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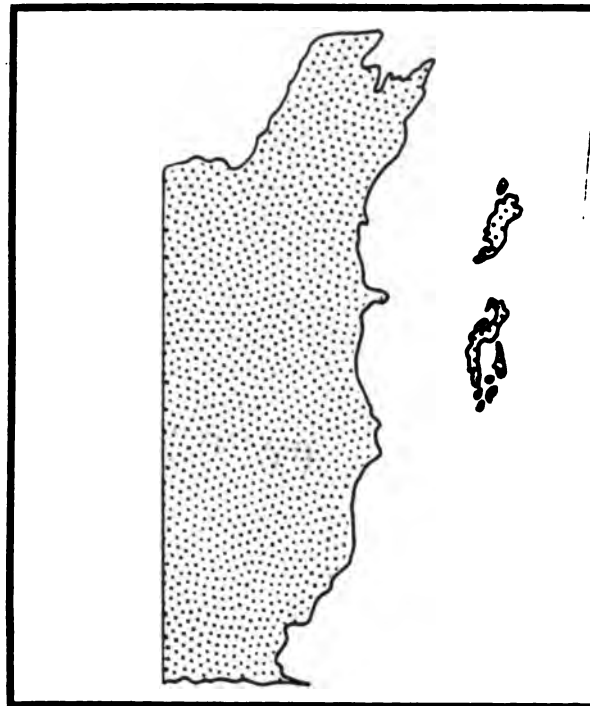


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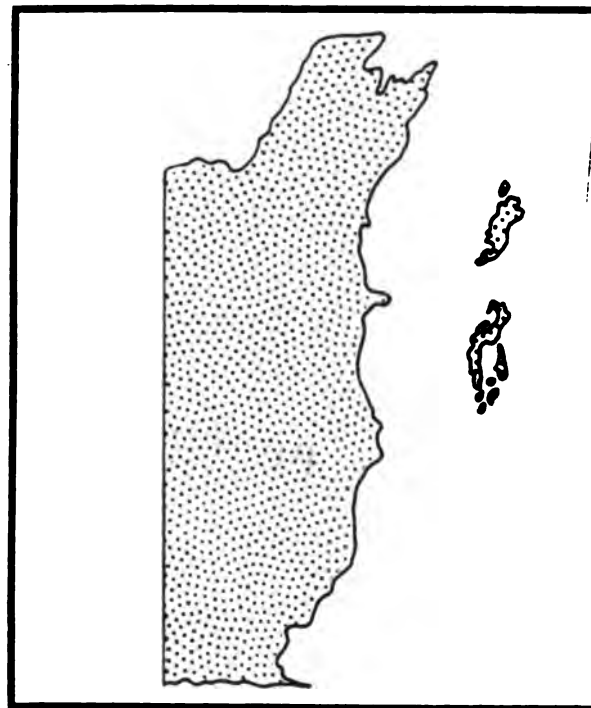


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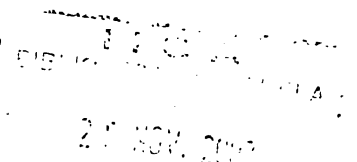
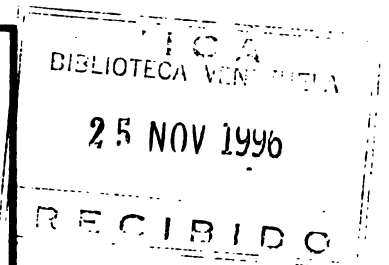


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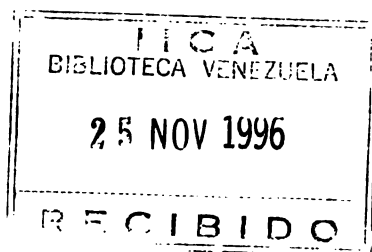


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## PREFACE

In response to the mandate of the Ninth Inter-American Conference of Ministers of Agriculture, the Inter-American Institute for Cooperation on Agriculture (IICA) collaborates with its Member States, through its Offices and the Center for Programs and Investment Projects (CEPPI), in developing sectoral studies at the request of governments and/or international financial organizations.

Belize became IICA's newest member-country when it signed the Institute's Convention on November 9, 1992. On the basis of discussions between the Ministry of Agriculture of Belize and IICA, it was agreed that a diagnosis of the agricultural sector be prepared in supporting the Ministry's efforts to develop an agricultural sector strategy. In addition, the diagnosis would provide IICA with information for designing its country strategy for Belize. The diagnosis was carried out by a mission from IICA, in collaboration with technicians from the Ministry of Agriculture of Belize. The mission and the preparation of the report were coordinated by CEPPI.

The report consists of nine chapters. Background information on Belize is provided in chapter one. An overview of the country's economic and agricultural policies is presented in chapter two. Chapter three examines the status of Belize's natural resource base, its use and the implications for agricultural development. Chapter four discusses the major characteristics of and trends in agricultural production and trade, and constraints on the agricultural sector. Chapter five provides a profile of smallfarm agriculture in Belize, while chapter six assesses the major institutions operating in the sector. Chapter seven gives a diagnosis of the basic agricultural support services (planning, research, extension, training and plant and animal health). Complementary support services in the sector (marketing and credit) are examined in chapter eight. Chapter nine presents a discussion of the major issues and strategic elements for the development of the agricultural sector, and makes specific policy and institutional recommendations.

Numerous institutions in Belize contributed to the development of this study by providing various types of information. These include the Central Bank of Belize, Banana Control Board, Belize Enterprise for Sustained Technology, Belize Federation of Agricultural Cooperatives, Belize Fishermen's Cooperative Association, Belize Marketing Board, Belize Sugar Industries, Caribbean Agricultural Research and Development Institute, Citrus Control Board, Central Statistical Office, Development Finance Corporation, Help for Progress Limited, the Ministries of Agriculture, Economic Development, Natural Resources, Finance, Trade and Industry, and the National Development Foundation of Belize.

Acknowledgement is also given for contributions from: Hon. Russell Garcia, Minister of Agriculture, Belize; Rodney Neal, Permanent Secretary, and Wendell Parham, Policy Analyst of the Ministry of Agriculture, Belize; David Wilson, Director of IICA's Plant and Animal Health Program; Sergio Sepulveda, Acting Director of IICA's Rural Development Program; and the technical and support staff of the Ministry of Agriculture of Belize.

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## ACRONYMS

<b>ACP</b>	<b>African Caribbean and Pacific Countries</b>
<b>ANDA</b>	<b>Association of National Development Agencies</b>
<b>APHIS</b>	<b>Animal and Plant Health Extension Services</b>
<b>APME</b>	<b>Animal Programme, Monitoring and Evaluation</b>
<b>ARC</b>	<b>Agricultural Research Committee</b>
<b>BABCO</b>	<b>Belize Agribusiness Company</b>
<b>BAC</b>	<b>Belize Advisory Council</b>
<b>BCA</b>	<b>Belize College of Agriculture</b>
<b>BCB</b>	<b>Banana Control Board</b>
<b>BCCI</b>	<b>Belize Chamber of Commerce and Industry</b>
<b>BCFA</b>	<b>Belize Cane Farmers Association</b>
<b>BEB</b>	<b>Belize Electricity Board</b>
<b>BEC</b>	<b>Belize Estate Company</b>
<b>BEIPU</b>	<b>Belize Export and Investment Promotion Unit</b>
<b>BEST</b>	<b>Belize Enterprise for Sustained Technology</b>
<b>BFAC</b>	<b>Belize Federation of Agricultural Cooperatives</b>
<b>BFCA</b>	<b>Belize Fishermen's Cooperative Association</b>
<b>BFPMP</b>	<b>Belize Forest Planning and Management Project</b>
<b>BGA</b>	<b>Belize Growers Association</b>
<b>BLDP</b>	<b>Belize Livestock Development Project</b>
<b>BLPA</b>	<b>Belize Livestock Producers Association</b>
<b>BMB</b>	<b>Belize Marketing Board</b>
<b>BNB</b>	<b>Belize National Bank</b>
<b>BNS</b>	<b>Bank of Nova Scotia</b>
<b>BRWA</b>	<b>Belize Rural Women's Association</b>
<b>BSB</b>	<b>Belize Sugar Board</b>
<b>BSI</b>	<b>Belize Sugar Industries</b>
<b>BTL</b>	<b>Belize Telecommunications Limited</b>
<b>BZ\$</b>	<b>Belize Dollar</b>
<b>CAEP</b>	<b>Caribbean Agricultural Extension Project</b>
<b>CAO</b>	<b>Chief Agricultural Officer</b>
<b>CARDI</b>	<b>Caribbean Agricultural Research and Development Institute</b>
<b>CARIBCAN</b>	<b>Caribbean-Canadian Trade Agreement</b>
<b>CARICOM</b>	<b>Caribbean Community</b>
<b>CBI</b>	<b>Caribbean Basin Initiative</b>
<b>CCB</b>	<b>Citrus Control Board</b>
<b>CCCB</b>	<b>Confederation of Cooperatives and Credit Unions of Belize</b>
<b>CDB</b>	<b>Caribbean Development Bank</b>
<b>CDC</b>	<b>Commonwealth Development Corporation</b>
<b>CET</b>	<b>Common External Tariff</b>
<b>CFNI</b>	<b>Caribbean Food and Nutrition Institute</b>

<b>CFRAMP</b>	<b>Caribbean Fishery Resource Assessment and Management Program</b>
<b>CIDA</b>	<b>Canadian International Development Agency</b>
<b>CGA</b>	<b>Citrus Growers Association</b>
<b>CNS</b>	<b>Comprehensive National Survey</b>
<b>CRWRC</b>	<b>Christian Reformed World Relief Committee</b>
<b>CSO</b>	<b>Central Statistical Office</b>
<b>CTA</b>	<b>Technical Centre for Agricultural and Rural Cooperation</b>
<b>CTM</b>	<b>Chinese Technical Mission</b>
<b>CTV</b>	<b>Citrus Tristeza Virus</b>
<b>CXC</b>	<b>Caribbean Examinations Council</b>
<b>DAO</b>	<b>District Agricultural Officer</b>
<b>DEO</b>	<b>District Extension Officers</b>
<b>DFC</b>	<b>Development Finance Corporation</b>
<b>ECIAF</b>	<b>Eastern Caribbean Institute of Agriculture and Forestry</b>
<b>EDF</b>	<b>European Development Fund</b>
<b>EEC</b>	<b>European Economic Community</b>
<b>EIB</b>	<b>European Investment Bank</b>
<b>EO</b>	<b>Extension Officer</b>
<b>ESE</b>	<b>Extension Supervisor of Education</b>
<b>ESS</b>	<b>Extension Supervisor Service</b>
<b>FAB</b>	<b>Fisheries Advisory Board</b>
<b>FAO</b>	<b>Food and Agricultural Organization</b>
<b>FOB</b>	<b>Free on Board</b>
<b>GATT</b>	<b>General Agreement on Tariffs and Trade</b>
<b>GGA</b>	<b>Grain Growers Association</b>
<b>GOB</b>	<b>Government of Belize</b>
<b>GDP</b>	<b>Gross Domestic Product</b>
<b>GM</b>	<b>General Manager</b>
<b>GSP</b>	<b>Generalized System of Preferences</b>
<b>HELP</b>	<b>Help for Progress, Limited</b>
<b>IFAD</b>	<b>International Fund for Agricultural Development</b>
<b>IDB</b>	<b>Inter-American Development Bank</b>
<b>INCAP</b>	<b>Institute of Nutrition of Central America and Panama</b>
<b>IOE</b>	<b>International Office of Epizootics</b>
<b>ITC</b>	<b>International Trade Center</b>
<b>JSA</b>	<b>Jamaica School of Agriculture</b>
<b>LCM</b>	<b>Livestock Central Market</b>
<b>MED</b>	<b>Ministry of Economic Development</b>
<b>MLC</b>	<b>Meat and Livestock Commission</b>
<b>MNR</b>	<b>Ministry of Natural Resources</b>
<b>MOA</b>	<b>Ministry of Agriculture</b>
<b>MOF</b>	<b>Ministry of Finance</b>
<b>MOH</b>	<b>Ministry of Health</b>



<b>MTE</b>	<b>Ministry of Tourism and Environment</b>
<b>MTI</b>	<b>Ministry of Trade and Industry</b>
<b>NAFTA</b>	<b>North American Free Trade Agreement</b>
<b>NAREC</b>	<b>National Agricultural Research and Extension Council</b>
<b>NARMAP</b>	<b>Natural Resource Management and Protection Project</b>
<b>NDFB</b>	<b>National Development Foundation of Belize</b>
<b>NEMOC</b>	<b>National Economic Mobilization Council</b>
<b>NFS</b>	<b>Non-Factor Services</b>
<b>NGOs</b>	<b>Non Government Organizations</b>
<b>OAS</b>	<b>Organization of American States</b>
<b>ODA</b>	<b>Overseas Development Administration</b>
<b>OIRSA</b>	<b>Organismo Internacional Regional de Sanidad Agropecuaria</b>
<b>PAHO</b>	<b>Pan American Health Organization</b>
<b>PAO</b>	<b>Principal Agricultural Officer</b>
<b>PAU</b>	<b>Policy Analysis Unit</b>
<b>PCB</b>	<b>Pesticide Control Board</b>
<b>PEO</b>	<b>Principal Extension Officer</b>
<b>PGA</b>	<b>Papaya Growers Association</b>
<b>PPS</b>	<b>Plant Protection Section</b>
<b>PS</b>	<b>Permanent Secretary</b>
<b>PVO</b>	<b>Principal Veterinary Officers</b>
<b>REAP</b>	<b>Relevant Education Agricultural Program</b>
<b>R&amp;D</b>	<b>Research &amp; Development</b>
<b>RDTs</b>	<b>Research Development and Transfer System</b>
<b>SAP</b>	<b>Sustainable Agriculture Production Programme</b>
<b>SCB</b>	<b>Sugar Control Board</b>
<b>SECC</b>	<b>Senior Executive Core Committee</b>
<b>SICO</b>	<b>Sugar Industry Control Ordinance</b>
<b>SFBBL</b>	<b>Small Farmers and Business Bank Limited</b>
<b>SSM</b>	<b>Senior Staff Meeting</b>
<b>TAMP</b>	<b>Toledo Agricultural Marketing Program</b>
<b>TCP</b>	<b>Technical Cooperation Project</b>
<b>TFAP</b>	<b>Tropical Forestry Action Plan</b>
<b>TRDP</b>	<b>Toledo Research and Development Project</b>
<b>TREC</b>	<b>Toledo Research and Extension Center</b>
<b>TSDP</b>	<b>Toledo Small Farm Development Project</b>
<b>TSUS</b>	<b>Tariff Schedule of the United States of America</b>
<b>UNHCR</b>	<b>United Nations High Commission for Refugees</b>
<b>USAID</b>	<b>United States Agency for International Development</b>
<b>UNDP</b>	<b>United Nations Development Program</b>
<b>UK</b>	<b>United Kingdom</b>
<b>USA</b>	<b>United States of America</b>
<b>VAT</b>	<b>Value-Added Tax</b>

<b>VIO</b>	<b>Veterinary Investigating Officer</b>
<b>VO</b>	<b>Veterinary Officers</b>
<b>VSO</b>	<b>Voluntary Services Overseas</b>
<b>WHO</b>	<b>World Health Organization</b>

## **WEIGHTS AND MEASURES**

<b>British</b>		<b>Metric</b>
1 foot	=	0.345 meters (m)
1 mile	=	1.61 kilometers (km)
1 acre	=	0.45 hectares (ha)
1 square mile	=	2.6 square kilometers (km <sup>2</sup> )
1 pound (lb)	=	0.4 kilogram (kg)
1 ton	=	1.016 metric ton (mt)
2205	=	1 metric ton (mt)

## **CURRENCY EQUIVALENT**

**BZ\$2.00 = US\$1.00**

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## EXECUTIVE SUMMARY

**Background:** Belize is a small country located on the eastern or Caribbean coast of Central America, and has the lowest population density in Central America and one of the lowest in the world. The country is divided into six geographic districts - Corozal, Orange Walk, Belize, Cayo, Stann Creek and Toledo.

The population is almost equally divided between males and females, and is multi-racial, the main ethnic groups being mestizo (Spanish-Maya), creole (of African descent) and garifuna (African-Caribbean descent). It also includes people of Spanish and East Indian descent, a small Mennonite community of European origin, and refugees from other Central American countries. Migration has been an important factor affecting the country's population growth in the last three decades, with most emigrants going to North America. In the last two decades, the employment situation has experienced a gradual change, primarily due to migration, changes in the economic structure and declining fertility. The service and agriculture sectors are the most important sources of employment, accounting together for 72% in 1993. Unemployment among females and youths are high, almost doubling those of males and the national average, respectively.

**Natural Resource Base:** Belize has abundant natural resources and environmental beauty which are major sources of tourist attraction. It has large land areas that are still undeveloped and their soils intact, and a low man-land ration compared to countries in the region. Although it is a relatively low country with large areas along the coastal plain below sea level, most of its water needs are met by rivers and streams. The country's river system includes 18 main catchment areas and rivers.

The country's forests contain a diversity of animal and plant species, many of which are endangered elsewhere in Central America. Its coastal and marine zone has a wide diversity of ecosystems that are rich in plant and marine resources. These include coral reefs, cays, extensive coastal lagoons and sea grass beds. The zone is supported by a long Barrier Reef (the second largest in the world) and many cays of various sizes. Besides being an important habitat for diverse species of marine life, the reefs support the country's important fishery and are a prime tourist attraction. The mangroves provide areas for fish spawning and feeding, and are the principal sources of nutrients for coastal marine life. They also function as sediment traps for waters from rivers and streams, and act as a physical buffer for the inland areas against storms.

Despite the abundant natural resources, population growth and development activities are putting increased pressure on the natural and environmental resource base. There is evidence of actual and potential natural resource and environmental problems in many parts of the country. The rate of deforestation is increasing, marine resources are being gradually overexploited, soils are eroding, rivers and streams are becoming polluted, and solid waste is accumulating in built-up areas such as Belize City. Land degradation is a potential problem due to the influx of illegal immigrants and refugees and agricultural activities. There are indications

that some degradation is occurring already, particularly in areas along the river banks where intensive cultivation takes place.

***The economy:*** Belize has a small, highly open agricultural-based economy similar to that of many countries in the English-speaking Caribbean. The economy was traditionally based on forestry, but is now mainly based on services, and to a lesser extent on manufacturing and agriculture. In the 1980-93 period, the services sector accounted for just over 50% of the total GDP, while the secondary sector (including manufacturing) contributed almost 26% and the primary sector 20%. In the services sector, trade, tourism and public administration are dominant, while in agriculture, the production of sugarcane, citrus, banana, seafood and livestock are the major activities. Tourism has expanded significantly in recent years, with the USA being the primary source.

In the 1980-93 period, economic growth was significant, averaging about 5.2% per year, and per capita income expanding by 2.8% per year. Since 1987, the country's economic performance was higher, averaging 8.4%/year and per capita income increasing by nearly 6%/year. Moreover, the key indicators of economic performance also reflected a healthy economy - low inflation rates, a fairly stable real effective exchange rate, and a steady upward trend in both capital formation and the level of foreign reserves. The strong performance of the economy, particularly since 1987 resulted from a rapid structural change, and successful implementation of the government's development strategy, the major thrust of which was agricultural diversification and exports (away from sugar), and greater emphasis on the production of bananas, citrus, cocoa, marine products, other non-traditional agricultural products, garment manufacturing and tourism development.

Belize's economy has been and remains heavily dependent on external trade. It is vulnerable to external shocks because of its dependence on a narrow range of exports - sugar, citrus concentrates, bananas and garments. These products are exported under preferential trade agreements with the European Community and the United States. Being a member of CARICOM, Belize has preferential access also to the markets of CARICOM-member states. Between 1985-93, total exports of sugar, bananas, citrus concentrates and garments to these markets accounted for an average of almost 88% of total domestic exports per year, and contributed approximately 29% to GDP.

Its trade policy measures included the use of import and export licenses, with most imports requiring a license subject to tariffs of either 44% or 59%. In recent years, the government has moved towards implementation of favorable trade policies to encourage exports and diversification. It adopted the Common External Tariff (CET) as part of an overall effort to harmonize the external tariff of CARICOM. The CET is expected to eliminate the stamp tax, reduce the maximum import tariffs to 45% initially, and subsequently in steps to 20% by the year 2000.

***The agricultural sector:*** In general, the soils of Belize present moderate to severe limitations for agriculture, including drainage, shallowness, low fertility and lack of moisture

in the dry season. About 16% has the capability for mechanized agriculture without large financial and technological investments, but much of this is already under cultivation, mainly with citrus and bananas. Of the remainder, 23% has potential for limited annual and perennial crops and pasture; 15% for mixed perennial crops and forest plantation; 27% for production forest; and 19% for protected forest.

In 1993, approximately 56,000 ha of the total cultivated land were under export crops, and 22,000 under domestic crops. Sugarcane is concentrated in the north (Orange Walk and Corozal districts); mechanized production of beans and corn in the west (Cayo district); citrus and cacao in the central area (Stann Creek valley); and rice and bananas in the south (Toledo district). There is also a significant portion of land under pasture or cultivated by small farmers with non-traditional crops. More than one-half of the total area under pasture is in the Orange Walk and Cayo districts. The non-traditional crops are cultivated throughout the country by small farmers. A large number of these are milpa farmers who use the slash-and-burn system, operating small plots comprised of mixed subsistence farming and cash crop production.

Since 1980, the government's agricultural policy has aimed to provide an adequate supply of food at reasonable prices to the society, and expanding exports. It emphasized a market-led approach that would contribute to: (i) greater efficiency in resource allocation in the long run; (ii) minimizing sharp fluctuations in market prices and reducing investment risks and uncertainty in the sector; (iii) promoting specific commodities for which there are identified and growing markets; (iv) achieving a higher level of self-sufficiency in food production; (v) reducing financial outlays of the government on the sector; (vi) expanding inter-sectoral linkages; and (vii) increasing the country's competitiveness in regional (CARICOM) and extra-regional markets. The government adopted a range of programs and policy measures to achieve its policy objectives, the most important being those related to marketing and price stabilization, price controls, import licensing, regulation, and policy support to specific areas through various public sector institutions and development concessions.

To support domestic production, a combination of import licenses and price controls were applied on a range of commodities. Import licenses were granted when there were production shortfalls of basic foods. Price controls were applied on several products (including locally-produced goods) at both the wholesale and retail levels, in the form of a maximum mark-up over the landed cost or wholesale price. Specific measures were implemented through the government's regulatory framework, targeting mainly export activities. Support was provided to expand diversification of the production base and increased exports of non-traditionals, through increased credit, extension, research, improved seeds, land development and machinery services. The banana industry was privatized, the government actively sought external funding to finance the expansion of bananas, citrus, cocoa and shrimp production; institutions such as the Development Finance Corporation, Belize Investment Export Promotion Unit, and the Belize Agribusiness Company were supported to facilitate diversification activities. Concessions were granted to certain imported products free of import and stamp duties, and to individuals and companies to invest in areas that contribute to the sector's diversification and exports.

The impact of government's policies, combined with a favorable external market environment made the sector the major source of economic growth. Agriculture achieved an average real growth rate of 4.7% per year in the 1980-93 period, above the average of that of most countries in the region. Growth was much higher since 1987, averaging 8.5%/year compared to 0.7% in the 1980-86 period. The sector's share in GDP and export earnings remained relatively stable over the period, averaging 21% and 78% respectively, per year. In 1993, the sector's growth slowed to 1.6%, and it contributed 19.2% to total GDP and 72.4% to export earnings. The sector's expansion since 1980 indicated a significant response in output to changes in higher real prices, complemented by the country's resource endowment and higher productivity.

The sector (including forestry and fishing) is the largest employer of labor in the economy. In 1993, it employed almost 25% of the labor force, less than 5% being women. An estimated 15% to 25% of the agricultural labor force includes illegal aliens and refugees. The sugar industry continues to be a major employer in the sector, with illegal aliens from neighboring countries comprising a significant proportion of its labor force.

Wages in Belize are higher than those of neighboring countries. The rates for unskilled agricultural workers are estimated to be about three to four times higher than those of neighboring Central American countries. This high labor cost is a factor that affects the development of many agricultural activities, reducing the country's competitiveness in both the domestic and export markets.

***Agricultural production and trade:*** Belize has a diverse and complex agricultural production system. There are approximately 14 major production systems, ranging from the slash and burn milpa system to large commercial activities. Each has special characteristics related to resource use and management, production objective(s) and marketing. In the north, commercial farming, particular sugarcane dominates the production system. In the Belize valley and the central area, there are commercial mixed farming and mechanized grain production, while subsistence milpa farming accounts for much of the agriculture in the southern part of the country.

Agricultural activities can be organized into two major groups, based on the marketing of their outputs: export-oriented activities that include the production of sugarcane, citrus, mango, banana, cacao, papaya and marine products (lobster, shrimp, conch, and frozen fish); and those that supply household needs and the domestic market, including production of corn, rice, red kidney beans, other food crops and livestock. Production is done by four main farming groups - milpa-type, permanent small farmers, medium-sized farms and large-scale farms.

Crop production includes the four major export crops and various staple crops for domestic consumption. In the 1980-93 period, crop production averaged 3.6% growth per year, accounted for more than 50% of the value-added in the sector, and contributed between 10 and 15% to total GDP.

Sugarcane is the most important crop cultivated, being the largest contributor to GDP and foreign exchange earnings. It is a smallholder crop, produced by almost 5,300 farmers concentrated in the Corozal and Orange Walk districts. The area cultivated ranged between 23,100 ha and 26,330 ha. After sugar, citrus is the second most important crop. The farms are concentrated in the Stann Creek valley, but cultivation has also expanded in the Cayo and Toledo districts. Since 1986, the total area cultivated increased almost sixfold, reaching 27,977 ha in 1993. Banana is the third major export crop, and is concentrated in the Stann Creek and Toledo districts, where the total area farmed ranged between 1,760 ha and 2,500 ha since 1990. Commercial production of cocoa expanded almost fifteen-fold since 1980, but declined recently due to closure of the operations of the principal buyer.

