operations and/or off-farm employment, and receive an increased share of Agricultural Sector income. These goals are constrained by some of the conditions described in Section III. However, other conditions are not really constraints, but offer opportunities for expanding the Sector and/or helping the target group.

1. Factors Affecting Production

a. Land and Climate

Costa Rica's land and climate situation were described in Section III. A. 1. in relation to the geographic and ecological zones.

The land area of 51,260 km² divided into tropical (36,370 km²), subtropical (9,810 km²) climates allows the nearly 2,000,000 inhabitants to enjoy an extremely wide variety of food and fiber. With its excellent land base the country can continue to produce the majority of its food requirements long after the population doubles by about the year 2,000. Almost any crop in the world can be grown somewhere in Costa Rica, but land and climate constraints limit the practicality of self-sufficiency in many of the basic agricultural commodities now being consumed. Alternative crops and changes in land use patterns are necessary in many areas if the country is to remain self-supporting and to conserve its finite land resources. The tropical areas of the Pacific have some fertile plains interspersed among many steep, leached hills. Long

dry seasons in the northern portion limit production to one crop per year, and in many areas a high concentration of rain within a few months each year causes heavy leaching, soil erosion, and flash floods. The tropical areas of the Atlantic have high to very high rainfall throughout the year. Flash flooding is a continuous hazard, roads are nonexistent or poor in many localities. These factors limit the production of certain basic foods currently in short supply nationally. The central high-lands have seasonally high rainfall, erratic dry seasons, very steep slopes and a minimum of mechanizable land. Denuded mountainsides planted to basic grains give low production and cause increasing soil erosion, while permanent crops, dairying and forestry on steeper lands tend to protect the more level areas for vegetable crops and annual crops.

To a remarkable extent Costa Rican agriculturists have adapted their farming technologies to their soil and climate constraints and advantages. Coffee, livestock, sugar cane, and forest are the dominant crops in the sub-tropical and temperate zones. Permanent crops, livestock and forest dominate the tropical zone. The evolution of agriculture in the country to date clearly shows that land use patterns which keep delicate tropical soils covered have given the highest returns on investment and kept soil erosion on these lands to a minimum. Unfortunately the Costa Rican soil and climate does not offer comparative advantage for most annual crops other than vegetables. The internal demand and future requirements for field crops (basic grains other than rice, cotton, peanuts, soybeans and sesame) must compete with pasture lands, forest lands and each other for scarce suitable land. Lack of sufficient land suitable for annual crops plus policies which stimulated extensive livestock production have wreaked havoc on extensive areas of steep mountain slopes suitable only for forest, permanent crops, or improved pasture. Low yields, low-value crops and severe soil erosion in these areas will tend to keep the poor small farmer marginal. It is true that fertilization, better varieties and improved cultural practices can increase yields for most basic food crops sufficiently to meet current internal requirements. At best, however, this is a short range solution, difficult to achieve and not the optimum use of available resources in terms of alternative opportunities. It is estimated by the extension service of MAG that they are reaching 10% of the small farmers with technical assistance and 5% with improved seed. This means that 90% and 95% respectively of the small farmers are not participating and thus are not increasing production. Perhaps more extension efforts should be focused upon diversification of the small farm enterprise as long range solution.

b. Land Tenure

The man-land relationships discussed earlier in this section show considerable variation among regions. Land concentration also varies considerably, and, as discussed in Section II, land availability is a major constraint to income improvement for a significant proportion of the small-farmer target group. The large concentrations of land in extensive livestock operations, plus a series of credit, tax, and pricing policies, severely limits the target group's access to new land resources. Those target group individuals who have the motivation and ability to successfully operate a small or medium-size farm will be providing income and employment not only to themselves and their families but to several times as many families who can be supported by the employment generated.

There is evidence of the growth and increasing stability of middle class farmers in Costa Rica. Many of them are outmigrants from overcrowded minifundia areas and to a considerable degree are spearheading development of the unsettled areas of the tropical lowlands. COCR policy has been to allow these enterprising colonists to claim up to 200 hectares of unsettled land.

Spontaneous colonization has many pros and cons. It was quite successful in the US and has proven more fruitful in Colombia than has "directed" colonization. Studies conducted in Colombia found that the spontaneous colonists had high motivation and less dependence upon government assistance for services and daily problem solving than did the "directed" colonists. Many problems could be avoided in Costa Rica if the COGR through ITCO would perform, or arrange for other public or private sector agencies to perform the following minimum services: a) clearly identify, by canton, lands available for distribution or settlement; b) contract for the construction of basic access roads or trails; c) parcel the land into economic sized units taking into account topography, soil capability, potential land use, etc.; d) establish and publish a simple equitable system for selecting settlers; e) give clear, negotiable titles as rapidly as

possible; f) give immediately minimum assistance in clearing a small plot on each farm for growing basic family food requirements; g) grant a small "grubstake" for basic tools, cement for a house floor, and roofing; and h) arrange with concerned agencies for follow-on assistance in health, education, technical assistance and credit.

Unutilized agricultural lands owned by government do not help the welfare of small or landless farmers, nor do they help increase basic domestic food production or increase exports. The same holds true for excessively large unutilized private land holdings. A law, now under consideration by the National Assembly, is designed to levy a land tax based upon potential land capability, and can do much to help break down unexploited large private land holdings.

There is considerable evidence that the GOCR is seriously and conscientiously addressing the man-land problem. The gravest danger to the success of these efforts lies in the tendency to do too much for too few settlers and too little for too many others. There is a tendency for planners to "get carried away" with high cost infrastructure such as irrigation, drainage, or reclamation type projects, when in reality a large percentage of the problem can be solved by simply assisting the well-motivated man to the land as outlined above.

c. Capital and Credit

The National Banking System (SBN) of Costa Rica consists of a Central Bank and four nationalized commercial banks. These four banks, through a total of seventy-seven regional offices, provide most of the credit. There are 273 cooperatives of which more than 50 percent are savings and loan cooperatives and 20 percent agricultural cooperatives, but most are very small and are not an important source of credit to the agricultural sector.

The four banks in the SBN have been quite competitive in agricultural lending. Although this competition causes some duplication, it helps prevent complacency and conservatism and to some extent provides alternatives for clients. However, because interest rates and other credit terms are controlled, it may result in an over expansion of banking services.

The Central Bank sets interest rates, which vary from 6 to 12 percent on deposits, from 8 to 11 percent on agricultural loans, and from 8 to 18 percent on other loans. In addition to interest charges, some borrowers may be charged up to 2 percent commission. With interest rates considerably below the inflation rate in recent years (about 25 percent inflation in 1975),

interest rates have been completely ineffective in distinguishing between productive and unproductive investments, since those with a negative or low real rate of return can be profitable for the borrower. Also, the present differential in interest rates between some commodities (e.g. 8 percent for corn and beans and 11 percent for sugar) is not likely to have any effect on farmer's decisions as both are highly subsidized. The subsidized situation is likely to influence decisions of bank officials, however, since they desire to make a profit. They will tend to discriminate against small farmer loans because they are more risky, more costly to administer, and pay lower interest rates. They may also tend to discriminate against new crops and enterprises. 1/

The Central Bank, as in most countries, provides reserves for the banks within the SBN through rediscounting and lending operations. Interest rates range from 4-14 percent depending upon the term and category.

A *tope* system has historically been used by the Central Bank to control the allocation and expansion of credit. Since 1970 the system has been less strictly enforced and has been modified several times to make it more flexible. Although specific lending limits are established for each of the four SBN member banks by category, these have in recent times been revised at least four times a year, usually as authentication of what the banks had done in excess of previous limits. This increased flexibility reflects the Government's policy of plentiful, low-cost credit to agriculture and industry. It significantly reduces the Central Bank's control over the SBN banks and in effect allows the banks to determine the rate of credit expansion. Some categories, such as basic grains or small farmers with annual incomes of less than 25,000 colones who borrow less than 100,000 colones have

1/ If inflation remains at or below the 6% recorded in 1976 the negative real interest rates experienced in preceding years will no longer obtain. However, this will not necessarily diminish bank officials' natural tendencies to discriminate against small farmer loans.

no top limit. It is suspected that credit to these categories may be diverted to other uses than intended, with the tacit approval of bank officials in order to avoid top limits in other categories.

In 1974 outstanding bank credit exceeded the programmed amount by more than ten percent. The administrative problems created by the use of the top system and its ineffectiveness in accomplishing its intended results would indicate that unless it is to be strictly enforced serious consideration should be given to discontinuing its use.

Limits are also set on how much credit may be given per unit of land area and for different levels of technology on major crops. For minor or non-traditional crops banks must make their own feasibility studies to determine lending levels. Adjustments in lending limits are normally made only on the basis of inflation and do not consider changes in technology. These practices tend to make credit much more readily available to traditional crops using traditional technologies and tend to discourage the use of new technology and the production of new crops.

Since 1970 there has been a rapid expansion of the money supply as compared to the Sixties, reflected by a near-tripling of agricultural credit through the SRN between 1970 and 1974. The general expansion of credit contributed to the severe inflation of the past few years.

70% of Bank agricultural credit in 1973-74 went to coffee and beef. Only four other commodities received more than 1% of total credit (rice 3-5%, sugar 2-4%, dairy 2-4%, and bananas 2-3%). Those products receiving the greatest allocations of credit tend to be the most important in terms of output, but credit distribution is more concentrated than output. Banks prefer short-term loans to reduce risk; making short-term loans for crops and long-term loans for livestock. Loans to livestock have increased since the late Sixties as lending to coffee has decreased. Aside from coffee, long-term crop loans are not generally available. This presents a serious constraint to the introduction of slow-maturing crops, such as citrus, pejobaye (peach palm), reforestation, and certain spices.

The increase in livestock loans may be related to loan collateral. With a high demand and fixed interest rates, bank profitability can be closely tied to higher interest loans with the greatest possibility of recuperation. Cattle loans are particularly attractive since the cattle themselves are the collateral and can be readily converted into cash. Credit allocation and the use of guarantees by the Commercial Banks reflect the conservative nature of the banks with respect to agricultural credit. In fact, no new agricultural crop or product has attained any importance in credit allocation since the early 1960's.

Small farmers get 75 percent of the agricultural loans and 18 percent of the credit. They receive special consideration in that there is no top for small farmer credit. Delinquency rates are low for all agricultural loans, only 3-4 percent for loans overdue one year or more, and the rate for small farmers is lower than average. This may reflect the fact that low interest rates and the high cost of lending to small farmers causes banks to require that these loans be less risky. Also, loans are given on an individual crop-by-crop basis. If diversification of small and medium-size farms is a sector development goal, new credit mechanisms such as lines-of-credit covering more than one farm activity may be necessary. External sources of financing have been important to the agricultural credit picture in Costa Rica but have not dominated. Since 1960 more than U.S. \$41.0 million have been loaned by AID, IDB, and IBRD for agricultural credit. As of March 1975 more than US\$25.0 million of this had been disbursed by the SRN, but this accounted for less than twenty percent of the System's agricultural credit outstanding at the end of 1974. In addition, private banks operating internationally have loaned US\$14.0 million through the government to the agricultural sector since 1960, mainly for livestock and bananas.

In general, the availability of credit in time and place needed does not appear to be a serious constraint to the production of traditional agricultural commodities by traditional methods. It may be a constraint to the production of new crops or commodities, to the use of improved practices, and to the expansion of credit to the Target Group farmers. The system of reporting, analysis and the distribution of information on commercial bank lending to agriculture and agro-industry is inadequate and too slow to serve the Central Bank, the MAG, and other officials effectively in planning and policy making decisions with respect to credit and capital. It may also influence the Central Bank's loss of control on the rate of credit expansion.

d. Labor

Costa Rica has a highly competent labor force estimated in 1976 at 657,700 persons, approximately 55 percent of whom are classified as rural.

Due to the rapid economic growth in the 1960's the country was able to maintain a reasonably low rate of unemployment, approximately 4-5 percent. In recent years the labor force has been increasing more rapidly than employment, resulting in higher unemployment rates in 1970's. The 1973 census estimated the national unemployment rate at 7.3 percent with rates up to 15 percent in some communities. 1/ The average for rural unemployment in 1973 was estimated at 7.9 percent, significantly higher than the national average for all unemployment. Urban unemployment was estimated at 6.7 percent.

Official estimates based on a July 1976 survey place the national average unemployment rate at 6.2 percent. A considerable change in the location of this unemployment also appears to have taken place since 1973. 2/ The 1976 estimates show rural unemployment at only 5.8 percent and urban at 6.8 percent. Average annual growth of the labor force from 1973-76 has been at about 4.2 percent. The rural labor force, however, has increased at an annual rate of only about 2.5 percent from 1973-1976. 3/

There are a large number of reports and, consequently, a diversity of opinion concerning the unemployment and underemployment situation in Costa Rica. Many of the earlier

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- 1/ It should be noted that the census was taken in May 1973 and consequently did not enumerate coffee harvest labor or income. The main coffee harvest is in November, December and January.
- 2/ Ministry of labor report based upon July 1976 Survey.
- 3/ Actual employment in agriculture increased at an annual rate of only about 1.0 percent during the same period. Rural employment outside of agriculture apparently increased at a higher rate since rural unemployment actually declined. Out-migration from rural areas could also explain the phenomenon.

reports were based upon insufficient or unreliable data. ^{1/} Only in 1973 did the GOCR begin to generate reliable employment data. Even data generated since 1973 does not accurately reflect the real situation with respect to rural or agricultural employment on an annual basis. The 1973 census was taken in May and employment data reflects only the employment situation for the week prior to the enumeration. The July 1976 survey (Encuesta de Hogares-1976) which provides the most recent information, used the same week in May 1976 as the reference for employment information. Due to the diversity of agricultural production and the seasonality of labor demand, such a narrow base of sampling leaves much opportunity for error. For example, sampling in May completely ignores the employment generated by the coffee harvest. The 1973-74 coffee harvest (November, December, and January) paid approximately 140,000,000 colones to rural workers. Based upon AID's definition of poverty this would equal 100,000 man-years of employment at a wage of 1,400 colones per year or sufficient income to support more than 15,000 rural families for a year above the poverty level. ^{2/} Thus, the coffee harvest alone would provide the equivalent of full time employment for approximately sixty percent of the total rural unemployed shown in the 1973 census.

The 1976-77 coffee harvest, because of the much higher rate paid for coffee picking, will provide the equivalent of non-poverty level incomes for approximately 27,000 families (even using a much higher exchange rate of 8.6 colones equal US\$1.00 or 1,700 colones per capita per year as a minimum)

Although there may be areas with some unemployment problems at the present time, official estimates appear to be very nearly correct except for the coffee harvest season. Regional difference, however, result in some areas actively seeking to import workers into the area (principally for crop harvest) while others have an apparent labor surplus.

The above notwithstanding underemployment appears to be a serious problem in Costa Rica, especially in agriculture. The small farm profile summarized in Section II of this assessment concludes that the rural poor are seriously underemployed. Ministry of Labor figures based on the July 1976 survey show that 19.4 percent of all those presently employed work less than forty hours per week.

^{1/} The 1974 IBRD Economic Report for Costa Rica cautioned that the discussion of employment and unemployment included therein was based upon poor and estimated data.

^{2/} The US\$150 per capita annual income is equal to 1,400 colones based on the moderate definition of 7.7 colones equals US\$1.00 See Section II, B. of this assessment.

More than one-third of those (7.0% of the total) work less than thirty hours per week. Almost one-third (32.0%) of those employed in agriculture are reported as working less than forty hours per week, the highest for any classification.

The age structure of Costa Rica's population insures that the size of the labor force will continue to increase quite rapidly at least until 1980. After 1980 it will continue to grow but at a less rapid rate.

Projections based on a study by the Instituto de Estudios Sociales en Población (IDESPO) show the following: 1/

Projection of Possible Labor Force

	<u>1973</u>	<u>1976</u>	<u>1980</u>	<u>1990</u>
Population (000)	1,872	2,009	2,225	2,822
Labor Force (000)	385	658	750	991
New Jobs Needed/year *		24,000	24,550	21,460

* Computed on a straight line basis holding unemployment at 6.2% from 1976 to 1990.

On the basis of 1973-76 performance the generation of new employment at this rate does not appear impossible. An average of 24,000 additional workers per year were employed during the three year period, a rate of increase only slightly below the numerical goal of the 1973-78 National Development Plan. The Plan calls for an annual increase in employment of 4.2 percent, exactly equal to the percentage increase obtained. The increase in agriculture, however, was only 50 percent and in construction only 30 percent of the goal. Employment in industry was almost 50 percent higher and in commerce 25 percent higher than the annual goals set in the Plan. 2/

1/ Based on M. Bogan and C. Raabe, Proyecciones Regionales de la Población de Costa Rica, Universidad Nacional de Costa Rica, Heredia, September 1976.

2/ Based on Problemas Ocupacionales en el Area Rural, by R.A. Rojas Jiménez, Ministry of Labor and Social Security, November 1976.

There are too many variables to make meaningful projections of the employment rate five or ten years in the future. Whether or not Costa Rica can continue to generate the 24,000 or more new jobs needed per year will depend upon the development policies and programs of the GOCR. It is doubtful whether the industrial sector can continue its past rate of growth. A higher growth rate in the agricultural sector is essential if employment and production goals are to be achieved. In summary, the GOCR will have to continue to give the highest priority in its development program to the generation of employment, especially in agriculture and the rural areas. This must remain a high priority at least beyond 1990 if serious unemployment problems are to be avoided.

e. Technology

Costa Rica has a large number of well trained agricultural technicians in all disciplines. In fact, the number of trained agricultural technicians in relation to population is one of the highest in Latin America. The quality of these technicians's academic training is also very high, but, as in many other countries, field experience and the practical application of academic knowledge is quite limited. The technology needed to increase the production and/or improve the marketing system already exists for most important crops and commodities. However, these technologies are all not yet available in Costa Rica, and much that is available has not been adequately adapted to local conditions.

Despite the availability of trained technicians and knowledge, technology is still a serious constraint to increased production and improved marketing in Costa Rica. Reasons for this are:

- Improved technology has not been introduced or adapted to the different potential ecological areas.

- There is an inadequate delivery system for the transfer of information to the potential user.

- Inputs essential to the utilization of improved technology often are not available.

- There is a reluctance to take risk, which impedes the acceptance of new technology by low income farmers living close to subsistence levels and by others who are skeptical of investing in unfamiliar commodities/practices.

Costa Rica has achieved notable success in the production and marketing of a number of products through the vertical integration of production-marketing system (e.g. coffee, bananas, sugar, tobacco). In these commodities the technology/marketing constraint has been successfully eliminated. However, these

successes took years (in some cases decades) to achieve, and are due in part to unique characteristics of crops or market. To replicate such systems with new commodities will be complex, difficult, but absolutely essential task.

f. Infrastructure

Costa Rica's comparatively excellent rural infrastructure was described in Section III A 3. Access roads in outlying areas, however, are a serious constraint to agricultural development. No other development activity can match the impact of building access and penetration roads in accelerating the rate and effectiveness of agricultural development. The effectiveness of almost all other infrastructural development depends upon access. Fortunately, Costa Rica policy makers and planners are seriously addressing this problem. Over \$ 50 million from IDB is being used to construct penetration roads.

2. Institutional Constraints

Most observers point to the plethora of government and semi-autonomous institutions and the lack of coordination between them as a major institutional constraint on agricultural sector development. The new CAN mechanism, described in Section III A. 4, has been able to effectively coordinate several new programs. Much work remains, however, to eliminate the duplication of effort and dissipation of resources in on-going programs. Other evidence that the agricultural public sector is reorganizing to become a more effective tool for development is to be found in the current efforts toward strengthening the role of the Minister of Agriculture, the development of the Ministry Planning Office OPSA the strengthening of the MAG Regional Directors, and the support of these Directors by the Minister.

Leadership in an effective agricultural development effort should come from a strong, well-funded, and influential Ministry of Agriculture. The link to regional offices needs to be directly from the Minister to the Regional Directors. The MAG to date has had limited influence in the coordination of sector activities at the regional levels, even though the CAR Directors are the nominal heads of the CANcitos, which could function as joint programming/planning bodies for the regional projects.

Except for the MAG and the Banks, none of the sector institutions have truly regional programs. This was a contributing factor to the failure of the CANcitos and is still a serious constraint on sector development. It limits the extent to which these institutions can coordinate their efforts with the MAG's primary development projects, and it limits the participation of people with valuable local knowledge and experience, both in planning and implementation. Regionalized programs are especially important for reaching AID's target group. As the Rural Profiles (see Section IV and Annexes) reveal, the target group is dispersed among the rural population. If we wish to reach a high proportion of poor farmers and landless poor with program resources, the resources must be focused on the identifiable areas of greatest target group concentration.

A general institutional constraint described by one knowledgeable observer is the public financial system, codified in the Ley Financiera de la República. The labyrinthine workings of this law make it all but impossible for a regular government ministry such as MAG to introduce flexibility into its programming. Although more agile in their budgeting systems, the autonomous institutions have independent funding from fixed, "tagged" tax sources, which places their budgets outside effective planning control at the sector level.

The cumbersome financial procedure endured by the regular Ministries and the fixed funding of the autonomous institutions are both symptomatic of a general institutional constraint on sector development. That is, the rate of change in the agricultural sector, the highest in the hemisphere

In the past decade, is too rapid for the institutional mechanism to deal with. As described in the credit section, for example, new crops are slow to receive credit support. Other sector institutions are also slow to recognize new agricultural opportunities and devote resources to them.

The new CAN-OPSA-COTEPSA system is a step in the right direction, for it can quickly identify new activities and react to them. But further change in the institutional structure is needed before the public agricultural sector can keep up with the rapidly changing agricultural economy.

3. Marketing Constraints

Successful marketing is the key to the development of a viable commercial agricultural sector. The efficiency of the marketing system in Costa Rica varies widely from one commodity to another. A wide range of products such as bananas, coffee, cacao, cut flowers, beef, shrimp, sugar, etc. are being marketed competitively and quite efficiently in international markets. Others (e.g., meat, milk, potatoes, some fruits, etc.) are being supplied to the domestic market in a fairly efficient manner. A large number of products, however, are being marketed relatively inefficiently, many with high product losses, or are reaching only limited markets due to marketing problems.

It is not within the scope of this assessment to identify and analyze all of the marketing problems and opportunities on a commodity by commodity basis. It is possible, however, to identify some of the more serious constraints and some of the more important opportunities. As used here 'marketing' will include all of those actions that take place in moving a product from the producer to the consumer. This will specifically include agro-industry or the processing of agricultural products.

For a wide range of products presently being produced for domestic consumption, marketing losses and inefficiencies are a serious constraint. This is most important in perishable products such as fresh fruits and vegetables but can also be costly in non-perishables such as wood

products. Inadequate transportation, improper production practices, poor handling and storage, insufficient technical knowledge, inefficient distribution systems, and others all take their toll. The result is reduced consumption, higher prices, lower quality products, market limitations and lower producer prices. A stagnant market situation for a crop, commodity, or commodity group develops, with dissatisfaction all along the marketing chain.

Costa Rica has a comparative advantage for the production of a large number of crops and commodities that are in demand in external markets or for which internal demand could be increased or developed. Most of the commodities that offer the greatest development potential require processing or agro-industrial elaboration in order to be profitable. The development of agro-industry is therefore essential in order to obtain maximum returns from the agricultural sector. The Government has long been aware of the need to promote the development of agro-industries. A multitude of government or quasi-government entities or organizations have programs or responsibilities 'to stimulate', 'to regulate', 'to control', 'to promote', 'to guide' development of agricultural industries. It is quite possible that the scatteration of responsibilities and programs for the promotion of agro-industry has itself been a constraint to further development.

It is not intended to imply that agricultural industry is not developed or important in the Costa Rican economy. The gross product value of agro-industry in 1973 was 3,900 million colones, 39 percent of the product value of all industry. Value added by agro-industry was 1,150 million colones or 86 percent of that added by all industry. Growth has been impressive; from 1965-73 the gross product value at current prices grew more than 154 percent for the food industry and 171 percent for non-food. ^{1/} Agro-industry in 1973 employed an estimated 19,000 persons with total wages of 300 million colones.

The non-agricultural industry sub-sector has developed at an even faster pace than agro-industry. Various programs, policies, tax concessions, etc., have helped to encourage this growth. As a result of these different rates

^{1/} Unpublished data. Banco Central de Costa Rica.

of growth, the relative contribution of agro-industry to all industry has diminished from 1960 to 1973 for both Gross Product Value and Value Added by Production. (See Table on page 68)

Many of the non-agricultural industries are highly dependent upon imported primary materials and a high proportion produce principally for domestic consumption. As a result, these industries have a considerably different impact upon the economy than do agro-industries. Much of the agricultural sector is dependent upon agro-industry for the processing and marketing of its products, and the income generated at the farm level provides additional employment and consumption. One study showed marked differences between agro-industry and other industry in several respects. ^{1/} A total of 392 industries were studied of which 70 were agro-industries. For each \$100.00 of sales, agro-industries utilized primary materials of national origin worth \$48.60. Non-agricultural industries utilized only \$12.00 worth of nationally produced primary materials. Also, for each \$100.00 of sales, the net balance of payments (the difference between the value of product exports and the value of imported primary materials) for agro-industry was \$15.90. For other industry it was negative \$20.30. Agro-industry also generates more employment and is more decentralized than other industry.

The Caldas study has broad implications for Costa Rica. The potential for development of agro-industry is probably equal to or greater than the development potential of non-agro-industry, and a significant expansion of the agro-industrial sector could produce the following benefits:

a. Agro-industries favor the direct utilization of renewable natural resources of the country, have an important multiplier effect in the national economy, and reduce the country's external dependence;

b. Because agro-industry depends upon agricultural production (including forestry and fish), it is a prime generator of indirect employment, most of which is in rural areas, and the industries themselves are much more likely to be decentralized because of the source of their primary materials.