Corn, rice and beans are Belize's most important domestic crops. The corn production system varies between locality and farmers, ranging from the mechanized system used by the Mennonites and some small farmers to the milpa system. The product is used mainly for feed consumption by poultry and pigs, and for food by the Maya Indians. Although it is cultivated throughout the country, a large proportion of the output comes from the Cayo, Orange Walk and Corozal districts. Production had an overall upward trend in the 1980-93 period, due to new lands brought into production and the use of improved technology by Mennonite farmers.

Rice production is highly subsidized, and its cultivation is concentrated in the Toledo and Belize districts. The main production systems are upland rice in the south, mechanized rainfed and lowland production in the south, mechanized cultivation in Orange Walk and irrigated rice in the north and Belize district. About 25% of the total rice output comes from the milpa-type production system. The different production systems have varying cultural practices, resulting in different yields and quality of both paddy and processed rice.

Since 1980, paddy production has fluctuated between a low of 4,100 mt and 10,000 mt per year; total output increased by 38% in 1992, and almost 47% in 1993. Output of processed rice increased steadily to reach 5,300 mt, almost twice the 1986 level, and the country is expected to have a surplus of rice in the current crop year. Production is affected by low paddy yields, poor grain quality and high production cost.

Beans (mainly red kidney beans) are a staple crop cultivated throughout the country by both milpa and mechanized farmers. Approximately 90% of the country's production comes from the Cayo and Orange Walk districts. Belize is considered to be self-sufficient in red kidney beans. Since 1980, output increased more than twofold, with significant growth occurring in the second half of the 1980s. In recent years, production fluctuated around 3,000 mt. Factors affecting production include adverse weather conditions and frequent incidence of rust and web blight.

Oilseeds such as soybeans, peanuts and sesame are important import substitution crops, providing vegetable oil for human consumption and supplying protein for livestock production. Soybean production steadily increased from 19 mt in 1987 to 280 mt in 1991 as a result of expanded cultivation in the Cayo and Corozal districts. Commercial production is constrained



by a lack of a processing facility, absence of higher yielding varieties, and appropriate technology to grow it as a second crop. Peanut cultivation expanded in the late 1980s to almost 200 ha, but declined to less than 100 ha in the 1990s.

The production of other crops like fresh vegetables (tomatoes, cabbages, peppers, cucumbers, lettuce, carrots and the like) is limited and seasonal. Most of these are grown on small plots for local consumption, and are cultivated from November to February, the coolest months of the year. The off-season shortages are compensated by imports, mainly from Mexico and Guatemala.

Livestock production comprises beef, pork, poultry and egg. In the 1980-93 period, this subsector experienced the highest annual growth rate (8.4%) compared to the other subsectors. The real value of output doubled due to expansion in beef cattle, pigs, poultry and milk production. The poultry subsector has been the most successful in the last decade and the country has become self-sufficient in poultry meat. The industry is based on imported feed concentrates supplemented by local ingredients, and is dominated by the Mennonite producers. The cattle subsector is the largest, in terms of the animal population. Most of the country's cattle is concentrated in the Orange Walk and Cayo districts.

The livestock production system of non-Mennonite producers are characterized by low productivity, due to the use of low levels of technology and inefficient management. Other major factors affecting the sector's development include: (i) insufficient short- and medium-term credit; (ii) inadequate research and technology transfer and extension; (iii) high input costs due to high tariffs and high transport costs; (iv) marketing constraints; (v) absence of grades and standards to meet both domestic and export market requirements; and (vi) inadequate slaughter and processing facilities.

The fishing subsector contributed 4% to GDP in 1993. Since 1980, real output expanded almost 6% per annum, and the subsector's contribution to primary production almost doubled. The most important species fished are lobster, shrimp and conch. However, the marine resource base is threatened by overexploitation of some species, illegal fishing and development activities on the coast and reefs which affect the coastal fish habitat.

The forestry subsector accounted for an average of 2.3% of the national output per year in the 1980-93 period. In absolute terms, the sector's growth was very significant, averaging 8.2% per annum. The trend in real output was somewhat cyclical, trending downward in the first half of the 1980s, but it reversed dramatically afterwards to record a growth rate of almost 20% per annum between 1986 and 1993. In the last year, output declined, primarily due to a reduction in mahogany production.

Agro-industrial activities in Belize consist primarily of the production of sugar and molasses, citrus concentrates, fertilizers, dairy processing, flour milling, various beverages, wood processing, dehydrated fruits and small food processing operations. The dominant activity is sugarcane and citrus processing, accounting for an average of 24% and 12%, respectively,

of the industrial output in recent years. There are also several processing operations dominated by small enterprises involved in the production of a variety of products such as pepper sauce, jams, peanut butter, fresh-squeezed juices and yogurt. Their development, however, has been affected by: costly imported inputs; the small scale of their operations; inefficient technology; low product quality; and competition from cheaper imports.

Traditionally, sugar, citrus concentrate, marine products, bananas and forestry products have been Belize's major agricultural exports. In the 1980-93 period, the share of these products in total foreign exchange earnings remained fairly stable, averaging about 77% per year. Non-traditional agricultural exports have increased significantly, partly due to agricultural diversification activities developed by the private sector, with financing from USAID and support from the government. Of the non-traditional exports, molasses and papaya are the most important, contributing more than 90% to the foreign exchange earnings of this group. Since 1985, the volume of marine products exported increased by nearly 8% per year, due to higher prices and the overall expansion in the export market.

The value of forest products exported fluctuated significantly, with the general trend being an upward one. Regarding other agricultural exports, their total value declined during the 1987-93 period; those of live animals, dairy products, and meat preparations fell by more than one-half.

Belize is dependent on a range of imported food, particularly processed food products. The most important foods imported were meat products, dairy, cereals (rice, wheat and other cereals), fruits and vegetables, while animal feed, fertilizers, herbicides and insecticides were the most important inputs. In the last decade, total food imports increased by more than 50 percent.

***Smallfarm agriculture:*** Small farmers comprise the largest farming group in Belize, operating holdings of less than 8.1 ha, or livestock enterprises having no more than 20 heads of beef cattle, one to five dairy cows, 10 to 15 pigs, or up to 200 units in the case of poultry. Their operations vary, depending on the type of production activity and the farming system. Small farmers engaged in export crops have larger farm sizes than those in mixed and subsistence farming; those involved in beef cattle production have a larger herd size than those in dairy farming.

Small farmers can be divided into two main groups: milpa producers, who practice shifting cultivation, and permanent cultivators. They are engaged in monocrop and mixed farming activities. In general, the principal crops cultivated are rice, corn, beans, vegetables, bananas, plantains, citrus, sugarcane and fruits. Small farmers are not involved very much in banana and mixed mechanized farming systems. In livestock farming, the enterprises are also mixed, having combinations of various types including cattle, pigs, poultry and bees.

Small farms in Belize are predominantly family-owned and -operated enterprises. Most are usually owned by a single holder, particularly a male with an average age of 45 years. The

farmers supplies much of the labor (occasionally supported by family and hired labor), having responsibility for land preparation, cultivation, harvesting and marketing. In the case of livestock, the owner does purchasing of animals, feeding and marketing.

The level of small farmers' income varies between production activities. Survey data showed that a large proportion of their income came from domestic crops, rather than mixed farming or export crops. Livestock production was not an important income source, unless it was the principal farm activity. Of the individual cropping enterprises, citrus and sugarcane generated the highest gross income, BZ\$10,000 and BZ\$7,600 respectively.

Belize's small farm sector is also characterized by a strong relationship between ethnic groups and geographic concentration of specific production activities. For example, the Garifunas are involved in the cassava-fish system in the central and southern coastal areas, while the Maya farmers have a corn-rice and corn milpa systems in southern Toledo, and in the corridor along the road between Cayo and Stann Creek.

The major constraints to small farmers development can be grouped into five areas: land insecurity and inadequate access to land; depletion of the natural resource base; inadequate provision of and access to support services; limited organization; and inadequate infrastructure.

***Agricultural institutions:*** The main public institutions are the Ministry of Agriculture (MOA), the Development Finance Corporation (DFC) and the Belize Marketing Board (BMB). There are also several ministries providing support to the sector, and statutory bodies with responsibilities for specific commodity areas. The latter include the Sugarcane Control Board, Citrus Control Board, Banana Control Board, Fisheries Advisory Board, the Meat and Livestock Commission and the Belize College of Agriculture (BCA).

The MOA is the principal institution responsible for executing the government's agricultural policy and agricultural planning. It provides various support services, including generation of statistics, land clearing and preparation, research and extension, veterinary support and laboratory analyses, plant and animal quarantine, soil testing and analyses, training, feeder road development, provision of improved planting materials, seeds and breeding animals, and management of fisheries resources. Over the years, its operations have been seriously constrained by limited financial and human resources. Since the early 1980's, a smaller proportion of the government's total budget has been allocated to the Ministry, with the reduction in the capital allocation being more significant. In the 1994/95 fiscal year, recurrent and capital allocations were 5% and 6%, respectively, of the total government budget. The Ministry spends a large proportion of its recurrent budget in salaries and wages, averaging 74% in recent years.

The DFC has played a critical development role in the agricultural sector, by being the principal financial intermediary providing credit to small and medium-size farmers. It has been the main lending agency supporting diversification away from sugarcane, by providing credit for new crops which commercial banks were reluctant to finance. Moreover, more than 50% of the

resources it received from external sources were channeled to agriculture *and related* activities. Its lending policy is different from those of other commercial financial institutions, providing supervised credit and charging lower than market interest rates. The Corporation was restructured in recent years, strengthening its capabilities in several areas to provide a more efficient service.

The BMB supports agricultural marketing. Its principal activity has been in purchasing, storing, processing and marketing rice. It is the sole legal importer of rice in Belize, purchasing from abroad to supplement local production. Through its local purchases and rice imports, it controls the domestic rice market and stabilized rice prices. Like most public marketing agencies in developing countries, the BMB experiences financial losses from its operations and is heavily dependent on the GOB for support. It is unable to compete with the private sector in marketing, and its operations are currently being reviewed with a view that it should engage less in direct marketing activities, and providing more support services.

Private sector organizations include producer associations, cooperatives, NGOs and the Mennonite Community. The large producer organizations are the Belize Livestock Producers Association, Cane Farmers Association, Citrus Growers Association, Banana Growers Association, Papaya Growers Association, Grain Growers Association and the Cocoa Growers Association. There are also several agricultural cooperatives, including three federations - the Belize Federation of Agricultural Cooperatives (BFAC), the Federation of Honey Producers and the Belize Fishermen's Cooperative Association (BFCA).

The BFAC is an umbrella organization of nine producer cooperatives and six affiliates, and its members are small farmers located mainly in the Cayo district. It focuses on helping its members to overcome problems related to high production costs, low yields, selection of alternative crops, inefficient production methods and access to markets. It assists to procure production credit, and provides technical assistance to farmers through its extension agents.

The BFCA is an umbrella organization of six fishermen's cooperatives - Northern Fishermen Cooperative, National Fishermen Producers Cooperative, Placencia Producers Cooperative, Caribena Producers Cooperative, Toledo North Cooperative and the Independence Fishing Cooperative. It represents the interests of these cooperatives and provides advisory services to the government on fisheries policies.

The role of NGOs in Belize's agriculture is developmental, providing services that are complementary to those supplied by the public sector. They implement their activities through self-help projects that are designed for a target clientele, usually small farmers, women or youths belonging to a specific geographic area. Most of these activities are funded from external sources. Although the government has provided support for specific projects (e.g., refugee resettlement), NGOs have a limited continuous, joint-venture relationship with the GOB.

Most NGOs are affiliated to the Association of National Development Agencies, an umbrella organization that provides a forum for addressing issues and establishing linkages with other regional and international organizations, to share experiences and gather relevant

information. The large ones operating in the farming and rural community include the Belize Enterprise for Sustained Technology (BEST) and Help for Progress Limited (HELP).

BEST's primary goal is to improve and sustain the economic well being of the poor, by strengthening the ability of community-based enterprises to sustain their own development. Its clients are distributed throughout the country, and it works closely with existing and newly-formed production, processing and marketing cooperatives, farmer groups, federations and micro-enterprises. HELP's clients are located primarily in rural areas, and it is involved in projects supporting rural development, including assistance to farmers and communities for improving their use of land and forest resources, improving crop and livestock production, supporting the development of women and youths, improving literacy, training and providing machinery services.

The Mennonite community, comprising five groups, has the largest and most efficient agroindustrial complex in Belize, engaging in production, processing and marketing activities. It operates as a closed political-socioeconomic communal-based system, pooling its resources to farm, purchase equipment and supplies and provide services. Most production activities are integrated and done on a large scale, utilizing improved technology. The output of these groups together accounts for more than 90% of the poultry meat and eggs, and a large proportion of the corn, rice, beans and feeds produced in Belize. Besides farm production and processing, the Mennonites have transport facilities and a distribution system throughout the country, that also involves private non-Mennonite wholesalers.

Bilateral and multilateral institutions supporting the country's agricultural development include USAID, the European Community, United Nations Development Program, Caribbean Development Bank and the Caribbean Agricultural Research and Development Institute.

***Basic agricultural support services:*** These include agricultural planning, research and development, extension, training and plant and animal health services. The MOA is the principal institution responsible for agricultural planning. Its Policy Analysis Unit provides important inputs to the planning process and coordinates planning activities.

Belize's national agricultural research system comprises components involving the public and private sectors, CARDI and the Chinese Technical Mission. The public sector component focuses mainly on non-traditional agricultural production, including livestock and fishing. The MOA is the lead institution in this area. Through its Department of Agriculture, the Ministry executes the country's technology research and development transfer agenda on crop and livestock development. Its Fisheries Department plays a similar, but smaller role for coastal fisheries.

Presently, the MOA's research program focuses on corn, rice, beans, vegetables and pests and diseases. Most activities are related to testing cultivars of these crops and providing corresponding plant protection measures. Its research on crops are carried out at its Central Farm Agricultural Research Station and the Toledo Research and Extension Center.

Non-public agricultural research is focused on specific commodity areas, and involves the transfer and adaptation of technology from both external sources as well as those generated locally. Institutions involved are the Belize Sugar Industry (for sugarcane and sugar), the Citrus Growers Association (citrus), the Banana Growers Association (banana), the Belize Agri-Business Company (papaya), CARDI (alternative crops, mainly oilseeds) and the Chinese Technical Mission (vegetables, lowland rice and corn).

Belize's agricultural research system is constrained by the absence of a long-term policy direction, inadequate planning and coordination of R & D activities, insufficient monitoring and evaluation, a severe shortage of resources, particularly in the MOA, a weak extension service, inadequate complementary support services, technological deficiencies and limited contacts with regional and extra-regional technology research and development systems.

The agricultural extension system comprises three components: the public service operated by the MOA; the private extension service of commodity organizations; and the service provided by NGOs. It operates in three major areas: export crops; domestic food production and import substitution; and agricultural diversification. Basically, its primary goal is to facilitate technology transfer to farmers for optimizing productivity and reducing output losses.

Through the MOA, the public extension service provides limited extension services including: (i) farm visits to resolve production, marketing and related problems; (ii) providing technological packages and demonstrations of recommended production practices; (iii) support services such as supplying seeds, seedlings and improved animal stock; (iv) collecting information on crop acreage and yields; and (v) organizing seminars, meetings and training activities for farmers. The service focuses mainly on smaller farmers, producing corn, rice, vegetables, root crops, peanuts, beans, honey, livestock and fishing.

The commodity organizations provide extension services to their members in specific production areas. On the other hand, the NGOs, particularly BEST, BFAC and HELP offer a range of extension support to various groups of small farmers. Besides support to increase production, their services include business management support, and promoting sustainable farming practices that are both economically viable and environmentally positive.

The extension system is constrained by three main factors: absence of a long-term policy direction; limited quality and extent of extension coverage; and weak linkages to research activities and the private sector.

Formal training in agriculture takes place at four levels: primary education, high school or secondary level, post secondary education and specialized in-service training. The Belize College of Agriculture is the primary post-secondary institution providing formal agricultural training. It offers a two-year program in applied science in general agriculture that includes both theoretical and practical training. Its program provides specialized training to students wishing to have a career as technicians, managers and farmers in the sector, and for further training. Beyond this level, students are trained abroad.

In-service training is done by most institutions providing support to the sector. It consists of short training courses, workshops, conferences and seminars to strengthen skills and improve the knowledge base in specialized areas, where there is need for an immediate application/implementation of ideas. Such training is also geared to prepare technical personnel to implement specific activities of new projects. An acute shortage of qualified training personnel, absence of a consistent training program for the MOA's staff and inadequate training facilities are some major constraints to effective training.

The MOA executes the GOB's policies and programs in animal and plant health, and a limited veterinary service is provided by the private sector. The Ministry's services include: (i) organization and administration of and information about the service; (ii) animal quarantine; (iii) diagnostic and surveillance; (iv) control and eradication of pests and diseases; (v) registration of pesticides; and (vi) registration and control of veterinary products.

The Ministry's livestock and animal health division provides ambulatory services to livestock farmers, as well as extension advice on animal husbandry and management. In recent years, the emphasis has been on providing ambulatory services, and promoting the adoption of critical practices such as vaccinating against diseases, deworming, utilization of mineral supplements, use of a planned breeding program and a commercial approach to livestock farming.

Animal quarantine is governed by legislation, dealing with various aspects of animal importation, movement, inspection procedures and diagnostic tests. Diagnostic services are done by the veterinary section of the MOA, and animal health services are provided through its three veterinary clinics located in Belize, Orange Walk and Cayo respectively. The Plant Protection Section has responsibility for plant health services, including diagnostic and surveillance, control and eradication campaigns, information gathering and dissemination, and liaison and advisory services. Quarantine services are also provided by inspectors located at six official entry points into Belize, having responsibilities for both animal and plant movements, and assisting in documenting movements of pesticides into the country. Presently, there is no registration system for veterinary drugs, except for those pesticides registered for animal use that are handled by the PCB. Legislation only provides for inspection of slaughter houses and for food additives.

Since 1987, Belize has experienced sporadic outbreaks of the medfly. The country was required to maintain a medfly-free status to qualify for shipping fresh fruit without chemical treatment to the USA and other medfly-free countries. Other plant health problems include white flies, the sigatoka disease of bananas, weeds, post-harvest problems and the constant threat of the citrus tristeza virus which has been detected in a very small percentage of trees. However, Belize appears to have a fairly good animal health status.

The plant and animal service is affected by absence of an overall animal and plant health policy; inadequate resources; limited information; weak organization and management; insufficient monitoring; absence of training programs; and inadequate legislation.

***Agricultural marketing:*** Belize's agricultural marketing system has a *large* number of agents, comprising various farming groups, producer associations, corporate entities, wholesalers and retailers, rural assemblers, truckers and shippers. There is a smaller group of medium- and large-scale farmers who are commercial oriented, producing for both the domestic market and for export.

The system varies in structure and efficiency. It is based on a traditional retail structure, with a large number of small retail outlets, specialized retailers and a few public markets. Most retailers are small, traditional business operators concentrated in Belize City, in small towns and neighborhood areas, carrying a limited range of products. In addition, there are several supermarkets; these are larger, more organized operations located in Belize City and small towns, retailing a variety of food products, a large proportion of which is imported, processed foods.

The market characteristics are also directly related to the profile of producers and the degree of development of the production-marketing system. Based on these, three different marketing systems for agricultural products exist in the country. The most developed is that of traditional products, sold to preferential markets under contractual agreements. This system is characterized by a production system oriented to meet specific market requirements, existence of integration arrangements or contract mechanisms between producers and marketing agents, strict grading standards, financing mechanisms and commercial information.

A second system corresponds to the processed products that are domestically marketed, such as dairy, poultry and beef products. Most marketing activities are done traditionally, without the support of grading and information systems. Fresh meat is sold in neighborhood areas, in small retail outlets and in public markets, while frozen and processed livestock products are marketed in supermarkets and smaller retail outlets. Live cattle and other livestock are wholesaled and retailed mainly in rural markets. The third system is the least developed, and it corresponds to the marketing of basic, locally-consumed non-traditional products, including grains, vegetables, root crops, fruits, meat and fish. A large proportion of these products is distributed through unorganized markets. To a large extent, the characteristics of this system are related to the production system, which is not sufficiently organized and developed to supply stable quantities having a uniform product quality.

Despite some efforts over the years by the government to address various constraints of the marketing system, major problems still remain. Some major constraints are: absence of a comprehensive assessment of the marketing system; limited development of marketing firms; prevalence of a centralized and atomized system; lack of horizontal and vertical integration; limited size of the domestic market; an inadequate information system; inadequate transportation; and a limited role of the public sector.

***Agricultural credit:*** The institutional credit system comprises four commercial banks and the DFC. While the commercial banks make short- to medium-term loans, the latter focuses on medium- to long-term lending. Credit from commercial banks is allocated to more stable and



less risky activities, where repayment periods are relatively shorter, there is virtually no supervision of borrower activities and market interest rates are charged. Most of their credit to the sector has financed traditional export commodities; in 1993, 90% of their agricultural portfolio went into this area. The main recipients of commercial bank credit are large- and medium-scale farmers and commercial enterprises with sound credit ratings. Loans to small farmers are restricted to those producing export crops, where marketing arrangements between producers and processors facilitate direct and prompt repayment.

The DFC provides development financing to the sector, channeling credit to traditional, as well as selected non-traditional production areas and to smaller farmers. In the 1980-93 period, 44% of the DFC's total credit was channelled into agriculture, with the main beneficiaries being the sugar, cattle and dairy and banana sub-sectors. In recent years, a smaller proportion of its total loans went into the sector.

NGOs, producer organizations, and to lesser extent credit unions, also supply agricultural credit. These have partly filled the critical gap left by traditional financial institutions, and are important sources of funding for the small farm sector. Loans are not given directly to farmers but rather through cooperatives and farmer groups. Although the resources available are limited, interest rates are usually lower and they disburse credit more consistent with farmers' requirements compared to formal institutions. Producer organizations such as the BCFA and CGA provide limited, short-term loans to small farmers for the purchase of inputs. In addition, a few processing enterprises such as the Citrus Company of Belize and the Belize Food Products Limited make short and medium-term loans to farmers for inputs, equipment and machinery.

The institutional capability to mobilize and channel funds effectively varies between the credit institutions. Despite the differences, there is potential for them to adequately meet the credit needs of the sector, through greater collaboration and networking. Though they lend mainly to the traditional export sector, commercial banks have the most potential to mobilize domestic resources. Both the NDFB and BEST have a stronger capability to access grant funds, have a low operational cost and they provide smaller-size loans and work in development areas where risks are higher.

The major constraints of the agricultural credit system include: absence of a comprehensive credit policy for sector; limited credit by commercial banks to non-traditional areas; shortage of grant funds and resources from external agencies for on-lending by NGOs; limited accessibility to secure loans, particularly by small farmers; inadequate support services; the prevailing land tenure situation; lack of crop insurance; and absence of a mechanism to coordinate the activities of lending institutions.

***Development potential and strategy:*** Belize's agricultural sector has much potential for development, not only because of the country's natural resources endowment, but also because of the possibilities for increased diversification of production and exports through the exploitation of new market opportunities, developing linkages with other sectors of the economy, and improving production efficiency. To fully exploit these three important sources of growth,

the government will need to do the following: (i) continued sound economic management of the country through the pursuit of appropriate macroeconomic, trade and sectoral policies; (ii) formulation of an agricultural development strategy, identifying the principal policy objectives and measures to be adopted for the sector, and priority areas to be targeted; (iii) improving the system of incentives to attract both local and foreign investment; (iv) increased investments in research and development and transfer of new technology to the sector; (v) investments in support services and basic infrastructure; (vi) human resource development; (vii) improved management of the environment and the natural resource base; and (viii) strengthen the MOA's capabilities to plan, execute, coordinate and monitor sector policies and programs, and provide other support services adequately.

A primary area to be addressed is the design of an agricultural development strategy for the country. Among others, the strategy should assess the long-term potential and outline the role of both the traditional and non-traditional subsectors, the role of public and private sector institutions and identify priority areas for investment and development. Elements of the strategy should include: (i) emphasis on a market-led approach; (ii) the need for a more competitive agriculture (in both the domestic and export markets); (iii) sustainability of agricultural production, the environment and natural resource base; and (iv) inter-sectoral linkages.

The strategy should be a market-led approach, focusing on: (i) improving the country's agricultural competitiveness; and (ii) accelerating agricultural diversification. These two major objectives are complementary and should be pursued within a framework that ensures a more sustainable agricultural sector in the long run. Several factors point to the need for this focus, including: the declining importance and uncertainty of the preferential export markets; the emergence of NAFTA which is likely to affect Belize exports to the North American markets significantly over the medium and longer term; and the implementation of trade policy measures which will likely facilitate cheaper imports.

There are five broad areas in the sector with much development potential. These include the traditional export crops, traditional domestic crops, food security or import substitution products, non-traditional exports and forestry. Belize will continue, at least for the foreseeable future, to depend heavily on the exports of sugar, citrus products and bananas for the major portion of its foreign exchange earnings, and for employment of a significant part of its work force. Long-term planning for the traditional sector is required, and policy objectives should aim to increase productivity, develop and commercialize new end uses for these products, and increase utilization of by-products.

The most important of the traditional domestic crops, particularly from a food security standpoint, are rice, corn and beans. Agricultural policy should support achieving and maintaining domestic self-sufficiency in these crops on a competitive basis, with annual increases in output to meet projected local demand. The food security/import substitution strategy should focus on improved production efficiency of certain vegetables and livestock products, and commercial development of commodities high on the import bill, which could be produced on a competitive basis. In this regard, soybean, peanuts and meat products have much potential.

The development of Belize's agriculture is closely linked to the exploitation of its natural resource base. Therefore, the government's agricultural development strategy should include measures to use and manage natural resources more efficiently, for enhancing the environment and contributing to sustainable agricultural production. The government needs to influence changes in the attitude toward natural resources use - land, forest, water, coastal and marine - by the different sectors. An integrated resource planning and management approach is suggested, taking into consideration the physical resource base and the long-term economic and social needs of the country.



# CHAPTER I

## BACKGROUND

### 1.1 Main Physical Characteristics

Belize<sup>1</sup> is located on the eastern or Caribbean coast of Central America, bounded on the north and northwest by Mexico and on the west by Guatemala. Its land mass includes 450 tiny islands called cays that are located in the inner coastal waters. The area of the mainland and cays is approximately 22,963 km<sup>2</sup> (8,860 miles<sup>2</sup>). The country's greatest length is 280 km. from north to south and its greatest width is 109 km.

There is a low coastal plain, much of it covered with mangrove swamp. Moving inland from the coast, the land rises gradually towards the interior. The most prominent physiographic feature is the Maya Mountains in the south-central part of the country. These mountains and the Cockscomb Range form the backbone of the southern half of the country, the highest point being Victoria Peak (1,128 meters) in the Cockscomb Range. In the west, the Cayo District includes the Mountain Pine Ridge, ranging from 305 meters to around 914 meters above sea level, while the central and northern parts of the coastal plain have considerable areas of flatter land. A large part of the mainland is covered by forests.

There are many rivers, some navigable for short distances by shallow draught vessels. The inner coastal waters are shallow and contain lagoons. These are sheltered by a line of coral reefs, dotted by the cays that extend almost the entire length of the country. Belize's barrier reef is the longest in the northern hemisphere and the second longest in the world. It extends for some 220 km from the Mexican border in the north to Sapodilla Cayes in the south.

The country's climate is sub-tropical, tempered by trade winds. The temperature in coastal areas ranges from about 10°C (50°F) to about 36°C (96°F); inland the range is greater. Rainfall has a unimodal distribution pattern, with most of it occurring from June to December, with an occasional dry spell in August. It varies from an average of 1,300 mm in the north to 4,400 mm in the extreme south.

### 1.2 Political Background

**Belize** achieved full independence on September 21, 1981. It is a sovereign, democratic state, with membership in the British Commonwealth, the United Nations, the Non-Aligned Movement, and the Organization of American States, as well as a member of the Caribbean Community (CARICOM) and related institutions.

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<sup>1</sup> Its former name was British Honduras, which was changed in 1973.

<sup>2</sup> Using an offshore territorial limit of 20 km, the national territory covers about 46,620 km<sup>2</sup>.

The Government of Belize is operated on the principles of parliamentary democracy based on the Westminster system. Her Majesty Queen Elizabeth II is the titular Head of State. She is represented in Belize by a Governor-General, who must be a Belizean. A Prime Minister and a Cabinet make up the Executive branch of government, while a 28-member elected House of Representatives and an eight-member appointed Senate form a bi-cameral legislature. The Cabinet consists of a Prime Minister, other Ministers and Ministers of State. Its members are appointed from the majority party in the House of Representative by the Governor-General, on the advice of the Prime Minister. Five Senators are appointed by the Governor-General on the advice of the Prime Minister, two on the advice of the Leader of the Opposition, and one on the advice of the Belize Advisory Council. The Speaker of the House of Representatives and the President of the Senate are elected either from among the members of these Houses (providing they are not Ministers), or from among persons who are not members of either House.

General elections are usually held at intervals of five years. The minimum voting age is 18. The Prime Minister usually advises the Governor-General to dissolve the National Assembly and determines the date of general elections.

The country is divided into six geographic districts: Belize, Cayo, Corozal, Orange Walk, Stann Creek and Toledo (FIGURE I.1). Except for the Belize and Cayo districts, the others have one major town, each of which is administered by a locally elected town board<sup>3</sup>. Belize City is administered by a nine-member elected City Council, while the villages are governed by locally elected village councils.

The capital of the country is Belmopan, which also is the seat of government<sup>4</sup>. Belmopan is located in the Cayo district and it is situated almost in the geographic center of the country, about 80 km to the southwest of Belize City. It is the principal location for administrative offices and it continues to attract people, mainly government workers relocating to the new capital.

### 1.3 The Economy

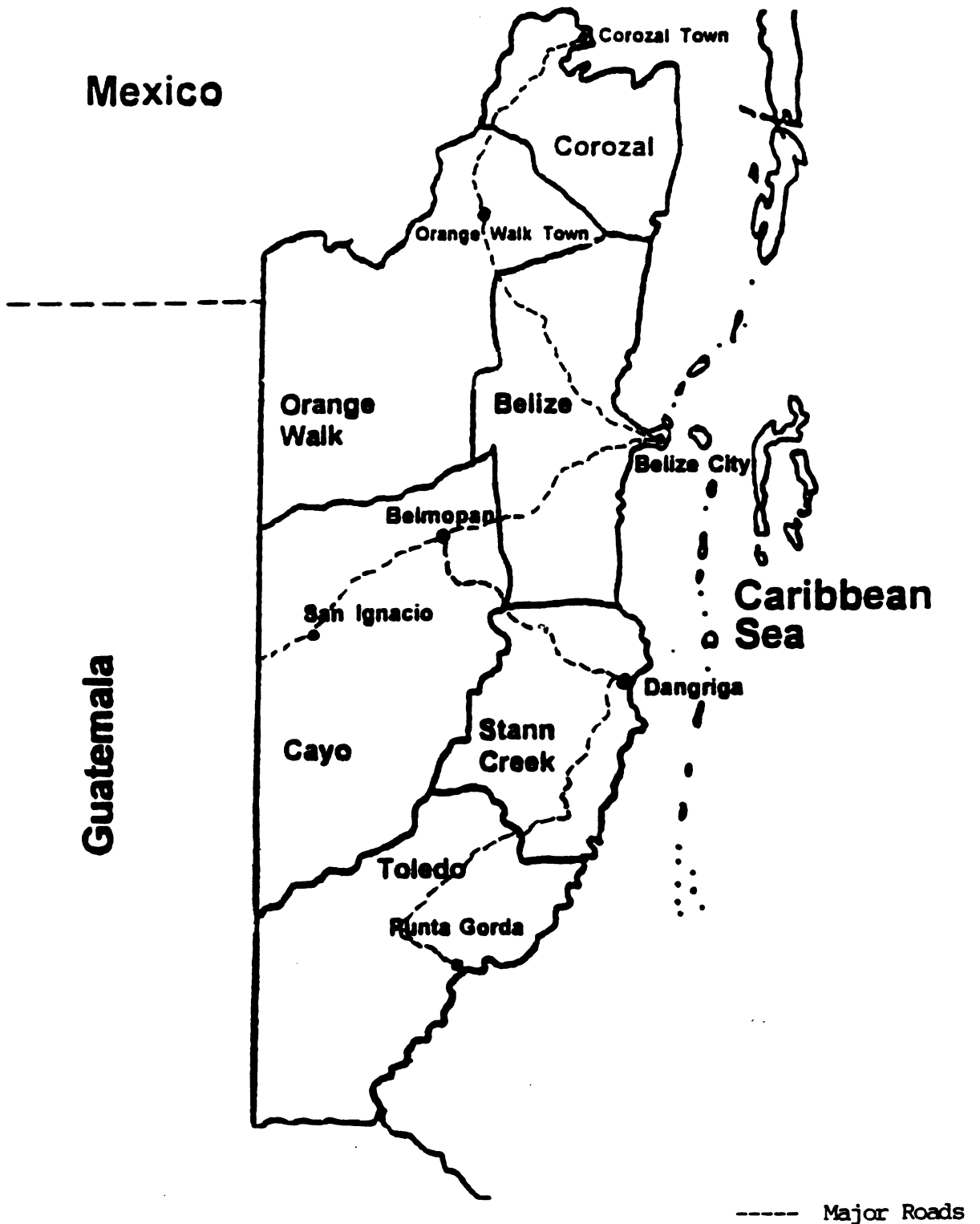
Belize's economy was traditionally based on forestry, mainly the export of logwood, mahogany and chicle. In terms of sectoral contribution to GDP, the economy is now mainly based on services, and to a lesser extent on manufacturing and agriculture. In the 1980-93 period, the services sector accounted for just over one-half of the total GDP, while the secondary sector (including manufacturing) contributed almost 26% and the primary sector 20% (TABLE I.1).

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<sup>3</sup> Belize and Cayo districts have more than one major towns. Every town board in the various districts is headed by a mayor.

<sup>4</sup> Belmopan was built in 1970 following extensive damage to the former capital Belize City by Hurricane Hattie in 1961.

FIGURE I.1  
MAP OF BELIZE WITH ADMINISTRATIVE DISTRICTS



SOURCE: MOA.

TABLE 1.1  
SECTORAL CONTRIBUTION TO GDP, 1980-93 (%)<sup>5</sup>

SECTOR	1980	1984	1988	1993
PRIMARY SECTOR:	20.7	21.1	20.0	20.4
AGRICULTURE	15.3	15.7	13.6	13.0
FORESTRY & LOGGING	2.4	2.0	3.1	2.5
FISHING	2.8	3.0	2.7	3.6
SECONDARY SECTOR:	28.3	26.7	25.9	27.0
MANUFACTURING	21.4	19.6	17.7	15.9
OTHER	6.9	7.1	8.2	11.1
SERVICES	54.6	55.5	58.0	55.9

SOURCE: TABLE A.1.

In the services sector, trade, tourism and public administration are dominant, while in agriculture, the production of sugarcane, citrus, banana, seafood and livestock are the major activities. In the secondary sector, the most important activities are those of manufacturing and construction, but there are also relatively small mining and quarrying operations. The main manufacturing activities include sugarcane and citrus processing, as well as small enterprises for metal doors and windows, furniture, concrete blocks, bricks, clothing, boat building, soft drink bottling, brewing, cigarette manufacture, tyre recapping, flour, animal feed, wire and paper products, wood products, food processing and meat packing.

In recent years, there has been a resurgence in forestry activities and a significant expansion in fishing. Reforestation and natural regeneration of the pine forest (mainly in the Cayo, Stann Creek and Toledo districts) and artificial regeneration of fast-growing tropical hardwood species are in progress. Lobster, conch and shrimp catches have increased steadily since 1985, due to growing demands of the tourism sector and favorable export prices.

Tourism has expanded significantly in recent years. Between 1987 and 1991, the number of tourist arrivals almost doubled, with the USA being the primary source. The country's large barrier reef and network of lagoons, caves on land and in the sea, a wide variety of animals, bird species and colorful flora, over 600 Maya ruins, many rivers and the harmonious multi-racial society are the main factors attracting tourists. Partly due to the buoyancy in the tourist sector, airport facilities were upgraded and sizeable investments were made in hotels in both Belize City and the cays.

#### 1.4 Population and Labor Force

Belize has the lowest population density in Central America and one of the lowest in the world. According to a mid-year estimate in 1993, the country's population was 205,000, with

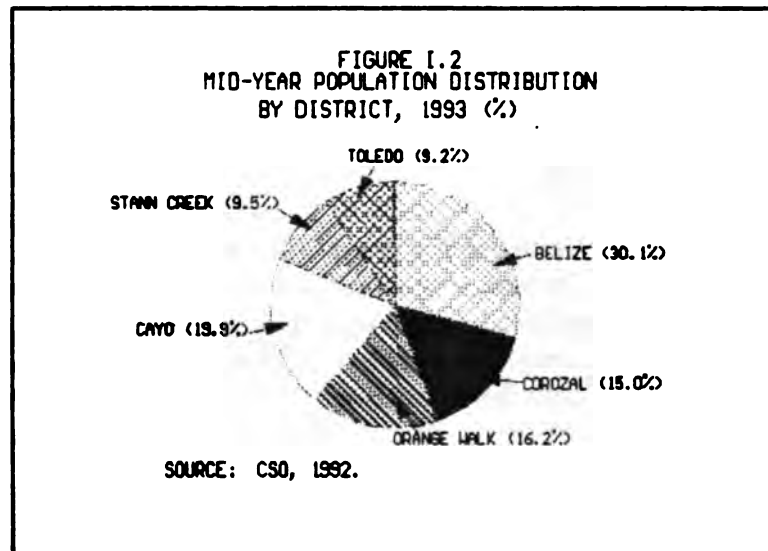
<sup>5</sup> The total in each column exceeds 100% because it includes the imputed bank service charges.



a density of about nine persons per square kilometer<sup>6</sup>. The average growth rate was higher in the 1980-93 period (3.1%/year), as compared to 2.2% in the 1970-80 period. Approximately 46% of the population was urban and 54% was rural. The population was almost equally divided between males and females, the latter slightly lower. Almost 44% of the population was less than 15 years of age and one-half was in the working age group (15-65 years).

Belize's population is multi-racial, the main ethnic groups being mestizo (Spanish-Maya), creole (of African descent) and garifuna (African-Caribbean descent). According to the 1991 population census, these groups comprised approximately 44%, 30% and 7%, respectively, of the total population. There are also people of Spanish and East Indian descent, a small Mennonite community of European origin, and a group of inter-racial mixture. The multi-racial composition of the Belizean society also includes Chinese, Arabs and refugees from other Central American countries who have settled in the country<sup>7</sup>. As a result of the country's multi-racial society, several languages are spoken, including English, Spanish, Garifuna and Maya.

In 1993, the Belize district had the largest proportion of the population (30%); almost 20% resided in the Cayo district, 16% in Orange Walk, and 15% in the Corozal district (FIGURE I.2). In the 1980-93 period, the Cayo district experienced the highest growth in population, followed by the Belize and Stann Creek districts, respectively.



Migration (both emigration and immigration) has been an important factor affecting the country's population growth in the last three decades, with most emigrants going to North

<sup>6</sup> CSO 1993.

<sup>7</sup> Presently, the number of documented refugees is estimated to be 10,000 persons from El Salvador, Guatemala, Nicaragua and Honduras. However, estimates of the total are higher. The number of displaced persons who came to Belize from these countries in the last decade is estimated at 20,000 to 50,000 (Woods et al. 1993).

America<sup>8</sup>. According to the last census, most emigrants (54%) in recent years were in the 15-24 age group. Furthermore, most were from urban areas and fairly well educated (reached primary, secondary and post-secondary levels)<sup>9</sup>. Parallel to emigration, the country has also attracted a large number of immigrants, particularly from other Central American countries. In 1991, the foreign-born population was 25,548 or about 14% of the total population. This was almost twice that of 1980, which was 12,403, or about 9% of the population.

In the last two decades, Belize's employment situation has experienced a gradual change, primarily due to migration (both internal and external), changes in the economic structure and declining fertility. The working age population increased from under 50% in 1970 and 1980 to 54% in 1993, while female participation in the labor force almost doubled (TABLE A.2). Compared with the 1980s, when unemployment was between 14% and 16%, it declined to nearly 10% in 1993, with female unemployment (14.7%) almost doubling that of males (7.5%)<sup>10</sup>. Unemployment among youths remained high, averaging 24% in 1993. The gender distribution for this group was similar to the national situation: unemployment among young females was almost twice as high (36%) as that of males (19%).

Regarding sectoral contribution to employment, the service and agriculture sectors are the most important. In 1993, the service sector accounted for 54% of total employment, with the government employing 18% and the wholesale and retail (16%). The agricultural sector (including fishing and forestry) employed 26%, similar to the level recorded in the 1970s and 1980s. The manufacturing sector accounted for 12%, while one-quarter (21%) of employed persons were self-employed.

## 1.5 Infrastructure

Belize has five major highways: (i) the Northern Highway connecting Belize City with Orange Walk and Corozal towns and to Chetumal on the Mexican border; (ii) the Western Highway, connecting Belize City with Belmopan and continuing to Santa Elena/San Ignacio and Benque Viejo del Carmen, then to the border with Guatemala; (iii) the Southern highway linking Stann Creek and Toledo districts; (iv) the Hummingbird highway that links Cayo with the Stann Creek district; and (v) the Coastal highway linking Belize City to Dangriga.

All principal towns and villages are linked by roads to Belmopan and Belize City, and there are regular bus services that operate between the main towns. There are also secondary and access roads that link settlements and production areas, but many of these, particularly the latter, are in poor condition during rainy season.

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<sup>8</sup> It is estimated that between 40,000 and 50,000 Belizeans have settled in the USA.

<sup>9</sup> In 1991, Belize's adult literacy rate was approximately 70%. This is considered to be lower than the rate of previous years.

<sup>10</sup> Other data suggest that, because of high underemployment and the large subsistence sector in Belize, the overall unemployment rate is closer to double digit level.

The main airport and shipping port of Belize are located in Belize City. The airport is adequate for the country's air traffic needs, but its shipping port can only accommodate small vessels with less than 17 feet draught. There is also a smaller port at Big Creek in the southeastern part of the country, used mainly for shipping bananas for export.

## CHAPTER II

### ECONOMIC AND AGRICULTURAL POLICIES

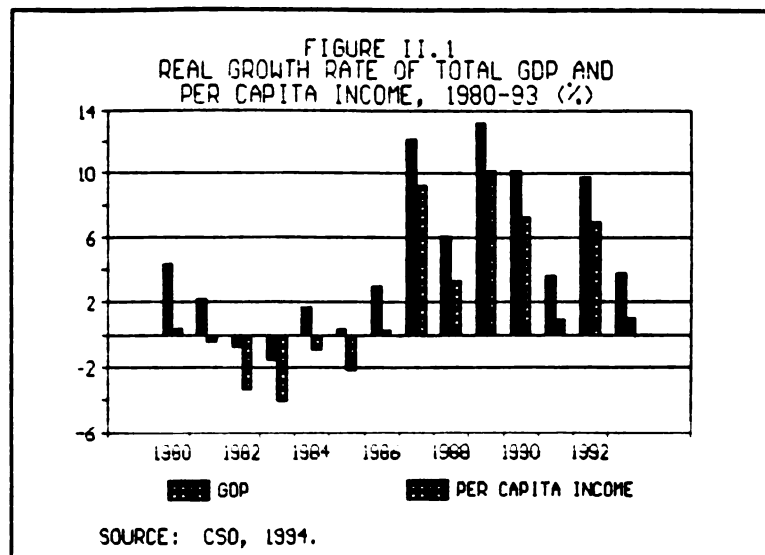
#### 2.1 Economic Policies and Performance

Belize has a small, highly open agricultural-based economy similar to that of many countries in the English-speaking Caribbean. Since 1980, the government's development strategies have focused on, among other things: (i) achieving a reasonably high growth rate; (ii) diversification of the economic base (away from sugar) by expanding production of other agricultural commodities, manufacturing activities and tourism; (iii) expansion of food production; (iv) job creation; (v) expanding private sector-led growth; (vi) improving the competitiveness of the economy; and (vii) more efficient management and utilization of the resource base. The major thrust of the development strategy has been to promote export-led growth through diversification of the production base.

Compared to most Caribbean countries, the overall growth of the Belize's economy in the 1980-93 period has been significant, averaging about 5.2% per year. Moreover, the key indicators of economic performance also reflected a healthy economy during that period (TABLE A.3). Except for a few years in the early 1980s, the indicators showed positive real growth rates of both GDP and per capita income, low inflation rates, a fairly stable real effective exchange rate, and a steady upward trend in both capital formation and the level of foreign reserves. However, in 1993, the economy expanded at a slower rate than the previous year, visible exports declined, and credit to the government by the Central Bank increased significantly, contributing to a large decline in foreign reserves.

Although economic growth in the 1980-93 period was generally significant, its trend was cyclical (FIGURE II.1). The period could be divided into two main sub-periods: 1980-86 and 1987-93. In the first, growth was marginal, averaging 1.3% per year, while real per capita income fell by an annual average of 1.5%. In the second, the country's economic performance improved significantly; the average growth rate in GDP was 8.4% and that of per capita income was almost 6% per year.

In the 1980-86 period, the decline of sugar prices was the major factor contributing to low economic performance. This was worsened by an inappropriate government policy response that focused on expansionary demand policies, resulting in a worsening of domestic imbalances. The overall impact of these policies was: (i) a high total consumption, averaging 91% per year; and (ii) a decline in gross investment of almost 15% in the period, with private investment declining steadily between 1981 and 1986.



In 1984, the Government of Belize (GOB) implemented a stabilization program to correct the major imbalances in the economy. The program focused on improving the efficiency of the economy and the public sector, through measures which emphasized fiscal restraint, increased taxes, a tighter monetary policy, institutional reform and privatization. Since 1986, these measures facilitated higher growth, lower inflation rates (compared to the 1980-86 period), and steady growth in gross capital formation, private investment and foreign reserves<sup>11</sup>.

The strong performance of the economy since 1987 also resulted from a rapid structural change and successful implementation of the government's development strategy. The major thrust of the strategy was agricultural diversification and exports (away from sugar) and greater emphasis on the production of bananas, citrus, cocoa, marine products, other non-traditional agricultural products, garment manufacturing and tourism development. The high GDP growth rate, and expansion of the agricultural sector (including non-traditional products), manufacturing and tourism during this period are indicative of the successful impact of the government's policies.

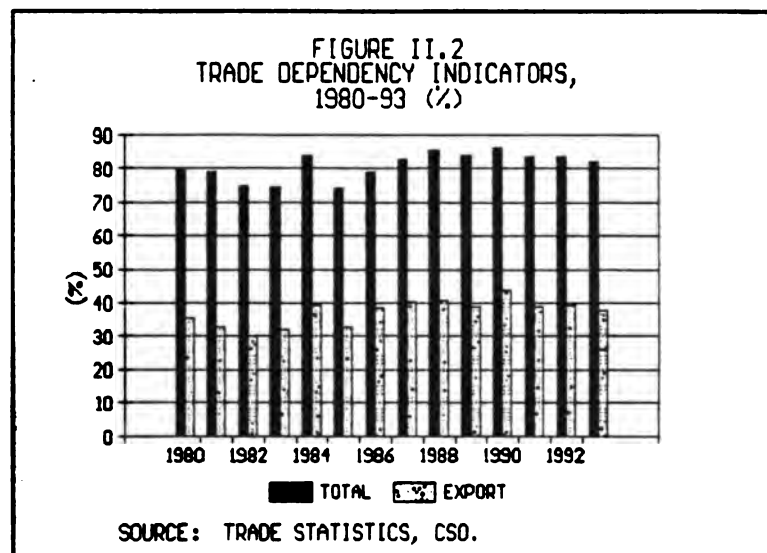
In 1990, the growth rate of GDP declined by 3% from its 1989 level. In response to this decline, the government eased credit restrictions in 1991, particularly to the private sector, which contributed to the economy expanding by almost 10% in 1992. The GOB continued its economic reform program by privatizing the telecommunications company, the banana-marketing organization, followed by formation of the Belize Electricity Ltd. in 1992 to replace the Belize Electricity Board. It also implemented measures to organize a domestic capital market, first within the Central Bank, and subsequently as an independent market for private domestic savings mobilization and investment in debt and equity issues.

<sup>11</sup> In the 1987-92 period, real private investment averaged more than BZ\$100 million/year compared to only BZ\$ 54 million in the 1980-86 period, while foreign reserves steadily increased to more than BZ\$100 million for the first time.

Furthermore, as part of the process of structural change towards a more open, competitive economy, the GOB took steps in recent years to gradually reduce its dependence on external trade taxes for revenue, and to rely more on domestic taxation. The policy measures adopted included: (i) implementation of CARICOM's Common External Tariff (CET), which will lower import tariffs over time; (ii) reducing the corporate tax rate in 1992 from 45% to 30%, to streamline the tax system and encourage greater compliance; (iii) designating the country's first two export processing zones to support the export-led strategy; and (iv) strengthening hemispheric ties by joining the Organization of American States (OAS), the Inter-American Development Bank (IDB), the Inter-American Institute for Cooperation on Agriculture (IICA), and several sub-regional organizations that will increase the country's access to development financing, external technical cooperation and strengthen its ties to Central America and Mexico. In addition, the government has proposed the use of a value-added tax (VAT) as part of its tax reform program<sup>12</sup>.

### 2.1.1 External Trade

Belize's economy has been and remains heavily dependent on external trade. It is vulnerable to external shocks because of its dependence on a narrow range of exports - sugar, citrus concentrates and bananas. Between 1980 and 1993, the share of exports of goods and non-factor services (NFS) in total GDP ranged between 70% and 94%, while the proportion of imports and NFS varied between 80% and 110% of national income. The dependency on trade is also reflected in the country having a high trade dependency indicator (TDI), ranging between 74% and 86%, and the impact of exports on changes of the TDI (Figure II.2)<sup>13</sup>.



<sup>12</sup> The proposed VAT is part of the GOB's medium term economic strategy; it hopes to implement the VAT in 1996.

<sup>13</sup> The total TDI is expressed as a ratio:  $(TRD/(E + Tr))$ . TRD is the total value of exports and imports of goods and services, and  $(E + Tr)$  is GDP plus the value of imports of goods and services. The trade dependency indicator for exports is  $X/(E + Tr)$ , where X represents the value of exports of goods and services.

Much of Belize's exports of goods is done under preferential trade agreements with the European Community (EC), the United States (USA) and the Caribbean Community (CARICOM). The main products exported to the preferential markets include sugar, bananas, citrus and garments. Sugar and bananas are exported to the EC market under the EC-ACP Lome agreement<sup>14</sup>. Sugar is exported to the USA also under a sugar quota arrangement, while citrus concentrates and garments are exported to the same market under the Caribbean Basin Initiative (CBI) arrangement<sup>15</sup>. In recent years, Belize's molasses has been exported to Jamaica for the production of ethanol, which is then exported to the USA under the CBI. Being a member of CARICOM, Belize has preferential access also to the markets of CARICOM-member states.