^{1/} Fernando Caldas, Consideraciones Sobre Las Agroindustrias en Costa Rica. Mimeo, 1976.

c. Agro-industry contributes favorably to the balance of payments.

In summary, it must be concluded that marketing, including processing, is a serious constraint to the further development of many crops and commodities in Costa Rica. The duality exhibited by the agricultural sector, with the production and marketing of some commodities highly developed, and other relatively important ones virtually undeveloped, suggests that a vertically integrated approach might be the most successful way to solve the wide range of marketing problems that exist for the more important agricultural commodities. Much is being done in this area and much more is needed.

AGROINDUSTRIAL PRODUCTION
Total Value Output and Value Added, 1960-1973
(Millions of Colones, current prices)

	1960		1965		1970		1973	
	T.O. ^{a/}	V.A. ^{b/}	T.O.	V.A.	T.O.	V.A.	T.O.	V.A.
1. Food Products ^{c/}	847	205	1,009	269	1,540	474	2,848	728
2. Non-Food Products ^{d/}	149	70	199	81	299	139	438	208
3. Total Agro-Industries ^{b(1+2)}	996	275	1,207	350	1,839	613	3,286	936
4. Other Industries	285	114	652	248	1,400	512	2,457	814
5. Total Industries (3+4)	1,281	389	1,859	598	3,239	1,125	5,743	1,750
6. Agro-industries as a Percent of Total (3/5)	78%	71%	67%	61%	60%	55%	57%	46%

SOURCE: Caldas, Fernando, *Consideraciones sobre las Agroindustrias en Costa Rica, 1970.*

a/ Total Value Output

b/ Value Added

c/ Excludes coffee processing, includes beverages.

d/ Tobacco, leather industry, wood & wood products, and wood furniture.

4. Policy Constraints

By and large the policies of the GOCR during recent years have been favorable to both agricultural development and AID's Congressional Mandate objectives. The fastest agricultural production growth rates in the Hemisphere were achieved over the past decade within a political environment of freedom, peace, and security. The Costa Rican people have received increasing levels of government services, and enjoy rising incomes and a variety of economic, social, and political opportunities. Much of this progress can be attributed to the GOCR policies.

Policy in the agricultural sector is usually arrived at by consensus. The president establishes general policy upon the advice of the legislature, special interest groups, and executive branch agencies. Government policy formulation is shared by ministries, agencies, semi-autonomous institutions and Presidential advisers. The Ministry of Agriculture has a major responsibility for establishing sector policy and/active through the Minister's chairmanship of the CAN, in its coordination. Though each sector institution maintains its own planning department, the CAN-OPSA-COTEPSA system attempts to assure that these plans are consistent with overall sector and national plans. One of OPSA's most important current projects is a new four-year Agricultural Development Plan.

While the CAN and OPSA are now coordinating new Sector policy and programs, the legacy of past independence in institutional policy-making still has damaging effects on Sector development. Duplicated efforts, dissipated resources, contradictory policies, and the resulting economic distortions continue. It is hoped that the new Four-Year Plan will review continuing activities and suggest ways for correcting the deficiencies.

Greater inter-institutional policy coordination implies a centralization of policy formulation and control. Simultaneously, we argue that a decentralization of project formulation and implementation through greater regionalization of Sector activity is needed. The two processes are not necessarily contradictory. National level policy formulation should produce coherent coordinated, overall policies determining credit arrangements, target groups, products or groups of products to be developed, regional allocation of resources, agro-industries, etc. The formulation and operation of specific projects to implement these policies should be in large degree left to regional (local) groups, under the leadership of the MAG-CAR Directors and incorporating representatives of the bank and other Sector institutions, farmer groups, and the private

sector involved in agriculture. The Cantonal Agricultural Committees could serve as a mechanism. The basic differences between such groups and their predecessor CANcitos would be that:

- a) They will be involved in specific project activities. The CANcitos were general forums.
- b) They may be concerned with a smaller area (cantón) than the CANcitos (regions).
- c) They will be implementing programs and responsible for controlling and disbursing funds, something the CANcitos did not do.
- d) They will enjoy the collaboration of the technical staffs of operating sector institutions and the OPSA. The CANcitos received little support or communication from the CAN.

This last arrangement will hopefully allow the local-level personnel to make a regular input into the national-level policy-making process, and to keep national-level technicians and decision makers apprised of local situations and changing conditions.

Another aspect of the fast pace of change in Costa Rican agriculture is the suddenness with which traditionally profitable activities can begin to decline. To recognize such a decline and react to slow further expansion of an activity, stop such expansion, diminish the absolute level of public sector support, or eliminate such support altogether, is an essential policy if the gains derived from new ventures are not to be lost in supporting activities whose time has passed. Successful activities develop powerful interest groups, high levels of investment, and dependent economic sectors. When difficult times arrive, these groups are vigorous in seeking assistance from their government. The usual government response is to subsidize the now unprofitable enterprise from public revenues. Such a response may not always be inappropriate, especially when large numbers of economically marginal families are involved, and when such funds are used to assist their transition to new activities. This social responsibility is usually presented as the justification for such subsidies in Costa Rica; it is not always true. Government subsidy of rice growers is the current prime example; beef producers may be next. A sector in a period of rapid change, such as the Agriculture Sector in Costa Rica today, is unusually exposed to this risk.

SECTION IV: Innovative Strategy and Program Implications

A. Priority Constraints and Opportunities

The constraints and opportunities which most seriously affect Sector development in general and the achievement of AID-mandate goals in particular may be grouped into three categories: Resources and Land Use; Marketing and Processing; and Sector Policy, Planning, and Institutional Coordination.

1. Resources and Land Use

The most critical problem facing the Agricultural Sector is the rapid destruction of the nation's forests. Slash-and-burn agriculture and indiscriminate timber harvesting are destroying watersheds and soils in steeply sloped areas, and contributing to drought conditions in flatlands downstream. In ten years land availability will become a serious general constraint on Sector development if destructive land use continues. Land availability and productivity is already a serious limiting factor for target group farmers in many areas.

Deforestation and constraints on achieving AID's Mandate goals with small farmers are intimately linked. Ironically, target group farmers are in some cases the worst offenders in indiscriminate deforestation. They are the squatters who move into uncut forest and fell the trees to start a farm. They are precisely the sort of highly motivated, hard-working rural poor who should be included in land reform and colonization programs. If deforestation is to be halted, this group of vigorous colonizers must be located on land already cleared and currently in extensive use, or settled on new land carefully selected as ecologically suitable for agriculture.

Also involved in deforestation are lumbermen who waste two-thirds of the wood they cut, and large farmers who cut out forest to expand their pastures. Much of the good land with potential for intensive agriculture is currently in extensive cattle production. This creates an artificial shortage of land which forces the destructive process described above. If the activities of all these groups are not soon rationalized, the country will be left without forest with much of the soil and water resources destroyed.

2. Marketing, Processing, and Agro-Industry

For a number of products destined mainly for export, Costa Rica has highly efficient marketing systems. For some products, including basic grains and animal products, even the domestic system is fairly efficient. But the majority of fresh fruits and vegetables are marketed under a traditional system which provides only two basic (but essential) services: transportation and risk bearing. Grading and selection, storage, careful handling and efficient service to areas outside the Meseta Central, are all outside the marketing system's current capability. It is also a system particularly incapable of efficiently handling new production outside of traditional areas or new products. This last condition may be a serious limiting factor to the realization of some of the most important opportunities in the agricultural sector; viz., the introduction of new crops and activities for the domestic and export markets. The discussion in Section III mention a multitude of crop and livestock enterprises for which Costa Rica may have a comparative advantage. Some are completely new; macadamia, brackish water shrimp production, and certain oil seed crops. Others have traditionally existed in Costa Rica in the wild or on a small scale, but can be exploited to a much greater degree: pejiabayes, spices, essential oils, achiote, ornamental plants and flowers, and the fishing industry. Still others are produced commercially in Costa Rica but have a much larger potential market both inside and outside the country: dairy production, pork, fruits and vegetable for both fresh consumption and industrialization, and cocoa.

To successfully realize these opportunities will in many case require a complete reestructuring of the production/processing/marketing systems. In nearly all the cases cited the products need to pass through some sort of agro-industrial process before reaching the final consumer. As identified in Section III, agro-industrial development will have positive benefits for the target group, for the sector as a whole, and for the general economy. It should be given high priority in sector development planning. The process of agro-industrial development will be complex and difficult, but Costa Rica has several successful systems to use as models. A major feature of such systems, and one which is crucial for new agroindustrial development is the full participation of the private sector.

3. Sector Policy, Planning, and Institutional Coordination

Solving the complex problem of resource planning, agricultural diversification and agro-industrial development outlined above will require major modification of the Sector's policy-making, planning, and institutional structure.

Sector institutions are in many respects so rigid and resistant to change that they cannot keep up with the pace of evolution in the agricultural economy, manifested by new opportunities for profitable production and the declining profitability of some traditional activities. Major factors limiting the agility of policy making, planning, and program activity are:

a) Lack of sufficient information for policy decisions. A key area is natural resource and land use information. Another is information of the feasibility and profitability of new and old production activities. A third is technical information on the adaptation of activities and technologies to Costa Rica's varied ecological zones.

b) The fragmental structure of planning and policy making, impeding the exchange of information and ideas between sector institutions. Once new policy directions are identified, the lack of institutional coordination again surfaces as a major constraint.

Finally, project design and implementation must become to a large degree the responsibility of regionally-based and coordinated institutional personnel working with local groups.

B. GOCR Policy and Program Implications

1. Land and Natural Resources

Formulating and implementing a coherent national policy which promotes rational use of natural resources while meeting target group land requirements will be a formidable task. A necessary first step is to acquire adequate natural resource information to determine which zones should be maintained in forest, which critical areas need reforestation, and which areas are appropriate for settlement. This information will also indicate which areas of land already are being under-utilized and are appropriate for intensification.

The information developed by such a resource survey and land use inventory will be used by decision makers to formulate new legislation, new land tax and policies, new land reform programs, and programs of improved land and renewable natural

resource utilization.

Specific policy and program suggestions are:

- Accelerated land settlement programs to provide land to the landless rural families and land-poor farm families who can manage a farmstead. Such programs should contain strict selection criteria, be consistent with resource management policies, and provide new settlers with the basic tools and resources needed to get started. Follow-on support services from sector institutions must be programmed and coordinated from the beginning.

- Credit and tax policies are among the most powerful policy tools available to implement overall strategy, and presently are not being sufficiently employed. Loans are still being given to clear forest for cattle pasture even as deforestation is daily decried by national leaders and surplus beef accumulates. Land taxes can be used to force the intensified use of land or its sale.

- Investment in infrastructure directly affects resource use and abuse. In new settlement areas, roads, communications, and other infrastructure will be essential to successful development. Similarly, opening roads through forested areas will encourage cutting if strict protection measures are not enforced.

- Forest protection laws must be enforced and certain selfdefeating policies changed, e.g., the payment to displaced squatters for the 'land improvement' of cutting down forest cover. Land owners who wish to retain their forest should be given support in protecting their land from the depredations of squatters.

2. Diversification, Marketing, and Processing

To maintain previous rates of growth and provide the rural target groups with income and employment, the agricultural sector must diversify into new products with potential for agro-industrialization and export. It was these sorts of products (coffee, sugar, bananas, and beef) which fueled the sector's expansion over the past decade. The sugar market has collapsed, beef production has overexpanded and cannot find markets, and most serious of all, the appearance of coffee rust may seriously disrupt production. Diversification is indicated.

Basic policy and program requirements to achieve this are:

- A national policy determination making product diversification and agro-industrial development priority goals.

- Increased information capabilities in the areas of marketing, crop adaptation, economic feasibility of new activities, and export opportunities.

- New credit policies to permit increased lending for perennial and non-traditional crops.

- Awareness of possibility/declining of profitability of traditional activities and policy adjustments where indicated.

- Research and development of production technology for industrial commodities; introduction of new plant materials; adaptation trials.

- Increased public credit to agro-industry and 'package lending' to processors who wish to vertically integrate production and marketing to meet export market standards.

- Arrangements for 'draw-back' privileges (duty-free import of export-destined materials) for agro-industries.

- The inclusion of private industry in the planning and implementation of diversification and agro-industrial projects.

- Encouragement for private industries and recognition that they must be permitted to make profits and expect efficient performance from their employees.

Agro-industrial development may be the most effective means of generating the employment needed to keep up with the rapidly growing labor force and to provide more off-farm jobs for poor farmers. Diversification into more labor intensive and profitable activities is the other important means for increasing target group incomes. Some of these activities, identified in earlier sections, are:

- Milk production currently covers only half of domestic consumption and could be expanded to supply national needs, and perhaps even provide exportable surplus. It can be a fairly labor intensive activity, has other excellent economic characteristics for the target group, and necessarily develops an agro-industrial complement. Increased dairy production can be fitted to a policy of decreased emphasis on beef production, as dairying regularly supplies bull calves and culled heifers to the meat market. Shifting extensive beef production to more intensive dairying will free land for crops. In those large areas of the country which are best suited for beef production, intensification of land use through better management will allow the same overall beef production from fewer hectares.

- Other livestock enterprises, such as pork poultry, and egg production, have strong potential, but are, like dairying, limited by the high cost of concentrated feed. Programs to develop alternative national sources of animal feed will be critical to full realization of Costa Rica's potential for animal production. Suggestions for the development of root crops and pejiñone for animal feeds are contained in Section III.

- Shifting rice culture from large to medium and small-scale farmers could provide significant income and employment opportunities for the target group. New technology rice farmers may be selected from over-crowded minifundio areas or areas of high unemployment. As production increases in the new rice zones, credit restrictions on large rice farmers would tend to limit their rice plantings. Land thus liberated can, through the application of better seed and improved technology, become an important element in increasing production of cotton, corn, beans, oilseed etc. With the prospect of continuous deficits of these basic crops, lands that can produce them should not be in rice. Rice production under paddy rice culture worldwide is far superior to upland rice.

- Spices, flavorings, and essential oils are strong possibilities for labor intensive, high-value, small-scale, industrializable crops. Several international firms are already involved in such production in Costa Rica and others are seriously considering entering into production. Costa Rica's wide range of climate and growing conditions, well-educated, capable small-farmer groups, and stable political climate make it an ideal country for such production.

- Fruits and vegetables for fresh, frozen, dehydrated and canned export also can have strong employment and small farmer income effects while providing raw material for agro-industry. Several firms are involved in such production, but the potential market far exceeds current supply.

To successfully develop new crops for the export market will require the full participation of national and international private industry and stronger links between producers and processors. Such links exist in coffee, tobacco, and banana production; they need to be forged for each new crop.

Also with regard to diversification, one must note that while cost of high quality seed and planting material add little to total production costs, the use of such material has great effect on the yield and marketability of the final product. One of the wisest investments a country can make is to provide its farmers with the best seed and plant material worldwide research can produce. This material must be introduced, tested, and adapted to local conditions, and if necessary, distributed on a subsidized basis.

Increased diversification and agro-industrialization will further accelerate the rate of change in the agricultural sector. New opportunities will appear and old ones decline each year. A given commodity may enjoy a few years of high profitability and then, because of biological or economic factors quickly declined. Others will provide steady income over the long-term. In any given year,

some proportion of the dozens of individual products coming off the farms will not show a profit. Policy makers should officially recognize this fact of agricultural life and work out programs to help reduce some of the risk to farmers without placing a large financial burden on the rest of the economy.

3. Policy, Planning and Coordination

The program implications for sector policy, planning, and coordination are:

- Information gathering and analysis to provide policy makers with complete, current information is essential. While the CAN-OPSA-COTEPSA arrangements improve on previous structures and provides a possible format for coordinating data efforts, the different institutions still largely go their separate ways. Programs must be developed to promote regular exchange of information and eliminate duplication of data collection and analysis.

- Institutional policy and planning coordination - Costa Rica has a number of highly capable agricultural sector institutions managed and staffed by well-trained, competent, dedicated individuals. Each organization can point with pride to successful programs and projects. Even the weakest sector institutions, as their critics will admit, perform certain functions well. However, even well-conceived and perfectly executed programs by a single institution may have little discernible effect. The feasibility of coordinated efforts in Costa Rica has been demonstrated by this year's program in cotton production and the AID-supported soybean project. Both were coordinated by the CAN, and involved the Banks, the MAG, the CNP, the University, and several other institutions. Given direction and support from their superiors, the staffs of different institutions work well together at the national and local levels. Sector policy makers must take advantage of these institutional capabilities.

- Regionalized project design and implementation is another critical institutional opportunity. The MAG's field-level staff and field members of other institutions are of high quality. They can be supplemented by local citizens with experience in their areas. Policy should encourage the regionalization of other sector institutions roughly along the MAG's geographical regions. The Cantonal agricultural committees should be encouraged, given secure-funding in all regions, and linked with institutional resources.

- The Private Sector should, as a matter of policy, be included in sector planning and project development. Cooperative technical assistance arrangements between the MAG, the University, and private firms engaged in export production have been tried with moderate success. Such arrangements should be encouraged.

C. AID Strategy

U. S. assistance to Costa Rica in agriculture began in 1942 when the Institute for Inter-American Affairs under Point-Four formed the first Servicio (STICA), which continued until 1952. Bilateral programs of the US Government have continued to the present date via the International Cooperative Administration (ICA) and AID. These efforts were largely institution building, and focused on the transfer of basic agricultural technology. Judging by the comparatively high level of technical capability of government officials and farmers alike, they have been relatively successful.

Recent programs in agriculture have included a \$16.5 million Agricultural Sector Loan in 1970, now almost completed, which assisted in strengthening the Ministry of Agriculture, INFOCOOP, the National Banking System, INCO, IFAN, CNP and the University of C. R. in providing services and resources to small farmers; a second \$7.9 million Sector Loan in 1974, now almost one-third completed; and a small grant funded project (Agricultural Services-Grant 515-T-122). The Grant Project provided funding for a series of studies, technical assistance from US and other sources, project management, and other costs of project monitoring and evaluation.

The rationale for continuing assistance to Costa Rica in the Agricultural Sector will fall within the political, economic and philosophical arguments for a continuing AID relationship with a "middle-income" country, to be presented in a DAP revision in May 1977. These will rest partly upon the identification of innovative areas, technical subject matter opportunities, or "limiting factor" segments in critical Sectors where AID, continuing as a relatively minor donor, may have special knowledge, interest or experience.

The constraints listed above fall into areas in which AID has experience and specialized expertise, and are congruent with the concerns behind the Mandate of the Foreign Assistance ACT. During the DAP revision in May 1977 and thereafter we will develop a series of specific projects forming a prototype relationship between AID and a critical development Sector in a growing, relatively progressive middle-income developing country. In this instance, we propose that a Sector-wide program funded during Fiscal Years 1978 and 1979 address these limiting segments. Each project selected would have its specific purpose, outputs, and inputs. All projects would contribute to common objectives of the overall Sector program, as well as to addressing specific sub-sectoral problems.

The use of one Sectoral Presentation each year (loan and grant) would simplify project documentation, as well as offer a simultaneous consideration of entire AID interventions proposed for the Sector. A package of related projects totalling 8 to 10 million dollars would be presented in each year's PID, PRP and PP.

In the immediate future (FY 78) we are planning a loan/grant Project in post-harvest problems of traditional crops and the development of vertically integrated production and marketing systems for high value non-traditional crops that have potential for better land utilization and employment generation. This 78 Project will focus on farm-related market problems, food processing, agro-industry, new crops in new lands, land settlement, natural resource utilization, and employment generation. It represents a change in direction from the institution building/production technology approach. For traditional crops, the emphasis will be on marketing problems. For new crops, the Project will focus on the entire agricultural system, from production to final sale. This Project is expected to begin at about the time that Loan 515-T-025 will be near completion, and will be a step in the transition to a new strategy of addressing development problems characteristic of a "middle-income country".

D. Areas for Possible AID Assistance

1. Natural Resource Data for forest and land use planning. Possible areas of assistance are in remote sensing; CRIES; technical assistance and training in resource analysis; resource policy; and land use planning. Activities would be focused in the new Vice-Ministry of Agriculture for Natural Resources and OPSA.

2. Marketing, especially the development of local and regional market systems, to provide income opportunities, reduce food losses, improve food quality, and lower costs to consumers. Assistance in the development of grades and standards. MAG, IPAN (Municipal market loans) and OPSA would be likely participants.

3. Agro-Industry and Exports. Technical assistance and training in product and market identification, vertically-integrated production systems, and farmer organization. Financing and technical assistance for agro-industrial development. The Ministry of Agriculture, OPSA, CODESA, the Export Promotion Center, and the private sector.

4. Land Titling, Distribution, and Sale.
 Technical assistance and program support to an accelerated land distribution program. ITCO and MAG.

5. Agricultural Sector Planning, Training, Project Design and Development. Support to an Agricultural Economics research center within the University of Costa Rica, which would train economists, provide feasibility studies to government and private industry, plan and help implement projects, assist the OPSA in sector planning and policy, maintain an agricultural data Bank, and perform program evaluations.

6. Research, Development, and Promotion of New Crops. Introduction of new crops and planting materials. Adaptation research. Research on agro-industrial uses. Outreach; mechanisms for new activities. MAG, UCR, Regional Institutions.

E. Planned Investment Schedule

		Contribution by	
		AID	GOCR
		(\$000)	
FY 78	Land Productivity and Employment Generation (Loan/Grant) (Related Project Development Costs)	8,000	4,000
	Technical Support		
	FY 78	100	-
	FY 79	100	-
	FY 80	100	-
FY 79	Agriculture Sector Project (Loan/Grant) (Related Project Development Costs)	8,000-10,000	4,000-5,000
	Technical Support		
	FY 79	100	-
	FY 80	100	-
	FY 81	50	-

F. Information Requirements for Programs and Projects

USAID is presently involved in planning the Land Productivity and Employment Generation Project for FY 78 funding. Information needed will include (1) basic data on characteristics of small farmers who will participate in project activities (baseline survey for evaluation purposes); (2) a study on the nature and magnitude of small farmer postharvest and marketing problems in several regions of the country; (3) feasibility studies on three to five systems of non-traditional crops; (4) and an Interim Report on the past and current programs of the Institute for Lands and Colonization (ITCO).

Information requirements for the FY 79 Agriculture Sector Development Project will require assistance to USAID and the GOCR from a variety of sources. We anticipate the need for TDY assistance from AID/W, IQC contractors USDA/PASA, USDA/RSSA and local PSC or institutional contractors in pre-project studies; project development; project documents preparation; economic, technical and social soundness and feasibility studies in such areas as natural resource information, soil conservation, forestry and fisheries management, grain storage and handling, farm level post-harvest handling, regional marketing systems, food processing technology and engineering, new product marketing, land settlement systems, agricultural information systems for sector project planning in new crops, agricultural product export promotion and sector assessment updating. Details of these needs must await later stages of program and project development, planning and negotiations with the GOCR and approval by AID/W. As the list of technical areas to be covered is further defined, plans will be developed to obtain the information according to needs. Funds will also be requested at later dates to cover costs involved.

G. Other Donors and Programs

A major portion of foreign credit from donors has gone into traditional infrastructure projects. Looking at the total undisbursed balance of \$574.1 million in all Sectors, one finds that 20 percent is for transport; 20 percent for electric power and communication; 33 percent for miscellaneous infrastructure and capital imports; 7.5 percent for agriculture; 4.7 percent for health; 3 percent for education; and 1.2 percent for pre-investment surveys.

During the next two years, both the IBRD and IDB are planning lending programs of approximately the same magnitude as recent years. The IBRD is currently analyzing three possible new loans: (1) Agricultural Credit/Rural Development to finance livestock and crop development, as well as possible feeder roads and other rural infrastructure -- proposed \$15 million; (2) Urban Transport to finance improvement of traffic and transit facilities -- amount still to be determined; and (3) Boruca Power and Aluminum to finance a hydro-electric project for an aluminum smelter -- amount still to be determined and further project preparation delayed until a firm decision is made about a company to construct the smelter plant. Besides two projects in the agriculture and education sectors which are still awaiting final approval by the GOCR and the IDB, the IDB is currently analyzing three possible new projects: (1) Rural Roads, Third Stage which would extend the Bank's current feeder road program -- proposed \$46 million; (2) Education to finance a strengthened GOCR technical and vocational education program -- proposed \$9.8 million; and (3) Pre-Investment Fund, II to finance feasibility studies and training for OFIPLAN -- proposed \$4 million.

In reviewing other donor credit program, it is also interesting to note the prevailing terms and interest rates, especially in light of the previous discussion of external debt servicing -- i.e. that 65% of Costa Rica's "active" hard currency loans have terms less than or equal to 25 years and greater than or equal to 5 percent and that 34 percent have terms less than or equal to 10 years and greater than or equal to 6 percent. The IBRD's range from 30 years and 7-1/4 percent to 25 years and 8 1/2 percent; the IDB's range from the Special Fund terms of 35 years and 2 percent to 20 years and 8 percent; CAREI's range from 35 years and 2 percent to 10 years and 8 percent; and the British Government's only active loan is for 25 years

and 6 percent. The bulk of the remaining credit is at regular commercial terms.