Belize has benefitted greatly from the various preferential markets, particularly those of the EC and the USA. While these trade agreements may result in distortions and resource misallocation from a global efficiency perspective, they make a significant contribution to the country's income, employment and foreign exchange earnings. Between 1985-93, total exports of sugar, bananas, citrus concentrates and garments to these markets accounted for an average of almost 88% of total domestic exports per year, and contributed approximately 29% to GDP. Furthermore, due to the differences between the world prices and those obtained in the preferential markets for sugar and bananas, the annual benefits of exporting to these markets contributed between 5% and 10% per year to GDP in the 1980-92 period. In 1990, employment in the sugar, citrus and banana sub-sectors accounted for almost 60% of total employment in agriculture, and approximately 28% of the labor force. Exports to the CARICOM market were relatively small in the same period, averaging about 8% of total exports. Food products including shrimp, beans and citrus concentrate accounted for almost 85% of the total value of exports to the CARICOM region.

Belize's trade policy measures included the use of import and export licenses<sup>16</sup>. Presently, most imports that require licensing have total import taxes of either 44% or 59% (14% stamp duty, plus 30% or 45% duty). Some licensed goods (flour and beans) are also subject to price controls.

Import licenses are required for 26 items, including 16 that are agriculture-based (TABLE A.4)<sup>17</sup>. Most of the agricultural products subject to this requirement are import substitutes and some are competitive exports, such as molasses and sugar, citrus and pepper sauce. The operation of the licensing system depends on the particular commodities covered.

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<sup>14</sup> Belize's exports of sugar and bananas go mainly to the United Kingdom under this agreement.

<sup>15</sup> Garments are re-exported to the USA under the 807 agreement, in which a duty is paid on the value-added in Belize.

<sup>16</sup> A comprehensive discussion of the import licensing system has been done by Hood 1994.

<sup>17</sup> The number of items requiring an import license was reduced from 48 in 1986. Since 1987, those that no longer require a license included rice and disinfectants. The Belize Marketing Board has a monopoly on rice imports.

In some cases, import licenses are granted when there is a scarcity of important items in the domestic market (such as beans and poultry). In other cases, licenses are issued on a very restricted basis (such as for flour, meats, citrus and citrus products).

Export licenses are required for several commodities including wood products, fish, sugar, wild animals, plants, spices and seeds. The tariff includes specific charges, as well as those ranging from 5% to 25% ad valorem<sup>18</sup>. While the main objective of these licenses is to generate revenue, some were implemented to limit exports of forestry and fish products for conservation purposes.

In recent years, the GOB has moved towards implementation of favorable trade policies to encourage exports and diversification. The country adopted the Common External Tariff (CET) as part of an overall effort to harmonize the external tariff of CARICOM. Implementation of the CET will be done on a phased basis, and it is expected to eliminate the stamp tax, reduce the maximum import tariffs to 45% initially, and subsequently in steps to 20% by the year 2000<sup>19</sup>. The implications of the CET on tariff rates will vary among different products.

According to the World Bank, implementation of the CET will result in an increase in some tariff rates, particularly for import substitutes such as food products (TABLE II.1). In addition, rates are likely to decrease for some products, especially non-foods such as machinery and equipment, while others are likely to remain high (such as for furniture, dried fish, flour and macaroni). As a result, the protective effect of the CET will not be minimal, since it is likely to result in a shift in raising revenue away from capital goods to import substitutes. For example, revenue from import duties on animal products is expected to increase by 114%, while that from machinery is expected to decrease by 27%<sup>20</sup>. Furthermore, the rates will give increased protection for animal and vegetable products, edible fats, prepared foods, plastics and chemicals. Belize has also implemented stamp duties (12%), and a revenue replacement duty which is not likely to be affected by the CET. However, the overall likely impact of these measures will be higher increased rates of effective protection on import substitutes, particularly on processed foods.

Besides foreign exchange earnings, Belize depends heavily on international trade for government revenue. Between 1980 and 1992, taxes (import and export duties, stamp duties, etc.) on international transactions averaged almost one-half of the total central government revenue, with import duties alone contributing nearly 39%. Therefore, the adoption of trade liberalization measures are likely to affect government revenue, as well shifting the incidence

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<sup>18</sup> Some exports to CARICOM countries are not subject to export tariffs.

<sup>19</sup> The Ministry of Finance estimates suggest that the net effect of the CET on revenue will be marginal, increasing between 1% to 2%.

<sup>20</sup> World Bank 1992.



of taxes. For example, changes in Belize's tariff rates that result in a reduction in trade taxes would require that taxes be raised elsewhere if the level of revenue is to be maintained..

TABLE II.1  
CHANGES IN THE DUTY RATES ON SELECTED IMPORT  
SUBSTITUTE PRODUCTS DUE TO THE CET (%)

PRODUCT	OLD RATE	NEW RATE
DRIED FISH	0	45
BUTTER	5	10
CEREAL FLOURS (WHEAT)	10	45
LARD	1	10
SAUSAGE	15	45
MACARONI	30	45
POULTRY FEED	0	30
CANDLES	10	45
CHOCOLATE	65	45
LAUNDRY BLUE	45	10
PAINT	60	10
BAY RUM	70	45
LEATHER	15	5
FURNITURE	60	30
PAPER BAGS	35	30

SOURCE: WORLD BANK 1992.

Currently, Belize's tariff rates are much higher than those of most Latin American countries. The unweighted mean tariff for Belize is approximately 25% (excluding stamp duties), while those of other Latin American countries average about 16% (5% to 25% including surcharges)<sup>21</sup>.

## 2.2 Agricultural Policies

Since 1980, the GOB outlined the country's agricultural policy in three main documents: the Agricultural Development Plan of 1982-84; the Five-Year Macro Economic Plan, 1985-89; and the 1990-94 Development Plan. Despite changes in political administrations, the overall policy varied very little in the 1980-94 period. In summary, Belize's agricultural policy aimed at "providing consumers with a wholesome and safe diet at reasonable prices, and having an environment within which an efficient and dynamic agriculture can provide for domestic food needs and larger foreign exchange earnings."<sup>22</sup> It emphasized a market-led approach that would contribute to: (i) greater efficiency in resource allocation in the long run; (ii) minimizing sharp fluctuations in market prices and reducing investment risks and uncertainty in the sector; (iii) promoting specific commodities for which there are identified and growing markets; (iv) achieving a higher level of self-sufficiency in food production; (v) reducing financial outlays of the government on the sector; (vi) expanding inter-sectoral linkages; and (vii) increasing the country's competitiveness in regional (CARICOM) and extra-regional markets.

<sup>21</sup> Economic reform measures in many Latin American countries have resulted in a reduction of their tariff rates and partial, if not total elimination of quantitative restrictions. The high rate of border taxation in Belize has induced smuggling from the neighboring countries of Mexico and Guatemala.

<sup>22</sup> Ministry of Economic Planning 1985.

A set of specific commodities were targeted for development, including citrus, banana, rice, corn, beans, cocoa, marine products, fruits and processed agricultural products<sup>23</sup>. The strategy for developing these products focused on the following major areas: (i) providing support to the sector through credit, research, and improving plant and animal health facilities; (ii) strengthening the technology adaptation and transfer system; (iii) improving the marketing system and generation of market information; (iv) implementing a price stabilization program through the Belize Marketing Board (BMB); (v) greater collaboration of the Ministry of Agriculture (MOA) with other public and private sector institutions and non-government organizations (NGOs) involved in agricultural production, distribution and export activities; (vi) improving infrastructure to facilitate movement of products and inputs; and (vii) facilitating human resource development in the sector.

The GOB adopted a range of programs and policy measures (both macroeconomic and sector-specific) to achieve the objectives of its agricultural policy. The most important of the sector-specific measures were those related to marketing and price stabilization, price controls, import licensing, regulation, and policy support to specific areas through various public sector institutions and development concessions.

In the area of marketing, the basic objective of the GOB's policy has been to reduce costs and increase market efficiency through greater competition, improvement in storage facilities, and improved distribution, infrastructural facilities and information. Besides the constraint of a small domestic market, the GOB's policy also focused on reducing the large price fluctuations, due to gluts and shortages, and low competition in both the factor and product markets.

The main marketing policy instrument was a purchase and storage program, aimed at stabilizing domestic grain prices, mainly rice<sup>24</sup>. This program has been administered through the Belize Marketing Board (BMB), and was designed to make the government a buyer of last resort. Rice paddy was purchased (processed and stored) at a pre-announced reservation price that provided a minimum guarantee price to farmers. Moreover, this policy was complemented by making the BMB the only approved importer of rice, to complement production shortfalls and to stabilize domestic consumer prices. A ceiling price for rice was also established at the retail level.

To support domestic production, a combination of import licenses and price controls were applied on a range of commodities. Import licenses were granted when there were production shortfalls of basic foods (such as rice and red kidney beans). Price controls were applied on several products at both the wholesale and retail levels (including locally-produced goods), in

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<sup>23</sup> For perishable products such as fruits, vegetables, meat, seafood and dairy products, the policy focused on expanding linkages to processing activities.

<sup>24</sup> In previous years, both corn and red kidney beans were purchased by the BMB.

the form of a maximum mark-up over the landed cost or wholesale price<sup>25</sup>. These controls were linked to the import licensing system, so as to prevent monopolistic profits on those commodities subjected to import licenses. In recent years, the number of products subject to price controls were reduced. Presently, eight imported basic food products are subject to price controls (including cheese, powdered milk, cooking oil and rice), while locally-produced foods having controls include beer, rice, flour, fish, sugar and bread.

The government's policy measures of price stabilization, price controls and import licensing were designed mainly to expand domestic production of basic foods. For example, rice and beans are critical staples in the Belizean diet, and the policy measures targeted these for expanded production. In the case of beans, the measures provided a production advantage to red kidney beans (due to popularity), as compared to blackeye and pinto beans.

In addition to focusing on specific commodities, the GOB's policy measures were aimed at influencing production of various groups in the sector, such as targeting small farmers for the local market, and a small number of larger farmers producing for the export market. The BMB's policies, together with price control and import licensing measures, are likely to have had a greater impact on the former group, while general macroeconomic and trade policies are likely to have affected the latter.

The GOB also implemented specific measures through its regulatory framework. These targeted mainly export activities such as sugar, citrus, bananas and marine products. Production, pricing, marketing and other aspects have been regulated by bodies such as the Sugar Control Board, Banana Control Board, and Citrus Control Board. With regard to marine products, regulations were implemented to protect depletion of fish stocks, by limiting the fishing season as well as the catch of certain species.

The sugar industry has remained a highly regulated entity because of its critical role in the economy. The Sugar Industry Control Ordinance of 1959 established the Belize Sugar Board, with control over licensing and delivery of quotas. The Ordinance (revised in 1980) also gives the Minister (of Trade and Industry) having responsibility for the industry, the powers to regulate sugarcane production and sales, as well as the manufacture and sale of sugar. Sugarcane prices are negotiated by the Belize Cane Farmers Association (BCFA) on behalf of farmers.

In general, the GOB's policy favored sugarcane production by small farmers on their own land and to provide a fair price for their product. The pricing formula gave farmers 65% of the gross proceeds received for the sale of all sugar and molasses, minus expenses such as ocean freight, insurance, commissions and stevedoring. The policy was also directed to maintaining Belize's share in the EEC and US quota markets.

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<sup>25</sup>

The retail prices for locally-produced goods are often specified.

Support was also provided to expand diversification of the production base and increased exports of non-trationals. Credit, extension, research (such as the Toledo Research and Development Project), improved seeds, land development and machinery services were provided to support rice production. For bananas, citrus, cocoa and shrimp production, the GOB privatized the banana industry and actively pursued external funding to finance the expansion of these commodities. Support was given to institutions such as the Development Finance Corporation (for financing agriculture), Belize Investment Export Promotion Unit (BEIPU), and the Belize Agribusiness Company (BABCO) to facilitate diversification activities. In addition, concessions were granted to certain imported products free of import and stamp duties, and to individuals and companies to invest in areas that contribute to the sector's diversification and exports.

### 2.2.1 Major Policy Impacts on Agriculture

In the 1980-93 period, Belize's agricultural sector (including fishing and forestry) expanded above the average of that of most countries in the region, achieving a real growth rate of 4.7% per year (TABLE II.2). With the exception of negative growth in two years (1983 and 1986), positive growth was recorded in every year in the period. All the subsectors also recorded good growth: crops (3.6% per year); livestock (8.4%); fishing (6.2%); and forestry (8.6%). The sector's share in GDP and export earnings remained relatively stable over the period, averaging 21% and 78% respectively, per year. In 1993, the sector's growth slowed to 1.6%, and it contributed 19.2% to total GDP and 72.4% to export earnings.

TABLE II.2  
AGRICULTURAL GDP: CONTRIBUTION TO TOTAL GDP AND EXPORTS  
AND REAL GROWTH RATES, 1980-93 (%)

CONTRIBUTION	PERIODS		
	1980-86	1987-93	1980-93
AGRICULTURE'S SHARE IN GDP	22.8	19.3	21.1
AGRICULTURE'S SHARE IN EXPORT EARNINGS	77.0	78.2	77.6
REAL GROWTH RATE OF AG. GDP PER YEAR	0.7	8.5	4.7

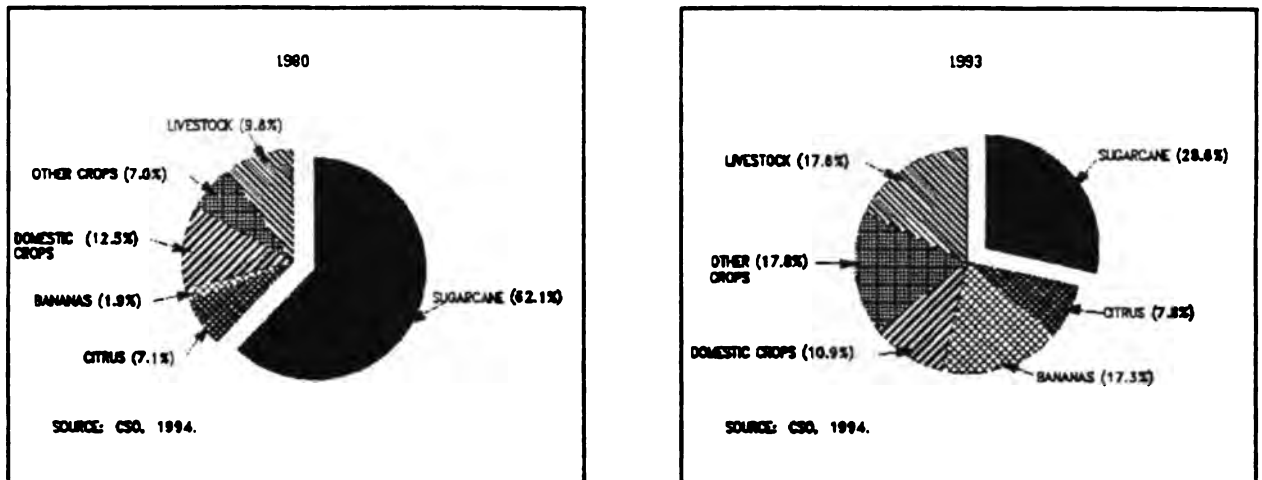
SOURCE: CSO 1994.

One of the major impacts of both economic and agricultural policies was on the structure of the agricultural sector. Although the sector has maintained its share in national output, the composition of agricultural GDP reflected an increasing importance of the non-sugar subsectors in the economy. In 1980, the total value-added contribution by agriculture (crops and livestock) to GDP was BZ\$78.5 million<sup>26</sup>. Sugarcane production contributed 62%; domestic crops (corn, rice and RK beans) 12%; livestock about 10%; and citrus and other crops about 7% each (FIGURE II.3). In 1993, BZ\$127.6 million was the value-added contribution by agriculture, with sugarcane accounting for 29%, and livestock, other crops and bananas increased to just

<sup>26</sup> Value-added in factor prices represents the contribution to the factors of production (gross output plus subsidies less purchases from other sectors).

over 17% each. Regarding exports, the sugar sub-sector contributed nearly 75% to total agricultural exports in 1980; its contribution in 1993 was only 50%. The growth of non-sugar agricultural production in this period largely reflected the success of the government's strategy to diversify the agricultural production base.

**FIGURE II.3**  
**COMPOSITION OF TOTAL VALUE-ADDED IN AGRICULTURE,**  
**1980 AND 1993 (%)**



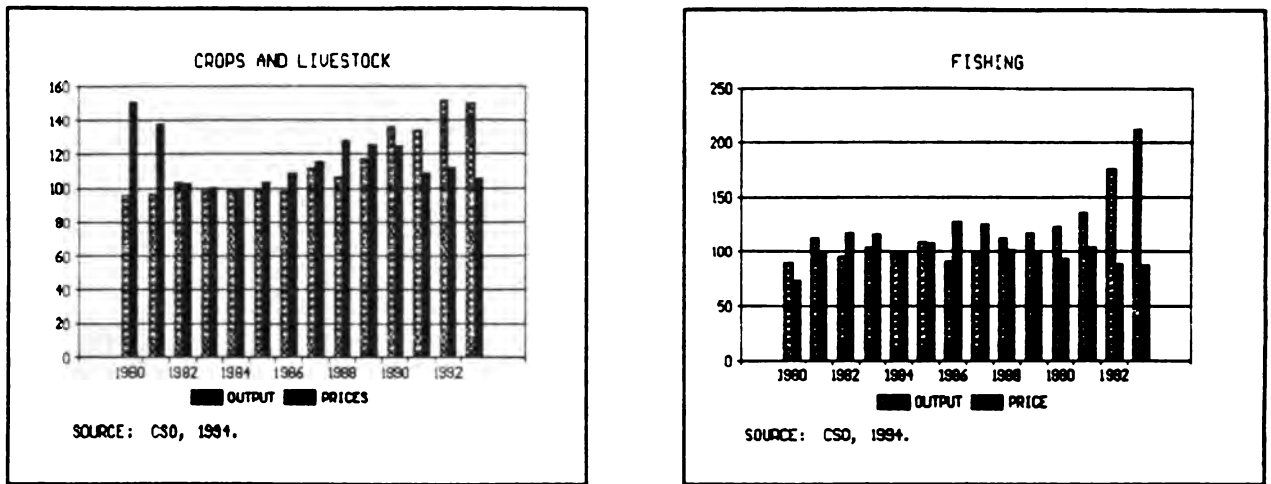
The performance of the agricultural sector indicates two distinct trends in the 1980-93 period, the first from 1980-86 and the second from 1987 to 1993. In the first period, total agricultural output was almost stagnant, averaging only 0.7% per year; in the second, output recorded a significant upward trend, with growth averaging 8.5% per year (TABLE II.2). The trend in the growth of real output of the other subsectors in these periods was similar to that of the overall agricultural sector.

To assess the sector's performance since 1980, it is necessary to look at those factors which have contributed to changes in the output trend during the period. In the 1980-86 period, the sector's poor performance resulted mainly from a deterioration in the domestic terms of trade of agriculture vis-a-vis the rest of the economy, i.e., a decline in the real prices of agricultural output<sup>27</sup>. In the case of the crop and livestock subsectors, the real price level stagnated, while the output level declined significantly, before improving (FIGURE II.4). The decline in real prices for the crops subsector was steeper compared to that of livestock during this period. In the 1987-93 period, output continued to trend upwards, but real prices declined.

<sup>27</sup>

Real prices of agricultural goods is a ratio of the implicit price deflator of agricultural output to the implicit price deflator of GDP.

**FIGURE II.4**  
**INDICES OF REAL PRICES AND OUTPUT FOR THE CROPS AND LIVESTOCK**  
**AND FISHING SUBSECTORS, 1980-93 (1984 = 100)**



The trend in real prices for the fishing and forestry subsectors was not similar to that for crops and livestock. In the case of fishing, the real price and output levels exhibited a cyclical trend to 1986; since then, the price level steadily declined, while the output level increased significantly (FIGURE II.4). With regard to the forestry subsector, both price and output declined up to 1986; afterwards, output accelerated, while the price remained almost the same as the 1984 level.

Comparing the real price trend of agricultural exportables relative to that of import substitutes, the price of exportables declined more in the first half of the 1980s. In the second half of the decade, although both groups of products recorded a positive trend in real prices, that of exportables increased faster, averaging about 8% per year compared to 2% per year for import substitutes<sup>28</sup>. The growth of the agricultural export subsector in this period was largely due to: (i) an expansion in sugarcane output, which resulted from replanting of smut-resistant varieties and higher profitability in production; and (ii) the significant growth in banana and citrus production, which almost doubled.

The expansion of the agricultural sector since 1980 indicated a significance response in the sector's output to changes in higher real prices. This was complemented by the country's resource endowment, particularly land, which facilitated increased production. The World Bank estimated that average productivity increased by approximately 2% per year in the 1980-90 period<sup>29</sup>. Although the export and import substitution subsectors experienced higher real prices,

<sup>28</sup> World Bank 1992.

<sup>29</sup> World Bank 1992. The Bank estimated the short-run elasticity for aggregate agricultural output to be 0.25, while the short-run price elasticity of supply was estimated to be 0.50. Higher productivity resulted from a combination of improved technology and expansion in the area cultivated.

both were able to expand without a significant competition for resources. The abundance of land facilitated part of the expansion in the output of both subsectors. In the second half of the 1980s, the total cultivated area grew by nearly 40%, while that of the export subsector increased by about 60%. In addition, the availability of additional labor in the export sector, particularly migrant workers and refugees from neighboring Central American countries, did not affect labor supply for other production activities in agriculture or the economy.

Despite the significant growth of the economy, food prices in Belize increased relatively slowly in the 1980-92 period, compared to some Caribbean countries and the USA (TABLE A.5). This was largely due to good economic management, and the productive capacity of the country to respond to higher prices and market opportunities.

As indicated, the government has been granting development concessions for investment in various sector of the economy. Between 1990 and 1993, approximately 133 companies, with a total capital outlay of nearly BZ\$ 500 million, were granted approval by the Ministry of Economic Development (MED) for investment in various areas in agriculture. In recent years, granting concessions to such companies involved a revenue loss (from import and stamp duties, etc.) by the government, averaging just over BZ \$2.0 million annually in the agricultural sector (TABLE A.6)<sup>30</sup>. A large proportion of the government's revenue loss was from investment in banana and citrus production.

### 2.3 Major Policy Issues

The agricultural sector has been the major source of economic growth in Belize. Since 1980, the sector's significant expansion resulted from a combination of three main sets of factors: (i) higher prices for agricultural exports due to preferential marketing arrangements; (ii) good economic policies and management of the economy; and (iii) an adequate endowment of resources. Any changes to these factors in the future are likely to have significant implications for growth, employment and foreign exchange earnings.

A major challenge to the GOB is to sustain the growth levels of both the economy and the agricultural sector experienced in the last decade. However, due to the country's heavy dependence on external trade, the country's single most important challenge will be to become competitive in external markets. This should be consistent with the country's efforts to achieve important development goals, such as low rates of inflation and unemployment, diversification of the economy and the agricultural sector, expansion in food supply and conservation of the natural resource base and the environment. However, several critical policy issues will need to be addressed if the past growth performance and these goals are to be realized.

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<sup>30</sup> This loss may be only in the short-run, since the potential impact of these activities in the longer run could be significant.

**(a) Uncertainty of the preferential markets:** More than one-half of Belize's foreign exchange earnings are obtained from agricultural exports (sugar, bananas and citrus concentrates) to preferential markets. The major issue facing the country is the uncertainty of continued access to these markets in the future, particularly those of the USA and the EC for sugar and bananas, respectively. Belize has already experienced a decline of nearly 50% in its sugar quota between 1984 and 1993 in the USA market (TABLE A.7), while the emergence of the single EC market augurs future uncertainty for bananas<sup>31</sup>. Although preferential access to the UK market for bananas seems assured in the medium term, the possibility that cheaper "dollar" bananas could be exported to the EC market is a serious long-term challenge for Belize.

Although a loss of all the preferential markets for Belize's exports is not expected to occur soon, the economy can be severely affected if there is a complete termination of the trading arrangements<sup>32</sup>. If the markets are lost in the short run, the World Bank estimated that the weighted average price of the three agricultural exports would decline by about 35%; the value of total value of agricultural exports would decline by 48%, or the total value of goods exported would fall by 36%<sup>33</sup>. It also estimated the consequences of a phasing out of the trading agreements over a five- to ten-year period in different scenarios. If the three commodities are phased out over an eight-year period, the estimated effect would be a decline in price and output of 4% and 2% per year respectively (TABLE A.8). The foreign exchange impact would be a decline of US\$4.7 million or 6.1% of the export earnings per year from the agricultural sector. If the market for each commodity is phased out alone, the loss of the sugar market would have the greatest impact on the economy.

In addition to the concern of losing the preferential markets, other policy actions in these markets could also affect Belize. For example, lower support to agriculture in the EC and the USA are likely to affect the prices of Belize's exports of sugar and bananas. As a result of the conclusion of the GATT and increasing global trade reforms, there is the possibility that support (price and income) to agriculture could be lowered in these countries, which in turn could result in lower guaranteed prices for Belize's exports.

**(b) North American Free Trade Agreement (NAFTA):** The emergence of NAFTA poses a significant challenge to Belize, with regard to the country's competitiveness in the North American market. Under the agreement, Mexico's preferential access to the large North American markets will make its exports more competitive. This will likely affect the exports of similar products to these markets by other Latin American and Caribbean countries. In the case of Belize, exports of citrus concentrates and garments are likely to be affected. The World Bank estimated that elimination of USA import restrictions on citrus exports from Mexico and other

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<sup>31</sup> The UK is the principal destination of Belize's banana exports in the EC market, which is done under the EC-LOME Protocol.

<sup>32</sup> If the preferential market arrangements are to be terminated, this is expected to be phased over a long period, probably between 5 and 15 years.

<sup>33</sup> World Bank 1992. Figures are based on the 1990 level of production and exports.



**Latin American** countries over a five- to ten-year period, could reduce the price received by Belize for its citrus exports by 12% to 17%<sup>34</sup>.