While foreign capital transfers are the most important part of all donor and commercial transactions, there are also extensive technical assistance activities in Costa Rica -- both grant and loan funded. This technical assistance is provided by the UNDP and related UN agencies; by the OAS; and by bilateral programs from Japan, Canada, West Germany, Mexico, Switzerland, Spain, Brazil and the United States. In the agricultural sector technical assistance is provided from FAO in forestry development, animal health, irrigation, fisheries, plant pathology, agricultural diversification, agrarian reform, conservation, and prevention of coffee plant rust; from WFP for the GOCR feeding programs; from West Germany for forestry, bee-keeping, cassava processing and agricultural education, from Switzerland for agricultural mechanization; from IBS for fisheries development; from OAS for agricultural and rural development; and from ILO for rural development.

A Profile of the Rural Poor in Costa Rica
Samuel R. Daines, LA/RD Consultant
December 16, 1976

A. Resource Endowment and Use on Target Group Farms

1. Land Resources

a. Land Availability

- Total Farm Size

In Costa Rica in 1973 there were 73,399 total farms of which 44,728 have less than 10 hectares of land. Of these about 60 percent, or 26,660, had percapita incomes of less than US\$150 in 1969 prices. While the percentage of poor farms is lower as farm size increases it is interesting to note that in Costa Rica, distinct from other Central American countries, never more than two-thirds of any farm size are poor by the US\$150 percapita standard. Table 1 indicates that up to about 2.5 hectares, the percentage of poor farms is about two-thirds, and that after that point up to 20 hectares it is roughly half. This implies that there are significant numbers of very small farms which are not poor by our definition. In addition, though it is established and discussed in the income section, it is worth mentioning here that this finding is not highly sensitive to small changes in the poverty definition. There are large numbers of very small farmers who would still be in the non-poor category even if a higher poverty line were used. A 27 percent increase in the income definition reduces the non-poor group by only 17.

What this implies is that for Costa Rica the rural poverty problem and the small farm problem are not the same. Farm size definitions of the target group are inadequate to capture the target group with which AID is interested.

Table 1 presents the distribution of land by farm size and income class for Costa Rica as a whole.

Table 1
Land Distribution by Farm Size
Costa Rica 1973

INCOME	Number of Farms by Farm Size and Income Class					
	Landless	0/1 Ha.	1/2 Ha.	2/5 Ha.	5/10 Ha.	10/20 Ha.
Poor	2,870	9,018	4,336	6,550	3,886	4,079
Non-Poor	1,320	4,275	2,498	5,551	4,364	4,607
Total	4,190	13,293	6,834	12,101	8,250	8,686
Percent of Poor Farms	68.5	67.8	63.5	53.9	47.1	47.0
Percent of All Poor Farms	9.4	29.3	14.1	21.3	12.6	13.3
						100

SOURCE: Based on Computed Census/Academia Table 4.

It is unfortunate from a land resource point of view that the largest group, almost 40 percent, of the poor farmers are on holdings of less than 1 hectare. As we shall see in the crop mix section, there is little hope of finding crop combinations so intensive that this size of holding can ever hope to produce incomes above the poverty line for the farm families so situated.

- Arable Land in Farms

Table 2 indicates for selected small farm sizes the amount of arable land in the farm.

Table 2

Arable Land by Farm Size

Farm Size	Arable Land in Ha. per farm	Percent of Land which is arable
2-3 Ha.	1.85 Ha.	70.1 Percent
5-10 Ha.	3.34	49.8
10-20 Ha.	5.32	38.2
20-50 Ha.	8.33	27.1

SOURCE: Daines Table 1

It is very difficult to estimate based on census information how much land is suitable for crop production. The figures in Table 2 include all lands cultivated in the last five years, but probably excludes a large amount of land which is in uncultivated pasture but which could be used to produce crops. If it were possible to estimate the portion of these pastures which are suitable for crop production it would tend to reduce further the proportion of crop production land which is held by small and poor farmers.

b. Land Use

- Cultivation Intensity

A critical question in a country with limited land resources and heavy rural population pressure is the efficiency with which land is used. Table 3 quantifies the proportion of land dedicated to general use categories for poor and non-poor farms.

Table 3
Land Use by General Use Category

Farm Size	Percent of All Land in Each Use Category		
	Percent Cultivated Annual Crops or in Fallow	Percent in Perennial Crops	Percent Pasture
0-1 Ha.			
Poor	31.1	52.7	9.3
Non-Poor	20.4	61.9	10.0
1-2 Ha.			
Poor	38.4	38.5	15.4
Non-Poor	24.4	58.0	12.8
2-5 Ha.			
Poor	34.7	24.9	20.3
Non-Poor	20.3	48.8	35.0
5-10 Ha.			
Poor	25.4	14.5	42.0
Non-Poor	17.7	36.2	36.5
10-20 Ha.			
Poor	22.0	7.1	42.9
Non-Poor	17.8	20.9	44.5

SOURCE: Computed Census/Academia Table 2B and 2B. ^{1/}

Simple examination of the land use patterns in Table 3 reveals a consistent difference between the poor and non-poor farms of all size groups. The poor farms consistently have a lower proportion of their land in perennial crops. This focuses the land use issue as much on what the cropped land is used for as on the amount of it which is cropped. Each of these factors are of apparent importance in distinguishing the poor from other farmers. Table 4 presents the cultivation intensity comparison.

^{1/}
Tables computed from Di Mare et al, *Algunas Condiciones de Vida de la Población Rural de Costa Rica*, Academia de Centro America, 1976, and *Los Censos Nacionales de Costa Rica de 1973*, Dirección General de Estadística y Censos.

Table 4
Cultivation Intensity for Poor and Non-Poor Small Farms
(Percent of Land Cropped by Farm Size and Income Class)

Farm Size	Percent of Land Cropped	
	Poor Farms	Non-Poor
0-1 Ha.	83.8	82.3
1-2 Ha.	76.9	83.2
2-5 Ha.	59.6	69.1
5-10 Ha.	39.9	53.9
10-20 Ha.	29.1	38.5

SOURCE: Computed Census/Academia Table 2D and 2E

Table 4 demonstrates two consistent trends, the first is that for both poor and non-poor farms the intensity of cultivation drops dramatically as farm size increases. The larger small farms (10-20 Ha.) crop well under half as much of their land as do the smallest farms. The second conclusion is that for farms of similar size, the poor farms are consistently less intensive in their use of land.

The issue of differences in which crops occupy the cropped land will be discussed in part D, Production Patterns, but it is important to note at this point that a large part of the differences in income between the poor and non-poor farms appear to be due to both intensity of cultivation and crop mix.

Cultivation intensity varies not only by income class and farm size, but also by region. Certain regions have a much higher crop intensity. Figure 1 divides the country into seven agronomically defined regions which will be used in various parts of this assessment.

By selecting a few representative farm sizes Table 5 presents a comparison of the cultivation intensity of land use for these seven regions.

Figure 1.
Agronomic Regions of Costa Rica
Utilized in the 1973 Agricultural Census

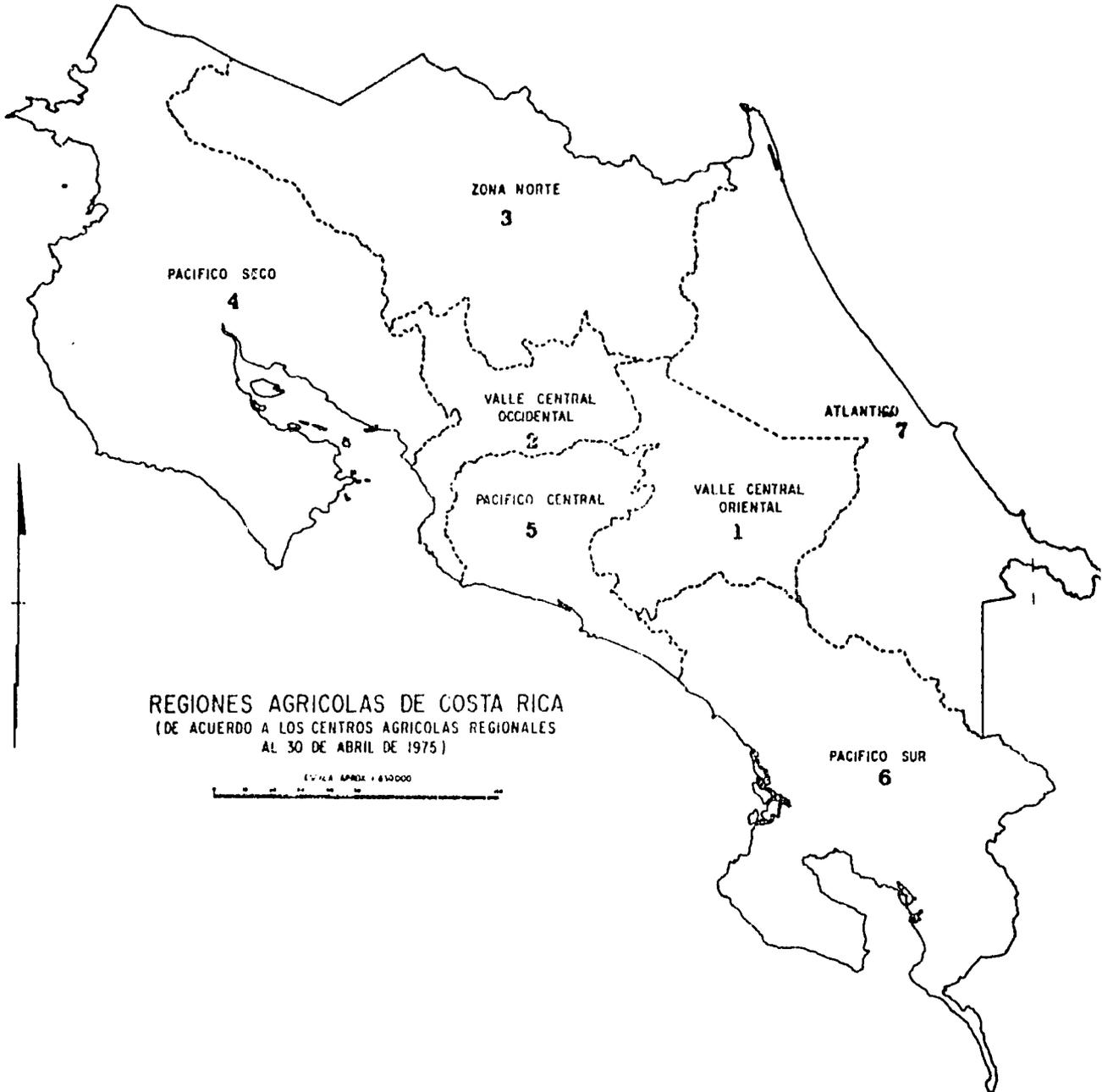


Table 5
Cultivation Intensity by Farm Size and Region
(Percent of Land in Crops or Rotation)

Region	Farm Size			
	2 to 3	5 to 10	10 to 20	20 to 50
	Ha.	Ha.	Ha.	Ha.
Central Valley E.	67.8	46.7	34.7	24.5
Central Valley W.	79.9	64.3	48.4	34.5
North Zone	58.4	41.1	31.5	20.5
Dry Pacific	70.0	37.8	25.4	18.1
Cent. Pacific	73.7	51.0	39.5	30.4
Pacific South	72.5	50.4	38.3	29.8
Atlantic Zone	68.1	57.8	49.7	32.0
All Regions	70.1	49.8	38.2	27.1

SOURCE: Daines Table 1

The Dry Pacific Zone, while consistently the lowest intensity area for the larger size farms is surprisingly intense in the smaller units under 5Ha. Equally surprising is the finding that larger units over 20 Ha. are uniformly unintensified land users without large differences between zones. What does appear consistent is that the larger the farm the less intensive the use of farms. This is an important conclusion for Costa Rica where cleared and accessible agricultural land is scarce, and would lend support to land redistribution efforts whether they are encouraged by market mechanisms or by land reform.

- Land Productivity

While land use intensity may give a reasonable good picture of land use efficiency, it is at best a proxy for direct measures like land productivity and land profitability. Land productivity may be thought of as a societal view of land use efficiency since it attempts to estimate the value added per land unit. This might be thought of as a rough measure of the contribution of a particular land unit to national objectives like nutrition or national income. It should not be confused with measures of private return of a hectare of the land to the farmer, estimates of private returns are treated under the heading "Profitability of Land Use" which follows.

Table 6 presents estimates of the productivity of land for various farm sizes and for the poor and non-poor farm classes.

Table 6
Land Productivity by Farm Size and Income Class

Farm Size	Gross Value of Output per Arable Hectare in Colonos/Ha.		
	Poor Farms	Non-Poor Farms	All Farms
	0-1 Ha.	5,483	14,641
1-2 Ha.	3,301	8,705	5,276
2-5 Ha.	2,747	6,827	4,617
5-10 Ha.	2,917	5,855	4,469
10-20 Ha.	3,017	4,997	4,067

SOURCE: Computed Census/Academia Tables 1A, 1B, and 1C.

While the productivity of land in the non-poor group drops consistently, among the poor farms it reaches a floor at about 2 Ha. and then seems to hover at about the same level as farm size increases. The land productivity of the poor is lower in all groups (except the farms less than 1 Ha.) than the lowest non-poor group.

Profitability of Land Use

This concept is similar to land productivity except that the viewpoint is the farmer, and hence the measure is not the gross value of output per hectare, but rather net income or profits per hectare. In accounting, terminology the income concept used here is the net return to land, capital and family labor. Table 6a presents these profitability ratios.

Table 6a
Profitability of Land Use by Farm Size and Income Class

Farm Size	Net Income Per Arable Ha. in Colonos/Ha.	
	Poor Farms	Non-Poor Farms
	0-1 Ha.	3,356
1-2 Ha.	1,693	5,283
2-5 Ha.	1,234	4,238
5-10 Ha.	928	3,506
10-20 Ha.	438	2,695

SOURCE: Computed Census/Academia Tables 1A, 1B, and 1C.

The consistency with which private profitability of land use falls as farm size increases argues strongly that land is most efficiently used on smaller holdings. The fact that land on the smallest non-poor holdings is earning almost twenty times as much net income per arable hectare as it is on the farms over 30 Ha. is evident in Table 6a. Poor farms, while exhibiting the same trend begin at less than half the profitability level, and drop more rapidly to the floor of about 450 Colonos per Ha. which is similar to the largest non-poor farms. The non-poor farms generally have land profitabilities four times as high as comparably sized poor farms. Arable land, rather than total land, was used to these ratios in order to avoid prejudice to larger farms simply because they may have larger amounts of low quality or unusable land. Using arable land, as measured by land recently cultivated or cropped, may overestimate the true productivity of larger holdings, since they undoubtedly have a larger proportion of land which is suitable for cultivation but which has not been recently used, than do smaller farms. This implies that if more accurate measures of land quality were available the effect would be to accentuate the trend seen in Table 6a.

2. Labor Resources and Employment Patterns

a. Labor Supply on Target Group Farms

Table 7 indicates the number of man-days of labor available from inside the farm family per hectare of land cropped. This is intended to be an indicator of the supply of family labor, and an indicator of population pressure on the land. It is an underestimate because of the existence of a large rural labor poor which is landless. It is difficult to include the landless population in these estimates, however, because their labor is available for work on large holdings as well.

Table 7

Labor Supply on Small Farms

Farm Size	Man-Days of Economically Active Family Labor Available Per Cropped Hectare per Year
0-1 Ha.	1,284
1-3 Ha.	483
3-4 Ha.	382
5-10 Ha.	245
10-20 Ha.	180
20-50 Ha.	138

SOURCE: For 0-1 Ha. farms, Indonesia Tables 3 and four for no. of workers per hectare, and computed Indonesia/Agencia Table 10 for area cropped. For all other farm sizes, Indonesia Table 4.

Table 7 indicates that labor supply and hence population pressure are extremely high in all of the small farm sizes. It is difficult to sense the employment implication of these numbers without establishing some magnitudes on the amount of labor demanded by various agricultural activities. In this sense, this section on employment is interrelated to the section on production patterns. If the production patterns which exist, or could potentially exist, require roughly as much labor as is supplied, then one would conclude that the population pressure and labor supply are not excessive. Interpreting labor supply figures is only enlightening when presented with some rough ideas of labor demand. Table 8, which presents the labor demand of different agricultural activities in Costa Rica should be reviewed keeping in mind that small farms (up to 10 Ha.) have a labor supply of from 243 to 1,264 man days per cropped hectare. The question addressed by Table 8 is, "are there feasible crop combinations which could provide reasonable full employment for small farms?"

Table 8

Labor Requirements of Agricultural Activities
in Costa Rica

Crop or Activity	Man-Days of Labor	Percent of Farm Family Labor Supply (Ave. for farms 0-10 Ha. is 728 man-days per Ha.) which would be absorbed if all Arable land was in this crop.
HIGH LABOR CROPS		
Onions	331-502	45-69
Flowers	300-500	41-69
Bananas	153-214	21-43
Tomatoes	200-232	28-32
Tobacco	150-194	21-27
Potatoes	110-206	15-28
Coffee	64-203	9-29
Beets	140-140	19-20
Carrots	120-140	17-19
Lettuce	128-	17-
MEDIUM LABOR CROPS		
Pineapple	65-93	12-13
Cabbage	78-82	11-
Plantain	70-70	10-11
Sugar Cane	81-81	8-11
Avocado	62-	9-
Cocoa	15-50	2-10
Oranges	84-	9-
Cassava	48-43	7-9
Dairy (Intensive)	54-59	7-8
Cumote	55-	8-
LOW LABOR CROPS		
Corn	45-50	6-7
Sorghum	40-45	5-6
Sweetcorn	38-42	5-
Beans	25-33	3-5
Vainicas	23-30	3-4
Papaya	33-	5-
Guineo	30-	4-
Rice	8-12	1-6
Coconuts	10-14	1-2
Beef Livestock	4-8	.5-1

SOURCE: Academia pages 34-87 Costa Of Production Data^{1/}

NOTE: The two figures given in most cases represent the range of labor intensity of different technological levels in Costa Rica.

When we compare the labor demands of crop alternatives with the labor supply of the average small farm we can see that there are no feasible crop mixes which would provide for reasonable employment levels for farm family labor. When we realize that there are severe seasonal concentrations of labor demand in these crops which are not represented here, the problem of providing reasonable employment levels for small farmers on their own land becomes increasingly improbable.

b. Employment Patterns

- On-Farm Employment and Underemployment

There are a series of conceptual and data problems which make it difficult to obtain accurate employment information on small farms. It is difficult to estimate what might be considered full employment. Does eight hours a day or ten hours, or six hours (as is the case in much of Costa Rican agriculture) comprise a fully employed day? How many days a year of work constitute a fully employed year? If an average number of either hours per day or days per year is used, the statistical result will be that some farm families may be more than fully employed. The definition used in this document for full employment is 280 days of work per economically active family member per year. The number of people in the family who can work is defined by the census as those economically active, a complete description of this definition is given in the population census document. Using this definition there are an average of 1.81 economically active workers per farm family. This figure is drawn from the Academia study Table 4. In order to convert employment outside the farm into man-days, the average off-farm wage per day is divided into the off-farm salary. These averages drawn from Academia Table 34 are 18,023 colones per day for employment outside the farm in agricultural activities, and 18.7 colones per day for rural employment in non-agricultural activities.

^{1/}

Di Mare et al, Algunas Condiciones de Vida de la Población Rural de Costa Rica, Academia de Centro América, 1976.

The second difficulty with estimating agricultural employment is that it is highly seasonal. Since the data base which is used for this document does not contain monthly labor use information the employment rates will all be over-estimates, and correspondingly, the unemployment will be less than it would be if seasonal data were used.

The third difficulty which flows from a combination of the other two, is that the data do not contain direct information on the amount of labor which is hired. It may be that even though the family labor lays idle much of the year, during the harvest, for example, they must hire additional outside labor to supplement their supply during the peak period. Hiring outside labor also may occur when family labor is not sufficient to supply even non-peak labor demands, or when family labor has off-farm alternatives at a higher wage than hired agricultural labor could be drawn onto the farm. In Table 9, where the agricultural employment account is presented, a finding of over 100 percent employment probably means that the family is hiring outside labor to supplement its own labor supply.

For all of the reasons given above, the figures in Table 9 represent maximum family employment on the farm, in all cases the figure will be less than the one seen in Table 9.

Table 9

On-Farm Employment Rates for Farm Families
by Farm Size and Income Class

Farm Size	Percent of Active Family Labor Utilized in Agricultural Activities on the Farm	
	Poor Farms	Non-Poor Farms
0-1 Ha.	8.5	9.5
1-2 Ha.	21.0	30.1
3-5 Ha.	31.9	55.9
5-10 Ha.	42.6	87.2
10-20 Ha.	51.3	102.8
Over 20 Ha.		221.0

SOURCE: Computation based on Computed Census/Academia Tables 2A, 2B and man-day requirements for various crops from Table 8.

Table 9 demonstrates the clear trend between farm size and employment rates. The fact that both poor and non-poor families are employed less than 10 percent of their available work-days on their farms should be interpreted to mean that they are not really farmers. Their farms could not be expected to absorb more than 20-30 percent even with the most intensive crops which under the technological conditions and market distance of many small farms are economically infeasible.

The agricultural employment rates for the larger farms is indicative of a sizeable rural underemployment. The poor are characterized by substantially lower employment rates on-farm for all farm sizes.

Table 10 contains an account by major crop type of the origin of on-farm labor demand.

Table 10
On-Farm Agricultural Employment by Crop Type

Farm Size & Income Class	Percent of total family active labor supply which is required by crop type					
	Cereals	Vegetables Tobacco Potatoes	Coffee	Perennial Crops	Pasture based Livestock	Total
0-1 Ha.						
Poor	1.1	0.8	5.6	0.9	0.07	8.5
Non-Poor	0.6	1.0	7.2	0.6	0.07	9.5
1-2 Ha.						
Poor	4.0	2.4	11.6	2.6	0.4	21.0
Non-Poor	2.7	3.2	21.5	2.4	0.3	30.1
2-5 Ha.						
Poor	7.3	2.8	14.8	5.2	1.6	31.9
Non-Poor	4.8	4.0	39.1	6.6	1.5	55.9
5-10 Ha.						
Poor	10.7	3.7	13.1	9.8	5.3	42.6
Non-Poor	7.8	5.0	54.8	14.9	4.7	87.2
10-20 Ha.						
Poor	15.0	3.4	11.2	10.7	11.0	51.7
Non-Poor	13.8	5.8	52.4	19.4	11.4	102.8
Over 20 Ha.						
Non-Poor	34.0	3.6	41.6	48.3	83.4	221.0

SOURCE: Computation based on Computed Census/Academia Tables 2A, 2B and labor requirements figures from Academia.

From Table 10 it is obvious that the most important contributor of employment for small farms, both poor and non-poor is coffee. It is also interesting to note that the difference in the amount of coffee labor between the poor and the non-poor accounts for almost all of the difference in agricultural employment. Table 11 presents this comparison.

Table 11
Coffee Employment Differences and Total Agricultural Employment Differences Between Poor and Non-Poor Farms

Farm Size	Coffee Employment Difference Between Poor and Non-Poor	Total Employment Difference Between Poor and Non-Poor	Percent of Total Employment Difference Explained by Coffee
0-1 Ha.	1.6 Percent	1.0 Percent	160 Percent
1-2 Ha.	9.9	9.1	109
2-5 Ha.	24.3	24.0	101
5-10 Ha.	41.7	44.6	94
10-20 Ha.	41.2	51.5	80

SOURCE: Computation based on Computed Census/Academia Tables 2A, 2B and labor requirement estimates by Academia.

A reasonable conclusion from Table 11 is that the principal difference between the employment of poor and non-poor small farmers inside their farms is attributable to the difference in the amount of coffee which they grow.

The ineffectiveness of cereals as a source of employment is demonstrated by the fact that while cereals are the largest or second largest crop in area cultivated in all small farms, they provide only a small proportion of the total agricultural employment as indicated in Table 10.

- Off-Farm Employment

Table 12 indicates the off-farm employment patterns for poor and non-poor small farm families.

Table 12
Off-Farm Employment Patterns by Farm Size

Farm Size Income Class	Percent of Total Active Family Labor Employed Outside the Farm		
	In Agriculture Sector	Outside Agriculture	All Off-Farm Employment
0-1 Ha.			
Poor	2.1 Percent	11.7 Percent	13.8 Percent
Non-Poor	24.8	133.3	158.1
1-2 Ha.			
Poor	1.0	5.6	6.6
Non-Poor	15.7	89.4	105.1
2-5 Ha.			
Poor	1.0	4.4	5.4
Non-Poor	12.4	56.9	69.3
5-10 Ha.			
Poor	0.4	3.6	4.0
Non-Poor	27.0	40.3	67.3
10-20 Ha.			
Poor	1.0	3.2	4.2
Non-Poor	8.6	33.0	41.6
Over 20 Ha.			
Non-Poor	6.5	30.1	36.6

SOURCE: Computation based on Computed Census/Academia Tables 1A, 1B and Academia Table 24.

While the agricultural employment estimates are consistently higher than true employment rates, the off-farm employment figures in Table 12 are in almost all cases underestimates. This results from the fact that the off-farm employment information was gathered in a population census which asked for employment information for the month prior to the interview. Unfortunately the month covered did not fall in an average agricultural labor season, and hence the figures underestimate off-farm agricultural employment.

The sizeable difference between the poor and the non-poor point principally to employment in on-agricultural activities as the factor of most importance. Poor farmers would appear to be poor for two principal reasons; first, they cultivate less coffee than non-poor farmers of similar size, and secondly, they are unable to obtain non-agricultural jobs. These two factors do not account for all of the differences in income but they do predominate.

- Overall Employment Summary

Table 13 combines the on-farm and off-farm employment of the poor farm families to give a summary profile.

Table 13
Employment Summary of Rural Poor Farm Families

Farm Size (Poor Only)	Percent of Total Active Labor Employed		
	On the Farm	Off-the Farm	Total Employment
0-1 Ha.	8.5 Percent	13.8 Percent	22.3 Percent
1-2 Ha.	21.0	6.6	27.6
2-5 Ha.	31.9	5.3	37.2
5-10 Ha.	42.6	4.0	46.6
10-20 Ha.	51.3	4.1	54.4

SOURCE: Tables 10 and 12.

From three fourths to one half of the available economically active labor in poor farm families is without productive employment. As the farm size increases the on-farm labor demand increases substantially, while the off-farm employment is stable. This leads us to conclude that off-farm employment is not responding in any direct way to the gravity of farm labor surpluses, farms with larger surplus labor (except for the very smallest 0-1 Ha. farms) do not find significantly more off-farm employment.

There are three basic policy or strategy alternatives for increasing the employment of poor small farmers:

1. Increasing the labor demand of the farm itself. This may be done by increasing cultivation, shifting the mix of crops to more labor intensive ones, or by technological changes which result in more labor use (one example is that increased yields usually result in increased harvest labor, and if the increases are based on fertilizer, improved seeds, and chemicals, and

not offset by labor losses in mechanization the net result will be increased employment.)

ii. Increasing the demand for off-farm labor on larger farm units. This strategy would focus on changes similar to those noted in/except on larger farms.

1.

iii. Increasing the demand for off-farm labor in non-agricultural activities. Agro-industry may be the most promising of these non-farming alternatives, but marketing, textiles manufacturing, wood and leather products also have significant potential.

The potential of increasing on-farm employment for the poor small farmer is probably limited mostly to increasing the proportion of labor intensive crops which he grows. Unfortunately the poor farms are not likely to be able to increase their labor intensity in the same way that the non-poor farms of comparable size have accomplished this because the added non-poor labor intensity has come from coffee, and there is little potential for adding coffee. It is unlikely that significant employment increases could come from either increased cultivation or from technological change unless the increases and change were in non-cereal crops. The principal potential for large on-farm employment increases is likely to be from adding labor intensive crops.

The potential of increasing small farmer employment by increasing labor demand on large farms is likewise related to the labor intensity of the crops they add. Even substantial increases in cereal production on large farms would result in relatively small increases in small farmer employment.

Non-farm employment possibilities are discussed in the agro-industrial profile, and appear to be at least as important as the direct employment alternatives.

3. Capital Resources and Financial Profitability

The availability of agricultural credit in Costa Rica is probably the highest in Latin America if measured by the amount of credit per arable hectare or per agricultural worker. Table 15 presents a comparison of credit levels in various countries as close to 1970 as possible.

Table 15
Agricultural Credit Availability per Arable Hectare
and per Agricultural Worker for Selected Countries

Country	US\$ of Agricultural Credit per Worker in Agriculture	US\$ of Agricultural Credit per Arable Hectare
Costa Rica	\$428	\$167
Argentina	380	17
Chile	270	42
Mexico	230	87
Venezuela	168	86
Colombia	154	77
Brazil	112	48
Uruguay	100	9
Peru	98	61
Guatemala	61	35
Ecuador	58	19
Bolivia	3	1

SOURCE: Samuel Daines et al, Colombia Agriculture Sector Analysis doc. 2, AID 1973 Tables 64 and 66. Based on FAO Production Yearbook 1970 and Dale Adams, Agricultural Credit in Latin America, Ohio State University 1989.

Unfortunately, the small farmers who comprise the target group have little access to this credit. Annex 9 of the Tripartite Agricultural Sector Studies focuses, in part, on the inadequate credit base of the poor farmer. More direct information on this credit gap and its income impact should be available from a possible AID supported small farm survey during 1977.

The "bankability" of small farm agriculture in Costa Rica is an issue of importance to this profile. If small farm credit is to be expanded on a paying basis the activities it finances must themselves be profitable. Table 16 presents estimates of the financial profitability in banking terms of small farm operations by farm size and income class.

The concept in Table 16 is to present the net income return to the costs of production which a bank would normally finance as a part of agricultural credit. This provides an indicator of the bankability of agricultural activities on target group farms. The returns are not truly "net" because they do not include return to farmer owned assets and labor.

Table 16
Estimates of Financial Profitability of Small and Poor
Farms by Farm Size

Farm Size	Rate of Financial Return: i.e. Net Agricultural Income (Sales-Costs) ^{1/} as a percent of costs (poor farms only)
0-1 Ha.	141.0 Percent
1-2 Ha.	70.0
2-5 Ha.	73.5
5-10 Ha.	43.3
10-20 Ha.	17.8

SOURCE: Computation based on Computed Census/Academia Table 1A.

Poor target group farmers are remarkably profitable in terms of income as a percent of costs. This profitability drops off as farm size increases, and the rate of return on the larger poor farms (10 to 20 Ha.) is low enough to be questionable from a bankers point of view.

Agricultural credit if it were allocated on the basis of profitability should reach more of the poor small farmers in the target group. The average profitability (measured the same way as in Table 16) of all farms over 20 Ha. in Costa Rica is 25.5 percent. This implies that all of the small poor farms under 10 Ha. (86.7 percent of the target group farms) are significantly more profitable than the average medium or large farm in Costa Rica.

Agricultural credit is seldom allocated on the basis of profitability. Factors such as size of loan, administrative costs related to assessing a large number of small borrowers, risk involved in working with small enterprises with few assets to use as security and many others are more important in lending decisions.

^{1/} It should be noted that there are some weaknesses in this method of estimating farm profitability. Minimum input operations with relatively low incomes may show a high percent of profitability as a percent of costs simply because costs are extremely low.

While it is difficult to make estimates of capital productivity and financial profitability based on the Computed Census/Academia data, the figures above should lead us to conclude that the target farmers under 10 Ha. are not poor because they are inefficient in their use of capital or financial resources. It would also appear that programs directed at changing their business operation with a view to increasing its profitability are not likely to be as useful (because profitability is already very high) as are programs oriented toward increasing amount of financial resource at his disposal so than he can achieve a higher total return at perhaps a lower rate of return. The capacity to expand and absorb additional financial resources is probably very small for the 0-2 Ha. farmers, but may be significant for the 2-10 Ha. group.

B. Income Patterns of the Rural Poor

1. Definitions and Dimensions of Rural Poverty

a. All Rural Poor

Defining a target group of rural poor for AID purposes is essentially an attempt to identify a sub-group of the rural population which ought to be the focus of AID programs. The target group may be defined geographically, ethnically, economically by farm or employment type, or farm size class. Each of these methods has a two fold intent, first, to find a disadvantaged group and secondly, to so define the group that they are distinguishable for program purposes from the non-target population.

In Costa Rica the choice is to approach the identification of the target group using income level as the principal preliminary characteristic. An income definition of the target group unfortunately cannot serve for program purposes since it is not easy to estimate income levels as a pre-requisite to including a family in an AID program. To do so would require exhaustive survey work on each family to determine their income level before they could be included. The procedure selected for target group definition has three stages. First, an income profile of the total rural population by region, farm size, crop type, disaggregated between the farming and landless populations. This step is to suggest meaningful proxies for income, that is characteristics, which may be useful for program purposes. The second step involves survey work on selected sub-groups. The characteristics chosen to provide this second level target group definition are geographic and cropping patterns. The third step involves actual sample survey work in the selected geographic areas to establish feasible (that is adequate for program implementation) guidelines for selection of families for inclusion in AID programs. The statistical basis for the target group definition may be found in various parts of this document. The present section on income deals directly with the geographic component.

Farm size definitions are inadequate since a large percent of the smallest farms are not poor, and a large portion of medium sized farms are. Poor and non-poor farms are found in significant numbers alongside each other in all of the provinces.

A further consideration which complicates target group definition in Costa Rica is the difference between the direct recipients of program funds, and those intended to benefit from program funds. The landless poor are the best example of this definitional difficulty. Programs which are intended to generate employment for the landless poor would largely be disbursed to

agroindustries and farmers. The farms which might be used to generate that employment may not themselves be the smallest or poorest ones. In Costa Rica the smallest farms are owned and operated by families who are classified as farmers but who are really rural laborers. Attempts to improve their quality of life will probably not be directed at their farms, and hence they would be intended recipients of program benefits through added employment, but not the first or direct recipients of program funds. For Costa Rica the target group will be defined as the group which is to receive program benefits.

Table 17 presents an outline of the dimensions of the "income defined" target group using three alternative annual income levels to divide the poor and non-poor. These definitions begin with a standard in 1969 US\$ of \$150 per capita. The measurements are all based on data from 1973. Three different exchange rates are used in converting the data to US\$, the lowest of these, 6.7, was the rate used to tax coffee exporters in 1973 the highest one was the free market rate, and a third estimated between the two is used to give a poverty definition averaging the extremes. These three alternative definitions represent approximations of the target group size depending on which of these three rates is taken to most accurately reflect the "true" value of the Colon in 1973.

Table 17
Dimensions of the Rural Poor Target Group

Income Definition In Colones per Capita/year	Target Group			Non-Poor Families	Percent Poor
	Farm Families	Landless Families	Total Families		
Low Exc. Rate Below 1100 Col.	34,705	56,412	91,117	111,787	45%
Mid Exc. Rate Below 1400 Col.	40,686	70,570	111,256	91,648	55%
High Exc. Rate Below 1700 Col.	45,480*	82,020	127,500	75,404	63%

* Possible because more than one family live on some farms.

SOURCE: Based on Computed Census/Academia Table 3A.

Alternative exchange rates move the total size of the target group from 45 percent of the rural population to 63 percent. Using the mid-exchange rate definition. Table 18 explores the regional distribution of the rural poor by province. The objective on Table 18 is to see if the poor are geographically concentrated in a way which would allow Programs to centralize in certain areas.

Table 18

Geographic Distribution of the Rural Poor Target Group

Province	Poor Families (Under 1400 Col. Capita/year)	Percent of Rural Pop. Poor	Percent of National Poor in Province
San José	24,713	53.3	22.2
Alajuela	23,908	75.1	21.5
Cartago	12,485	57.5	11.2
Heredia	6,175	43.1	5.6
Guanacaste	21,179	64.5	19.0
Puntarenas	16,488	52.8	14.8
Limón	6,308	42.8	5.7
Total	111,256	54.8%	

SOURCE: Computation based on Computed Census/Academia Table 3A.

Provincial differences in the percentage of the rural population in the poverty group permit a rough classification of provinces into three groups:

i. Average poverty provinces (those with poverty percentages close to the national average). In this group are San Jose, Alajuela, Cartago, and Puntarenas.

ii. High Poverty provinces with poverty percentages significantly above the national average. Only one province, Guanacaste is in this class.

iii. Low poverty provinces, with poverty percentages significantly below the national average. This includes Limon and Heredia.

Provincial level analysis of poverty incidence may miss important differences which appear at the cantonal or district level. The rural profile data base contains information at the canton and district level and will be used to examine in more detail geographic concentrations of poverty for program design purposes. Once identified, these specific areas are to be the subject of a detailed rural sample survey as mentioned earlier.

In addition to addressing the issue of the severity of poverty by province, Table 18 presents the proportion which each province comprises of the total target group. Three of the seven provinces, San José, Alajuela, and Guanacaste, contain almost two thirds of the total rural poor although many cantons or smaller areas equally as poor are located in other provinces.

b. Farm Families

There are between 35,000 and 45,000 farm families in the target group depending on the income definition used. This is 38 percent of the total farm families at the lowest income definition and 36 percent at the highest.

The geographical distribution of the farm families included in the target group is illustrated in Table 19.

Table 19

Distribution of Poor Farm Families by Province

Province	Number of Poor Farm Families		Percent of Poor Farm Families by Province (under 1100 Col.)
	Under 1100 Col. Per Capita Per year	Under 1700 Col. Per Capita Per year	
San Jose	8,760	11,458	25.2 %
Alajuela	7,312	9,803	21.0
Cartago	3,038	3,902	8.8
Heredia	1,164	1,564	3.4
Guanacaste	5,898	7,568	17.0
Puntarenas	6,601	8,501	19.0
Limon	1,932	2,684	5.6
Total	34,705	45,480	100.0

SOURCE: Computed Census/Acaademia Table 3A.

Puntarenas and San Jose have a significantly larger share of the poor farmers than they do of the target group as a whole. This indicates that in these two provinces a larger proportion of the target group are farmers, and a consequently smaller relative proportion are landless laborers. This also implies that in the poverty concentration province of Guanacaste, the proportion of landless poor in the target group is also high compared to other provinces.

Four of the seven provinces (San José, Alajuela, Puntarenas and Guanacaste) comprise 82 percent of the farming target group.

Table 20 presents the distribution of rural poor by farm size using the 1100 Colon per capita annual income definition. The figures in Table 20 are for farms not families. Since there are some cases of more than one family per farm the number of families in Table 21 is slightly larger.

Table 20

Rural Target Group Farms by Farm Size

Farm Size	No. of Poor Farms (under 1100 Col.) (/capita/year)	No. of Non-Poor Farms	Percent of Farms which are poor
"Landless" Farms	2,870	1,320	68.5
0-1 Ha.	9,018	4,275	67.8
1-2 Ha.	4,336	2,498	63.5
2-5 Ha.	6,550	5,551	54.1
5-10 Ha.	3,896	4,364	47.2
10-20 Ha.	4,079	4,607	47.0
Over 20 Ha.	0	20,045	0.0
Total	30,739	42,660	41.9

SOURCE: Computed Census/Academia Tables IA, IB, and IC.

By this definition 42 percent of the farms with 51% of the farm population in Costa Rica are operated by families with less than \$US 150 per capita annual income. Since there is probably an overestimation bias in the way family labor is valued, there are probably slightly more than 31 thousand farms in the target group.

While there is a decreasing trend in the percent of farms which are poor as farms increase in size, the decline is not as rapid as one might expect based on similar information from other countries, in Costa Rica there are significant numbers of non-poor farms in the smallest sizes, and significant numbers of poor farms in the 10-20 Ha. size. Poverty is not simply a question of gross farm size, a farm size definition of poverty would be largely inadequate as a way of defining the target group in Costa Rica.

Farm families are shown in Table 21 with alternative definitions of "poverty". This Table shows the sensitivity of the size of the target group to differing income level definitions.

Table 21

Target Group Farm Families in Costa Rica
by Alternative Definitions of Poverty

Poverty Definition (per capita/year)	No. of Families in Target Group	Population in Target Group
Less than 1100 Colones	34,705	241,875
Less than 1400 Colones	30,686	283,244
Less Than 1700 Colones	45,480	315,801

SOURCE: Computed Census/Academia. Table 3A.

The three different definitions change the percent of the farm operating population which is poor from half (51 percent) to two thirds (67percent).

The distribution of the farming poor may be seen in Table 22 where the population is given by income segment.

Table 22

Income Distribution of the Farming Population

Income Strata (per capita) per year)	Population	Percent of Population by Income Strata
Less than 100 Colones	42,943	9 Percent
100-300 Colones	46,164	10 "
300-500 Colones	42,531	9 "
500-800 Colones	59,481	13 "
800-1100 Colones	50,756	11 "
1100-1400 Colones	41,369	9 "
1400-1700 Colones	32,557	7 "
1700-2000 Colones	25,374	6 "
Over 2000 Colones	129,501	27 "
Total	471,676	100 Percent

SOURCE: Computed Census/Academia. Tables 3A, and 3B.

c. Landless Rural Poor

The number of poor farming families is less in Costa Rica than the number of rural landless poor. Table 23 presents the number of landless poor using the three alternative poverty definitions explained above.

Table 23

Landless Rural Poor

Poverty Definition in Colones per capita	No. Poor	No. Non Poor
Less than 1100	364,837	377,160
Less than 1400	454,864	287,133
Less than 1700	522,798	219,199

SOURCE: Computed Census/Academia. Table 3A.

It is often suggested that the landless population is poorer than the farming population. Since the absolute size of the landless group in Costa Rica is significantly larger than the farming group, the landless group would be expected to predominate in the target group. But is a larger proportion of the landless population poor? Table 24 tests this hypothesis and finds that at the lower income definition the opposite is true, a slightly higher proportion of the farming population is classed as "poor" than is classed poor for the landless population. As the poverty line is moved up this changes, and the landless group show a higher incidence of poverty.

Table 24

Comparison of the Proportion of the Landless and Farming Population Classed as "Poor"

Income Definition (Per Capita/year)	Percent of Farming Population Classed as "Poor"	Percent of Landless Population Classed as "Poor"
Under 1100 Colones	51,3 %	49,2 %
Under 1400 Colones	60,1	61,3
Under 1700 Colones	67,0	70,5

SOURCE: Computation based on Computed Census/Academia. Table 3A.

The differences in any definition are not large, it would appear that landless and farming families are almost equally poor.

Table 25 presents the geographical distribution of the rural landless poor.

Table 25

Distribution of the Rural Landless Poor by Province

Province	Landless Poor Families		Percent of National Landless Under 1100 Col.
	Under 1100 Col. per capita/year	Under 1700 Col. per capita/year	
San Jose	11,431	17,046	20.3
Alajuela	12,476	17,316	22.1
Cartago	6,984	10,351	12.4
Heredia	3,572	5,864	6.3
Guanacaste	11,914	16,232	21.1
Puntarenas	7,022	10,337	12.5
Limon	3,013	4,854	5.3
Total	56,412	82,020	100.0

SOURCE: Computed Census/Academia. Table 3A.

As was mentioned above, Guanacaste has a disproportionately large landless poor group, the share of poor farmers in Guanacaste is only 17 percent compared with 21 percent of the national landless poor. This is a result of the large changes in production patterns in this region as large numbers of earlier poor small farmers became landless poor.

One of the principal concerns of any program aimed at the rural poor must be employment of the landless families. The share of landless and farm families in the target group is indicated in Table 26.

Table 26

Summary of Landless and Farm Population in the Target Group Using Alternative Poverty Definitions

Poverty Definition in Colones/Capita/year	Farm Poor	Landless Poor	Total Poor
POPULATION			
Less than 1100	241,875	364,837	606,712
Less than 1400	283,244	454,864	738,108
Less than 1700	315,801	522,798	838,599
No. FAMILIES			
Less than 1100	34,705	56,412	91,117
Less than 1400	40,686	70,570	111,256
Less than 1700	45,480	82,020	127,500

SOURCE: Computed Census/Academia. Table 3A

The predominance of landless poor in the income defined target group may be seen more clearly in Table 27 where the percentage shares of the target group and total rural population are presented.

Table 27

Rural Poor Target Group
Percentage Share of Farm and Non-Farm Poor
of the Target Group and of the Total Rural Population

Poverty Definition In Colones/capita/year	Farm Poor	Non-Farm Poor	Target Group	Total Rural
PERCENT OF TARGET GROUP				
Less than 1100	39,9 %	60,1 %	100 %	
Less than 1400	38,4	61,6	100	
Less than 1700	37,7	62,3	100	
PERCENT OF THE TOTAL				
Less than 1100	19,9	30,1	50,0	100
Less than 1400	23,3	37,5	60,8	100
Less than 1700	26,0	43,1	69,1	100

SOURCE: Computation based on Computed Census/Academia. Table 3A.

From one half to two thirds of the rural population are in the poverty target group depending on the exchange rate chosen to define poverty. The composition of the target group varies only slightly as the poverty line is move upward; the landless proportion rises from 60 to 62 per cent.

The income profile of the landless poor is given in Table 28.

Table 28

Income Profile of the Landless Rural Population

Income Strata in Colones/capita/year	Population	Percent of Population
Less than 100 Colones	49,400	7 Percent
100 to 300 Colones	25,750	3
300 to 500 Colones	59,240	8
500 to 800 Colones	119,926	16
800 to 1100 Colones	110,512	15
1100 to 1400 Colones	90,827	12
1400 to 1700 Colones	67,934	9
1700 to 2000 Colones	52,640	8
Over 2000 Colones	166,559	22
Total	741,997	100

SOURCE: Computed Census/Academia. Tables 3A, and 3B.

2. Income Level and Source (Farm/off Farm) by size

a. Income Level by Farm Size

Table 29 presents the income level of poor and non-poor farms by farm size. The income definition used is the lowest, 1100 Colones per capita/per year.

Table 29

Income Level of Farm Families by Farm Size

Farm size	No. Poor	Average annual Income per capita of Poor Farms	Average annual Income per capita of Non-Poor Farms	Poor Income as a % of Non-Poor
"Landless" Farms	2,870	470	3,258	14.4 %
0 to 1 Ha.	9,018	494	3,622	13.6
1 to 2 Ha.	4,336	562	3,847	14.6
2 to 5 Ha.	6,550	636	4,017	15.8
5 to 10 Ha.	3,896	643	4,634	13.9
10 to 20 Ha.	4,079	582	4,722	12.3
Over 20 Ha.	0	na	4,771	na
All Farms	30,739	562	4,449	12.6

SOURCE: Computed Census/Academia. Tables 1A, and 1B.

The poor farm target group appears to identify a particularly disadvantaged portion of the population. As was mentioned earlier, the disadvantaged are not restricted to very small farm sizes. The differential between the poor and non-poor incomes is dramatic and does not appear to vary consistently with farm size. Farms classed poor (accounting for about 42 percent of farms, have incomes of only 12 to 15 percent of the average incomes of non-poor farms.

Table 30 presents the geographic distribution of poor farms and compares the average income per capita on poor farms by province.

Table 30
Distribution of Poor Farms by Province

Province	No. of poor Farms	Percent of National Poor Farms	Average per capita income	Income as a % of National Ave. for poor Farms
San Jose	8,593	28,2	558	99,3 %
Alajuela	6,767	22,2	587	104,4
Cartago	3,314	10,9	521	93,9
Heredia	1,146	3,8	426	75,8
Guanacaste	4,422	14,5	588	104,6
Puntarenas	4,626	15,2	566	100,7
Limon	1,653	5,4	na	na
Total	30,521	100.0	562	100.0

SOURCE: Computed Census/Academia. Table 1A.

Except for Heredia, there appears to be less than seven percent variation in the average income level of the poor farmers. Heredia appears to have significantly lower average income among poor farmers; this finding will be disaggregated to the canton and district level to search of geographic concentrations of poverty in this province during the development of a sample frame for targeted surveys.

Table 30 addresses only the issue of the number of poor farms and their income level. To address the issue of the incidence of poverty by province Table 31 presents the percent of farms which are classed as poor, using the 1100 Colon income definition.

Table 31

Geographic Incidence of Farm Poverty

Province	Percent of Farms with under 1100 Colones/capita/per year	Farm Poverty Index (Province as a % of National%)
High Farm Poverty Provinces		
Cartago	51,3 %	122
San Jose	49,0	117
Average Farm Poverty Provinces		
Guanacaste	40,2	96
Alajuela	39,3	94
Limon	39,2	94
Low Farm Poverty Provinces		
Puntarenas	36,0	86
Heredia	33,2	79
Total	41,9	100

SOURCE: Computation based on Computed Census/Academia. Tables 1A, and 1B.

It is interesting to note that Heredia, the province with the lowest average income among poor farmers, is the province with the least incidence of poverty when measured by the percent of farms which are poor. This indicates that while the proportion of farms which are poor may be small, the severity of the poverty level of this small number is acute.

San Jose is classed by the standard in Table 31 as a high farm poverty incidence province. Disaggregating these province wide findings to the canton and district level should provide considerable program guidance on the location of potential geographic targets.

b. Income Source by Farm Size

Table 32 presents the percent share of income originating from on-farm and from off-farm sources to farm families.

Table 32
Income Sources for Farm Families by Farm Size

Farm Size	Percent of income from ON-FARM sources (Poor Farms Only)	Percent of Income from OFF-FARM sources	
		Poor Farms	Non Poor
"Landless" Farms	50,7 %	49,3 %	74.4 %
0 to 1 Ha.	62,3	37,7	74,3
1 to 2 Ha.	85,0	15,0	50,7
2 to 5 Ha.	90,0	10,0	31,1
5 to 10 Ha.	92,4	7,6	19,4
10 to 20 Ha.	93,1	6,9	15,4
All Poor Farms	81,0	19,0	26,5

SOURCE: Computed Census/Academia. Table 1D.

The importance of off-farm income sources decreases consistently as farm size increases. This is similar to the conclusion from the employment section in which the larger farm are able to absorb an increasing share of the available family labor. It is surprising that in no case do off-farm sources account for more income than on-farm sources.

The difference in dependance on off-farm income sources between the poor and non-poor farms is substantial. In most cases the percentage contribution of off-farm income is more than twice as high on non-poor farms as on poor farms.

Table 33 presents the source of off-farm income by sector which is divided between off-farm employment on other farms and off-farm employment in non-agricultural activities.

Table 33

Off-Farm Income Source by Sector

Farm Size	Percent of Income from Off-Farm <u>Agriculture</u>		Percent of Income from Off-Farm <u>Non-Agriculture</u>	
	Poor	Non Poor	Poor	Non Poor
	"Landless" Farms	8.3 %	14.4 %	41.0 %
0 to 1 Ha.	5.4	11.3	32.2	63.0
1 to 2 Ha.	2.1	7.3	12.8	43.3
2 to 5 Ha.	1.5	5.3	8.3	25.6
5 to 10 Ha.	1.6	4.1	5.9	15.2
10 to 20 Ha.	1.5	3.1	5.4	12.3
Over 20 Ha.	na	2.6	na	12.8
All Farms	3.0	4.5	15.9	21.9

SOURCE: Computed Census/Academia. Tables 1A, and 1B.