In the long run, there is the likelihood that other countries in Latin America and the Caribbean will join NAFTA. The implication of this for Belize is that the CBI framework may be changed, which could affect its preferential access to the USA market. Furthermore, there is also the possibility that the Canadian-Caribbean trade agreement (CARIBCAN) could be affected in the longer run, if NAFTA is enlarged to include Caribbean countries.

**(c) Diversification:** Due to the market vulnerability for Belize's traditional exports, diversification of the country's production and export base and targeting new markets should be top policy priorities of the GOB. To some extent, the expansion of bananas, citrus, marine products and fruits (such as papaya) in the 1980s was a commendable strategy for widening the production base.

The major challenges to the GOB are to provide the appropriate incentives and support systems for facilitating diversification. In this regard, critical areas that need to be addressed include fiscal incentives, investment and export financing, and improvement in infrastructure (roads, port and communication), research and extension, credit, marketing and other support services.

**(d) Competitiveness:** The need for Belize to be competitive in both the internal and external markets in the longer run should be a major policy goal of the GOB. This results from a combination of three sets of factors: (i) Belize's heavy dependence on exports for its growth, income, employment and foreign exchange earnings; (ii) uncertainty of the preferential markets in the future; and (iii) increasing globalization of economic activities, liberalization and the formation of trade groupings (such as NAFTA) are reducing trade barriers and increasing competition for market shares.

Currently, the country is not competitive in world markets in sugar, bananas and citrus; neither is it competitive with many countries in the hemisphere in garment production. In recent years, the sugar and banana prices received by Belize averaged 42% and 30%, respectively, above the world price. Moreover, although the need to be competitive in the external market is a major issue, Belize's producers will also be challenged to become more efficient in the domestic market, given the prospects of cheaper food imports. Therefore, a critical task for the country is to increase its production efficiency of the major export products, while at the same time reallocating its resources into areas of production in which it has a competitive advantage.

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<sup>34</sup> Ibid.

## CHAPTER III

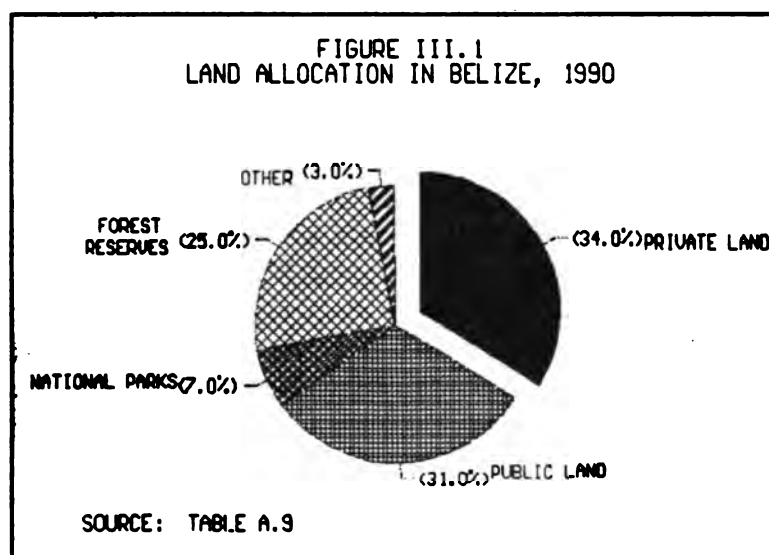
### NATURAL RESOURCE USE AND MANAGEMENT

Belize's natural resources include land, water, forests and coastal and marine resources. The country also has deposits of mineral resources such as gold, silver, other precious metals and petroleum, although development of these is limited.

#### 3.1 Land

The country has two major agro-climatic zones: the northern and the southern. The northern zone is relatively flat, with considerable areas of swamplands on the coastal plain. Its average annual rainfall is about 1,300 millimeters, and its calcareous soils are suitable for cultivation of a wide variety of crops. However, these soils change abruptly to acidic soils in certain areas. The southern zone encompasses the central mountains and a flat to undulating coastal belt. The siliceous soils of the mountains are not suited for agriculture. Moreover, the high level of acidity, together with soil infertility and poor drainage, constitute important constraints to crop production. The average annual rainfall varies from 1,500 millimeters in the northern part of this zone, to 4,445 millimeters in the southern part.

Belize has a total surface area of approximately 2,298,461 hectares (ha). Of this, 34% is privately owned; 31% is public land leased to the private sector; 25% is public land in forest reserves; 7% constitute national parks, of which 3% is privately owned by non-profit conservation organizations such as the Program for Belize (FIGURE III.1).



The most comprehensive data on land use in Belize is provided by the 1984-85 Agricultural Census. According to this source, there were 11,011 holdings comprising 253,549 ha (TABLE III.D). Of the total area, just under 50% had forests, almost one-quarter was under

temporary and permanent pastures and meadows, 8% was under semi-permanent crops, and 4% under permanent crops.

TABLE III.1  
LAND USE IN BELIZE, 1985

LAND USE	NUMBER OF HOLDINGS	AREA (HECTARES)
TOTAL AREA*	11,011	235,549.2
ARABLE LAND:		
TEMPORARY CROPS IN THE OFF-SEASON	5,337	9,902.8
FALLOW + TEMPORARY PASTURES/MEADOWS	3,893	12,458.5
SEMI-PERMANENT CROPS	5,956	21,341.8
PERMANENT CROPS	6,461	10,182.3
PERMANENT PASTURES/MEADOWS	1,517	47,686.1
OLD FALLOW LAND	2,037	11,186.1
WOOD AND FOREST	4,315	134,402.2
OTHER	7,877	6,204.9

\* INDICATE HOLDINGS REPORTING  
SOURCE: AGRICULTURAL CENSUS, 1984-85.

According to the Country Environmental Profile, there are seven principal landforms in Belize, and most of these have soil and topography characteristics indicating that there are moderate to severe limitations of their use for agriculture<sup>35</sup>. It is estimated that between 15,000 and 16,000 km<sup>2</sup> have potential for various agricultural activities including intensive crop production, permanent tree crops, milpa agriculture, pasture and productive forestry. The areas where more extensive agriculture is recommended are in the Northern Lowlands, the Toledo Lowlands, the Pine Ridge Lowlands and places that have the karst landscapes (such as the Toledo Foothills, Maya Mountains, Central Foothills and the Bravo Hills). Several parts of the coastal floodplain, such as the Northern and Central Coastal Plains, have soils that are affected by seawater and are waterlogged in the wet season, with some areas in this condition permanently. Most of these areas are unsuitable for agriculture, and it is recommended that the mangrove be left unexploited to support coastal protection and fish spawning. The remaining areas of the country are recommended mainly for productive and/or protective forestry.

Compared to the Central American and Caribbean countries (except Guyana and Suriname), Belize has large land areas that are still undeveloped and their soils intact. However, land degradation is a potential problem due to the influx of illegal immigrants and refugees and agricultural activities<sup>36</sup>. There are indications that some degradation is occurring already, particularly in areas along the river banks where intensive cultivation takes place. Furthermore, a large proportion of the land leased from the government is also being cleared for agricultural purposes, with possible long-term adverse effects on soil quality.

<sup>35</sup> Country Environmental Profile. Several studies evaluated the country's land resource and its capability. For more recent information, see the studies on the Land Resource Assessment of Belize 1993.

<sup>36</sup> Intensive use of lands having high potential is desirable but should be done with proper management. In Belize, expansive use of lands with poor management is common.

### 3.2 Water

Although Belize is a relatively low country with large areas along the coastal plain below sea level, most of its water needs are met by rivers and streams. The country's river system includes 18 main catchment areas and rivers, most of which originate in the uplands and Maya Mountains and flow to the Caribbean Sea (FIGURE III.2).

There is limited information on the country's water resources, whether surface or underground water. Surface water resources appear to be abundant except on the Vaca Plateau, where streams disappear in the porous limestone. About 70% of the country's population, including the major population centers, Belize City, Belmopan, St. Ignacio and Dangriga, use surface water sourced from streams. For many villages and settlements in the rural areas, streams are the major water source for washing and even drinking.

There is limited information on Belize's groundwater resources, but they appear to be a potential source of potable water. The country has both water-table and artesian aquifers. The shallow aquifers of the former group are used for water supplies mainly throughout the country, while water from the latter can only be accessed at deeper levels. Presently, irrigated water is of minor importance in total water use, but there is potential for its increased use in the agricultural sector.

Although water pollution is not a serious problem yet, the risk of contamination increases with the intensification of domestic and productive uses. The contamination of fresh water is a potentially serious area of environmental concern, due to inadequate monitoring of toxic levels. In some areas such as San Antonio, Paraiso, Cristo Rey and San Pedro, groundwater supplies contain nitrate levels that are near to or above the recommended human tolerable levels<sup>37</sup>. This is probably due to effluent discharge by human and livestock activities. To secure continued quality and an adequate water supply, enforcement of the guidelines and regulations for well-drilling and water supply are needed, and adequate government coordination of the activities of those agencies responsible for water development is required.

### 3.3 Forests

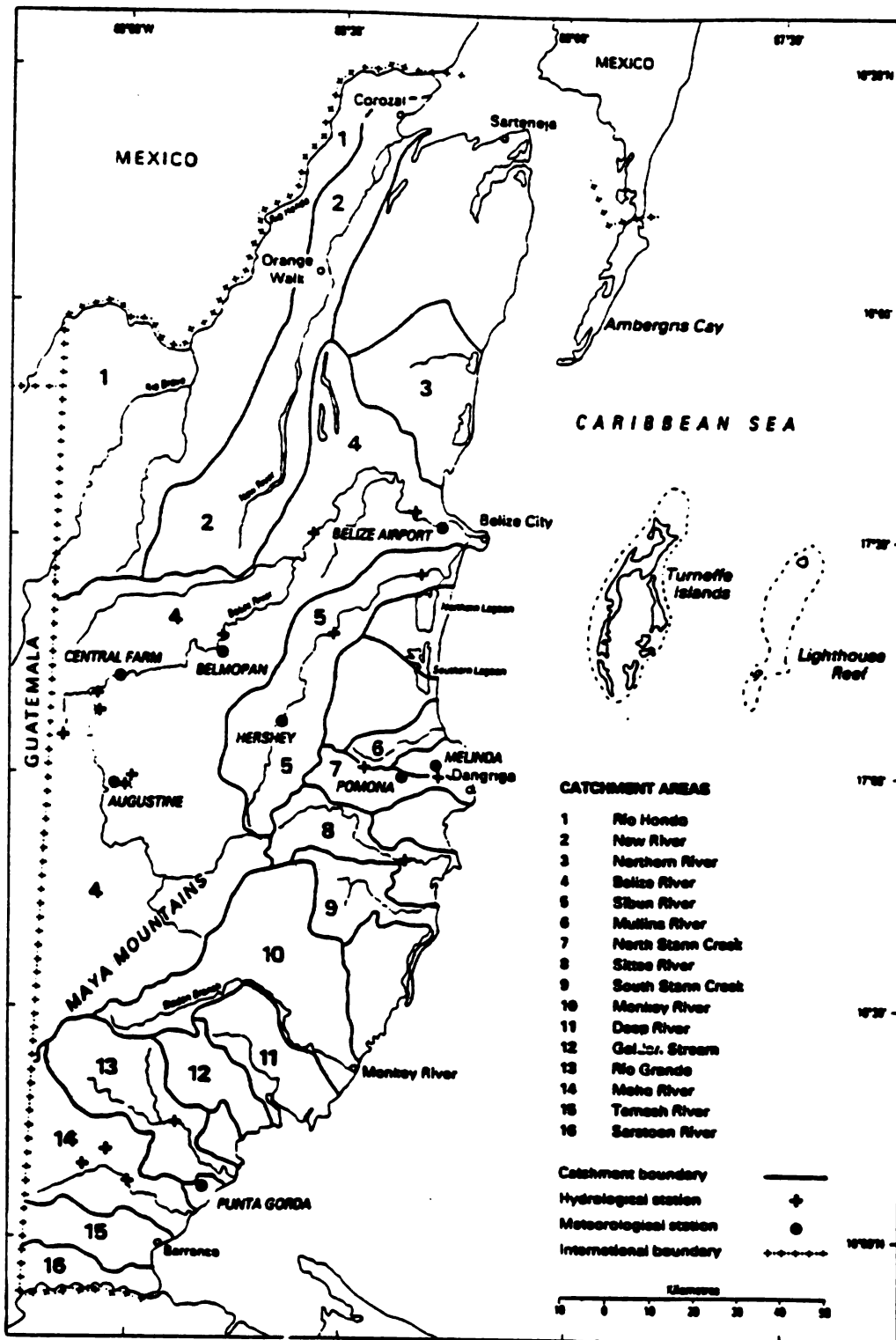
Belize's forests contain a diversity of animal and plant species, many of which are endangered elsewhere in Central America. Hurricane damage has had a long-lasting effect over much of the country's forests, with big trees absent in many areas because of wind-throw. The largest single block of forest area that is intact extends over the remote, mountainous region on the Mayan Mountains.

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<sup>37</sup> King et al. 1993.

FIGURE III.2

MAIN RIVERS AND CATCHMENT AREAS



SOURCE: COUNTRY ENVIRONMENTAL PROFILE 1984.

The country's present forest composition is poorly known due to technical constraints, including inadequate information and an absence of standard definition for the different vegetation types. Available information indicates that Belize has 7,343 km<sup>2</sup> of national forests, 8,293 km<sup>2</sup> of private forests and approximately 6,379 km<sup>2</sup> of forest reserves<sup>38</sup>. The forestry vegetation is dominated by broadleaf trees over approximately 63% of the country (TABLE III.2)<sup>39</sup>. Natural pine covers about 11% of the land area, although only 2% is closed forest. Pine tree savanna, where scattered pine trees and clumps of pine are found among extensive grasslands, occurs in large areas on the coastal plain.

TABLE III.2  
ESTIMATES OF BELIZE'S FOREST TYPES

VEGETATION CLASS	EXTENT	
	AREA (KM2)	PERCENT
BROADLEAF COVER	13,725	63
OPEN BROADLEAF COVER	469	2
MIXED BROADLEAF & PINE	378	2
PINE WOODLAND	360	2
PINE WOODLAND SAVANNA	637	3
PINE TREE SAVANNA	1,227	6
MARSH/SWAMP FOREST	553	2
MANGROVE FOREST	523	12
NON-FOREST COVER	1,536	7
AGRICULTURAL/URBAN LAND	2,323	11
TOTAL	21,731	100

SOURCE: BELIZE FOREST DEPARTMENT 1993.

Despite the country's low man:land ratio, the long history of commercial logging has altered the country's timber resources, particularly the hardwood species. Although some forest species remained intact, deforestation and its impact on environmental degradation is becoming an increasing problem in the country. Between the late 1960s and the 1980s, it is estimated that the rate of deforestation was about 0.2% per year or almost 3,500 ha<sup>40</sup>. This rate is expected to have increased in recent years due to an escalation in land clearance. During 1990, approximately 98,400 ha was given for development concessions and other leases for agricultural development<sup>41</sup>. Although not all of this land is likely to be cleared, the estimate is that between 6% and 12% is expected to be deforested. Between 1989 and 1991, the total estimated area cleared of forests was 100,851 ha, of which clearance on private land was the highest (TABLE III.3).

<sup>38</sup> Belize Today, June/July 1990.

<sup>39</sup> Belize Forest Department 1993. Due to limited information available, the data should be viewed as an approximation of the country's forest resources.

<sup>40</sup> King et al. 1993.

<sup>41</sup> Ibid.

TABLE III.3  
ESTIMATED RATES OF FOREST CLEARANCE (1989/90-1990/91)

TENURE TYPE	APPROXIMATE TOTAL AREA, 1990 (HA)	APPROXIMATE RATE OF CLEARANCE (%)	APPROXIMATE AREA CLEARED
PRIVATE	774,767	3.8	58,728
LEASED NATIONAL LAND	259,214	5.9	30,377
NATIONAL LANDS	541,029	0.5	10,126
FOREST RESERVES	578,064	0.2	1,781
NATIONAL WILDLIFE RESERVES	86,416	0	0
PRIVATE RESERVES	75,010	0	0
TOTAL (HA)	2,314,500	-	100,851

SOURCE: KING ET AL. 1993.

The latest information available also indicate that much of the land cleared of vegetation previously went into urban and agricultural development (TABLE A.10). Over 2,000 km<sup>2</sup> of broadleaf cover were converted to agricultural activities, mainly in the northeast Orange Walk and Corozal districts, the Belize Valley and southern Toledo district. Between 1970 and 1990, some 60,024 ha % of the original forest reserves were transferred to the private sector. Most was used for agriculture rather than for sustainable logging activities.

Another source of forest loss not fully accounted for is associated with squatter occupation and various types of encroachment<sup>42</sup>. Milpa and other forms of subsistent farming are the predominant forms of land exploitation in many undeveloped areas of the country. However, the environmental impact of the milpa system of agriculture is less severe than complete forest clearance, partly because the rotation of crops on a periodic basis allow soil conditions to improve, through the accumulation of organic matter and domination of weeds by bush fallow vegetation. Nevertheless, as population increases, fallow periods are shortened, soil is degraded, and new land areas are converted from forest to agriculture.

Due to pressure on the use of class 4 land for agricultural purposes, it is estimated that deforestation will occur in between 50 to 100 years, if only class 5 land is left intact<sup>43</sup>. This means that if the steep slopes of the Maya Mountains and the entire Rio Bravo Conservation Management Area is preserved, then about one-fifth of the country's land area will remain under forests. However, if clearance activities on the steep slopes of the Maya Mountains do not cease, particularly along the Hummingbird Highway, it is likely that the core area of the country will be deforested. This will result in soil degradation, environmental destruction, flooding of very valuable agricultural land and loss of a potential substantial income from both agriculture and tourism. In the north Stann Creek area, flooding is already becoming more regular, partly due to increased clearance of the watershed's forests. In central and southern Belize, increasing forest clearance for citrus and banana plantations was done in recent years, and this is likely to have long term negative impacts on the environment.

<sup>42</sup> Most squatter occupations are by illegal immigrants, refugees and other landless farmers displaced from agricultural areas.

<sup>43</sup> The country's land is classified into five classes. See Chapter IV. King et al. 1993.

Closely associated with deforestation and environmental degradation is the high consumption of fuelwood for white lime production<sup>44</sup>. Much of this is concentrated along the Hummingbird Highway where the production kilns are located. The principal concern with this activity is that the "caleros" (lime producers) cut trees illegally on steep slopes, contributing to, among other things, soil erosion, sedimentation and loss of biodiversity. Deforestation adds to the environmental degradation already taking place in this area due to land clearance and road construction.

The importance and value of conserving biological diversity and environmental integrity are appreciated in Belize. Over the years, some steps have been taken by the government to protect the natural resource base and preserve the environment. Laws for the establishment of conservation reserves and for protection of the environment were enacted. Public policies have been supported by activities of NGOs and international institutions to improve management of the natural resource base and environmental enhancement.

However, public policy measures were not totally successful. For example, although 15 areas, totalling just over 6,000 km<sup>2</sup> (28% of the country's area) have been declared as legal forest reserves (i.e., land for permanent forestry), parts of these were diverted for agricultural uses due to increasing pressure for land by small farmers (such as milperos). Moreover, there is uncertainty about the current status of these reserves (TABLE A.11), because a high proportion of leases granted at the ministerial level in recent years have not been fully documented. None of the reserves has an adequate management plan or an up-to-date inventory of their timber, water, soil, wildlife and recreation resources.

In recent years, the government adopted a Tropical Forestry Action Plan (TFAP) for the country<sup>45</sup>. This plan focuses on accelerated development of the forestry industry, and it also seeks to strengthen forest management and conservation programs. Under the Plan, the nature, management and harvesting of the country's forests are being evaluated, given the soil characteristics and land slopes. Some of its recommendations include: (i) logging on granitic soil should be limited to slopes up to a 4° angle; (ii) intensive harvesting is considered appropriate for non-granite soils having a slope angle up to 15°; (iii) selective logging should be done on slopes between 15 and 25°; and (iv) no logging should take place on land with greater than 25° slopes.

There is a widely held view that Belize has abundant forest resources. To some extent, the government's policy is influenced by such opinion. However, with the expansion of clearance and agricultural activities, the risks of soil and gene-erosion, flooding and disruption of water supplies increase. Deterioration of the forest environment would equally threaten tourism and the country's unique ecosystems.

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<sup>44</sup> White lime is produced in kilns from limestone for use as a fertilizer input, mainly in citrus production. It is also used in banana cultivation, sugar processing, construction and shrimp farming.

<sup>45</sup> The TFAP was developed in collaboration with FAO.



### 3.4 Coastal and Marine Resources

Belize's coastal and marine zone contains a wide diversity of ecosystems that are rich in plant and marine resources (FIGURE III.3). These include coral reefs, cays, extensive coastal lagoons and sea grass beds. The zone is supported by the long Barrier Reef and many cays of various sizes. Most cays are mangrove islands, though a number are primarily sand with coconut palms. There are three large atolls, with extensive mangroves also outside the reef. The mainland coastline consists of low-lying coastal plains, dominated by mangrove habitat, numerous lagoons and rivers.

The coral reefs have a highly productive ecosystem and they are also a major source of income. Besides being an important habitat for diverse species of marine life, the reefs support the country's important fishery and are a prime tourist attraction. The mangroves provide areas for fish spawning and feeding, and are the principal sources of nutrients for coastal marine life. They also function as sediment traps for waters from rivers and streams, and act as a physical buffer for the inland areas against storms.

The major marine resources comprise a wide variety of fish species and other marine life. Those of commercial importance to the country are lobster, conch, shrimp, snapper, fin fish and stone crab. The fishing industry is a major contributor to the economy, in terms of both the economic support to many geographic areas and foreign exchange earnings through marine exports.

Development of coastal areas has had adverse impacts on marine life and the environment. In the last two decades, many development activities occurred in or near coastal areas, resulting in a large proportion of the country's population being concentrated in these places. In the cays, dredging for construction of tourist facilities contributed to sedimentation which may have long-term impacts on the reefs<sup>46</sup>. The water supply systems in coastal areas, especially in the cays have been affected by population pressures and waste disposal. In places such as San Pedro and Placencia, water supply has been contaminated. Dumping in mangrove areas near Belize City, San Pedro and other coastal communities is likely to pollute the coastal waters and affect marine life and the reefs seriously. In addition, several coastal areas have been affected by beach erosion.

The various habitats in the coastal and marine systems are essential for flood and erosion control, water purification, nursery grounds for juvenile fish and other marine species, and as important habitats for high profile species such as sea turtles<sup>47</sup>. There is evidence that mangrove clearance on certain cays contributed to acute coastal erosion. With regard to the barrier reef, it is a complex, dynamic system that is affected not only by natural processes (e.g., hurricanes), but also by human activities such as agriculture, fishing and diving. The reef and adjacent areas

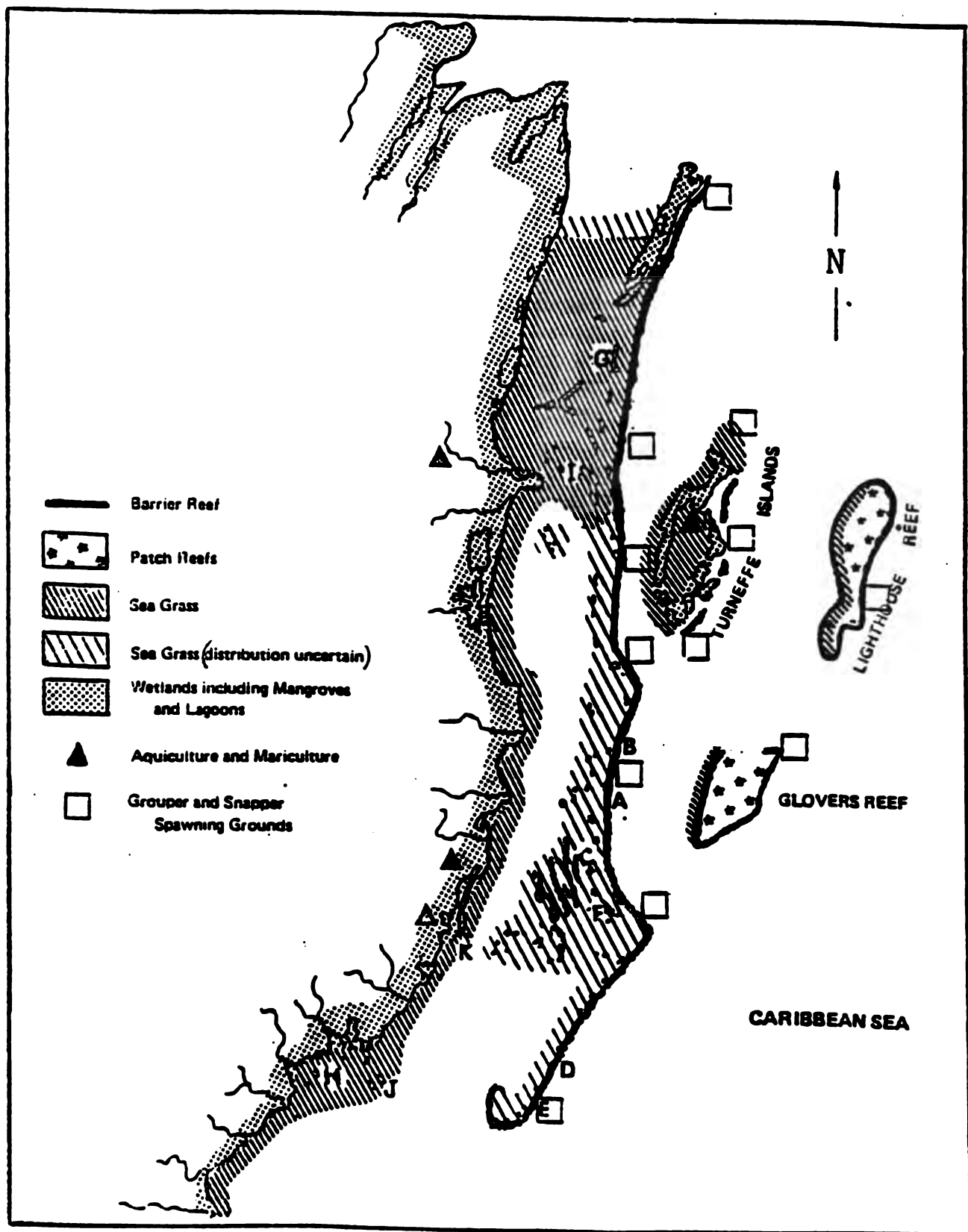
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<sup>46</sup> So far, no in-depth study has been done on the impact of dredging on the reefs.