Based on table 33, Table 33 summarizes the proportion of the off-farm income which is non-agricultural in origin. From Table 35 we can see that while the level of off-farm income varies significantly by farm size and between the poor and non-poor, there is little difference in the proportion of off-farm income by sector. What this implies is that the non-poor do not have improved incomes because they are able to depend more on non-agricultural employment.

Table 34

Proportion of Off-Farm Income Originating in
Non-Agricultural Employment

Farm Size	Percent of Off-Farm Non -Agricultural Poor Farms	Income Originating in Off-Farm Employment Non-Poor Farms
"Landless Farms	83.2 %	80,6 %
0 to 1 Ha.	85,6	84,8
1 to 2 Ha.	85,9	85,6
2 to 5 Ha.	84,7	82,8
5 to 10 Ha.	78,7	78,8
10 to 20 Ha.	78,3	79,9
Over 20 Ha.	na	83,1
All Farms	84,1	83.0

SOURCE: Computation based on Computed Census/Academia. Tables 1A, and 1B

C. Market Orientation and Subsistence on Target Groups Farms.

"Subsistence agriculture" is a term usually applied to farms outside, or principally outside, the market economy, which produce most of their own inputs and consume most of their output. Except in a very few cases there appear to be no subsistence farms by this definition in Costa Rica.

Certain crops, however, are consumed by their producers in significant quantities. Corn and beans are examples of crops which, in certain regions, are consumed on the farm in significant quantities. It is proper, therefore, to speak of subsistence crops but not subsistence farms, since only in rare cases do these subsistence crops make up a large share of the total value of production on small or poor farms. Since the subsistence crops are grains, and low value per hectare crops, the share of land dedicated to them will be higher proportion than their share of value of output. The share of product value and not the share of area cultivated must be used to measure subsistence. Table 35 presents the value of product consumed as a percent of the value of product sold as an indicator of the level of subsistence for poor and non-poor farms.

Table 35

Subsistence Index:

Value of Product Consumed as a percent of product
Value Sold

Farm Size	Poor Farms			Non-Poor Farms
	Puriscal	Turrubares	National Average	National Average
0 to 1 Ha.	9,6 %	7,5 %	4,0 %	0,9 %
1 to 2 Ha.	8,3	14,9	5,3	1,3
2 to 5 Ha.	8,5	8,8	6,4	1,5
5 to 10 Ha.	7,3	7,0	5,8	1,5
10 to 20 Ha.	6,2	7,4	5,6	2,1
Over 20 Ha.	na	na	na	1,3
All Farm Sizes	7,6 %	7,9 %	5,2 %	1,3

SOURCE: Computation based on Computed Census/Acadamia. Tables 1A, and 1B.

In addition to presenting national averages for both poor and non-poor farms, Table 35 includes two extremely poor Cantons where subsistence levels are considerably higher. Three obvious trends are evident in Table 35: first, poor farms are three to four times more subsistence oriented than non-poor farms; second, as poverty deepens inside the poor group so does the level of subsistence and third, in the non-poor subsistence increases as farm size increase, and the incidence of home consumption on farms over 20 Ha. is as strong as the average.

Table 35 underestimates the level of subsistence because two important sources of home produced consumption are not captured in the basic data used for the Table. The data do not include home consumption of livestock products. Given the importance of livestock in the total product mix on small farms as is discussed in the production patterns section, the consumption of livestock products may be almost as important as crop consumption. The second omission is of small vegetable crops or permanent crops which are grown exclusively from home consumption and for which the volume of each item (for example one or two plantain trees) is small enough that the interviewer likely omitted it from the questionnaire. These omission may likewise be important.

Even if we allow for 100% underestimation, the level of subsistence on the average for poor target group farms would be about 10% on the average, and even in the poorest canton, less than 30%.

It appears, therefore, that the target group are basically market oriented in terms of the sale of their produce. Whether they are also integrated into the market for agricultural inputs is an issue addressed in the technological indicators of this study, which indicates that while the level of input purchases is lower on poor farms, almost all of them are involved in the purchase of some inputs and in that sense are involved in the market economy.

D. Production Patterns

The intent of this section is to provide a profile of the production patterns and technological characteristics of farms which may be included in AID program activities. The group of farms who may receive direct assistance must be broader than just the poor and very small farms since a principal program focus should be to generate employment for landless workers, and expand off farm employment opportunities for the smallest farms. Four potential program focusing on farm sizes have been selected as representative sizes, and the country has been divided into seven agronomically defined regions for this analysis of production and technological patterns. One extra farm size (20 to 50 Ha.) is added in the tables for comparison purposes to illustrate the pattern on larger farms.

1. Crop Mix and Livestock Production Patterns

The total value of production on small farms in Costa Rica comes from diverse set of agricultural activities. Though annual crops are important in terms of area cultivated they only contribute 11-13 percent of total value of production. Table 36 separates agricultural activities on small farms into three categories, annual, perennial crops, and livestock products.

Table 35

The Contribution of General Crop and Livestock Activities to Total Value of Production on Small Farms (Including 17 Principal Crop and Livestock Products)

Farm Size	Percent of Total Farm Value of Production*			
	Annual	Perennial	Livestock	Total
2 to 3 Ha.	13,4 %	38,0 %	48,6 %	100 %
3 to 4 Ha.	11,8	45,1	43,1	100
5 to 10 Ha.	11,3	43,3	45,4	100
10 to 20 Ha.	13,2	46,7	40,1	100
20 to 50 Ha.	11,2	36,3	52,6	100

* Production consumed on the farm is included in total value of production. The price used to value home consumed production is the average producer price from the Academia study.

SOURCE: Daines Representative Farm Analysis Table 22.

The importance of perennial crops, especially coffee, is not surprising, but the importance of animal products on even the smallest farms distinguishes Costa Rican small farmers from most other Latin American small farmers situations. The general lack of importance of basic grains and other annual crops, even when home consumption is included, emphasizes the point made elsewhere that subsistence agriculture is clearly not the rule for small Costa Rican farmers.

Regional differences in crop mix on small farms are significant. Table 37 indicates the percent of total value of production originating in annual crops, perennial crops, and livestock products.

Table 37

Crop and Livestock Contribution to Farm Value of
Production by Agronomic Region

Economic Region and Farm Size	Percent Contribution to Total Value of Farm Production			
	Annual Crops	Perennial Crops	Livestock Products	Total Value
Cent. Valley East				
2 to 3 Ha.	13 %	48 %	39 %	100 %
5 to 10 Ha.	9	50	41	100
10 to 20 Ha.	9	46	45	100
Cent. Valley West				
2 to 3 Ha.	8	53	39	100
5 to 10 Ha.	5	69	26	100
10 to 20 Ha.	3	73	24	100
North Zone				
2 to 3 Ha.	13	42	45	100
5 to 10 Ha.	13	44	43	100
10 to 20 Ha.	23	70	7	100
Dry Pacific				
2 to 3 Ha.	20	5	75	100
5 to 10 Ha.	15	7	78	100
10 to 20 Ha.	13	6	81	100
Central Pacific				
2 to 3 Ha.	10	38	52	100
5 to 10 Ha.	7	34	59	100
10 to 20 Ha.	14	40	46	100
Pacific South				
2 to 3 Ha.	21	50	29	100
5 to 10 Ha.	19	52	29	100
10 to 20 Ha.	18	47	35	100
Atlantic Zone				
2 to 3 Ha.	8	31	61	100
5 to 10 Ha.	10	47	43	100
10 to 20 Ha.	12	45	43	100

SOURCES: Daines, Representative Small Farm Analysis, Table 22.

Annual crops are least important in two Central Valley regions, and most important in the Pacific regions. Perennial crops, are important, as would be expected, in all regions except the Dry Pacific area where irrigation would be required to support them. In the Dry Pacific area livestock along with annual crops predominate. In both of the Central Valley regions small farms depend on annual crops to a larger extent than large farms, but there is no obvious crop mix trend according to farm size elsewhere.

a. Annual Crops

While annual crops occupy a significant share of the land in small farms, they are relatively unimportant in value terms. Table 38 indicates the contribution of major annual crops to total farm value of production.

Table 38

Percentage Contribution of Principal Annual Crops to the total Value of Production on Small Farms

Crop	<u>Percent of Total Value of Farm Production</u>			
	2 to 3 Ha.	5 to 10 Ha.	10 to 20 Ha.	20 to 50 Ha.
Corn	3,8 %	2,9 %	3,8 %	3,7n%
Rice	2,0	2,2	3,2	0,5
Beans	1,7	1,4	1,9	1,8
Basic Grains	7,5	6,6	8,9	8,9
Potatoes	1,7	1,2	1,2	0,9
Cassava	1,1	1,3	1,8	0,9
Tomatoes	1,4	0,9	0,3	0,2
Tobacco	1,7	1,3	1,0	0,2
Other Annuals		4,7	13,2	2,3
All Annuals		11,3		11,2

SOURCE: Daines, Representative Small Farm Analysis. Tables 22, and 23,

On a national basis corn is the most important annual crop on small farms in terms of value. Tomatoes and tobacco are very important for the smallest farms. These cropping patterns vary considerably by region. A detailed description of the cropping patterns in each region for each farm size is given in Daines, Representative Small Farm Analysis Table 22. Potatoes are only important on small farms in the Central Valley East, and to a lesser degree in the North Zone. In those two regions potatoes are approximately four times as important on the smallest (2-3 Ha.) farms as all basic grains together. Basic grains predominate among annual crops in the all of the Pacific zones, though to a lesser degree in the Pacific South where tobacco is almost as important on small farm as basic grains. Tomatoes are an important small farm crop in both Central Valley regions and yuca in the North and Atlantic zones.

It appears that annual crops, taken as a group, are not very important sources of income (or consumed value) on small farms as a whole, however, they are more important on the poorer of the small farm group than for all small farms. This tendency may be seen in Table 39.

Table 39

The Relative Importance of Annual and Cereal Crops in Total Value of Farm-Production Between Poor and Non-Poor Farms

Farm Size and Income Class	Percent of Land in Cereals	Percent of Land in Annual Crops	Percent Additional Annual Crops on Poor Farms
0 to 1 Ha.			
Poor	31,5 %	37,1 %	43,8 %
Non-Poor	18,2	25,8	
1 to 2 Ha.			
Poor	38,2	43,2	33,3
Non-Poor	25,5	32,4	
2 to 5 Ha			
Poor	30,7	33,1	47,8
Non-Poor	18,8	22,4	
5 to 10 Ha.			
Poor	19,5	20,9	29,8
Non-Poor	14,0	16,1	
10 to 20 Ha.			
Poor	13,3	13,9	0,7
Non-Poor	12,7	13,8	

SOURCE: Computed Census/Academia. Tables 2 D , and 2E

Table 39 indicates that the poorer farms in the smallest size groups depend much more on annual crops for their production than do the non-poor. In addition, it indicates that basic grains predominate in the annual crop group more heavily for the poor than the non-poor. This implies that non-poor farms are more diversified into other annual crops like potatoes, tomatoes, tobacco which, while more profitable, are also higher risk crops.

In summary, it appears that annual crops are much less important on small farms than livestock and perennial crops. This is true for both the poor and non-poor small farms, even after adjusting the national averages for each size range by the added dependence factor on poor farms.

While it is not always safe to suggest that observed differences between poor and non-poor are necessarily causative (as opposed to symptomatic) of their poverty, the data available here would lead us to hypothesize that diversification out of basic grains, into other annual or other agricultural activities may be a vital factor in raising target group incomes.

b. Perennial Crops

In four out of the seven zones, perennial crops predominate in small farm production. Coffee is the most important crop, not only among the perennial crops, but it is also the most important single agricultural activity on small farms. Coffee in addition, is of prime importance to the landless laborers and small farmers as a source of employment.

Perhaps the most important difference between the poor and non-poor small farmer is that the non-poor farm has substantially more coffee. The magnitude of this difference has already been presented in the employment section of this document and will not be repeated here. This difference is, however, limited to certain regions. Table 39a presents the percent share of value of production on small farms from coffee by region.

Table 39a

**Coffee Value as a Percent of Total Value of Production
for Small Farms by Region and Farm Size**

Region	Farm Size			
	2 to 3 Ha.	5 to 10 Ha.	10 to 30 Ha.	20 to 50 Ha.
Cent. Valley E.	42.9%	40.8%	38.2%	31.7%
Cent. Valley W.	48.4	61.8	63.7	67.2
North Zone	30.8	28.1	38.8	9.8
Dry Pacific	2.6	3.8	2.8	2.6
Cent. Pacific	35.9	30.8	36.2	32.9
Pacific South	45.2	45.0	38.6	24.9
Atlantic Zone	2.5	2.7	2.1	1.6
All Regions	29.8	30.4	31.5	24.4

SOURCE: Daines, Representative Small Farm Analysis, Table 25

Reasons other than coffee must be the predominant explanation for differences between the poor and non-poor in the dry Pacific and Atlantic zones since coffee is virtually non-existent there.

In the important coffee regions, coffee accounts for approximately 90 percent of the perennial crop value on small farms, and in the other regions from 50-75 percent. In the Atlantic zone, however, coffee is only 5 percent of perennial crop value. Other important small farm perennial crops include bananas, plantains, guineo, cacao and sugar cane. Table 40 outlines the percent importance in farm production value of these other perennial crops by region for farms between 5-10 Ha.. A more detailed treatment for all small farm sizes can be seen in Daines, Representative Small Farm Analysis, Table 24.

Table 40

The Contribution of Perennial Crops (Excluding Coffee)
to the Total Value of Farm Production on 5 to 10 Ha.
Farms

Region	Percent of total farm value of production				
	Bananas	Plantains	Guineo	Cacao	Sugar Cane
Cent. Valley E.	1.0%	0.3%	0.0%	0.0%	7.7%
Cent. Valley W.	0.0	0.1	0.0	0.0	7.0
North Zone	2.1	4.0	1.5	0.8	7.4
Dry Pacific	0.3	2.0	0.3	0.0	1.2
Cent. Pacific	0.6	0.7	0.2	0.0	1.7
Pacific South	1.6	4.1	0.2	0.2	1.0
Atlantic Zone	10.0	13.8	0.2	20.1	0.5
All Regions	2.2	3.5	0.3	3.0	3.8

SOURCE: Daines, Representative Small Farm Analysis, Table 24

Table 40 emphasizes the wide regional variation in the importance of perennial crops. Sugar cane is the widest ranging of the important non-coffee perennial crops, and provides 5-10 percent of small farm incomes in the Central Valley and North zones. Cacao, bananas, and plantains are vital to small farm incomes in only the Atlantic zone where they contribute 35-45 percent of the gross value of production on small farms. While guineo is of some small importance in the North zone on small farms, its insignificance as an income source is surprising.

Differences in the importance of perennial crops between the poor and non-poor appear to be limited to coffee. There is little observed difference in the cultivation of other perennial crops (see Computed Census/Academia Tables 2D, and 2E).

C. Livestock Products

The importance, and in many regions predominance, of livestock products on small farms is obvious from the tables already presented. This section will explore the product composition inside livestock and indicate the regional variation in the mix of livestock products on small farms.

Livestock products may be divided into two groups, pasture based, including milk, beef, sheep, etc., and non-pasture livestock including poultry (meat and eggs), pork, honey, etc. For the small farmer the distinction is important since his

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Table 42

The Contribution of Pork and Poultry
Products to Total Value of Production on Small Farms
by Region and Farm Size

Region	Value of Production as a % of Total Farm Production					
	Pork			Poultry (eggs and meat)		
	2/3	5/10	10/20	2/3	5/10	10/20
Cent. Valley E.	3%	6%	3%	3%	2%	1%
Cent. Valley W.	6	4	3	28	14	9
North Zone	15	11	13	6	4	22
Dry Pacific	47	31	27	11	7	5
C. Pacific	14	13	13	22	12	4
Pacific South	12	10	10	9	5	4
Atlantic Zone	38	20	16	8	6	8
All Regions	20%	20%	12%	12%	9%	8%

SOURCE: Daines, Representative Farm Analysis, Table 25

Subsistence on small farms may be as important in livestock products as in crops. The census data on which these analyses are based was unable to capture the on-farm consumption of livestock products. Table 41 and the other tables in this document included consumed and sold livestock products together in the total value. Home consumption of farm produced livestock commodities is an important issue which should be addressed in a regionally targeted sample survey because of the possible positive nutritional impact on target group families. Livestock products may have a significantly lower share in cash income than in total value of farm production.

The importance of pork and poultry in the small farm production pattern may be seen by comparing the percent shares of total farm production values for these products with basic grains as is shown in Table 42.

Milk and beef products appear as important small farm commodities in all regions, milk products being most important in the Central Valley East, and the Central Pacific regions, while beef is most important in the Dry Pacific, and Atlantic regions. Both milk and beef are important small farm products in the North zone. In the farm sizes from 10 to 50 Ha. beef becomes predominant over milk in all cases.

Table 43

Milk and Beef Share of Total Value of Production
on Small Farms by Region and Farm Size

Region	Percent of Total Value of Farm Production					
	Beef			Milk		
	2/3	5/10	10/20	2/3	5/10	10/20
Cent. Valley E.	8%	9%	10%	20%	24%	30%
Cent. Valley W.	2	4	6	4	4	6
North Zone	10	15	36	14	13	27
Dry Pacific	12	29	39	5	11	10
Cent. Pacific	7	9	15	9	13	16
Pacific South	4	7	11	4	7	9
Atlantic Zone	11	15	17	4	2	2
All Regions	8%	13%	19%	9%	10%	14%

SOURCE: Daines, Representative Small Farm Analysis, Table 25

2. Yield Patterns and Technological Level on Small Farms

a. Technological Indicators on Small Farms

Two indicators are used to give a technological profile of small farms, mechanical intensity, and fertilizer use.

- Mechanical Intensity

The number of tractor or mechanized horsepower per hectare cultivated instead of increasing on larger farms as one might expect in Costa Rica, declines as is indicated in Table 44.

Table 44

Mechanical Intensity of Cultivation on Small Farms
As Indicated by the Number of Tractor Horsepower
per Cultivated Hectare

Farm Size	Horsepower per Cultivated Ha.	Mechanical Intensity Index (National Average HP/Ha. Cultivated = 100)
2 to 3 Ha.	0.92	158
3 to 4 Ha.	0.95	162
5 to 10 Ha.	0.70	120
10 to 20 Ha.	0.61	104
20 to 50 Ha.	0.45	77

SOURCE: Daines, Representative Small Farm Analysis, Table 4

The decline in mechanical intensity should not be interpreted to indicate that the smaller farms utilize a larger proportion of their total power in mechanical form than do larger farms. Table 45 indicates that small farms utilize more animal and human power as well, which means they are simply more power intensive than larger farms.

Table 45

Power Source and Intensity on Small Farms by Farm Size

Farm Size	Draft Animals per Hectare Cultivated	Total Power Indicator (Mechanical Animal and Human)	Index of All Power (Nat. Ave. = 100)
2 to 3 Ha.	0.14	2.14	252
3 to 4 Ha.	0.14	1.82	214
5 to 10 Ha.	0.10	1.27	149
10 to 20 Ha.	0.07	1.03	122
20 to 50 Ha.	0.05	0.83	98

SOURCE: Dainoff, Representative Small Farm Analysis, Table 4

The smallest farms have 2.5 times as much power available per hectare cultivated as the national average. These figures overestimate the power utilized per hectare cultivated since much of the power on small farms comes from human labor, which is significantly under utilized. If however, human labor is subtracted out leaving only animal and mechanical power (for which there is no reason to think that they would be less fully utilized on small than on large farms) the small farms still appear to be much more power intensive.

Whether the finding that smaller farms utilize more mechanical and other power per hectare cultivated is an indicator that they are at a higher technological level depends on the definition of "technology". So many different meanings have been given to the word "technology" that it is perhaps better not to give an interpretation which depends on any one of them. All that can be said from Table 45 is that small farms use more power (animal, mechanical, and human) per Ha. cultivated than do larger ones. This finding may have some tentative program implications, since programs aimed at increasing the mechanical power available to small farmers on the basis that they are power scarce would

probably need to be reexamined.

As with other characteristics of small farms, mechanical and power intensity vary regionally, and conclusions drawn only based on national averages might find they are characteristic of no region. Mechanical power use on small farms is virtually non-existent in the Atlantic zone, and very infrequent on small farms in the Central and Pacific South regions. The Dry Pacific and North zones are the most mechanically intense of small farm regions, followed closely by Central Valley West and Central Valley East. The total power index follows a similar regional pattern indicating that by and large mechanical power does not result in a reduction in the amount of animal and human power used.

- Fertilizer Use

Small farms utilize significantly less fertilizer per cultivated hectare than the national average. It is interesting to note that this is also true of medium sized farms (from 20 to 50 Ha.); only over 50 Ha. do farms operate at fertilizer use levels above the national average.

Table 46 presents a summary of fertilizer use in major crops per hectare cultivated in those crops.

Table 46

Fertilizer Use on Small Farms

Farm Size	Kg. of Fertilizer per Ha. Cultivated	Fertilizer Use Index (Nat. Ave. Kg/Ha. Cultivated = 100)
2 to 3 Ha.	149.9 Kg.	67
3 to 4 Ha.	160.8	72
5 to 10 Ha.	158.9	71
10 to 20 Ha.	161.6	72
20 to 50 Ha.	155.8	70

SOURCE: Daines, Representative Small Farm Analysis, Table 7

There is little observable trend among small and medium sized farms in the overall use of fertilizers. All are significantly below the national average, which is itself rather low by experiment farm standards.

Except for the Dry Pacific and Atlantic regions, over half of the total fertilizer used on small farms is

used in coffee, and in the principal coffee areas the figure is over 75%. Even so, fertilizer use in coffee on small farms is significantly less than the national average. The only exception to this is in the Central Valley West region where small farms apply significantly more fertilizer in coffee than the national coffee average.

In the Dry Pacific region two thirds of small farm fertilizer is used in rice and one third in corn. In the Pacific South region almost one third of small farm fertilizer is applied in tobacco.

Fertilizer use in basic grains on small farms varies widely by region, with some regions and farm sizes above the national average application rate but most regions below. In bananas, small farm fertilizer use is consistently less than 10 percent of the national average reflecting the strong influence of the large and well organized corporate production. In tobacco and in sugar cane, small farms vary only slightly above and below the national average.

Most small farms appear to be using some fertilizer, and while the overall average is significantly under the national average, there are important regions and crops where small farms appear not to be significantly behind the larger farm size segment in fertilizer use.

b. Yield Patterns

Corn yields on small farms are clustered about the one metric ton per hectare figure with a gradual declining trend as farm size increases. Corn yields on farms of 20 Hms. or less are slightly higher than the national average, in rice they are significantly lower and in beans slightly lower. Table 47 presents yield patterns in basic grains which in the interest of brevity average out the rather substantial regional differences. A complete region and farm size breakdown of yield patterns for all major crops is given in Daines, Representative Farm Analysis Tables 9 through 13.

Table 47

Yields in Basic Grains on Small Farms

Farm Size	Physical Yield Index (National Average Yield in Tons/Ha. = 100)		
	Corn	Beans	Rice
2 to 3 Ha.	108	102	63
3 to 4 Ha.	105	88	64
5 to 10 Ha.	80	90	76
10 to 20 Ha.	104	103	72
20 to 50 Ha.	105	75	56

SOURCE: Daines, Representative Small Farm Analysis, Table 9

Yields of tobacco on small farms are consistently above the national average reflecting the more localized and higher technological level in this crop.

Yields of potatoes, yuca, and tomatoes appear to be regionally determined, there are no farm size patterns nor overall small farm averages which would be meaningful.

Small farm yields of coffee appear to be only slightly below the overall average for the various regions. Banana yields are lower in comparison to national averages than any other crop.

Except for a few crops, there are essentially no yield patterns among small farms which can be identified easily. Most of the yield differences appear to be regional in nature and little related to farm size.

E. Production Constraints

The poor target group having been defined and described, the focus of discussion now turns to searching for ways to improve their situation. The method suggested in the Latin America Regional Agriculture Assessment Guidelines, and chosen here, to "allow the problems to suggest the solutions", begins at the farm level asking the question, what factors are limiting the poor farmer from improving his income or welfare? These problems, or limiting factors are called "constraints". Two general types of constraints will be

examined, farm level, and non-farm factors.

Farm level, or production constraints will be grouped into categories roughly corresponding to the resources utilized at the farm level and the technology used to combine these resources in production.

Two methods of searching for problems and feasible solutions are utilized, the first (and preferable) method originates in a comparison of production characteristics between the poor and non-poor farms, and the second in a direct examination of the poor farms themselves using independent measures of potential.

To simplify the constraints analysis, the improvement of net income is used as the single most important objective. The target group farms may improve its income in one, or a combination of the following changes:

- Increase the amount of land cropped (including land "cropped" in pasture) by obtaining the use of added land through purchase, rental, or other tenural forms
- Increase the amount of land cropped by increasing the proportion of land utilized (cropping heretofore unutilized land).
- Increase income without increasing the area cropped by changing the combination of crops and livestock products from lower value per Ha. products to higher value per Ha. products.
- Increase income without changing the area cropped or the mix of products by increasing the income yield or productivity of land used in a particular crop. The income yield per hectare may be increased by increasing the value of output more than the additional costs of the technological change, or by holding the value of output constant and reducing the cost of inputs. Changes of this type include, for example, utilizing more fertilizer, more pesticides, better seed, improved management or technical practices, increasing the number of animals per Ha. in pasture, etc. Most of the changes in this category are loosely known as "yield improving technological" changes.
- Increasing the price received per unit of product. This may be accomplished by either improving the quality of the product (a technological change), or in changing the marketing arrangement.

In summary, a farmer may increase his income by cultivating more land, growing higher value crops, improving the income yield per hectare, or by getting a better price for his product

The above catalog of income improvement alternatives helps to structure the discussion of constraints which limit the achievement of improved income.

1. Land Constraints and the Potential for Increasing the Area Cultivated on Target Group Farms

It is unfortunate that none of the data available permits a direct measure of the quality of land in the poor and non-poor farms. It is difficult therefore, to measure land slack and to estimate the relative importance of land as a constraint on the improvement of target group income. Only one category of land in the data is clearly an indication of land slack, the amount of land classed as "fallow".

Table 4B indicates the percent of land in fallow for the target and non-poor farms by farm size.

Table 4B

Land Slack Estimates
Percent of Land Once Cultivated, not now Utilized

Farm Size	Poor Farms	Non-poor Farms	Difference
0 to 1 Ha.	0.0%	0.0%	0.0%
1 to 2 Ha.	0.0	0.0	0.0
2 to 5 Ha.	1.5	0.0	1.5
5 to 10 Ha.	4.4	1.6	2.8
10 to 20 Ha.	8.0	3.7	4.3
Over 20 Ha.	na	4.9	na

SOURCE: Computed Census/Academic Tables 2D and 2E

Using fallow land as an indicator of land slack it would appear that there is no slack in target group farms under 2 Ha., and an insignificant amount of slack, and only from 4-8 percent slack in target group farms above five Ha. Fallow land may not be all available for cultivation, some fallow is a necessary part of the cultivation cycle. If we assume that the non-poor farm is an indication of the minimum fallow necessary to operate, then the land slack measure is only the difference between the fallow percents. The net measure of land slack indicates that from 3-5 percent of land is in available fallow on target group farms over five Ha.

In many countries including Costa Rica, land slack is not found in fallow but in poorly utilized pasture which could be cultivated or brought into intensive improved forage and pasture crops. The proportion of pasture land may be used as a rough indicator of land slack. This measure is not reliable enough to be used with confidence, but in the absence of direct measures of land quality is preferable to no measurement at all.

Table 49

Possible Land Slack in Pasture and Fallow

Farm Size	Percent of Land in Pasture on Poor Farms	Net Land Slack on Poor Farms in Fallow and Pasture
0 to 1 Ha.	9.2%	9.2%
1 to 2 Ha.	15.4	15.4
2 to 5 Ha.	20.3	21.8
5 to 10 Ha.	42.0	44.8
10 to 20 Ha.	42.9	47.2

SOURCE: Computed Census/Academic Tables 2D and 2E

The discussion on commodity mix on small farms in part D, Production Patterns, leads us to conclude that a significant part of the pasture is in relatively productive use. Some of the net land slack in Table 49 must therefore be discounted as being in current productive use.

Poor farms under five hectares cultivate from 60-84 percent of their land, farms from 5 to 10 Ha. cultivate only 40 percent and from 10 to 20 Ha. only 29 percent. Even if we discount for the probable decrease in quality as farm size increase there would appear to be considerable land slack on target group farms over five Ha. It is probably reasonable to suggest that 20 percent of the land in 5 to 10 Ha. farms, and 30 percent in 10 to 20 Ha. target group farms is slack.

Land and land quality are a highly regional phenomenon, and the conclusions drawn here vary widely from region to region, as demonstrated in Table 50.

Table 50

**Estimates of Land Constraint on Small Farms
by Region for Farms from 10 to 20 Ha.**

Region	Percent of Land by Land Use Category (10/20 Ha.)			
	Fallow	Pasture	Pasture + Fallow	Uncultivated
C. Valley E.	4.2%	48.1%	52.3%	65.3%
C. Valley W.	1.8	45.7	47.5	51.6
North Zone	5.2	40.1	45.3	68.5
Dry Pacific	3.8	64.9	68.7	74.6
C. Pacific	9.0	46.3	55.3	60.5
Pacific S.	9.5	35.8	45.3	61.7
Atlantic	9.2	29.1	38.3	50.3
All Regions	6.3	44.9	51.2	61.8

SOURCE: Samuel Daines, *Representative Small Farm Analysis*, Tables 2 and 3

Many factors make this estimate difficult, for example in the Atlantic zone where colonization potential is significant and land is not a serious constraint, Table 50 indicates that a larger than average amount of land in farms is cultivated. What may be drawn from Table 50 is that there is probably a potential increase in land under cultivation in target farms from 10 to 20 Ha. on the order of 30 to 40%.

In summary, land appears to be a binding constraint on the development of the 74 percent of the target group farmers who are on farms of less than five Ha. It appears not to be a constraint on target group farms over 10 hectares, indeed a significant assistance opportunity should be to increase the amount of land under cultivation on these farms.

For the target families on farms under five hectares, the land constraint conclusion eliminates expanding cultivation within the present farm as a viable income improvement strategy, leaving the following assistance alternatives for examination:

- Focus assistance on increasing the supply of land to target group families in this class.
- Focus on one or a combination of the other farm income

increasing alternatives (higher value crop mix, improved technology, etc.)

- Focus assistance on creating off-farm employment opportunities for these small farmers.

Increasing the supply of land to the less than five Ha. group may involve public land reform or colonization, but it could also be done by direct financing of land purchase or rental. The issue of land reform/colonization and an evaluation of its advisability and feasibility are beyond the scope of this paper, but increasing the supply of land to these less than 5 Ha. poor farmers would appear to be a critical need.

Alternatives for improving income through technological change will be discussed in E.3 below. Off-farm employment alternatives may be generated either on other larger farms, or in non-farm activities.

The assistance opportunity of bringing unutilized land in target group farms between 5-20 Ha. is significant, and may be viewed not only as an income generating alternative for these farmers, but may generate employment alternatives for members of the smaller target farms, and for landless families.

Identifying increased cultivation in this target group segment as a potential assistance strategy leads us to a second level of farm level constraints, i.e., what are the factors which impede the cultivation of this land? We might divide these into farm level resource constraints, and off-farm factors will be discussed later, the paragraphs which follow focus only on farm level constraints.

Financial limits, available labor, and managerial capacity are perhaps the most important farm level constraints to the expansion of cultivation. There may be certain areas in Costa Rica, and certain seasons of the year when labor to operate extended cultivation may be difficult to obtain. Some have suggested that the level of social services and programs in the rural areas in Costa Rica may be such that many unemployed workers are not seriously looking for work. The data available do not directly address this issue, all that can be said is that except for periods of coffee harvest there appear to be significant labor surpluses in all rural regions. In the absence of other evidence it must be assumed that labor could be drawn to production alternatives at or near the current wage rate in sufficient quantity to not present a constraint on the expansion of cultivation in target group farms from 10 to 20 Ha. in size. Farm family labor on these farms could provide a large proportion of this added labor requirement without even requiring outside workers.

Credit and financial resources in Costa Rica are abundant relative to other Latin American countries, as was demonstrated in Table 15. The tripartite credit study indicated that poor farms unfortunately do not have adequate access to this credit. This issue is unclear and will need to be studied in particular areas and for the specific target group areas where assistance programs are proposed. It is possible that credit and financial constraints are principal limiting factors which prevent the cultivation of additional area. Markets, marketing, and technological factors may be more important limits on this expansion. Managerial practices in the livestock area may need to be altered in order to either make the livestock activity more intense, based on improved or cultivated pasture, or by increasing the animal land ratio on part of the pasture land to release the balance to cultivation. These are issues, beyond the scope of this overall assessment which must be addressed on an area by area basis, using sample survey data, for each geographic area selected for program assistance.

The availability of additional market at profitable prices and the availability of target farmers to adequate marketing infrastructure are probably as important limiting factors as the farm level constraints.

In summary, it appears that three fourths of the target group farm families are constrained by available land, and that increasing cultivation is a low potential area for activity among those farms of less than five Ha. For target group farms over five Ha. increasing cultivation is a significant opportunity for assistance activity, with the potential of increasing target group incomes (assuming no change in productivity) by 30-40 percent.

2. Crop Mix Constraints and Alternatives for Cultivating More High Value Crops on Target Group Farms

One alternative for increasing target group incomes is to shift the mix of crops in a higher value direction, that is substituting higher value crops for lower value ones, without increasing the total area cultivated. To explore the income potential of this approach we begin by classifying crops according to their value per hectare. One of the difficulties of making this value per hectare comparison is to avoid comparing crops at different technological levels. It is useful to separate the income increases which come from changing technological level from those which come from simply changing the proportion of products grown at constant yield levels. In order to arrive at comparisons, between crops, of the value per hectare, eliminating technological differences, the comparisons are made in terms of the crop found on farms, which is corn. If the corn yield is low, then the

assumption is that this farmer is at a relatively low technology and hence the compared crop value relates to a lower yield as well. Table 51 contains the estimate of value per hectare for various crops as a percent of corn value per hectare on the same farms. Since many high value crops are only profitable in certain regions, whereas corn is grown in all, the comparison crop will dictate which region the figures are drawn from. The number in () after the value figure indicates the region from which the estimate is taken (see Figure 1).

Table 51

Value of Production per Hectare Cultivated

Crop	Value of Production Per Hectare Cultivated (Corn Value of Production per Ha. Cult. = 100)		
	2 to 5 Ha. Farms	5 to 10 Ha. Farms	
Tomatoes	9345	2898	(1)
Bananas	711	3303	(4,5)
Tobacco	1245	1106	(6)
Potatoes	896	970	(1)
Coffee	769	844	(2)
Sugar Cane	202	754	(5)
Plantains	589	623	(6)
Yuca	367	439	(3)
Cacao	118	157	(7,6)
Rice	159	175	(2,1)
Beans	108	229	(2)
Corn	100	100	(all)

SOURCE: Deines, Representative Small Farm Analysis, Tables 9, 10, 11, and 12

There are a wide variety of specialty and minor crops in the high value category which are not included in the table, but which present viable small farm alternatives.

Livestock activities are difficult to classify according to their value per hectare since some of them do not even involve land (poultry and pork) and the ones that do use land do not generally use cultivated land. When livestock is based on cultivated pasture it can be a high value activity. When dairy is based on cultivated and improved pastures its value per cultivated Ha. in Costa Rica is 669 percent of corn value on 0 to 5 Ha. farms, and 376 percent on 5 to 10 Ha. farms. Beef is not as high value even when based on cultivated pasture, it is 265% of corn value on 0 to 5 Ha. farms and 155% on 5 to 10 Ha. farms

The non-pasture based livestock products since they require no land are among the best alternatives for income generation on target group farms under 5 Ha. These activities are already important income sources and familiar to a wide range of target group families, and therefore require no new technology to be expended. In this sense we might think of the non-pasture based animal activities (poultry, pork, honey, etc.) as very high on the list of "high value" products.

The question of the potential of the target group farms to cultivate a higher proportion of high value crops may be addressed by first comparing the proportion which high value crops already represent in the crop mix of poor and non-poor small farms. Table 52 presents this comparison.

Table 52

Comparison of the Area Cultivated in Low Value Crops
Between Poor and Non-Poor Small Farms

Crop Type and Farm Size	Percent of Land Cultivated		Difference	
	Poor	Non-Poor	%	Ha.
Low Value Cereals				
0 to 1 Ha.	31.5%	18.2%	-13.3%	519 Ha.
1 to 2 Ha.	38.2	25.5	-12.7	777
2 to 5 Ha.	30.7	18.8	-11.9	2,607
5 to 10 Ha.	19.5	14.0	- 5.5	1,505
10 to 20 Ha.	13.3	12.7	- 0.6	353

SOURCE: Computed Census/Academia Tables 2D and 2E

The potential cultivated land which could be shifted from low value to higher value crops is small in the farms over five hectares, if the non-poor are taken as the model. What this implies is that for the under five hectare farms there appears to be significant room for substitution of lower value crops by higher value.

Coffee is the crop which provides the high value basis for the income earned by the non-poor farms. It accounts for nearly all of the differences in income between the poor and non-poor in the principal coffee regions. The answer to how to raise the income of the under five hectare farms seems simple enough, grow more coffee or crops like it in value per hectare. Since coffee is not really

an alternative other products must be sought.

Unfortunately, most of the high value crops are high risk crops. Their risk comes principally from high production costs and wide market price fluctuations which occur most violently where the size of the market is small, as is the case of Costa Rica.

The most important constraints on shifting the crop mix are off-farm market system constraints. In the commodities where processing plants are an integral part of the marketing chain assistance directly to processing activities is one way of reducing the off-farm constraint.

In summary, it appears that some potential, large enough to be worth exploiting, exists in target group farms from 2 to 5 Ha. to substitute higher value crops for cereals. Non-poor farms in similar regions on similar sized farms have been successful in doing so. Little potential for crop mix shift appears to be present in the over five Ha. target group farms. The mode of assistance and principal bottlenecks are likely to be found in marketing and processing, and not at the farm level.

3. Technological Constraints and Alternatives for Increasing the Income Productivity of Cultivated Land Through Technical Change

On all farm sizes there is obvious potential to increase income by improving productivity through technological change. As was observed in the section on yield patterns on small farms, there are many crops in which the small farm yields are both lower than the national average, and very low by technical standards for the climate and soil conditions of Costa Rica.

Improved practices with resulting yield increases appears to be the only on-farm income alternative for the smallest farms under two hectares.

The crop mix is so diverse in Costa Rica, and the regional differences so marked that it is beyond the scope of this paper to explore the potential and describe the constraints which limit yield increasing technological change. The detailed comparison of yields by crop size and region undertaken in the Representative Small Farm Analysis (see Tables 9-13) revealed a heterogeneity of yield patterns which defied simple analysis. There were simply no obvious patterns. It is probable that careful analysis at the cantonal or district level, disaggregating by cropping type and income class, would provide a serious basis for both estimating the impact and evaluating the feasibility of yield increasing programs.

Table 53 summarizes the conclusions of the farm level constraints section for the farming segment of the target group.

Table 53

Summary of Priority of Constraints and Potential Areas of Opportunity for Assistance for Income Improvement of Rural Poor Farm Families

Farm Size	No. of Target Families	Priority Constraints at the Farm Level	Priority Areas for Assistance
0 to 1 Ha.	9,018	Land Availability	Off-Farm Employment Land Reform Colonization
1 to 2 Ha.	4,336	Land Availability	Off-Farm Employment Land Reform Colonization
2 to 5 Ha.	6,550	Low Value Crop Mix Low Yields	High Value Crops Tech. Change
5 to 10 Ha.	3,896	Low Utilization of Land Low Yields	Increase Cult. Tech. Change
10 to 20 Ha.	4,079	Low Utilization of Land	Increase Cult.
All Poor Farms	<u>27,879</u>		

TABLE 1A: POOR FARMS(A)

FARM FAMILY INCOME
(FARM AVERAGES)

ANNEX B

COSTA RICA

INCOME SOURCES (D)	FARM SIZE	LANDLESS FARMS (B)	LESS THAN 1 HECTARE	1 TO 1.0 HECTARES	2 TO 4.9 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HAS. (C)	ALL FARM SIZES
	CATEGORY								
(1) NUMBER OF FARMS		2,870	9,018	4,336	6,550	3,896	4,079	0	30,739
(2) WAGE INCOME		1,888.7	1,557.8	1,610.2	2,025.7	2,508.9	2,096.3	0.0	2,013.3
(3) ON-FARM		310.8	441.0	1,057.6	1,579.2	2,124.0	2,616.8	0.0	1,260.0
(4) OFF-FARM		1,577.9	1,116.7	552.6	446.4	384.0	339.5	0.0	753.3
(5) AG. SECTOR		265.7	169.2	80.0	71.4	34.5	73.2	0.0	121.1
(4) OTHER SECTORS		1,312.2	947.5	472.6	374.9	299.4	266.2	0.0	632.2
(7) FARM PRODUCTION INCOME		1,037.1	1,142.8	1,619.5	1,951.2	1,895.7	1,213.1	0.0	1,482.8
(8) GROSS FARM SALES		2,060.4	1,985.8	3,031.2	4,605.6	6,276.5	8,043.0	0.0	4,265.1
(9) PRODUCTION COSTS		2,023.4	823.0	2,311.7	2,654.3	4,380.7	6,830.7	0.0	2,742.2
(10) HIRED LABOR		46.3	62.3	154.2	249.7	569.8	1,226.5	0.0	334.3
(11) MATERIALS		1,953.5	722.4	1,938.4	2,119.7	3,340.3	5,056.0	0.0	2,217.0
(12) TRANSPORTATION		0.5	38.1	180.0	285.8	470.4	547.1	0.0	232.9
(13) OTHER INCOME		273.0	304.8	433.5	527.0	603.3	712.0	0.0	459.2
(14) AUTOCONSUMPTION		8.4	79.5	206.4	296.7	364.4	452.3	0.0	222.5
(15) HOUSING		265.4	225.2	227.1	230.3	238.9	259.7	0.0	236.6
(14) TOTAL NET FAMILY INCOME		3,199.8	3,065.6	3,663.3	4,504.1	5,008.0	4,881.5	0.0	3,955.5
(17) NON-CASH INCOME		584.8	745.9	1,401.5	2,106.3	2,728.2	3,328.8	0.0	1,719.3
(18) CASH INCOME		2,615.0	2,319.6	2,171.8	2,397.7	2,279.8	1,552.6	0.0	2,236.2
(19) AVERAGE FAMILY SIZE		6.8	6.3	6.5	7.0	7.3	7.4	0.0	6.8
(20) PER CAPITA NET INCOME		470.5	494.7	561.6	635.7	643.4	582.0	0.0	562.3
(21) NET INCOME PER ARABLE HECTARE		0.0	3,355.6	1,692.7	1,233.5	927.8	437.8	0.0	1,561.4
(22) VALUE PRODUCT PER ARABLE HECTARE		0.0	5,482.7	3,306.7	2,747.4	2,917.1	3,016.9	0.0	3,428.6

FOOTNOTES:

- (A) A POOR FARM IS A FARM OF LESS THAN 20 HECTARES IN WHICH TOTAL NET PER CAPITA INCOME (LINE 20) IS LESS THAN 1400 COLONES PER FAMILY MEMBER, EQUIVALENT TO THE AID POVERTY DEFINITION OF \$150 PER CAPITA PER YEAR IN 1940 PRICES. ALL VALUES IN 1973 COLONES.
- (B) LANDLESS FARMS ARE A RESIDUAL CENSUS CATEGORY FOR FARMS OF INDETERMINATE TENANCY AND/OR AGRICULTURAL ENTERPRISES SUCH AS PIG, POULTRY, AND DAIRY PRODUCERS WHO HAVE NO AGRICULTURAL LAND IN PRODUCTION.
- (C) FARMS OVER 20 HECTARES ARE DEFINED AS "NON-POOR" REGARDLESS OF COMPUTED PER CAPITA INCOME.
- (D) THE METHODOLOGIES EMPLOYED FOR CALCULATING THE BUDGET ITEMS ARE AS FOLLOWS:
- (2) WAGE INCOME = (3) + (4)
- (3) ON-FARM LABOR INCOME = TOTAL FARM LABOR REQUIREMENTS (IN COLONES) MINUS HIRED LABOR COSTS (ITEM 10).
- (4) OFF-FARM INCOME = (5) + (7)
- (7) FARM PRODUCTION INCOME = (8) - (9). (RETURNS TO LAND AND CAPITAL)
- (9) PRODUCTION COSTS = (10) + (11) + (12).
- (13) OTHER INCOME = (14) + (15).
- (15) HOUSING = 1% OF IMPUTED RENTAL VALUE OF A SIMILAR HOME IN THAT CANTON.
- (17) TOTAL NET FAMILY INCOME = (2) + (7) + (13). OR ALTERNATIVELY, (17) + (18). NET RETURNS TO LAND, LABOR, AND CAPITAL.
- (18) NON-CASH INCOME = (3) + (14) + (15).
- (19) CASH INCOME = (4) + (7).
- (21) NET INCOME PER ARABLE HECTARE = (21) / TOTAL ARABLE HECTARES AS REPORTED IN THE AG CENSUS.
- (22) VALUE PRODUCT PER ARABLE HECTARE = (22) / TOTAL ARABLE HECTARES AS REPORTED IN THE AG CENSUS.

TABLE 1P: NON-POOR FARMS (A)

FARM FAMILY INCOME
(FARM AVERAGES)

COSTA RICA

INCOME SOURCES (D)	FARM SIZE CATEGORY								
	'LANDLESS' FARMS (B)	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.9 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HAS. (C)	ALL FARM SIZES	
(1) NUMBER OF FARMS	1,320	4,275	2,499	5,551	4,764	4,607	20,645	42,660	
(2) WAGE INCOME	13,139.5	13,959.2	10,444.9	8,530.7	9,217.6	9,169.2	8,450.7	9,220.3	
(3) ON-FARM	654.7	700.8	1,625.5	2,727.4	3,889.4	4,788.9	5,380.4	3,977.1	
(4) OFF-FARM	12,484.8	13,258.3	8,819.3	5,803.2	4,327.4	3,479.4	3,061.2	5,243.2	
(5) AG. SECTOR	2,429.3	2,015.1	1,270.5	1,005.1	928.8	694.7	527.7	901.7	
(6) OTHER SECTORS	10,055.4	11,238.2	7,539.7	4,797.1	3,393.5	2,784.6	2,533.5	4,341.4	
(7) FARM PRODUCTION INCOME	3,251.3	3,539.7	6,485.0	9,659.3	13,407.7	13,505.1	10,329.0	9,908.1	
(8) GROSS FARM SALES	7,390.9	6,811.5	11,035.8	14,612.9	21,240.4	22,584.5	51,129.5	32,109.4	
(9) PRODUCTION COSTS	4,129.6	3,271.9	4,553.7	4,953.6	7,826.6	9,079.3	40,729.5	22,201.2	
(10) HIRED LABOR	127.7	112.6	219.6	405.3	1,087.4	1,777.4	13,274.4	6,623.8	
(11) MATERIALS	4,000.7	3,137.9	4,237.0	4,396.1	6,642.6	6,974.0	26,796.8	15,282.3	
(12) TRANSPORTATION	1.0	15.2	98.0	152.0	246.6	327.7	654.2	325.1	
(13) OTHER INCOME	370.4	333.0	451.0	489.7	629.9	864.4	901.9	718.8	
(14) AUTOCONSUMPTION	2.8	61.2	147.1	212.4	312.7	470.9	643.3	429.3	
(15) HOUSING	361.6	271.8	303.8	277.2	315.1	389.7	264.6	290.4	
(16) TOTAL NET FAMILY INCOME	16,771.2	17,830.9	17,381.0	18,677.7	22,248.5	22,539.2	19,756.6	19,747.3	
(17) NON-CASH INCOME	1,025.1	1,033.9	2,076.6	3,217.1	4,517.3	5,553.6	6,226.3	4,695.9	
(18) CASH INCOME	15,746.1	16,797.0	15,304.4	15,460.6	17,731.1	16,984.6	13,460.2	15,051.4	
(19) AVERAGE FAMILY SIZE	5.8	5.4	5.0	5.3	5.7	5.8	6.7	6.1	
(20) PER CAPITA NET INCOME	3,259.2	3,622.8	3,846.9	4,106.5	4,633.9	4,721.7	4,770.6	4,449.0	
(21) NET INCOME PER ARABLE HECTARE	0.0	8,131.7	5,282.9	4,237.4	3,506.7	2,600.1	446.3	2,536.1	
(22) VALUE PRODUCT PER ARABLE HECTARE	0.0	14,641.5	9,705.0	6,826.5	5,852.5	4,907.8	5,922.8	6,786.6	

FOOTNOTES:

(A) A NON-POOR FARM IS OVER 20 HECTARES AND/OR A FARM IN WHICH TOTAL NET PER CAPITA INCOME (LINE 20) IS MORE THAN 1400 COLONES PER FAMILY MEMBER, EQUIVALENT TO THE AID POVERTY DEFINITION OF \$150 PER CAPITA PER YEAR IN 1960 PRICES. ALL VALUES IN 1973 COLONES.

(B) 'LANDLESS' FARMS ARE A RESIDUAL CENSUS CATEGORY FOR FARMS OF INDETERMINATE TENANCY AND/OR AGRICULTURAL ENTERPRISES SUCH AS PIG, POULTRY, AND DAIRY PRODUCERS WHO HAVE NO AGRICULTURAL LAND IN PRODUCTION.

(C) FARMS OVER 20 HECTARES ARE DEFINED AS 'NON-POOR' REGARDLESS OF COMPUTED PER CAPITA INCOMES.

(D) THE METHODOLOGIES EMPLOYED FOR CALCULATING THE BUDGET ITEMS ARE AS FOLLOWS:

(2) WAGE INCOME = (3) + (4)

(3) ON-FARM LABOR INCOME = TOTAL FARM LABOR REQUIREMENTS (IN COLONES) MINUS HIRED LABOR COSTS (ITEM 10).

(4) OFF-FARM INCOME = (5) + (6).

(7) FARM PRODUCTION INCOME = (8) - (9). (RETURNS TO LAND AND CAPITAL)

(9) PRODUCTION COSTS = (10) + (11) + (12).

(13) OTHER INCOME = (14) + (15).

(15) HOUSING = 1% OF IMPUTED RENTAL VALUE OF A SIMILAR HOME IN THAT CANTON.

(16) TOTAL NET FAMILY INCOME = (2) + (7) + (13). OR ALTERNATIVELY, (17) + (18). NET RETURNS TO LAND, LABOR, AND CAPITAL.

(17) NON-CASH INCOME = (3) + (14) + (15).

(18) CASH INCOME = (4) + (7).

(21) NET INCOME PER ARABLE HECTARE = (7) / TOTAL ARABLE HECTARES AS REPORTED IN THE AG CENSUS.