<sup>47</sup> IOU 1992.

FIGURE III.3

COASTAL AND MARINE ECOSYSTEMS



SOURCE: COUNTRY ENVIRONMENTAL PROFILE

are already subject to increasing pressures from tourism-related activities. Moreover, deforestation and intensive agricultural practices generate conditions which are detrimental to the reefs and fisheries, such as soil erosion, pesticide and fertilizer run-off, and coastal sedimentation.

Due to the economic importance of the country's fisheries, overexploitation is a major concern to the government. With an increasing number of fishermen targeting mainly lobsters and conch, there is a real threat of over-fishing, with the resultant depletion of stocks. In addition, because most Belizeans prefer higher-value fish (such as snapper and mackerel), lower-value species are underexploited. The problems are further exacerbated by the high incidence of illegal harvesting of "shorts" and out-of season species. Deep-sea fishing beyond the barrier reef has not been fully exploited, due to inadequate resources by fishermen and insufficient information of the resources in this area.

### **3.5 Natural Resource and Environmental Issues**

Although Belize is assumed to be relatively endowed with "abundant" natural resources, population growth and development activities are putting increased pressure on the natural and environmental resource base. There is evidence of actual and potential natural resource and environmental problems in many parts of the country. The rate of deforestation is increasing, marine resources are being gradually overexploited, soils are eroding, rivers and streams are becoming polluted, and solid waste is accumulating in built-up areas such as Belize City.

There are three regions of the country where the ecological threats and socioeconomic deficiencies are most severe. These are: (i) The Toledo district that borders the Mayan Mountain and Columbia Forest Reserves; (ii) areas of the Stan Creek district near the Sibun, Sittee River and Manatee Forest Reserves; and (iii) the farming community in the Cayo district near the Mountain Pine Ridge Forest Reserve and Society Hall Nature Reserve.

In the Toledo district, agricultural activities are perceived to be the most threatening factor to the natural resource base, in areas that border the Mayan Mountain and Columbia Forest Reserves. Encroachment on protected areas and cultivation of fragile ecologies are most severe. The milpa system of production is prevalent in this district, and the cycle of shifting cultivation and slash and burn is becoming shorter. It averages about 5.2 years, which is considerably less than the 10 to 15 years reported in the past<sup>48</sup>.

There is increasing concern about the long-term sustainability of the milpa farming system with shorter cycles. Two factors are now combining to threaten its continued existence. The first is the increasing numbers of milperos, who are taxing the available land and do not allow for proper rejuvenation of the vegetation. The second is the reduced availability of good agricultural land, which is forcing more milperos to use marginal and lower-quality lands.

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<sup>48</sup> NARMAP 1993.

In a recent study, the World Bank evaluated the environmental situation of Caribbean countries<sup>49</sup>. Based on a scale of 1 to 5 (1 being least severe and 5 being most severe), the Bank assessed Belize's main environmental issues as follows: legislation/policy (2); monitoring/enforcement (5); institutional framework (2); coastal zone degradation (2); deforestation/habitat losses (3); parks and protected areas (2); marine pollution (2); fresh water pollution (3); sewage disposal (3); solid waste management (3); and public awareness/education (2).

The principal problem areas that need to be addressed include: (i) deforestation due to logging operations and conversion of land to agricultural activities; (ii) contamination of water resources resulting from solid and toxic waste disposal and chemical spills; (iii) destruction of wetlands due to drainage, filling, dumping activities; (iv) depletion of marine and coastal resources (fisheries overexploitation, destruction of mangroves and coral reefs); (v) agricultural activities which affect the soil capacity, soil erosion, soil fertility and induce pesticide run off; (vi) land degradation due to land development and mining operations (vii) destruction of flora and fauna (gene erosion and habitat destruction); (viii) environmental impact assessments of projects; (ix) enforcement and promotion of legislation; and (x) the need for adequate public policies and political will.

Basically, the emerging natural resource and environmental issues are a reflection of several fundamental problems in the country including: (i) insufficient information of the resource stock and assessment of the impacts of various activities; (ii) lack of comprehensive ecological planning; (iii) lack of general environmental awareness; (iv) insufficient human and financial resources; (v) insufficient alternative economic activities to reduce overuse of the resource base; (vi) inadequate on-farm research and adapted technology to reduce land degradation and erosion; and (vii) inadequate enforcement of regulations.

Belize's economy is interlocked with the country's natural resource and ecological base. Therefore, degradation of the latter would greatly affect sustainable development in the future. The main productive sectors, agriculture, fisheries and forestry, as well as tourism are fully dependent on the natural resource base to food, income and foreign exchange earnings. Sustainability of the resource base and productive activities, therefore, becomes a critical issue if the long-term economic development is to be assured. The main problem is not excessive exploitation of natural resources, but rather the use of improper practices of exploitation.

### **3.6 Support to Natural Resource and Environmental Management**

Since the UN Conference on the Human Environment in 1972, the GOB initiated efforts to monitor and regulate the economic and social activities in an environmentally sensitive manner. Important environmental legislation was approved, supported by laws dating back to colonial times that still influence the regulatory and management aspects of the environment.<sup>50</sup>

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<sup>49</sup> World Bank 1994.

<sup>50</sup> Ministry of Tourism and the Environment (MTE) 1993.

In 1992, the GOB submitted a comprehensive Environmental Protection Act to Parliament. The Act gave the Ministry of Tourism and Environment (MTE), established in 1989, the basis to protect the environment with the objective of establishing an equilibrium between nature and human needs. Beside being the lead government agency charged with ecological matters, the MTE receives inputs directly from international donors, local and foreign non-governmental organizations (NGOs) and industry groups. Its work on natural resource and environmental issues is also supported by other ministries such as the Ministry of Natural Resources (MNR), Ministry of Agriculture (MOA), the Ministry of Economic Development (MED), and it maintains inter-ministerial liaison through the National Economic Mobilization Council (NEMOC).

Recently, the MTE's Department of the Environment proposed a strategy to seek the cooperation of governmental, NGOs and foreign agencies for attaining its objectives and fulfilling its mission as an inter-institutional coordinating body. In 1993, it recommended the following actions: (i) evaluate the stock of natural resources; (ii) promote sustainable use; (iii) monitor the state of the environment; (iv) sensitize decision-makers; (v) promote the development of local energy sources; (vi) encourage the proper management of wetlands; (vii) promote the concept of sustainable development; (viii) adopt an inter-sectorial approach to environmental issues; (ix) develop a proper natural resource management program; (x) develop practical guidelines for coastal and marine resources management; and (xi) include environmental values into project appraisals.

Support is also provided by NGOs working in the environmental area. The more important of these groups include: (i) The Belize Audubon Society; (ii) Programme for Belize; (iii) CARE; (iv) Belize Enterprise for Sustainable Technology (BEST); and (v) the Belize Zoo and Tropical Education Center. Due to its small population, these groups have an exceptionally high profile in Belize, and they take a leading role in activities related to environmental conservation and management. Although the NGOs and other community groups have the potential to stimulate grassroots participation up to the decision-making level, their institutional capacity must be strengthened.

At the regional level, representatives of CARICOM countries met in 1989 and proposed a common environmental strategy. In Central America, under the leadership of Belize, the states comprising the "Mundo Mayan" group<sup>51</sup> submitted a proposal for a comprehensive interregional environmental management plan to the Global Environmental Facility. In recent years, Belize has also actively courted the international donor community and bilateral agencies for assistance in the area of environmental protection. As a result, several projects are currently executed in this area with external assistance, including: (i) the Natural Resources Management and Protection Project (NARMAP) that supports environmental planning, sustainable agriculture and sustainable forestry; (ii) development of a cadastral and resource-based geographical information

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<sup>51</sup> Mexico, Belize, Guatemala, Honduras and El Salvador.

system to support land-use planning; (iii) the Coastal Zone Management Program that supports enforcement of legislation and protects coastal and marine resources. The assistance provided by these agencies in collaboration with local government organizations are recognized as a valuable input for the country's environmental protection; and (iv) the Forest Planning and Management Project supporting landuse planning, forest management and social planning.

## CHAPTER IV

### THE AGRICULTURAL SECTOR: MAJOR CHARACTERISTICS, PRODUCTION AND CONSTRAINTS

#### 4.1 Land Potential

Belize has a total area of 2.31 million ha, of which an estimated 0.81 million are suitable for agriculture and 1.22 million are classified as suitable for forestry. Around 15% (122,000 ha) of the recommended area for agriculture is now under cultivation.

The country's land has been categorized into five agricultural land classes, ranging from class I to class V<sup>52</sup>. In general, the soils of these classes present moderate to severe limitations for agriculture, including drainage, shallowness, low fertility and lack of moisture in the dry season. It is estimated that 16% of Belize's land has the capability for mechanized agriculture without large financial and technological investments: 4% is class I land, which is suitable for most crops and has a high income potential (TABLE IV.1). However, much of this land is already under cultivation, mainly with citrus and bananas. Twelve percent (2,790 km<sup>2</sup>) belongs to class II and they have good financial potential from agricultural activities. The areas in this class include a large proportion of the Northern Coastal Plain and areas under sugarcane in the Corozal and Orange Walk districts.

TABLE IV.1  
RECOMMENDED LAND USE IN BELIZE

LAND CATEGORY	LAND CLASS	AREA KM2	%	RECOMMENDED LAND USE
1. HIGH INCOME POTENTIAL	I	990	4	AGRICULTURE
2. GOOD FINANCIAL SUCCESS	II	2,790	12	AGRICULTURE
3. SUCCESS SUBJECT TO SKILLED MANAGEMENT	III	4,480	20	FORESTRY/AGRICULTURE
4. MARGINAL	IV	4,470	20	FORESTRY/PROTECTION
5. MOSTLY STEEP LAND	V	10,000	44	PROTECTION

SOURCE: KING ET AL. 1993.

Class III land comprises 20% (4,480 km<sup>2</sup>) of the area. This could be successfully used for agriculture but subject to skilled management and much financial investment. However, it is recommended that this land be left under forests. Another one-fifth (4,670 km<sup>2</sup>) has marginal capability (class IV), and this should be left under forest also or as protected areas. The remainder is considered very marginal (class V), and it comprises 44% (10,040 km<sup>2</sup>) of the land area. The areas in this category include the steep slopes of the Maya Mountains and areas with limestone karst. Of these classes, it is recommended that those in the first and second (10% of the area) have good characteristics for cultivating food and cash crops; class III be used for

<sup>52</sup>

King et. al. 1993.

small holder development; class IV for forest and plantation crops; and class V be left under forestry.

With regard to land-use capabilities, these are estimated to be<sup>53</sup>: (i) 16% for intensive annual crops; (ii) 23% for limited annual and perennial crops and pasture; (iii) 15% for mixed perennial crops and forest plantation; (iv) 27% for production forest; and (v) 19% for protected forest.

However, the above land capabilities should be viewed as highly tentative, because the land classification systems used do not provide complete information. They assess land that is considered suitable mainly for modern mechanized agriculture, and do not assess the capability of highly fertile soils (such as the Toledo Foothills), which may produce good yields of maize and other crops, but are unsuited to mechanized cultivation because of their topography. The classification systems also tend to overestimate the land capability of tropical areas for sustained agricultural activities, because they do not consider soil erosion or nutrient leaching in high-rainfall areas when the land is cleared of its forest cover.

The potential of the country's land resource for agricultural development has moderate to severe limitations for modern agriculture, particularly in the south of the country. Of a total of some 15,000 km<sup>2</sup> of potentially mechanizable soils, limitations on agricultural uses include those related to drainage (30%), lack of moisture in the dry season, prone to erosion and high water level of the soil (26%), inherent low fertility (20%), and shallow rocky texture (5%)<sup>54</sup>. The remainder, comprising about 4,500 km<sup>2</sup> or 19% of the country's land area, has the capability for mechanized farming. Moreover, as more land is developed and those already developed are used intensively, quality land will become scarcer and the overall land quality is likely to deteriorate. The likely implication is that farmers will be constrained to use more marginal lands.

Given the soil characteristics, topography and likely impacts of production activities on the environment, recommendations on the appropriate use of land for agriculture were made in a recent study<sup>55</sup>. The recommended use of land on different slopes and soil type is summarized in Appendix TABLE A.12. With the exception of citrus, milpa agriculture and pasture activities, most cultivation practices are limited to land having slopes of 10° or less.

## 4.2 Land Tenure

The basic framework of Belize's land policy is outlined in three main legal documents

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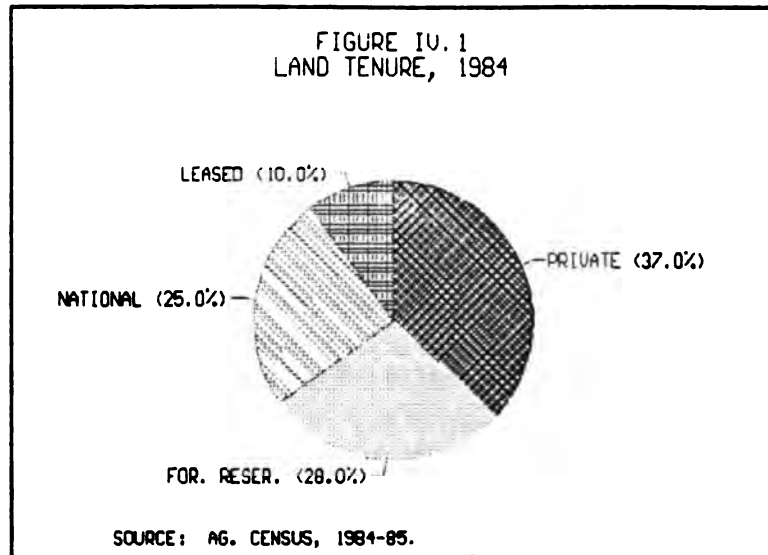
<sup>53</sup> IIED 1987. Land use capability is the most intensive use that can be productively sustained over time without degradation.

<sup>54</sup> USAID 1984.

<sup>55</sup> R. B. King et al. 1993.



which the **GOB** approved during the 1937-77 period<sup>56</sup>. It has four categories of land ownership: private lands, leased public lands, national lands and lands under forest reserves. According to the 1984-85 Agricultural Census, private lands accounted for 37% of the total area of the country; leased public lands 10%; national lands 25%; and forest reserves 27% (**Figure IV.1**).



The distribution of land in the private sector is highly concentrated, with a small number of large plots occupying a large proportion of the total area. According to the last agricultural census, plots larger than 607.5 ha (> 1,500 acres) comprised only 2% of the private holdings, but accounted for 86% of the area. On the other hand, 85% of the holdings were less than 14.6 ha (< 36 acres) in size and these covered only 4% of the area (**Table A.13**).

Belize has four main schemes that facilitate access to land. These are: (i) location tickets; (ii) ministerfiat and leasefiat schemes; (iii) conveyancing systems; and (iv) land registration and titling.

Location tickets are a conditional, freehold form of tenure, leading to eventual purchase. They were conceived as an instrument for promoting the development of selected areas, by distributing leases for a probationary period of up to five years, before giving the lessee a "Crown grant" that entitled him/her to freehold rights. During the probationary period, the lessee is required to adhere to certain conditions such as: all rights to natural resources remain with the government; leases can be terminated upon failure to comply with any of the conditions outlined in the agreement<sup>57</sup>; and transfer of the lease to third parties requires approval from the government.

<sup>56</sup> These are: (i) The Terms and Conditions of Leases of Crown Land issued in 1937; (ii) A Policy for Rural Land in British Honduras issued in 1958; and (iii) The Registration Act of 1977.

<sup>57</sup> Rent and date of payment, boundaries, permanent improvements, etc.

Location tickets are still being issued. They give the prospective buyer a specified period between the time of his declaration of intent to buy a particular plot and the acquisition of the freehold rights. However, the procedures to access land by this method are cumbersome, and location tickets are being phased out in favor of the other forms of tenure.

Leasefiat is a contract arrangement between an individual, or organization (the lessee) and the government for the lease of a certain tract of land. Leases can be renewed after an initial contract period of up to 10 years. If the lessee applies for ownership, a "Ministerfiat" can be issued to facilitate the transfer of land from the government to the individual or organization. The amounts paid during the lease period can be used as partial payment of the purchase price. In most cases, the government requires that 50% or more of the land area be developed.

The conveyancing system covers the transfer of land among private owners in those instances where no survey of the land was previously done. This system evolved from the common practice of sale of plots among individuals, with no official documentation of the actual transaction. Most of the current problems related to land tenure and titling result from the lack of information on land transactions, legal ownership, boundaries and location.

In 1954, a program of land registration based on surveying was introduced to address the problems of the conveyancing system of land transfers. The program provided land titles which facilitated legalizing and recording all changes in the tenure status of all land parcels and tracts of land. Under this system, all surveyed parcels are issued a "first certificate of title". If they are subsequently sold, a "transfer certificate of title" is issued to the legal owner, and the change of ownership is officially recorded.

The main issues and constraints of the land tenure system in Belize are<sup>58</sup>: (i) people often attempt to register land without having titles or documents to support their claims; (ii) squatters<sup>59</sup> possess no land title and they pay no rent to the state; (iii) lack of provision for indemnity<sup>60</sup>; (iv) inadequate resources of the Land Department to process a large number of conflicting and overlapping claims; (v) the slow process of transferring land; and (vi) the highly concentrated distribution of private land.

### 4.3 Land Use

A large proportion of the land farmed is under export crops (sugarcane, citrus, bananas and a small amount of cacao) and domestic crops (corn, rice and red kidney beans). In 1993, approximately 56,000 ha of the total cultivated land were under export crops, and 22,000 under

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<sup>58</sup> Presently, a land information system is being developed in the Ministry of Natural Resources. It will address some of these constraints and facilitate improved land management.

<sup>59</sup> These are farmers cultivating small plots on a semi-permanent or a temporary basis on both private and government lands.

<sup>60</sup> Registration Land Act of 1977.

domestic crops. Sugarcane is concentrated in the north (Orange Walk and Corozal districts); mechanized production of beans and corn in the west (Cayo district); citrus and cacao in the central area (Stann Creek valley); and rice and bananas in the south (Toledo district).

There is also a significant portion of land under pasture or cultivated by small farmers with non-traditional crops. More than one-half of the total area under pasture is in the Orange Walk and Cayo districts. The non-traditional crops are cultivated throughout the country by small farmers. A large number of these are milpa farmers who use the slash-and-burn system, operating small plots comprised of mixed subsistence farming and cash crop production.

According to the 1984-85 Agricultural Census, small farmers (those that are landless and those with <2.0 ha or <5 acres) cultivated only 0.8% of the land area, but accounted for 32% of the total farm holdings. In general, these farmers operate a mixed farming system, producing mainly for home consumption, and for some cash (see Chapter V). The milpa farmers lease land from the Government and from private landlords, cultivating mainly corn, beans and rice. Non-milpa small farmers with holdings between 2.0 ha and 20.3 ha (5 and 50 acres) constitute the largest group within the agricultural sector. They are concentrated in Corozal, Orange Walk, Stann Creek and Toledo districts. This group produces much of the food for domestic consumption, about 60% of the sugar cane and some citrus for export.

Holdings between 20.3 ha and 202.5 ha (50 to 500 acres) are, in general, operated by Mennonites who produce poultry, eggs, fresh milk, cheese and, to a lesser extent, vegetables for the domestic market. Holdings larger than 202.5 ha are mostly owned by corporations or by absentee landlords. Many of these holdings have not been brought into production and may be held for speculative purposes. Others have been farmed in a marginal way or occasionally rented to small farmers. These farms produce mainly sugar, citrus, bananas and mangoes for export.

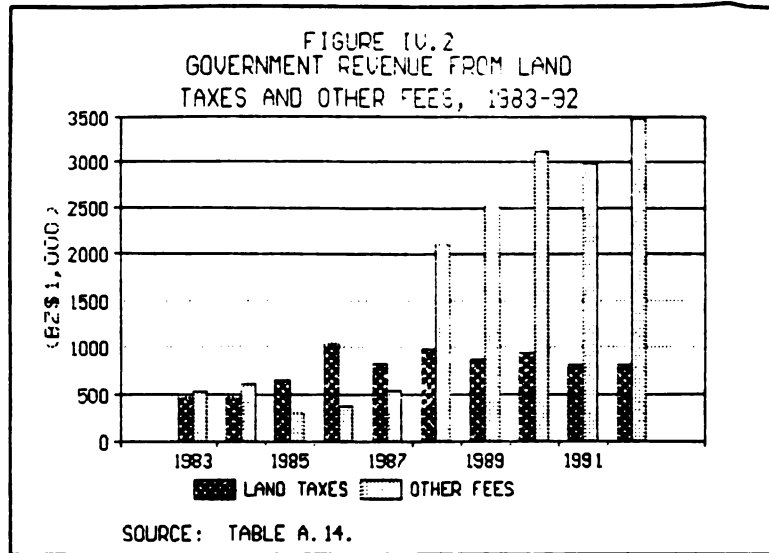
The utilization of public lands provides revenue to the GOB through land taxes, rents and various fees. The total revenue from land obtained in the 1983-92 period was approximately BZ\$27 million. Since 1988, land taxes have been a smaller proportion of total land revenue (FIGURE IV.2). Revenue from land purchase, registration fees, stamp duties, etc. increased significantly, from BZ\$0.3 million in 1985 to BZ\$3.5 million in 1992.

Although land revenue increased in the last decade, only a fraction of the total is actually collected. For example, it is estimated that at least 50% of land taxes have not been collected. The system of revenue collection is constrained by inadequate resources and support facilities. Government revenues from this source could be increased significantly, mainly through a modest investment in technology to facilitate information storage and monitoring of the situation<sup>61</sup>. Moreover, the schedule of fees for the land registry has not increased since its introduction in 1978, and needs to be adjusted to reflect changes in land values and inflation.

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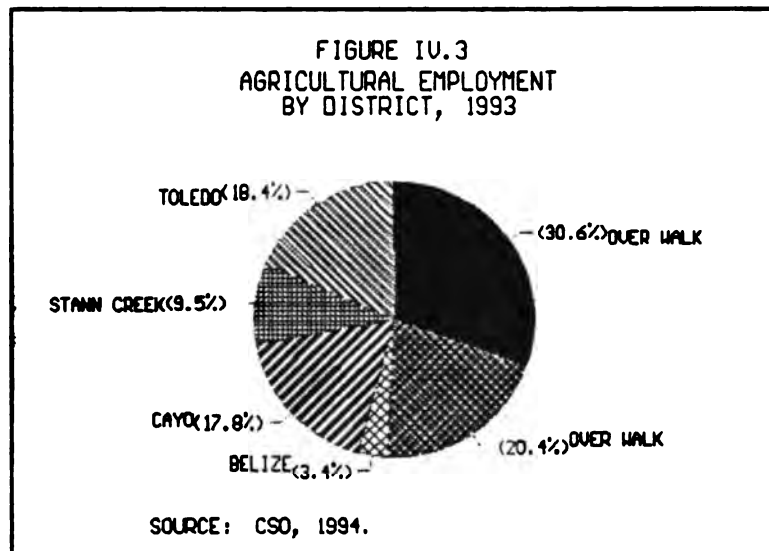
<sup>61</sup>

The land information system is expected to facilitate revenue collection.



#### 4.4 Employment and Wages

The agricultural sector (including forestry and fishing) is the largest employer of labor in the economy. According to a labor force survey in 1993, the sector employed 15,075 persons or almost 25% of the labor force<sup>62</sup>. Less than 5% of those employed in the sector were women. The districts accounting for most agricultural employment (FIGURE IV.3) were Corozal (31%), Orange Walk (20%) and Toledo (18%). Except for the Belize district, all other districts had most of their labor force employed in agricultural-related activities (Table A.15). The sugar industry continues to be a major employer in the sector, with illegal aliens from neighboring countries (mainly Guatemala and El Salvador) comprising a significant proportion of its labor force.



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This data is based on the CSO's labor force survey in October 1993.

In general, a large part of the agricultural labor force, estimated to range between 15% and 25% includes illegal aliens and refugees. In view of labor shortages in the sector, the government allows the use of foreign "guest workers" to supplement local labor. In addition, seasonal variations in agricultural labor demand provide the opportunity to hire migrant-temporary workers.

Wage rates for most categories of agricultural workers were relatively stable since 1980 (Table A.16). In 1992, the average wage rate for unskilled agricultural workers was BZ \$15/day, while similar workers in the industrial sector were paid BZ\$20/day. However, for most categories of workers, the rates have more or less stagnated since 1985, indicating a decline in real wage rates of at least 10%.

Wages in Belize are higher than those of neighboring countries. For instance, the rates for unskilled agricultural workers are estimated to be about three to four times higher than those of neighboring Central American countries<sup>63</sup>. This high labor cost is a factor that affects the development of many agricultural activities, reducing the country's competitiveness in both the domestic and export markets.

However, labor laws in Belize are relatively more liberal than those prevailing in the Central American region. In 1992, the government implemented a minimum wage law that sets the wage rate at BZ\$2.00/hour for manual workers in agriculture, agro-industry and export-oriented industries, and at BZ\$2.25/hour for other workers<sup>64</sup>. This rate, however, was not significant than that prevailing before the law was enacted.