(22) VALUE PRODUCT PER ARABLE HECTARE = (8) / TOTAL ARABLE HECTARES AS REPORTED IN THE AG CENSUS.

TABLE 10: ALL FARMS(A)

FARM FAMILY INCOME
(FARM AVERAGES)

COSTA RICA

INCOME SOURCES (D)	FARM SIZE CATEGORY	'LANDLESS' FARMS (B)	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.9 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HAS. (C)	ALL FARM SIZES
(1) NUMBER OF FARMS		4,190	13,293	6,634	12,101	8,250	9,686	20,045	73,399
(2) WAGE INCOME		5,433.1	5,572.9	4,839.5	5,009.7	5,527.7	5,720.7	6,450.7	6,202.1
(3) ON-FARM		419.2	524.6	1,265.4	2,105.9	3,057.7	3,715.8	5,392.4	2,839.2
(4) OFF-FARM		5,013.9	5,048.3	3,574.1	2,903.7	2,469.9	2,004.9	3,058.2	3,362.9
(5) AG. SECTOR		947.9	753.5	519.5	600.2	531.1	405.0	527.7	574.8
(6) OTHER SECTORS		4,066.8	4,294.7	3,055.5	2,403.5	1,938.7	1,599.8	2,530.5	2,788.0
(7) FARM PRODUCTION INCOME		1,737.9	1,927.2	3,398.0	5,487.1	7,993.1	7,732.7	10,399.0	6,321.6
(8) GROSS FARM SALES		4,434.9	3,537.8	6,529.2	9,196.1	14,266.0	15,756.1	51,129.5	20,449.4
(9) PRODUCTION COSTS		2,696.9	1,610.5	3,131.2	3,709.0	6,282.8	8,023.4	40,729.5	14,126.8
(10) HIRED LABOR		97.7	90.4	177.7	320.6	843.6	1,519.7	13,278.4	3,999.8
(11) MATERIALS		2,598.5	1,499.2	2,797.7	3,163.3	5,047.1	6,073.7	26,796.8	5,917.6
(12) TRANSPORTATION		0.6	70.8	155.7	224.4	352.0	476.8	654.2	326.3
(13) OTHER INCOME		304.3	313.9	436.9	509.9	616.8	793.0	906.9	610.1
(14) AUTOCONSUMPTION		8.4	73.6	184.7	254.0	337.1	466.8	643.3	342.1
(15) HOUSING		295.7	240.2	255.2	251.9	279.7	328.1	263.6	267.9
(16) TOTAL NET FAMILY INCOME		7,475.3	7,814.1	9,677.5	11,006.8	14,127.7	14,246.5	19,756.6	13,133.8
(17) NON-CASH INCOME		723.5	838.5	1,705.3	2,615.9	3,674.6	4,509.8	6,204.3	3,449.3
(18) CASH INCOME		6,751.8	6,975.5	6,972.1	8,390.9	10,453.1	9,737.7	13,449.2	9,684.5
(19) AVERAGE FAMILY SIZE		6.5	6.0	6.0	6.2	6.4	6.5	6.7	6.4
(20) PER CAPITA NET INCOME		1,348.8	1,500.7	1,762.5	2,227.9	2,754.2	2,777.7	4,770.6	2,821.3
(21) NET INCOME PER ARABLE HECTARE		0.0	4,891.6	3,005.0	2,611.6	2,292.0	1,625.0	448.3	2,169.8
(22) VALUE PRODUCT PER ARABLE HECTARE		0.0	9,428.1	5,276.1	4,518.6	4,469.8	4,067.6	5,922.8	5,392.3

FOOTNOTES:

(B) 'LANDLESS' FARMS ARE A RESIDUAL CENSUS CATEGORY FOR FARMS OF INDETERMINATE TENANCY AND/OR AGRICULTURAL ENTERPRISES SUCH AS PIG, POULTRY, AND DAIRY PRODUCERS WHO HAVE NO AGRICULTURAL LAND IN PRODUCTION.

(C) FARMS OVER 20 HECTARES ARE DEFINED AS 'NON-POOR' REGARDLESS OF COMPUTED PER CAPITA INCOMES.

(D) THE METHODOLOGIES EMPLOYED FOR CALCULATING THE BUDGET ITEMS ARE AS FOLLOWS:

(2) WAGE INCOME = (3) + (4)

(3) ON-FARM INCOME = TOTAL FARM LABOR REQUIREMENTS (IN COLONES) MINUS HIRED LABOR COSTS (ITEM 10).

(4) OFF-FARM INCOME = (5) + (6).

(7) FARM PRODUCTION INCOME = (8) - (9). (RETURNS TO LAND AND CAPITAL)

(9) PRODUCTION COSTS = (10) + (11) + (12).

(13) OTHER INCOME = (14) + (15).

(15) HOUSING = 1% OF IMPUTED TOTAL VALUE OF A SIMILAR HOME IN THAT CANTON.

(16) TOTAL NET FAMILY INCOME = (2) + (7) + (13). OR ALTERNATIVELY, (17) + (18). NET RETURNS TO LAND, LABOR, AND CAPITAL.

(17) NON-CASH INCOME = (3) + (14) + (15).

(18) CASH INCOME = (4) + (7).

(21) NET INCOME PER ARABLE HECTARE = (7)/TOTAL ARABLE HECTARES AS REPORTED IN THE AG CENSUS.

(22) VALUE PRODUCT PER ARABLE HECTARE = (8)/TOTAL ARABLE HECTARES AS REPORTED IN THE AG CENSUS.

TABLE 10: POOR FARMS

FARM FAMILY INCOME
(PERCENTS)

COSTA RICA

***** INCOME SOURCES *****	FARM SIZE CATEGORY *****	'LANDLESS' FARMS	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.9 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HAS.	ALL FARM SIZES
(1) NUMBER OF FARMS		2,870	9,018	4,336	6,550	3,896	4,079	0	30,739
(2) GROSS INCOME		0.590	0.521	0.439	0.449	0.500	0.605	0.000	0.509
(3) ON-FARM		0.097	0.143	0.288	0.350	0.424	0.536	0.000	0.318
(4) OFF-FARM		0.493	0.377	0.150	0.099	0.076	0.069	0.000	0.190
(5) AG. SECTOR		0.083	0.054	0.021	0.015	0.016	0.015	0.000	0.030
(6) OTHER SECTORS		0.410	0.322	0.128	0.083	0.059	0.054	0.000	0.159
(7) FARM PRODUCTION INCOME		0.324	0.379	0.442	0.433	0.374	0.248	0.000	0.374
(8) GROSS FARM SALES		1.512	2.412	1.700	1.735	1.432	1.177	0.000	1.532
(9) PRODUCTION COSTS		1.200	1.208	1.000	1.000	1.000	1.000	0.000	1.000
(10) WAGED LABOR		0.074	0.075	0.066	0.033	0.130	0.179	0.000	0.120
(11) MATERIALS		0.065	0.077	0.051	0.098	0.062	0.060	0.000	0.096
(12) TRANSPORTATION		0.000	0.046	0.081	0.107	0.107	0.080	0.000	0.082
(13) OTHER INCOME		0.085	0.099	0.118	0.117	0.120	0.145	0.000	0.115
(14) AUTOCONSUMPTION		0.002	0.025	0.056	0.055	0.072	0.092	0.000	0.056
(15) HOUSING		0.082	0.073	0.062	0.051	0.047	0.053	0.000	0.059
(16) TOTAL NET FAMILY INCOME		1.000	1.000	1.000	1.000	1.000	1.000	0.000	1.000
(17) NON-CASH INCOME		0.192	0.243	0.407	0.457	0.544	0.681	0.000	0.434
(18) CASH INCOME		0.807	0.756	0.592	0.532	0.455	0.318	0.000	0.565
(19) AVERAGE FAMILY SIZE		6.809	6.361	6.598	7.076	7.306	7.403	0.000	6.845
(20) PER CAPITA NET INCOME		470.577	494.748	561.655	635.767	643.428	582.071	0.000	562.362
(21) NET INCOME PER ARABLE HECTARE		0.000	3,355.644	1,692.737	1,233.580	927.893	477.812	0.000	1,661.488
(22) VALUE PRODUCT PER ARABLE HECTARE		0.000	5,482.738	3,300.719	2,747.484	2,917.100	3,016.945	0.000	3,428.654

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TABLE 1F: NON-POOR FARMS

FARM FAMILY INCOME
(PERCENTS)

COSTA RICA

FARM SIZE CATEGORY	'LANDLESS' FARMS	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.0 HECTARES	5 TO 9.0 HECTARES	10 TO 19.0 HECTARES	MORE THAN 20 HAS.	ALL FARM SIZES
(1) NUMBER OF FARMS	1,320	4,275	2,498	5,551	4,364	4,607	20,045	42,660
(2) WAGE INCOME	0.783	0.782	0.600	0.456	0.369	0.362	0.427	0.466
(3) ON-FARM	0.039	0.039	0.093	0.146	0.174	0.208	0.272	0.201
(4) OFF-FARM	0.744	0.743	0.507	0.310	0.194	0.154	0.154	0.265
(5) AG. SECTOR	0.144	0.113	0.073	0.053	0.041	0.031	0.026	0.045
(6) OTHER SECTORS	0.599	0.630	0.433	0.256	0.152	0.123	0.128	0.219
(7) FARM PRODUCTION INCOME	0.194	0.198	0.373	0.517	0.602	0.590	0.526	0.496
(8) GROSS FARM SALES	1.789	2.081	2.424	2.949	2.640	2.487	1.255	1.439
(9) PRODUCTION COSTS	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
(10) HIRED LABOR	0.030	0.036	0.048	0.081	0.136	0.195	0.326	0.297
(11) MATERIALS	0.048	0.059	0.030	0.047	0.082	0.078	0.057	0.085
(12) TRANSPORTATION	0.000	0.004	0.021	0.030	0.030	0.016	0.016	0.017
(13) OTHER INCOME	0.022	0.018	0.025	0.026	0.028	0.030	0.045	0.036
(14) AUTOCONSUMPTION	0.000	0.003	0.008	0.011	0.014	0.021	0.032	0.021
(15) HOUSING	0.021	0.015	0.017	0.014	0.014	0.017	0.013	0.014
(16) TOTAL NET FAMILY INCOME	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
(17) NON-CASH INCOME	0.241	0.057	0.119	0.172	0.223	0.245	0.318	0.237
(18) CASH INCOME	0.938	0.942	0.880	0.827	0.776	0.753	0.681	0.762
(19) AVERAGE FAMILY SIZE	5.929	5.452	5.086	5.344	5.740	5.808	6.776	6.124
(20) PER CAPITA NET INCOME	3,258,293	3,622,946	3,946,989	4,106,549	4,633,911	4,721,737	4,770,696	4,449,083
(21) NET INCOME PER ARABLE HECTARE	0.000	8,131,781	5,282,987	4,237,658	3,506,755	2,695,119	448,366	2,536,120
(22) VALUE OF PRODUCT PER ARABLE HECTARE	0.000	14,641,569	8,705,067	6,824,534	5,052,098	4,007,843	5,922,807	6,746,697

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TABLE 1F: ALL FARMS

FARM FAMILY INCOME
(PERCENTS)
COSTA RICA

INCOME SOURCES	FARM SIZE CATEGORY	'LANDLESS' FARMS	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.9 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HAS.	ALL FARM SIZES
(1) NUMBER OF FARMS		4,100	13,293	6,834	12,101	8,250	8,686	20,045	73,399
(2) WAGE INCOME		0.726	0.713	0.557	0.455	0.391	0.401	0.427	0.472
(3) OFF-FARM		0.256	0.267	0.145	0.191	0.216	0.260	0.277	0.216
(4) OFF-FARM		0.270	0.546	0.411	0.263	0.174	0.140	0.154	0.256
(5) AG. SECTOR		0.126	0.297	0.059	0.045	0.037	0.028	0.026	0.043
(6) OTHER SECTORS		0.544	0.548	0.352	0.218	0.137	0.112	0.128	0.212
(7) FARM PRODUCTION INCOME		0.232	0.246	0.391	0.498	0.565	0.542	0.526	0.481
(8) GROSS FARM SALES		1.646	2.106	2.085	2.479	2.270	1.663	1.259	1.447
(9) PRODUCTION COSTS		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
(10) HIRED LABOR		0.032	0.049	0.056	0.086	0.134	0.189	0.326	0.282
(11) MATERIALS		0.067	0.030	0.023	0.053	0.089	0.077	0.057	0.094
(12) TRANSPORTATION		0.000	0.010	0.047	0.050	0.056	0.053	0.016	0.023
(13) OTHER INCOME		0.040	0.040	0.050	0.046	0.043	0.045	0.045	0.046
(14) AUTO-CONSUMPTION		0.001	0.009	0.021	0.023	0.023	0.032	0.032	0.026
(15) HOUSING		0.039	0.030	0.029	0.022	0.019	0.023	0.013	0.020
(16) TOTAL NET FAMILY INCOME		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
(17) NON-CASH INCOME		0.096	0.107	0.196	0.237	0.260	0.316	0.318	0.262
(18) CASH INCOME		0.903	0.892	0.803	0.762	0.739	0.683	0.681	0.737
(19) AVERAGE FAMILY SIZE		6.500	6.069	6.039	6.282	6.473	6.580	6.776	6.426
(20) PER CAPITA NET INCOME		1,348.807	1,500.738	1,762.528	2,227.693	2,754.272	2,777.724	4,770.496	2,821.351
(21) NET INCOME PER ACRE HECTARE		0.000	4,891.639	3,005.064	2,611.618	2,292.033	1,635.073	448.366	2,169.830
(22) VALUE PRODUCT PER ACRE HECTARE		0.000	9,425.198	5,276.144	4,613.636	4,465.884	4,067.620	5,022.007	5,390.371

TABLE 2A: POOR FARMS(A)

LAND USE BY FARM SIZE
TOTALS PER SIZE CATEGORY(B)

COSTA RICA

LAND USE CATEGORY(C)	FARM SIZE CATEGORY	'LANDLESS' FARMS	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.0 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HAS.	ALL FARM SIZES
(1) NUMBER OF FARMS		2,870	9,018	4,336	6,550	3,886	4,070	0	30,730
(2) TOTAL AREA		0.0	3,906.6	5,644.6	20,530.3	27,371.9	58,860.4	0.0	116,513.9
(3) CULTIVATED CROP LAND		0.0	1,218.5	2,247.0	7,131.1	6,969.6	12,990.9	0.0	30,555.3
(4) ANNUAL CROPS		88.0	1,450.0	2,525.0	6,811.3	5,738.4	2,234.3	0.0	24,848.1
(5) CEREALS		88.0	1,232.2	2,234.3	6,378.8	5,350.4	7,050.8	0.0	23,072.7
(6) VEGETABLES		1.5	87.5	67.1	27.9	36.3	24.4	0.0	315.1
(7) TUBERS		0.4	81.3	102.3	170.2	135.5	137.2	0.0	627.3
(8) TOBACCO		0.0	47.8	121.1	234.2	216.0	213.7	0.0	932.9
(9) LAND IN FALLOW		-88.9	-231.4	-278.0	319.8	1,231.2	4,755.5	0.0	5,708.1
(10) LAND IN PERMANENT CROPS		0.0	2,061.8	2,250.7	5,115.0	3,950.6	4,184.4	0.0	17,632.8
(11) COFFEE		0.0	1,525.1	1,511.5	2,311.6	1,580.1	1,375.9	0.0	8,604.4
(12) COCOA AND COCONUT		0.0	12.0	64.3	472.6	820.7	840.6	0.0	2,335.4
(13) SUGAR CANE		0.0	165.2	245.6	583.9	434.4	400.1	0.0	1,827.5
(14) FRUIT TREES		0.0	73.5	90.6	290.0	292.2	500.6	0.0	1,255.2
(15) PASTURES		0.0	359.8	604.7	6,021.3	11,511.2	25,268.9	0.0	44,065.1
(16) FOREST		0.0	28.3	61.6	415.7	1,352.6	6,970.1	0.0	8,837.5
(17) OTHER		0.0	37.9	380.4	1,843.0	3,547.7	6,437.9	0.0	15,447.0

FOOTNOTES:

(A) A POOR FARM IS A FARM OF LESS THAN 20 HECTARES ON WHICH TOTAL ANNUAL PER CAPITA INCOME (SEE TABLE 1A) IS LESS THAN 1400 COLONES PER FAMILY MEMBER, EQUIVALENT TO AID POVERTY DEFINITION OF \$1.50 PER CAPITA PER YEAR IN 1960 PRICES.

(B) IN HECTARES

(C) DEFINITIONS OF LAND-USE CATEGORIES ARE:

(2) TOTAL AREA = (3) + (10) + (15) + (16) + (17).

(3) CULTIVATED CROP LAND = (4) + (9). PERMANENT CROPS ARE NOT INCLUDED IN THIS CATEGORY.

(9) LAND IN FALLOW, WHEN NEGATIVE INDICATES MULTIPLE CROPPING.

(10) LAND IN PERMANENT CROPS = (11) + (12) + (13) + (14).

(17) OTHER LAND USES INCLUDE BUILDINGS, ROADS, WINDBREAKS, CORALS, ETC.

TABLE 29: NON-POOR FARMS (A)

LAND USE BY FARM SIZE
TOTALS PER SIZE CATEGORY (B)

COSTA RICA

LAND USE CATEGORY (C)	FARM SIZE CATEGORY								
	'LANDLESS' FARMS	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.9 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HAS.	ALL FARM SIZES	
(1) NUMBER OF FARMS	1,320	4,275	2,498	5,551	4,364	4,607	20,045	42,660	
(2) TOTAL AREA	0.0	1,763.0	3,448.5	18,167.7	31,357.0	66,404.0	2,013,019.0	2,134,364.4	
(3) CULTIVATED CROP LAND	0.0	362.9	843.3	3,695.6	5,558.6	11,726.6	189,402.2	211,587.4	
(4) ANNUAL CROPS	47.5	456.7	1,118.1	4,073.2	5,040.0	9,250.3	89,836.2	102,832.3	
(5) CEREALS	47.5	323.3	880.4	3,424.5	4,406.5	8,144.5	87,757.1	105,324.2	
(6) VEGETABLES	0.0	93.3	128.1	303.2	250.2	174.8	464.3	1,414.2	
(7) TUBERS	0.0	33.0	77.7	261.8	323.2	521.9	1,352.8	2,572.7	
(8) TOBACCO	0.0	5.2	31.6	83.5	59.8	67.0	261.0	521.0	
(9) LAND IN FALLOW	-47.5	-95.7	-274.7	-377.6	508.7	2,476.2	99,566.0	101,755.1	
(10) LAND IN PERMANENT CROPS	0.0	1,065.2	2,000.2	8,379.8	11,391.5	13,221.8	87,456.6	124,737.1	
(11) COFFEE	3.5	923.1	1,612.0	6,532.0	7,183.4	7,254.0	25,074.6	48,589.9	
(12) COCOA AND COCONUT	0.0	2.1	25.1	331.2	920.2	2,122.9	11,316.0	14,720.8	
(13) SUGAR CANE	0.0	49.6	162.2	1,148.1	1,639.7	2,023.4	17,466.2	23,443.4	
(14) FRUIT TREES	3.8	35.8	77.9	378.6	718.0	1,236.2	21,209.4	23,662.8	
(15) PASTURES	0.0	179.1	442.5	4,546.4	1,467.6	29,702.7	1,055,381.1	1,101,717.6	
(16) FOREST	0.0	14.2	21.5	174.6	757.2	4,177.7	461,410.4	468,551.0	
(17) OTHER	0.0	118.7	140.8	870.1	2,196.9	7,073.0	217,546.2	227,946.0	

FOOTNOTES:

(A) A NON-POOR FARM IS OVER 20 HECTARES AND/OR A FARM ON WHICH TOTAL ANNUAL PER CAPITA INCOME (SEE TABLE 1A) IS MORE THAN 1400 COLONES PER FAMILY MEMBER, EQUIVALENT TO AID POVERTY DEFINITION OF \$150 PER CAPITA PER YEAR IN 1960 PRICES.

(B) IN HECTARES

(C) DEFINITIONS OF LAND-USE CATEGORIES ARE:

(2) TOTAL AREA = (3) + (10) + (15) + (16) + (17).

(3) CULTIVATED CROP LAND = (4) + (9). PERMANENT CROPS ARE NOT INCLUDED IN THIS CATEGORY.

(9) LAND IN FALLOW, WHEN NEGATIVE INDICATES MULTIPLE CROPPING.

(10) LAND IN PERMANENT CROPS = (11) + (12) + (13) + (14).

(17) OTHER LAND USES INCLUDE BUILDINGS, ROADS, WINDBREAKS, CORRALS, ETC.

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TABLE 20: ALL FARMS(A)

LAND USE BY FARM SIZE
TOTALS PER SIZE CATEGORY(B)
COSTA RICA

LAND USE CATEGORY(C)	FARM SIZE CATEGORY	'LANDLESS' FARMS	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.9 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HES.	ALL FARM SIZES
(1) NUMBER OF FARMS		4,190	13,293	6,834	12,101	8,257	3,627	20,045	73,399
(2) TOTAL AREA		0.0	5,774.5	9,293.1	38,698.0	58,720.0	129,464.5	2,013,018.9	2,250,878.3
(3) CULTIVATED CROP LAND		0.0	1,579.5	3,090.3	10,826.7	12,528.2	24,714.5	189,402.2	242,143.8
(4) ANNUAL CROPS		126.5	1,500.7	2,743.1	10,864.6	10,788.3	17,484.7	80,836.2	134,480.5
(5) CEREALS		124.5	1,554.5	3,114.8	9,733.3	9,757.0	14,361.3	87,757.1	128,396.9
(6) VEGETABLES		1.5	180.8	120.3	401.2	207.6	100.3	464.3	1,720.3
(7) TUBERS		0.4	114.4	180.1	432.1	458.7	661.0	1,352.8	3,200.0
(8) TOBACCO		0.0	54.8	152.8	317.8	285.9	290.7	261.0	1,354.0
(9) LAND IN FALLOW		-126.5	-327.2	-552.8	-57.8	1,739.9	7,231.9	66,565.0	107,463.3
(10) LAND IN PERMANENT CROPS		0.0	3,157.7	4,250.9	13,993.0	15,372.1	18,104.3	87,456.6	142,335.9
(11) COFFEE		0.6	2,454.3	3,123.6	9,443.6	8,743.6	8,130.8	25,074.6	57,494.4
(12) CACAO AND COCONUT		0.0	14.2	89.5	810.9	1,752.0	3,720.5	11,310.0	17,056.3
(13) SUGAR CANE		0.0	213.9	407.8	1,532.0	2,123.2	2,233.6	17,469.2	24,270.0
(14) FRUIT TREES		3.8	109.3	177.5	607.7	1,010.2	1,739.9	21,205.4	24,918.1
(15) PASTURES		0.0	537.9	1,347.3	10,567.7	22,977.8	54,711.7	1,058,381.1	1,145,783.8
(16) FOREST		0.0	42.5	83.2	590.3	2,105.9	11,136.0	473,410.4	477,389.4
(17) OTHER		0.0	356.7	521.2	2,713.1	5,744.7	14,111.0	217,546.2	243,393.1

FOOTNOTES:

(A) SUM OF TABLES 2A AND 2B.

(B) IN HECTARES

(C) DEFINITIONS OF LAND-USE CATEGORIES ARE:

(2) TOTAL AREA = (3) + (10) + (15) + (16) + (17).

(3) CULTIVATED CROP LAND = (2) + (8). PERMANENT CROPS ARE NOT INCLUDED IN THIS CATEGORY.

(9) LAND IN FALLOW, WHEN NEGATIVE, INDICATES MULTIPLE CROPPING.

(10) LAND IN PERMANENT CROPS = (11) + (12) + (13) + (14).

(17) OTHER LAND USES INCLUDE BUILDINGS, ROADS, WINDBREAKS, CORRALS, ETC.

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TABLE 20: POOR FARMS(A)

LAND USE BY FARM SIZE
(PERCENT) (B)
COSTA RICA

FARM SIZE CATEGORY (C)	'LANDLESS' FARMS	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.9 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HAS.	ALL FARM SIZES
(1) NUMBER OF FARMS	2,870	9,018	4,336	6,550	3,886	4,079	0	30,739
(2) TOTAL AREA	0.000	1.000	1.000	1.000	1.000	1.000	0.000	1.000
(3) CULTIVATED CROP LAND	0.000	0.311	0.384	0.347	0.254	0.220	0.000	0.262
(4) ANNUAL CROPS	88.656	0.371	0.432	0.331	0.269	0.170	0.000	0.213
(5) CEREALS	86.929	0.315	0.382	0.307	0.195	0.133	0.000	0.198
(6) VEGETABLES	1.539	0.022	0.011	0.014	0.011	0.000	0.000	0.002
(7) TUBERS	0.300	0.020	0.017	0.008	0.004	0.000	0.000	0.005
(8) TOBACCO	0.000	0.012	0.020	0.011	0.007	0.000	0.000	0.007
(9) LAND IN FALLOW	-98.959	-0.059	-0.047	0.015	0.044	0.080	0.000	0.048
(10) LAND IN PERMANENT CROPS	0.000	0.527	0.385	0.219	0.145	0.071	0.000	0.151
(11) COFFEE	0.000	0.390	0.259	0.141	0.057	0.023	0.000	0.076
(12) CACAO AND COCONUT	0.000	0.003	0.011	0.023	0.013	0.016	0.000	0.023
(13) SUGAR CANE	0.000	0.042	0.042	0.028	0.015	0.006	0.000	0.015
(14) FRUIT TREES	0.000	0.018	0.017	0.014	0.010	0.008	0.000	0.010
(15) PASTURES	0.000	0.002	0.154	0.203	0.420	0.420	0.000	0.378
(16) FOREST	0.000	0.007	0.010	0.020	0.049	0.118	0.000	0.075
(17) OTHER	0.000	0.000	0.000	0.000	0.120	0.100	0.000	0.132

NOTES:

(A) A POOR FARM IS A FARM OF LESS THAN 20 HECTARES ON WHICH TOTAL ANNUAL PER CAPITA INCOME (SEE TABLE 1A) IS LESS THAN 1400 COLONES PER FAMILY MEMBER, EQUIVALENT TO AID POVERTY DEFINITION OF \$150 PER CAPITA PER YEAR IN 1969 PRICES.