#### 4.5 Infrastructure

The present road system consists of a network of 2,547 km, comprising 526 km of main roads, 610 km of secondary roads, and 1,411 km of feeder roads (Table A.17). Since 1985, only the feeder road network increased (426 additional km). The limited expansion in the roads network is partly due to a decline in the government's budgetary allocation to the Roads Department, from BZ\$ 3.3 million in 1985 to BZ\$ 2.8 million in 1993<sup>65</sup>. The lack of adequate roads in various parts of the country limits easy transportation of goods within Belize, as well as between Belize and neighboring countries. In addition to the limited expansion, most secondary and feeder roads are not maintained properly, particularly during the rainy season. Although this situation affects most areas of the country, it is more acute in the southern part.

Belize does not have a deep water harbor, and this limits the easy flow of goods into and out of the country. In Belize City, the port system cannot accommodate ships with a draw

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<sup>63</sup> IDB 1993.

<sup>64</sup> Statutory Instrument No. 44 of 1992.

<sup>65</sup> Information supplied by the Road Department.

greater than 17 feet. As a result, large vessels must anchor a mile offshore and cargo has to be brought in and taken out by smaller vessels, a slow and expensive operation.

Electricity is provided by the Belize Electricity Board (BEB), which operates diesel power plants at Corozal, Orange Walk, Belize City, Belmopan, Dangringa and Punta Gorda. The BEB maintains a monopoly on the generation, transmission, distribution and sale of electricity, and there is little prospect of free entry into this industry in the near future.

Presently, electricity is costly (US\$ 0.2/KWH) compared to its price in Mexico (US\$ 0.05/KWH) and in most parts of the USA (about US\$ 0.1/KWH). Moreover, many rural areas do not have electricity. Both its high cost and unavailability affect the development of agro-processing and cold storage facilities, critical for post-harvest activities and marketing<sup>66</sup>. Due to inadequate plant facilities and limited transmission lines, many potential BEB customers have invested in private power plants. Even in these cases, the cost of electricity is high because of the relatively inefficient generation facilities.

In spite of some additions in recent years, Belize's basic infrastructure needs further improvement if commercial agricultural activities are to expand, and domestic and international investors are to be attracted to the sector. At present, inadequate infrastructure results in production inefficiencies and high production costs, which are constraints to the growth of agricultural and agroindustrial production and reduce the country's competitiveness in external markets.

## **4.6 Agricultural Production**

### **4.6.1 Organization of Production**

Belize has a diverse and complex agricultural production system. There are approximately 14 major production systems, ranging from the slash and burn milpa system to large commercial activities (APPENDIX B). In the north, commercial farming, particular sugarcane dominates the production system. In the Belize valley and the central area, there are commercial mixed farming and mechanized grain production (by the Mennonites), while subsistence milpa farming accounts for much of the agriculture in the southern part of the country. Each production system has special characteristics related to resource use (land, labor, capital and management), production objective(s) and marketing.

Agricultural activities can be organized into two major groups, based on the marketing of their outputs: export-oriented activities that include the production of sugar cane, citrus, mango, banana, cacao, papaya and fish products (lobster, shrimp, conch, and frozen fish); and those that supply household needs and the domestic market, including production of corn, rice, red kidney beans, other food crops and livestock. Production is done by four main groups of

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<sup>66</sup> The GOB is currently developing a hydropower facility on the Macal river to supply electricity. However, although total electricity supply will increase, its price is likely to remain high.

farmers: (i) milpa-type farmers; (ii) permanent small farmers; (iii) medium-sized farms; and (iv) large farms.

There are between 6,000 and 10,000 farm households that practice milpa-type agriculture, most of whom are concentrated in the southern part of the country. Milpa farmers are a subset of small farmers, cultivating their crops using the slash and burn method. Their farming practices approximate subsistent-type farming, and have remained basically unchanged over the years. These farmers live in isolated rural areas and their farms are managed by the milperos (male farmers), their wives and sometimes by older children. The average farm size ranges between 10 and 20 ha, but only between 2 and 5 ha are farmed annually. Except for rice, generally considered a cash crop, they cultivate small amounts of corn, beans, fruit trees, vegetables, root crops and some livestock, primarily for home consumption.

Permanent small farmers make a significant contribution to the country's food supply, through the production of a variety of grains, pulses, vegetables, root crops and fresh meat (mainly pork and poultry) for the domestic market. Some of these farmers also produce sugarcane in the districts of Corozal and Orange Walk, while others grow citrus in the Stann Creek Valley. Mechanized farming practices and the use of modern inputs are not uncommon among some of these farmers, particularly those cultivating grains and export crops.

The group of medium-sized farms includes the Mennonites and "mixed farmers." The Mennonites are a religious community whose production activities are done in a communal way. The size of individual holdings varies, but can be as much as 120 ha per farm family. Their production activities are done in an integrated manner, and the scale of operations is large and fairly efficient. These farmers share machinery and labor services, and jointly purchase inputs and market their products. Their production system is market-oriented, and activities are significantly integrated (particularly at Spanish Lookout), using modern technologies. Outputs include chicken, corn, rice, beans, milk, cheese and some vegetables, most of which are sold in the domestic market.

The "mixed farmers" are located mainly in Cayo, Corozal and Orange Walk among the Maya indians. They are estimated to be around 1,000 farm families. The farm size of this group varies between 10 and 40 ha, and they use some mechanization, grow a diversified group of crops, and have access to credit and modern technology.

In addition, there is a group of medium-sized farms using mechanized agriculture, growing mainly sugarcane, rice or citrus on plots, ranging between 6 and 20 ha in size. It is estimated that between 300 to 400 of these farmers cultivate rice in the Toledo and the Stann Creek districts, about 3,000 produce sugarcane in Orange Walk and Corozal, and approximately 350 grow citrus in the Stann Creek and Cayo districts.

Some of the large farms are owned by individuals, but the majority are under corporate ownership. Their average size exceeds 50 ha, and they usually specialize in sugarcane, citrus, mango, banana, rice and cattle production.

#### 4.6.2 Evolution of Agricultural Production

Historically, Belize's agricultural sector (including fishing and forestry) has been the most important sector of the economy, and an important source of the country's growth, employment and foreign exchange earnings. During the 1980-93 period, the average annual GDP growth rate was 4.6%, while that of the agricultural sector was 4.3% (TABLE IV.2). The corresponding growth rates for the livestock and fishing sub-sectors were much higher, almost doubling that of the overall agricultural sector. Only the crop sub-sector recorded lower growth, averaging 3.6% per year in the period.

TABLE IV.2  
AVERAGE GROWTH RATES FOR THE AGRICULTURAL SECTOR,  
1980-93 (%)

SECTOR	PERIODS		
	1980-86	1987-93	1980-93
AGRICULTURAL SECTOR:	0.1	8.5	4.3
CROPS	0.8	6.3	3.6
LIVESTOCK	7.5	9.4	8.4
FORESTRY	-8.9	19.8	8.2
FISHING	-0.6	13.2	5.8

SOURCE: CSO 1994.

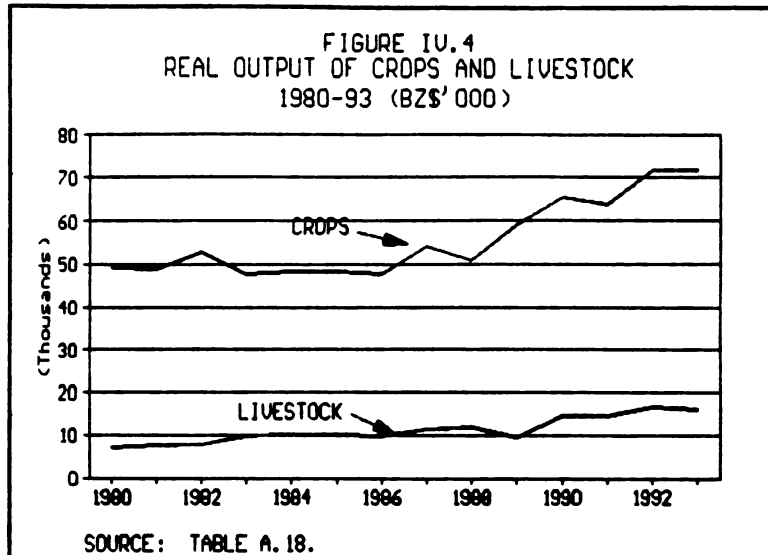
Based on the trend in the sector's growth, the 1980-93 period can be divided in two sub-periods: 1980-86 and 1987-93. The major characteristic of these two sub-periods indicate that growth was generally stagnant (except for the livestock sub-sector) in the first, but very significant in the second period. Although the forestry and fishing sub-sectors recorded negative average growth rates in the first sub-period, they experienced the highest rates in the second.

The sector's share in GDP has remained relatively stable in the last decade, averaging about 20%. In 1993, however, its contribution to total GDP declined to 19%. The share of the crop and livestock subsectors experienced a slight decline, while that of forestry increased marginally in the period (TABLE A.1). Currently, the sector employs 25% of the total labor force and contributes approximately 65% of the country's foreign exchange earnings.

**Crop production:** This includes the production of the four major export crops (sugarcane, banana, citrus and cacao), and various staple crops for domestic consumption (corn, beans, rice, root crops, vegetables and fruits). In the 1980-93 period, crop production averaged 3.6% growth per year, accounted for more than 50% of the value-added in the sector, and contributed between 10 and 15% to total GDP. The trend in real output was cyclical, but generally upward in the period (FIGURE IV.4). Except for sugarcane production, the overall performance of the export cropping sector in the 1980-93 period was good.



**Sugarcane** is the most important crop cultivated, being the largest contributor to GDP and foreign exchange earnings. It is a smallholder crop, produced by almost 5,300 farmers concentrated in the Corozal and Orange Walk districts. Since 1980, the area cultivated ranged between 23,100 ha and 26,330 ha, with the highest recorded in 1993.



Except for the 1985-89 period, when its production fell below 1 million metric tons (mt), production was relatively stable since 1980, averaging almost 1.1 million mt per year (TABLE A.19). Yields were the lowest in the region, ranging from 37 to 39 mt/ha, but processing efficiency was good. Despite a production decline in the second half of the 1980s, lower production costs and improved prices in this period contributed to annual increases of almost 19% in nominal value-added. In recent years, there were fairly steady increases in production, but prices declined. Production was affected by climatic conditions, management, low prices, an inefficient transportation system, reduction in the preferential quotas in the USA market and the uncertain future of the quota markets.

After sugar, citrus is the second most important crop. The farms are concentrated in the Stann Creek valley, but cultivation also expanded in the Cayo and Toledo districts. Since 1986, the total area cultivated increased almost sixfold, reaching 27,977 ha in 1993 (TABLE A.19). The industry comprises about 400 citrus growers and two processing plants (Citrus Company of Belize and Belize Food Products Ltd.) located in the Stann Creek district.

Oranges and grapefruit are processed for export. Since 1980, output of both products almost doubled. Output of oranges increased from 1.1 million boxes in 1980 to 1.8 million in 1993, while that of grapefruit grew by nearly 150%, from 0.4 million boxes to 1.0 million. This growth is largely attributed to the preferential access to the USA market which Belize enjoys under the Caribbean Basin Initiative (CBI). Notwithstanding the significant growth in output during the period, Belize has more potential to increase production. Yields could be increased

with more efficient management of farms. Some holdings have aged badly and cultivation practices such as spraying, fertilizing, pruning and soil preparation have not been efficient. The industry's major constraints include price fluctuations and the constant threat of the Tristeza virus.

Banana is Belize's third major export crop. It is concentrated in the Stann Creek and Toledo districts, where the total area farmed ranged between 1,760 ha and 2,500 ha since 1990. In the 1980-93 period, output increased significantly, from 0.8 million boxes<sup>67</sup> to 2.1 boxes (TABLE A.19). This growth was due to extensive plantings of disease-resistant varieties in the Stann Creek and Toledo districts begun in the early 1970's, a guaranteed market with the UK through a long-term contract with Fyffes Group Ltd., and higher export prices. In the second half of the 1980s, the increases in output averaged 32% per annum alone. In the 1990s, the production trend has been mixed, but output increased by almost 25% in 1993, as compared to 1990.

However, banana production is not as competitive as that of other Latin American countries. Yields are lower in Belize, averaging between 50% and 60% of that achieved in those countries; their production costs are 60% to 70% of those of Belize. The industry is affected by low yields, insufficient drainage and irrigation, and the constant threat of the Black Sigatoka disease. Moreover, there is uncertainty about the guaranteed UK market in the future, due to implementation of the single EC market, and proposals by other Latin American exporting countries to have open competition among banana producers in the European market.

Since 1980, commercial production of cocoa has become significant, even though the land for its cultivation was cleared shortly after the Hummingbird Highway was opened in the 1950s. Production increased almost fifteen-fold in the 1980-93 period, from 5 mt in 1980 to 72 mt in 1993<sup>68</sup>. However, production is costly and Belizean farmers need to adopt improved production techniques.

Corn is one of the most important domestic crops in Belize. It is used mainly for feed consumption (poultry and pigs) and for food by the Maya Indians. Although it is cultivated throughout the country, a large proportion of the output comes from the Cayo, Orange Walk and Corozal districts. The production system varies between locality and farmers, ranging from the mechanized system used by the Mennonites and some small farmers to the milpa system.

Belize has become self-sufficient in corn. In the 1980-93 period, although corn production fluctuated significantly, there was an overall upward trend (TABLE A.19), due to new lands brought into production and the use of improved technology by Mennonite farmers. These

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<sup>67</sup> Each box weighs approximately 42 lbs or 19.1 kgs.

<sup>68</sup> Production has decreased in recent years due to a cessation of operations by Hershey Foods.

farmers have achieved an estimated yield<sup>69</sup> of 2,694 kgs/ha compared to between 1,120 to 1,260 kgs/ha obtained by milpa farmers. The contribution of milpa production to total output has declined due to higher productivity and expanded cultivation by non-milpa farmers, as well as declining productivity by some milpa farmers. Belize has potential to increase output if more improved technology is used by non-Mennonite farmers.

Rice cultivation is concentrated in the Toledo and Belize districts and is subsidized<sup>70</sup>. The main production systems in the country are upland rice in the south, mechanized rainfed and lowland production in the south, mechanized cultivation at Blue Creek (in Orange Walk) and irrigated rice in the north and Belize district. The different production systems have varying cultural practices, which result in different yields and quality of both paddy and processed rice. For example, productivity under the milpa system ranges from 1,120 kgs/ha in Orange Walk to 1,700 kgs/ha in the Toledo district. The corresponding yields for mechanized production in these districts are almost twice those of the milpa system. It is estimated that about 25% of the total rice output comes from the milpa-type production system. In the Toledo district, approximately 60% is produced by milpa farmers, who cultivate both upland and rainfed rice.

Since 1980, paddy production has fluctuated between a low of 4,100 mt and 10,000 mt per year, primarily due to weather fluctuations and other production problems. In the last two years, total output increased significantly, by 38% in 1992, and almost 47% in 1993 (TABLE A.19). Subsidies to production activities and high producer prices contributed to the expansion in paddy output<sup>71</sup>.

Since 1986, output of processed rice has increased steadily (except for 1990)<sup>72</sup>. In 1993, production was 5,300 mt, almost twice the 1986 level, and the country is expected to have a surplus of rice in the current crop year. However, production is characterized by low paddy yields and poor grain quality. Experiments indicate that productivity can be increased significantly with better land preparation, improved technology (including high-yielding varieties) and crop management practices.

Edible beans, mainly red kidney beans (RK beans), are a staple crop cultivated throughout the country by both milpa and mechanized farmers. Approximately 90% of the country's production comes from the Cayo and Orange Walk districts. Although production fluctuated between 1,100 mt and 4,200 mt in the last decade, Belize is considered to be self-

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<sup>69</sup> Perry and Woods, SPEAR Report (1991).

<sup>70</sup> The production subsidy is higher in the Toledo district. All aspects of production are subsidized - from land preparation to transportation.

<sup>71</sup> Belize's rice is not competitive with those on the world market. Current paddy production cost is estimated to approximately BZ1.30 per kg, which is higher than the equivalent price of rice on the world market.

<sup>72</sup> Paddy produced from Toledo area is processed at the Belize Marketing Board's facility at Big Falls Ranch.

sufficient in **RK beans**. Since 1980, output increased more than twofold, with significant growth occurring in the second half of the 1980s. Much of this increase was the result of an increase in the area cultivated rather than higher yields<sup>73</sup>. In recent years, production fluctuated around 3,000 mt. Factors which affect its production include adverse weather conditions and frequent incidence of rust and web blight, which affect yields.

**Oilseeds** such as soybeans, peanuts and sesame are important import substitution crops. They provide vegetable oil for human consumption and supply protein for livestock production. Experiments on soybean and sesame cultivation by the Caribbean Agricultural Research and Development Institute (CARDI) started in the early 1980s. However, soybean production steadily expanded from 19 mt in 1987 to 280 mt in 1991 as a result of expanded cultivation in the Cayo and Corozal districts. Commercial production is constrained by a lack of a processing facility (for oil and meal production), absence of higher yielding varieties, and appropriate technology to grow it as a second crop (in rotation with other grains, particularly corn).

Cultivation of peanuts (which started in 1987) expanded in the late 1980s to almost 200 ha, but declined to less than 100 ha in the 1990s. Production fluctuated between a low of 116 mt in 1990 and a high of 214 mt in 1987<sup>74</sup>. Although a technological package has been developed, production is affected by lack of an appropriate quality product and market conditions.

The production of other crops like fresh vegetables (tomatoes, cabbages, peppers, cucumbers, lettuce, carrots and the like) is limited and seasonal. Most of these are grown on small plots for local consumption, and are cultivated from November to February, the coolest months of the year. The off-season shortages are compensated by imports, mainly from Mexico and Guatemala. Since the late 1980s, the Ministry of Agriculture (MOA) has made efforts to increase production of these crops through extension activities.

**Livestock and apiculture production:** The livestock subsector consists of beef, pork, poultry, and egg production. In the 1980-93 period, this subsector experienced the highest annual growth rate (8.4%) compared to the other subsectors in agriculture. Except for 1986 and 1989, total output has trended upward in the period (FIGURE IV.4). Real production (in value terms) doubled in the period due to expansion in beef cattle, pigs, poultry and milk production. In the first half of the 1980s, higher beef prices and significant increases in poultry production contributed to a higher output of the livestock sector. Since 1985, although total output continued to increase, much of this came from the poultry and dairy sub-sectors.

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<sup>73</sup> High-yielding red kidney bean varieties are not well adapted to the country's agroclimatic conditions, due to disease problems.

<sup>74</sup> Sinha 1991.

Despite the overall upward trend in livestock output, the production systems of non-Mennonite producers are characterized by low productivity, due to the use of low levels of technology and inefficient management. Other factors affecting the sector's development include: (i) insufficient short- and medium-term credit; (ii) inadequate research and technology transfer and extension; (iii) high input costs due to high tariffs and high transport costs; (iv) an oligopoly market structure; (v) small size of the domestic market; (vi) marketing constraints; (vii) absence of grades and standards to meet both domestic and export market requirements; (viii) low beef and swine/feed price ratio (3.6/1 and 6.2/1, respectively) compared to USA ratios (14.2/1 and 14.1/1 respectively)<sup>75</sup>; (ix) inadequate slaughter and processing facilities.

The cattle subsector is the largest, in terms of the animal population (TABLES A.20 and A.21). In the 1978-88 period, the cattle population increased moderately, before expanding significantly in the last five years. Most of the country's cattle is concentrated in the Orange Walk and Cayo districts, which together accounted for nearly 80% of the cattle population in 1992.

Traditionally, the Cayo district was Belize's major beef producer but it has now been replaced by the Orange Walk district. Production is done by different groups of farmers. Subsistence farmers have a few head of cattle, which serve as a source of cash for emergencies. The common beef cattle producers are small farmers who have less than 20 heads, and medium-sized farmers who own between 20 and 80 heads. There are few large farmers having more than 100 heads, and the cattle on these enterprises represent a significant proportion of the country's cattle population. Some of these farmers are in the Orange Walk district, where they rear between 500 and 1,800 heads of cattle.

Through its livestock stations, the government has been offering artificial insemination service to improve the genetic quality of cattle. Pure-bred Brahman cattle from the United States, Mexico, Guatemala and Costa Rica were imported to upgrade the quality of the country's beef herd. In the last two years, more than 150 young bulls of good genetic quality were sold to farmers around the country.

Cattle production comprises two components: animals slaughtered mainly for domestic consumption and cattle exported. Although the latter play a significant role in total output, the growth of the industry is largely influenced by meat production for the domestic market. In the 1980-93 period, both cattle production and the number slaughtered traced a cyclical trend. Animals slaughtered varied between a low of 5,800 heads in 1983 to a high of 8,700 in 1992 (TABLE A.19). In the 1980s, beef production averaged nearly 1.1 million kgs per year, but this increased to almost 1.5 million kgs annually since 1990. While the increase in beef prices was a major factor responsible for higher output, the subsector's development has been constrained by several factors. These include inadequate slaughterhouse facilities, inefficient pasture management, reduction in support services by the MOA, high costs of imported inputs (due to

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<sup>75</sup>

Deans 1987.

high tariffs on materials such as wires, staples, medication, wormers, chemicals, etc.), inadequate markets, poor infrastructure, and absence of a system of grades and standards. Due to inadequate facilities, a large number of unreported slaughterings take place each year.

Milk production is concentrated in the Cayo and Corozal districts, which together supplies nearly 99% of the country's output. In 1992, there were approximately 200 farmers with a total of 1,150 dairy cows involved in milk production in the country. Much of the output comes from small farms, ranging from 2 to 20 heads, and the yield per cow averaged about 9 kgs per day. Since 1980, production more than quadrupled to 1.3 million kgs in 1993 (TABLE A.19). This growth resulted from a market expansion for fluid milk and investments in cooling equipment in the country's two processing facilities: Western Dairies, owned by the Mennonites at Spanish Lookout, and Macal Dairy, located in the Cayo district<sup>76</sup>. In 1993, these facilities sold 934 mt and 185 mt respectively of processed milk.

Dairy production is affected by several factors, including: (i) inefficient pasture management; (ii) inadequacy of extension support; (iii) absence of laboratory services to test and maintain milk standards; and (iv) untimely delivery of milk for processing (particularly in the case of one processing plant). Despite the MOA's efforts to provide artificial insemination, pasture nurseries and animal stock to develop the dairy sector, trade policies favored the importation of cheaper dairy products which affected local production<sup>77</sup>. Moreover, local production affected full capacity utilization of the processing plants (particularly Macal), and was constrained by the small size of the domestic market.

Pig production is done by a large number of farmers engaged in extensive as well as backyard farming operations, using mainly local breeds. The larger operations are located in the Cayo, Orange Walk, Corozal and Belize districts. At present, less than 200 farmers are involved in the production of improved-quality pigs, with the size of their operations ranging from 5 to 70 sow units. The number of pigs slaughtered increased from 6,500 in 1981 to 11,000 in 1993. Pork production increased steadily in the 1980s, and exceeded 0.5 million kgs in the 1990s (TABLE A.19). The major constraints of this subsector include the high cost of feed, inadequate infrastructure, limited replacement stock of improved breeds and an increase in unreported pig slaughterings due to insufficient slaughterhouses.

The poultry subsector has been the most successful livestock subsector in the last decade and the country has become self-sufficient in poultry meat. The industry is based on imported feed concentrates supplemented by local ingredients. There are few non-Mennonite Belizean producers involved in the industry; it is more or less a monopoly dominated by the Mennonites. Despite the efforts of some cooperatives and small farmers to become involved in production,

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<sup>76</sup> Western Dairy's plant capacity is approximately 1,500 gallons/day, compared to 400 gallons/day for the Macal plant.

<sup>77</sup> Previously, the milk import policy did not allow importation of fresh milk. However, the Macal dairy was allowed to import UHT milk and utilize profits from its sale to improve its facilities. Presently, permission has been given to one merchant to import liquid milk. Powdered milk is still imported.

they have not been able to successfully compete with the more efficient operations of the Mennonite farmers.

In 1960, commercial production was practically non-existent; by 1980, output was nearly 2.0 million kgs, and this expanded almost fourfold to 7.6 million kgs in 1993. This growth resulted from the extensive poultry operations by the Mennonites in the Spanish Lookout, Blue Creek and Shipyard areas, where production is concentrated. Their production systems utilize improved technology, and are well integrated with their grain production, commercial feed manufacturing and meat processing operations. In general, the subsector is constrained by inadequate legislation governing production, insufficient resources for training and monitoring, and inadequate facilities for diagnosis and meat testing.

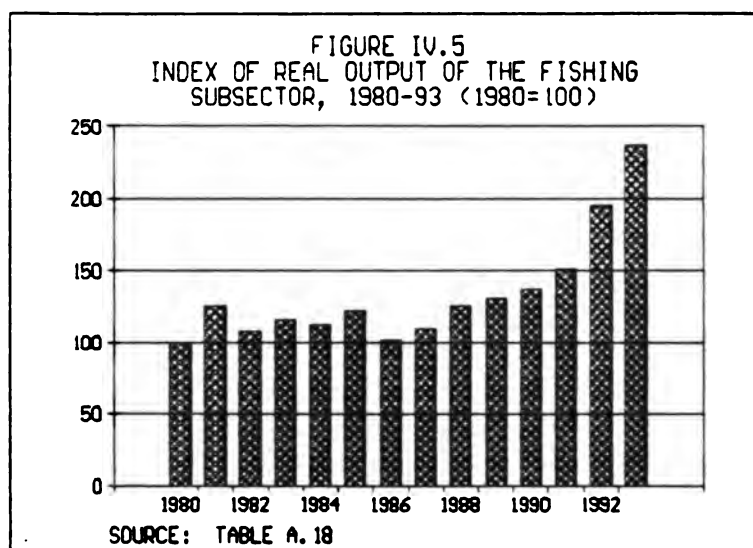
As in the case of poultry, the Mennonites produce a major proportion of the eggs consumed in Belize. The trend in output paralleled the growth of the poultry industry, due to the use of improved technology and management. Since 1980, output from domestic sources expanded rapidly in response to local demand, averaging an increase of almost 2% per annum to reach 2.3 million dozen in 1993. At the same time, imports of eggs (most of which are for hatching) declined significantly; in 1993, imports were only about 4% of those in 1980.