(B) PERCENT OF TOTAL AREA

(C) DEFINITIONS OF LAND-USE CATEGORIES ARE:

(3) TOTAL AREA = (1) + (10) + (15) + (16) + (17).

(7) CULTIVATED CROP LAND = (7) + (8). PERMANENT CROPS ARE NOT INCLUDED IN THIS CATEGORY.

(10) LAND IN PERMANENT CROPS = (11) + (12) + (13) + (14).

(17) OTHER LAND USES INCLUDE BUILDINGS, FENCES, WINDBREAKS, CEREALS, ETC.

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TABLE 2F: NON-POOR FARMS (A)

LAND USE BY FARM SIZE
(PERCENT) (B)
COSTA RICA

LAND USE CATEGORY (C)	FARM SIZE CATEGORY	'LANDLESS' FARMS	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.0 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HAS.	ALL FARM SIZES
(1) NUMBER OF FARMS		1,321	4,275	2,498	5,551	4,164	4,607	20,045	42,660
(2) TOTAL AREA		0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
(3) CULTIVATED CROP LAND *		0.000	0.204	0.244	0.203	0.177	0.176	0.054	0.099
(4) ANNUAL CROPS		47.529	0.258	0.324	0.224	0.161	0.134	0.044	0.051
(5) CEREALS		47.599	0.192	0.255	0.198	0.140	0.127	0.043	0.049
(6) VEGETABLES		0.000	0.052	0.037	0.016	0.007	0.002	0.000	0.000
(7) TUBERS		0.000	0.018	0.022	0.014	0.010	0.007	0.000	0.001
(8) TOBACCO		0.000	0.003	0.009	0.004	0.002	0.001	0.000	0.000
(9) LAND IN FALLOW		-47.599	-0.054	-0.079	-0.020	0.016	0.017	0.049	0.047
(10) LAND IN PERMANENT CROPS		0.000	0.619	0.580	0.486	0.362	0.209	0.043	0.058
(11) COFFEE		3.570	0.525	0.467	0.350	0.224	0.109	0.012	0.022
(12) CACAO AND COCONUT		0.000	0.001	0.007	0.018	0.029	0.031	0.005	0.006
(13) SUGAR CANE		0.000	0.027	0.047	0.057	0.053	0.030	0.008	0.010
(14) FRUIT TREES		3.850	0.020	0.022	0.020	0.022	0.019	0.010	0.011
(15) PASTURES		0.000	0.100	0.128	0.250	0.365	0.445	0.524	0.516
(16) FOREST		0.000	0.008	0.006	0.009	0.024	0.062	0.230	0.219
(17) OTHER		0.000	0.067	0.040	0.047	0.070	0.106	0.108	0.106

FOOTNOTES:

(A) A NON-POOR FARM IS OVER 20 HECTARES AND/OR A FARM ON WHICH TOTAL ANNUAL PER CAPITA INCOME (SEE TABLE 1A) IS MORE THAN 1400 COLONES PER FAMILY MEMBER, EQUIVALENT TO AID POVERTY DEFINITION OF \$150 PER CAPITA PER YEAR IN 1969 PRICES.

(B) PERCENT OF TOTAL AREA

(C) DEFINITIONS OF LAND-USE CATEGORIES ARE:

(2) TOTAL AREA = (3) + (10) + (15) + (16) + (17).

(3) CULTIVATED CROP LAND = (2) + (9). PERMANENT CROPS ARE NOT INCLUDED IN THIS CATEGORY.

(10) LAND IN PERMANENT CROPS = (11) + (12) + (13) + (14).

(17) OTHER LAND USES INCLUDE BUILDINGS, ROADS, WINDBREAKS, CEREALS, ETC.

TABLE 28: ALL FARMS (A)

LAND USE BY FARM SIZE
(PERCENT) (B)

COSTA RICA

FARM SIZE CATEGORY (C)	'LANDLESS' FARMS	LESS THAN 1 HECTARE	1 TO 1.9 HECTARES	2 TO 4.9 HECTARES	5 TO 9.9 HECTARES	10 TO 19.9 HECTARES	MORE THAN 20 HAS.	ALL FARM SIZES
(1) NUMBER OF FARMS	4,199	13,293	6,834	12,101	8,259	9,484	20,045	73,399
(2) TOTAL AREA	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
(3) CULTIVATED CROP LAND	0.000	0.278	0.332	0.279	0.213	0.197	0.094	0.107
(4) ANNUAL CROPS	134.659	0.326	0.322	0.281	0.183	0.129	0.044	0.059
(5) CEREALS	134.629	0.274	0.335	0.251	0.166	0.130	0.043	0.057
(6) VEGETABLES	1.539	0.231	0.021	0.010	0.004	0.001	0.000	0.000
(7) TUBERS	0.490	0.020	0.019	0.011	0.007	0.005	0.000	0.001
(8) TOBACCO	0.000	0.000	0.014	0.009	0.004	0.002	0.000	0.000
(9) LAND IN FALLOW	-136.559	-0.057	-0.059	-0.001	0.029	0.057	0.049	0.047
(10) LAND IN PERMANENT CROPS	0.000	0.556	0.457	0.351	0.251	0.144	0.043	0.063
(11) COFFEE	3.639	0.432	0.335	0.244	0.149	0.064	0.012	0.025
(12) CACA AND COCONUT	0.000	0.002	0.009	0.020	0.020	0.024	0.005	0.007
(13) SUGAR CANE	0.000	0.037	0.043	0.042	0.036	0.019	0.008	0.010
(14) FRUIT TREES	3.850	0.019	0.019	0.017	0.017	0.013	0.010	0.011
(15) PASTURES	0.000	0.004	0.144	0.273	0.391	0.438	0.524	0.509
(16) FOREST	0.000	0.007	0.008	0.015	0.035	0.089	0.230	0.212
(17) OTHER	0.000	0.062	0.055	0.079	0.097	0.131	0.108	0.108

FOOTNOTES:

(A) SUM OF TABLES 2A AND 2B.

(B) PERCENT OF TOTAL AREA

(C) DEFINITIONS OF LAND-USE CATEGORIES ARE:

(2) TOTAL AREA = (7) + (10) + (15) + (16) + (17).

(3) CULTIVATED CROP LAND = (3) + (8). PERMANENT CROPS ARE NOT INCLUDED IN THIS CATEGORY.

(10) LAND IN PERMANENT CROPS = (11) + (12) + (13) + (14).

(17) OTHER LAND USES INCLUDE BUILDINGS, ROADS, WINDBREAKS, CEREALS, ETC.

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TABLE 3A

POPULATION BY INCOME CLASS
(TOTALS)

INCOME CLASSES (C)	COSTA RICA							
	URBAN ZONES (A)		RURAL ZONES				TOTALS	
			FARM FAMILIES (B)		NON-FARM FAMILIES			
	FAMILIES	PEOPLE	FAMILIES	PEOPLE	FAMILIES	PEOPLE	FAMILIES	PEOPLE
LESS THAN 100 COLONES	7,464	33,217	6,807	42,243	10,595	49,400	25,066	125,569
100 TO 300 COLONES	6,200	26,202	6,559	44,164	5,340	24,750	16,008	92,115
300 TO 500 COLONES	7,720	17,938	6,033	42,531	7,741	24,750	17,403	92,115
500 TO 800 COLONES	4,522	41,593	6,233	50,481	19,243	110,026	31,008	110,700
800 TO 1100 COLONES	8,122	56,314	7,073	57,754	19,553	117,512	31,788	220,290
1100 TO 1400 COLONES	9,221	40,017	5,091	41,360	14,154	59,027	29,160	217,582
1400 TO 1700 COLONES	9,141	54,405	4,724	32,557	11,450	47,534	29,160	191,413
1700 TO 2000 COLONES	8,758	51,155	4,045	26,374	9,741	52,440	25,365	153,985
MORE THAN 2000 COLONES	43,009	402,136	23,874	129,501	37,744	176,559	22,144	137,169
TOTALS	140,765	742,057	73,399	471,676	129,005	741,057	343,660	1,055,730
POOR/NON-POOR TOTALS (D)								
CONSERVATIVE DEFINITION (E)								
POOR (<1100 COLONES)	31,146	169,254	34,705	241,875	56,412	364,837	122,263	775,966
NON-POOR	109,619	572,803	38,694	229,801	73,093	377,160	221,406	1,179,764
MODERATE DEFINITION (F)								
POOR (<1400 COLONES)	40,167	229,271	40,686	283,244	70,570	454,854	151,423	967,379
NON-POOR	100,598	512,786	32,713	189,432	59,035	287,133	192,247	989,351
LIBERAL DEFINITION (G)								
POOR (<1700 COLONES)	49,308	287,764	45,490	315,801	82,020	522,708	176,808	1,126,365
NON-POOR	91,457	454,291	27,909	155,876	47,485	218,100	166,851	829,365

FOOTNOTES:

(A) BASED UPON THE 1973 COSTA RICA CENSUS DEFINITION; THE SAN JOSE METROPOLITAN AREA AND ALL CANTONAL CAPITALS.

(B) ALL FARM FAMILIES, INCLUDING THOSE WITH URBAN RESIDENCES, ARE INCLUDED IN THIS CATEGORY.

(C) IN 1973 COLONES.

(D) THE FOLLOWING THREE DEFINITIONS OF POVERTY ARE BASED UPON THE AID POVERTY DEFINITION OF LESS THAN \$150 PER CAPITA PER YEAR IN 1969 PRICES. DIFFERENCES ARE DUE TO THE MULTIPLE EXCHANGE RATES WHICH WERE IN EFFECT IN 1973. PRICES ARE DEFLATED USING THE CENTRAL BANK'S COST-OF-LIVING INDEX FOR THE URBAN WORKING CLASS.

(E) CONSERVATIVE DEFINITION BASED UPON AN EXCHANGE RATE OF 6.7 COLONES TO THE DOLLAR. THIS RATE WAS EMPLOYED AS AN INDIRECT TAX ON COFFEE EXPORTERS.

(F) MODERATE DEFINITION BASED UPON MIXED RATE OF 7.7 COLONES TO THE DOLLAR.

(G) LIBERAL DEFINITION BASED UPON FREE MARKET RATE OF 8.6 COLONES TO THE DOLLAR.

TABLE 2B

POPULATION BY INCOME CLASS
(PERCENTS)

COSTA RICA

INCOME CLASSES (C)	URBAN ZONES (A)		RURAL ZONES				TOTALS	
	FAMILIES	PEOPLE	FARM FAMILIES (B)		NON-FARM FAMILIES		FAMILIES	PEOPLE
			FAMILIES	PEOPLE	FAMILIES	PEOPLE		
LESS THAN 100 COLONES	0.05	0.04	0.09	0.09	0.08	0.07	0.07	0.06
100 TO 300 COLONES	0.04	0.03	0.09	0.09	0.04	0.03	0.05	0.05
300 TO 500 COLONES	0.03	0.02	0.09	0.09	0.06	0.08	0.05	0.06
500 TO 800 COLONES	0.05	0.06	0.11	0.11	0.13	0.15	0.10	0.11
800 TO 1100 COLONES	0.06	0.08	0.10	0.11	0.13	0.15	0.10	0.11
1100 TO 1400 COLONES	0.06	0.08	0.08	0.09	0.11	0.12	0.08	0.11
1400 TO 1700 COLONES	0.06	0.08	0.07	0.07	0.09	0.07	0.07	0.10
1700 TO 2000 COLONES	0.06	0.07	0.06	0.06	0.08	0.07	0.07	0.08
MORE THAN 2000 COLONES	0.50	0.54	0.33	0.27	0.29	0.22	0.26	0.07
TOTALS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
POOR/NON-POOR TOTALS (D)								
CONSERVATIVE DEFINITION (E)								
POOR (<1100 COLONES)	0.22	0.23	0.47	0.51	0.44	0.49	0.37	0.40
NON-POOR	0.78	0.77	0.53	0.49	0.56	0.51	0.64	0.60
MODERATE DEFINITION (F)								
POOR (<1400 COLONES)	0.29	0.31	0.55	0.60	0.54	0.61	0.44	0.49
NON-POOR	0.71	0.69	0.45	0.40	0.46	0.39	0.56	0.51
LIBERAL DEFINITION (G)								
POOR (<1700 COLONES)	0.35	0.39	0.62	0.67	0.63	0.70	0.51	0.58
NON-POOR	0.65	0.61	0.38	0.33	0.37	0.30	0.49	0.42

FOOTNOTES:

- (A) BASED UPON THE 1973 COSTA RICA CENSUS DEFINITION; THE SAN JOSE METROPOLITAN AREA AND ALL CANTONAL CAPITALS.
- (B) ALL FARM FAMILIES, INCLUDING THOSE WITH URBAN RESIDENCES, ARE INCLUDED IN THIS CATEGORY.
- (C) IN 1973 COLONES.
- (D) THE FOLLOWING THREE DEFINITIONS OF POVERTY ARE BASED UPON THE AID POVERTY DEFINITION OF LESS THAN \$150 PER CAPITA PER YEAR IN 1962 PRICES. DIFFERENCES ARE DUE TO THE MULTIPLE EXCHANGE RATES WHICH WERE IN EFFECT IN 1973. PRICES ARE DEFLATED USING THE CENTRAL BANK'S COST-OF-LIVING INDEX FOR THE URBAN WORKING CLASS.
- (E) CONSERVATIVE DEFINITION BASED UPON AN EXCHANGE RATE OF 6.7 COLONES TO THE DOLLAR. THIS RATE WAS EMPLOYED AS AN INDIRECT TAX ON COFFEE EXPORTERS.
- (F) MODERATE DEFINITION BASED UPON MIXED RATE OF 7.7 COLONES TO THE DOLLAR.
- (G) LIBERAL DEFINITION BASED UPON FREE MARKET RATE OF 5.6 COLONES TO THE DOLLAR.

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LIST OF ACRONYMS

AITEC	Acción Internacional Técnica (consulting firm)
CABEI	Central American Bank for Economic Integration
CACM	Central American Common Market
CAN	National Agricultural Council
CAR	Regional Agricultural Center
CCSS	Social Security Institute
CIGRAS	Seed and Grain Laboratory
CITA	Center for Investigations in Food Technology
CNP	National Production Council
CODESA	Costa Rican Development Corporation
DGEC	Statistics and Census Bureau
DINADECO	National Community Development Organization
GOCR	Government of Costa Rica
IFAM	Municipal Development Institute
IMAS	Social Assistance Institute
INA	National Vocational Training Institute
INFOCOOP	Cooperative Development Institute
ITCO	National Land and Colonization Institute
MAG	Ministry of Agriculture and Livestock
MEIC	Ministry of Economy, Industry and Commerce
OPIPLAN	National Planning Office
OSPA	Sectoral Office of Agricultural Planning
PIMA	Integrated Program of Agricultural Marketing
SEN	National Banking System
UCR	University of Costa Rica

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SUMMARY OF BASIC SOCIO-ECONOMIC INDICATORS

ANNEX E

	<u>1950</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>
I. PRODUCTION				
GDP (market prices)	¢1,416 mil.	¢2,860 mil.	¢6,524 mil.	¢16,607 mil.
GDP per capita	¢1,670	¢3,288	¢8,767	¢28,335
Real GDP (1966 prices) n.a.		n.a.	¢5,480 mil.	¢7,656 mil.
Avg. Annual Growth				
Real GDP				---6.6%---
II. STRUCTURAL TRANSFORMATION (Sectoral output as % of GDP at constant prices)				
		<u>1963</u>	<u>1973</u>	
Agriculture		25.8	22.2	
Mines/Industry		17.0	19.5	
Construction		5.6	5.8	
Basic Services 1/		5.7	7.6	
Commerce		14.5	16.7	
Other Services (including gov't)		31.2	27.9	
III. INCOME DISTRIBUTION				
Percent of family income: % of total				
		<u>1963</u>	<u>1973</u>	
Lowest 20%		6.0	5.4	
Next 60%		34.0	44.0	
Next 10%		14.0	16.2	
Highest 10%		46.0	34.4	
IV. BALANCE OF PAYMENTS				
Exports	\$55.6 mil.	\$ 84.3 mil.	\$231.2 mil.	\$487.6 mil.
Imports	\$46.0 mil.	\$110.4 mil.	\$316.7 mil.	\$699.8 mil.
Trade Balance	\$ 9.6 mil.	-\$26.1 mil.	-\$ 85.5 mil.	-\$212.2 mil.
Avg. Annual Growth				
Exports	---4.2%---	---11.4%---	---16.1%---	
Avg. Annual Growth				
Imports	---9.2%---	---12.5%---	---17.2%---	
Net Int'l Reserves (12/31)	\$6 mil.	\$16 mil.	\$26 mil.	\$52 mil.
Disb. Debt Outstanding (12/31)			\$121.6 mil.	\$476.7 mil.
Debt Service Payments			\$27.6 mil.	\$73.0 mil.
Debt Service/Exports			11.9%	14.9%
V. POPULATION/EMPLOYMENT				
	<u>1950</u>	<u>1963</u>	<u>1973</u>	<u>July 1975</u>
Population (000's)	866	1,397	1,887	1,968
Rate of Increase		---3.8%---	---3.0%---	---2.2%---
Urban Population		34.4%	40.6%	n.a.
Rural Population		65.6%	59.4%	n.a.
Labor Force	292,000	408,000	586,000	n.a.
Employed	280,000	379,000	542,000	n.a.
Unemployment Rate	4.1%	7.1%	7.3%	n.a.
<u>Employment by Sector</u>				
Agriculture		49.8%	38.2%	n.a.
Industry/Mining		11.8	12.9	n.a.
Construction		5.5	6.8	n.a.
Basic Services		4.7	5.5	n.a.
Commerce		9.9	14.8	n.a.
Services		18.3	21.8	
VI. SOCIAL INDICATORS				
<u>Housing Units with:</u>				
		<u>1963</u>	<u>1973</u>	
Piped Water		68.3%	78.2%	
Sanitation Facilities		60.0%	81.2%	
Electricity		54.5%	66.3%	
Radios		54.2%	77.0%	
<u>Proportion of 6-12 age group in:</u>				
Primary School		84.1%	94.0%	
Literacy Rate			89%	
No. of Doctors per 10,000 people		4.62	6.74	
Infant Mortality Rate per 1,000		69.8	43.6	
Life Expectancy		63	68	
<u>Coverage of Social Security Insurance:</u>				
		<u>1960</u>	<u>1970</u>	<u>1973</u>
For Sickness and Maternity		15%	46%	58%
For Old Age/Disability		7%	28%	42%

1/ Electricity, gas, water, communications and transport.

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GROSS DOMESTIC PRODUCT, BY SECTOR OF ORIGIN
(Millions of Colones, Market Prices)

	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
Agriculture	832.8	836.5	924.0	994.1	1,065.6	1,178.4	1,302.9	1,469.3	1,443.4	1,601.6	1,962.9	2,522.4	3,283.2
Industry/Mfg. & Mining	512.2	573.2	659.4	730.9	781.2	897.3	1,004.5	1,192.2	1,325.0	1,507.1	1,903.3	2,677.9	3,207.2
Construction	171.8	155.9	185.4	164.9	204.3	224.1	245.6	277.4	343.3	423.8	507.1	654.9	833.2
Basic Services 1/	186.7	207.9	227.5	244.1	268.2	291.6	344.8	384.0	443.8	509.9	595.5	700.0	1,064.7
Commerce	696.4	735.3	793.3	879.4	918.2	1,011.0	1,116.3	1,371.3	1,502.0	1,651.3	2,054.5	2,754.7	3,252.5
Banking & Insurance	129.5	129.8	153.3	168.9	187.2	204.4	236.9	302.7	321.0	404.5	508.5	635.3	832.0
Dwellings	357.8	360.8	373.1	391.7	425.8	444.0	467.6	498.7	524.9	553.4	626.5	744.5	957.2
General Government	322.3	343.5	352.9	454.8	498.1	541.9	614.5	693.2	813.6	995.0	1,196.6	1,576.4	2,141.9
Other	194.7	210.3	229.6	242.6	255.4	273.1	302.6	335.7	375.2	420.1	495.9	626.7	809.8
(Adjustments)	-	-	-	-	29.9	46.9	19.6	-	44.8	146.1	311.2	148.3	-
TOTAL	3,404.2	3,608.2	3,928.5	4,288.4	4,633.9	5,126.7	5,655.3	6,524.5	7,137.0	8,215.8	10,162.4	13,178.0	16,507.2
Real GDP (1966 prices)	-	-	-	4,288.4	4,529.7	4,915.3	5,183.6	5,571.7	5,952.5	6,438.7	6,932.1	7,307.2	7,555.5
Per Cent Increase	-	-	-	-	5.6%	8.5%	5.4%	7.5%	6.8%	8.2%	7.7%	5.4%	3.4%

1/ Electricity, Gas, Water, Transport, and Communication.

Source: Central Bank of Costa Rica.

EXPORTS BY SECTOR OF ORIGIN
(\$ Millions and Percentages)

	<u>1965.....1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1965-75</u> <u>Annual Per Cent</u> <u>Increase</u>	<u>1970-74</u> <u>Annual Per Cent</u> <u>Increase</u>	<u>1974-75</u> <u>Annual Per Cent</u> <u>Increase</u>
<u>TOTAL EXPORTS</u>	<u>111.8</u>	<u>231.2</u>	<u>225.4</u>	<u>280.9</u>	<u>344.5</u>	<u>440.3</u>	<u>15.8%</u>	<u>17.4%</u>	<u>10.5%</u>
<u>Agricultural Goods</u>	<u>85.9</u>	<u>169.9</u>	<u>158.1</u>	<u>206.9</u>	<u>243.2</u>	<u>287.6</u>	<u>13.8%</u>	<u>14.1%</u>	<u>11.0%</u>
Coffee	46.6	73.1	59.3	77.8	94.0	124.8	7.6%	14.3%	-22.2%
Banana	28.3	66.8	63.9	82.5	90.7	98.3	16.8%	10.1%	37.0%
Sugar	4.6	10.1	12.9	13.1	21.5	24.4	26.5%	24.7%	97.5%
Meat	5.2	15.0	20.5	30.2	32.6	34.2	20.0%	17.4%	-6.5%
Other	2.2	1.9	1.5	3.0	4.4	5.9	9.2%	32.7%	-11.4%
<u>Manufactured Goods &</u> <u>Misc.</u>	<u>24.9</u>	<u>61.3</u>	<u>67.3</u>	<u>74.0</u>	<u>101.3</u>	<u>152.7</u>	<u>21.2%</u>	<u>25.6%</u>	<u>11.7%</u>

Source: Department of Statistics thru Monthly Statistical Bulletin of the Central Bank (Dec. 1975).

NOTE: Exports are F.O.B.

MINIMUM WAGES

<u>Industry</u>	<u>Occupation</u>	<u>Daily Minimum</u>				<u>Dec.</u> 1976
		<u>1972</u>	<u>April</u> <u>1974</u>	<u>Dec.</u> <u>1974</u>	<u>Dec.</u> <u>1975</u>	
Coffee	Laborer	¢12.90	¢18.20	¢20.20	¢24.00	
Banana <u>1/</u>	Laborer	20.80	26.00	28.70	31.50	
Cattle	Laborer	14.00	18.00	22.00	26.00	
Sugar Cane	Laborer	13.60	19.15	22.00	24.00	
Other Agriculture	Laborer	12.80	18.05	20.20	24.00	
Mining	Laborer	19.00	24.70	27.25	31.00	
Meat Processing	Machine Operator	n. a.	n. a.	31.00	34.40	
Candy	Machine Operator	17.35	23.40	25.85	29.20	
Coffee Processing	Laborer	n. a.	n. a.	25.75	29.10	
Brewery	Machine Operator	23.00	28.75	31.65	35.15	
	Unskilled Operator	19.00	24.70	27.25	30.50	
Textiles	Machine Operator	17.25	23.30	25.75	29.10	
	Unskilled Operator	14.25	20.10	22.30	25.40	
Tailoring	Cutters	31.45	36.15	39.65	42.80	40.65
	Unskilled Laborer	14.25	20.10	22.30	25.40	20.70
Printing	Unskilled Laborer	14.35	20.25	22.50	25.65	
Cement	Skilled Laborer	26.20	31.45	34.55	38.00	
Motor Vehicle Repair	Skilled Laborer	26.30	31.55	34.70	38.15	
Plastics	Machine Operator	n. a.	n. a.	25.40	28.70	
Construction	Heavy Machine Op.	38.25	42.05	46.05	49.75	
	Skilled Laborer	28.50	34.20	37.60	40.60	
	Helper	19.95	25.95	28.65	32.65	
	Laborer	17.85	23.20	25.65	29.75	

1/ Does not include workers with Banana Co. of Costa Rica or Chiriquí Land Co.

Source: Dept. of State Airgram (A-47) dated 4/18/74, Gazette #232 dated 12/5/74, and Gazette #237 dated 12/13/75.