Honey is produced by five main cooperatives, but the majority of producers are located in the northern districts. It is primarily an export-oriented product, but this has been declining for several years (Table A.19). Production increased from 70 mt in the 1970s to peak at 308 mt in 1986. Thereafter, output declined steadily to 55 mt in 1993, less than 10% of the 1980 level. The number of producers declined to fewer than 100, while hives declined from 11,000 in the 1980s to approximately 1,200 in the 1990s. The invasion of the Africanized bees in 1987 and the inability of most producers to manage these bees resulted in closure of many hives. Other factors that affected production included aerial spraying to eradicate marijuana plants, inadequate training for managing the Africanized bees, and insufficient credit.

**Fish production:** The fishing subsector performs an important role in Belize's economy, providing employment for a large number of people, generating a substantial amount of foreign exchange, and providing food for local consumption. Most fishing activities take place inside the barrier reef around Glovers, Turneffe and Lighthouse reefs. The concentration of the fishing activities in this region resulted in some species being harvested near to or above their maximum sustainable yield.

The fishing industry is a small-scale commercial one, utilizing about 800 boats and providing jobs for more than 3,500 fishermen. Most fishermen are members of a fishing cooperative, which provides fishing equipment and soft loans to its members. Fishermen deliver their catch to the cooperative, which in turn processes, packages and markets the product. Presently, there are eight functional fishing cooperatives in Belize, all under their umbrella organization, the Belize Fishermen Cooperative Association (BFCA).

Although the relative contribution of the fishing subsector to GDP increased marginally since 1980 (from 2.8% to 3.6% in 1993), real output expanded almost 6% per annum, and the subsector's contribution to primary production almost doubled. Real output (including fish and shrimp) more than doubled in the 1980-93 period (FIGURE IV.5), reaching 1.1 million kgs in 1993. Between 1980 and 1986, output fluctuated, but steadily increased since 1987, with large expansions of almost 29% in 1992 and 22% in 1993 alone. In addition, production of the five major fish types (finfish, lobster, conch, shrimp and scalefish) recorded significant increases in output, particularly the crustacean species. Between 1986 and 1993, the growth in output of crustaceans alone averaged 7% per annum. The strong performance of the fishing subsector was due to the high export prices for the country's marine products.



Lobsters are fished from shallow water (less than 6 meters). About 75% are caught by unbaited traps and 25% by skin divers using hooked sticks. The official figure on the amount of lobsters caught is not precise, but it is estimated that more than 20% of the production is unreported. Since 1984, lobster production was cyclical, but output declined in recent years, to reach 200 mt in 1993 (TABLE IV.3). Both the demand and lobster prices have significantly increased in the export markets, and the number of fishing licenses issued almost tripled in the last 15 years, from 1,200 in 1979 to 3,500 in 1993. Parallel to this expansion in the number of vessels, the licensed fishermen already in operation enlarged their activities. In some cases, the number of traps per fisherman increased almost three times from one season to the next.

In the last decade, Belize has developed an important conch industry. This shellfish has been a traditional food and an important protein source in the diet of the people. In the second half of the 1980s, output declined, but expanded steadily in recent years to more than 200 mt (TABLE IV.3). However, the conch fishery is believed to be overexploited, which could affect its sustainability. Since 1977, regulations were implemented to limit conch fishing including: (i) a closed season from July 1 to September 30 each year; (ii) an annual quota of 296,000 kgs; and (iii) conch harvested should have a minimum of 18 cm. of shell length. In addition, the



conch fishery faces other problems such as illegal exportation by domestic fishermen, illegal fishing by foreigners, who catch undersized conch, and inadequate law enforcement and patrol activities in the national waters.

TABLE IV.3  
PRODUCTION OF MARINE PRODUCTS, 1985-93 ('000 KGS)

PRODUCT TYPE	1985	1986	1987	1988	1989	1990	1991	1992	1993
LOBSTERS	328.0	235.9	226.3	253.3	290.9	208.4	278.7	253.2	200.9
CONCH	175.9	116.0	120.2	145.9	95.6	179.3	207.9	210.1	211.0
SHRIMP	47.9	117.7	111.4	143.0	197.9	223.1	240.9	540.6	515.4
FIN FISH AND FILLET	259.0	339.9	425.6	392.1	357.2	345.9	349.5	278.6	191.0
OTHERS	6.0	5.6	7.8	6.8	10.6	15.1	3.1	3.5	4.0
TOTAL PRODUCTION	816.8	815.1	891.3	941.1	952.2	971.1	1,080.1	1,286.0	1,122.3

SOURCE: DEPARTMENT OF FISHERIES, MOA.

Finfishing is done during a short period in the months of December, January and February. Total production declined in recent years; in 1993, it was less than 50% of the peak production of 426 mt achieved in 1987. A large proportion was shipped to Jamaica and the USA in the form of fillets, whole fish (fresh and frozen), and some salted. Factors that prevented effective management of this fish include: (i) insufficient information to identify the maximum sustainable yield of the fishery; (ii) inadequate enforcement of regulations and surveillance activities to prevent illegal fishing by foreigners and domestic fishermen; (iii) insufficient financing of activities to promote more efficient operations; and (iv) insufficient training of small-scale fishermen regarding harvesting techniques.

In recent years, the structure of the fishing industry has been changing, with shrimp production almost doubling in the period. The output has come both from the shrimp catch at sea and an expansion in inland shrimp farming<sup>78</sup>. Trawling has been the primary method of harvesting shrimp, and has been done exclusively through joint venture agreements between the fishing cooperatives and Honduran business operators. Over the years, shrimp trawling operations in Belizean waters have increased, threatening sustainability of the resource base.

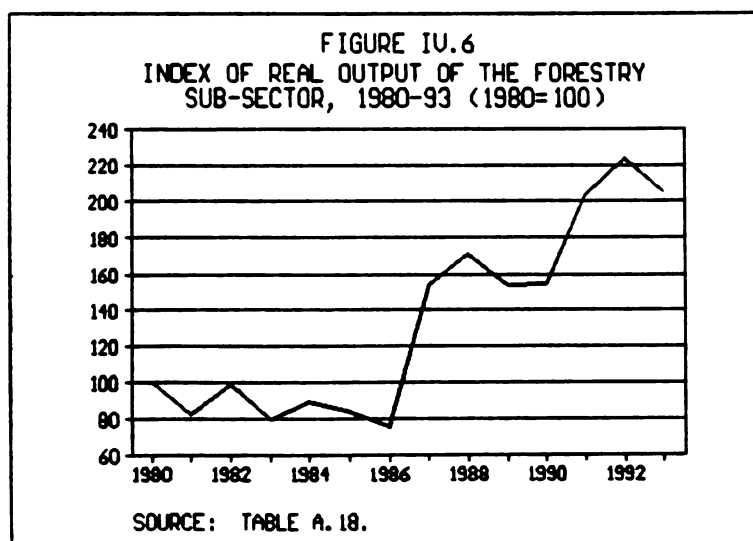
In addition, there are inland fishing operations comprising six shrimp farms and a fresh water aquarium farm. Shrimp farming (mariculture) began in 1982 under foreign ownership, but its development has been slow due to financial constraints. Presently, the area under shrimp farming ranges between 450 and 600 ha, and the production systems range from semi-intensive to very intensive. Yields of shrimp tails per ha. per harvest in the semi-intensive system was between 300 kgs to 900 kgs; in the very intensive system, they ranged from 1,360 to 1,900 kgs. Both feed and a high proportion of the seed stock are imported.

<sup>78</sup> In recent years, much of the increase in shrimp output has come from shrimp farming.

Shrimp farm performance was below expectations due to certain constraints, including insufficient technical staff and financing; expansion plans have not fully utilized the experiences from the previous pilot operations. Nevertheless, shrimp farming is a profitability activity and production could be enhanced through: (i) product differentiation; (ii) identification of new market opportunities abroad; (iii) improved quality and supply of seedstocks and feed for farming; (iv) reduction in the market transaction costs; and (v) expansion of the domestic shrimp processing capacity.

Although the country's fisheries have much potential for development, their resource bases are threatened by development activities. Destruction of coastal habitat is increasing, as coastal development occurs to meet the needs of an expanding tourism industry, and to establish residences for local people. This reduces areas of high biological productivity, such as sea grass and mangroves. Moreover, increased tourist activities on the reefs and pollution around those areas will affect fish habitats. Other critical areas to be addressed for ensuring sustainability of the resource base include: (i) availability of more information on the status of the resource; (ii) stronger institutional capabilities for enforcing regulations and reducing illegal fishing activities; and (iv) enforcing restrictions for entry into certain fishing activities.

**Forestry production:** The forestry subsector makes a small contribution to the country's GDP. Except for 1988 (when its contribution was greater than 3%), forestry accounted for an average of 2.3% of the national output per year in the 1980-93 period. However, in absolute terms, the sector's growth was very significant, averaging about 8.2% per annum. The trend in real output was somewhat cyclical, trending downward in the first half of the 1980s, but it reversed dramatically afterwards to record a growth rate of almost 20% per annum between 1986 and 1993 (FIGURE IV.6). In the last year, output declined, primarily due to a reduction in mahogany production.



Total production rose from 1.6 million board feet in 1980 to nearly 3.5 million in 1993 (TABLE A.22). The most important timbers harvested were mahogany, cedar and pine. The production of both mahogany and cedar experienced a downward trend during the 1980-86 period, but increased significantly afterwards. Due to the long history of logging operations in Belize, there are indications that mahogany production will not be sustainable in the future. In the early 1980s, the Belize Estate Company (BEC)<sup>79</sup> sold its plot of timber land, and the remainder of the mahogany resource has become smaller and economically inaccessible.

Pine production almost tripled during the 1980-93 period. The output increase was significant, particularly in the second half of the 1980's, due to: (i) protection of the domestic market from imports; and (ii) exploitation of local pine resources when land was cleared for agricultural activities. However, measures to protect the local pine industry were not completely successful. The import restrictions imposed a cost on consumers by increasing the domestic product price beyond that of the world market. In addition, some entrepreneurs were granted licenses to import pine wood.

The production cost of lumber in Belize has escalated in the last two decades, primarily due to: high wage rates; high overhead costs in relationship to the low volume produced by each enterprise; inefficient technology; poor lumber quality; low yields on private lands; reduced accessibility to timber resources; and the high cost of construction of roads to facilitate exploitation of the resources<sup>80</sup>.

There are concerns that the upward trend in timber production in recent years is unsustainable, due to a scarcity of mahogany trees and the possible reductions in supply coming from private lands in the north of the country, after the current harvesting cycle is completed<sup>81</sup>. The problem is compounded by an absence of adequate forest data and yield, hindering an accurate estimation of the country's timber potential<sup>82</sup>.

According to a preliminary survey carried out by the Belize Forest Department, the country has 11,501 km<sup>2</sup> of potential timber resources (TABLE A.23). Approximately 86% of this area lies outside the forest reserve areas. Within the forest reserve are found 11% of the hardwood timber and 72% of the pine resources, a substantial long-term supply of softwood lumber.

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<sup>79</sup> BEC was a major lumber producer.

<sup>80</sup> In recent years, high production costs, together with the protection granted to this subsector, resulted in the FOB price of Belizean pine being almost twice the cost of USA's southern pine.

<sup>81</sup> Smith 1991.

<sup>82</sup> The last national assessment of Belize's vegetation was carried out in 1959 as part of the land-use survey of the country.

## **4.7 Agro-Industrial Production**

Agro-industrial activities in Belize consist primarily of the production of sugar and molasses, citrus concentrates, fertilizers, dairy processing, flour milling, various beverages, wood processing, dehydrated fruits and small food processing operations. The dominant activity is sugarcane processing, which accounted for an average of 24% of the industrial output in recent years. Citrus processing has contributed between 10 and 12%.

Besides the traditional export-oriented agro-industrial activities, there are several processing operations that are dominated by small enterprises. In the last decade, the number of small processors involved in the production of a variety of products such as pepper sauce, jams, peanut butter, fresh-squeezed juices and yogurt has increased. However, development of these enterprises has been affected by: (i) costly imported inputs; (ii) the small scale of their operations; (iii) inefficient technology; and (iv) low product quality (for some products).

In 1990, the agro-industrial sector employed 3,429 workers or 53.7% of the total labor force employed in the manufacturing sector (TABLE A.24). In that year, the export-oriented activities (sugar and citrus juices) accounted for 17.6% of the total employment in the manufacturing sector, while the agro-industrial import substitution activities (meat processing, dairy products, sawmills, etc.) employed 36.1%.

Almost the entire agro-industrial sector is heavily dependent on preferential access to external markets abroad, or from measures applied to protect the domestic markets (import license and high import duties for close substitutes). As a result, the sector is highly vulnerable to any changes in the external markets or reduction in the policy measures to facilitate competition with imports.

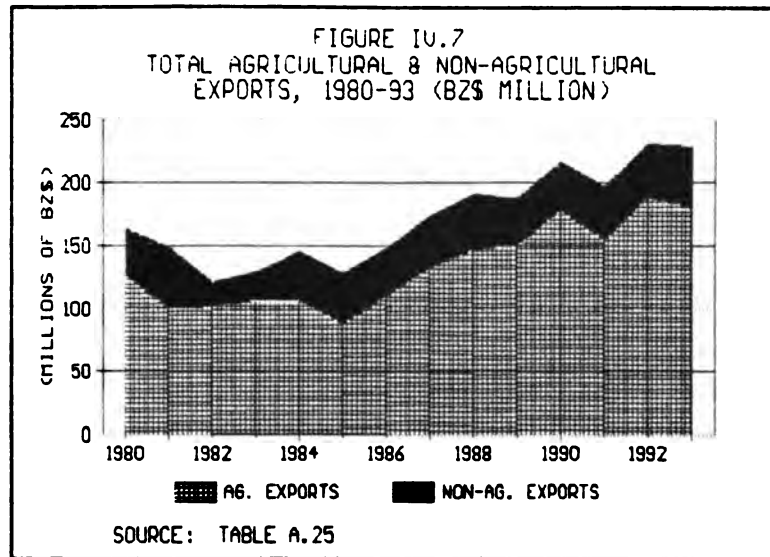
In addition to the above, agro-industrial production is constrained by: (i) the small size of the domestic market; (ii) high input costs and low productivity; (iii) production inefficiencies due to high effective protection; (iv) unreliable supply of raw materials; (v) an inefficient marketing system; and (vi) competition from cheaper imports.

## **4.8 Agricultural Trade**

### **4.8.1 Exports**

Traditionally, the major agricultural exports of Belize were sugar, citrus concentrate, marine products, bananas and forestry products. In the 1980-93 period, the share of these products in total foreign exchange earnings remained fairly stable, averaging about 77% per year (FIGURE IV.7). Since the late 1980s, non-traditional agricultural exports have increased significantly (TABLE A.26), partly due to agricultural diversification activities developed by the Belize Agribusiness Company (BABCO) and the Belize Export Investment Promotion Unit (BEIPU), with financing from USAID and support from the MOA. Of the non-traditional

exports, molasses and papaya are the most important, contributing more than 90% to the foreign exchange earnings of this group.



Sugar has been Belize's single most important agricultural export. A large proportion of it has been exported to the UK and to the USA on concessionary terms, at almost twice the world market price (TABLE A.27). Except for a few years, a significant portion was also exported to the Canadian market. Notwithstanding the higher guaranteed prices, the value of sugar exports declined by almost 14% in the 1980-93 period; as a proportion of total exports, it declined from 58% in 1980 to 36% in 1993. This reduction is due to a decline in the average export price received by Belize, lower quantities exported, a reduction in the USA market quota, and substantial increases in the exports of other agricultural products, particularly citrus concentrates and marine products.

The exports of other major agricultural products expanded significantly in the 1980-93 period. Compared to the 1980 level, the export earnings of these products in 1993 increased by 150%. Except forestry products, the export values of citrus concentrate, bananas and marine products more than doubled (TABLE A.25). Higher prices and preferential access to external markets accounted for the significant expansion in both production and exports.

The main traditional export markets for citrus concentrate were the USA (under the CBI arrangement) and Caribbean Community (CARICOM) countries. In recent years, increasing amounts were also sold to European countries. Besides higher export prices, the expansion in banana exports was facilitated by the privatization of banana farms started in 1985, considerable investment in field renovation, improvements in infrastructure and increased fertilizer use.

Since 1985, the volume of marine products exported steadily increased (TABLE IV.4), averaging nearly 8% per year. Higher prices and the overall expansion in the export market for marine products, particularly the USA were the main propelling factors in the growth of Belize's production and exports. The major products exported were lobster (including lobster meat), shrimp and conch; smaller quantities of whole fish, fish fillet, crab and aquarium fish were also sold abroad. The growth in shrimp farming contributed to higher shrimp exports in recent years. Besides the USA, other important external markets were CARICOM and the Central American countries.

TABLE IV.4  
EXPORTS OF MARINE PRODUCTS, 1985-93 ('000 KGS)

PRODUCT TYPE	1985	1986	1987	1988	1989	1990	1991	1992	1993
LOBSTER	315.8	222.4	213.1	238.4	274.0	192.9	243.6	237.8	195.0
CONCH	168.3	105.6	113.1	137.4	86.0	165.7	156.0	196.2	192.7
SHRIMP	45.8	107.2	99.5	125.1	177.6	198.1	231.3	411.5	631.5
FIN FISH AND FILLET	101.6	174.2	294.5	259.3	206.8	182.9	186.6	173.3	68.0
OTHERS	5.1	4.2	5.9	3.4	6.8	10.9	0.2	0.4	1.2
TOTAL EXPORTS	636.6	613.6	726.1	715.6	751.2	750.5	817.7	1,019.2	1,088.4

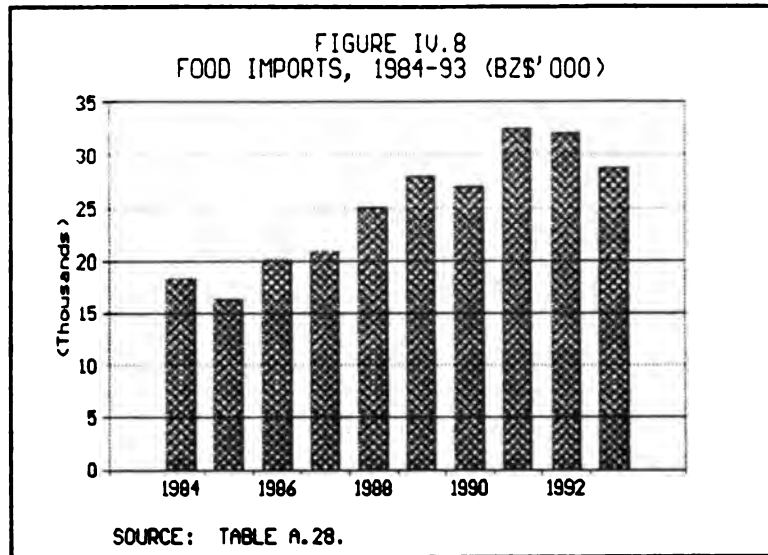
SOURCE: DEPARTMENT OF FISHERIES, MOA.

Although the value of exported forest products fluctuated significantly during the 1980-93 period, the general trend was an upward one. The fluctuation resulted from an unstable supply of mahogany and other woods. Regarding other agricultural exports, their total value declined during the 1987-93 period. Exports of live animals, dairy products, and meat preparations fell by more than one-half, and there was a significant decline in the exports of fruits and vegetables, red kidney beans, cucumber and mangoes. Inadequate equipment and high production costs were the main factors that affected meat preparations.

#### 4.8.2 Imports

Despite Belize's agricultural potential, the country is dependent on imported food, particularly processed food products. In 1984, total food imports amounted to BZ \$56 million; by 1993 this increased by more than 50% to BZ\$82 million (FIGURE IV.8). The most important foods imported were meat products, dairy, cereals (rice, wheat and other cereals not specified), fruits and vegetables, while animal feed, fertilizers, herbicides and insecticides were the most important inputs (TABLE A.28). Due to production problems and an expansion in demand, there were significant increases in the imports of some food products, particularly rice, red kidney beans and other cereals.

Unlike that of many other Caribbean countries, Belize's agricultural trade balance has been positive. In the 1984-93 period, the share of agricultural imports in the total import bill averaged about 20% per year, while that of agricultural exports averaged 79%. Despite this favorable position, the country has considerable potential to further increase its agricultural exports, as well as to reduce the level of its food imports through more efficient production and agricultural diversification.



## CHAPTER V

### SMALL FARM AGRICULTURE

#### 5.1 Small Farm Development Strategy

The small farm sector is a major component of Belize's agriculture, and the GOB's policy has aimed at improving the welfare of small farmers. During the last decade, it executed projects that contributed directly to improving small farm agriculture. The main ones were the Toledo Small Farmers Development Project (TSFDP), the Belize Livestock Development Project (BLDP), the Natural Resource Management and Protection Project (NARMAP), and the Southern Highway Project.

Of the various projects, the Toledo Small Farmers Development Project (TSFDP)<sup>43</sup> is a major initiative implemented during the last decade to develop Belize's small farmers. The main objectives of the project are: (i) develop improved and stable small farm production systems; and (ii) support farmers in adopting these systems through the timely provision of appropriate farm inputs and services, particularly credit and marketing outlets. In addition, the project pursues two complementary goals: to rehabilitate the Big Falls facilities for storing grains and milling rice, and to develop an agricultural marketing system in Toledo.

The project started in August 1988 and was expected to be completed in 1993, but the GOB requested an extension for an additional year. The total project cost is US\$2.9 million and is being financed by the International Fund for Agricultural Development (IFAD), the GOB and USAID. The implementing agency is the Ministry of Agriculture (MOA).

Although the project provided some valuable experiences related to project implementation and development of small farmers, there are several critical issues that were not adequately addressed, but which provide useful guidelines for similar projects in the future. First, the project's design assumed that some proven technologies from the Toledo Research and Development Project (TRDP) were already in place. Second, it was also assumed that the beneficiaries could be treated as independent farmers, with no special consideration given to their ethnic or community differences. Experience showed that both assumptions were weak.

Third, the TSFDP appeared not to have fully utilized some of the experiences of the TRDP. Instead of taking a step-wise approach to upland development of the Maya communities, the project's strategy pushed for a rapid introduction of changes in the project area (permanent settlement and more intense use of credit and capital investment) which were not fully successful.

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<sup>43</sup> IFAD 1983 and 1992; and Rai 1991.



Fourth, the project involved the participation of several agencies, therefore requiring close coordination and monitoring. This has been a difficult task for the project's management unit, which affected both the implementation of certain activities and achievements of the project in different ways. For instance, the marketing component, funded by USAID was implemented, independently from other project components. Moreover, although two market service centers were built and are currently in operation, their construction was delayed for almost two years. The future operation of these centers is uncertain, since the Belize Marketing Board (BMB) was unable to assume their administration. The marketing component was also affected by a lack of both viable outlets for several products and appropriate market intelligence data.

Fifth, the inability of the Development Finance Corporation (DFC) to deal with small farmers under the prevailing conditions in the project area resulted in a slow implementation of the credit component in its early years<sup>84</sup>. However, this aspect improved significantly and by the end of 1991, almost 50% of the budgeted credit was approved for loans to the project's participants. The DFC also encountered certain difficulties with the repayment of short-term credits for rice, which may have resulted from limitations of the viability of the recommended technology and marketing constraints.

Notwithstanding the above problems, the project devoted a considerable effort to the implementation of the credit program. It devised useful instruments such as the pro-forma budget to help the DFC manage the loans. It also assisted the land authority in land titling of certain areas, which facilitated accessibility to credit by using the land as collateral to secure loans. In addition, much effort was made to strengthen the extension service. Both the project's management unit and the MOA are aware of the importance of continuous extension support in various areas, particularly in the areas of farmers training and technical support personnel.

The IFAD mission that reviewed the project's performance (up to 1991) suggested several adjustments dealing with its organization, management, monitoring and follow-up, as well as for the responsibilities for executing various components. Most of these were executed, or are in the process of being implemented.

The Belize Livestock Development Project (BLDP) is a joint effort between USAID, the MOA and the Belize Livestock Producers Association (BLPA)<sup>85</sup>. The project's purpose is to improve livestock production efficiency, increase output and improve livestock marketing. It has two major components regarding small farmers: (i) livestock management (pasture, health and feed); and (ii) the "Fondo Ganadero" Partnership Program which is a credit facility for fattening steers. The project trains staff and extension agents, as well as farmers in the use of appropriate technologies, including pasture and herd management, nutrition and health. It was also instrumental in delivering artificial insemination services and facilitating the importation of pure-bred animals to improve the swine breeding stock. The Fondo is still active, but larger

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<sup>84</sup> The DFC is in charge of implementing the credit component of the project.

<sup>85</sup> CARDI & CTA 1992.

farmers benefited more compared to small livestock farmers, to whom it was targeted. Most small farmers were not eligible for financing because they did not meet certain criteria (such as having the necessary infrastructure).

The Natural Resource Management and Protection Project (NARMAP) is being implemented by the GOB, with funding from USAID and technical assistance from the World Wildlife Fund and Winrock International for Agricultural Development. Basically, the project aims at promoting the rational and sustainable use of renewable natural resources through the execution of specific activities in the areas of environmental protection, sustainable agricultural production and forestry. NARMAP's comprehensive strategy seeks to integrate the actions of the government with NGOs, under the common objective of achieving a proper balance between economic development and environmental protection. Despite being in its initial stage, the project generated good information on some important technical and economic aspects of production within the prevailing farming systems in some environmentally threatened areas of the country. Through its Conservation Development Fund of US \$500,000, it provides NGOs and community-based organizations with resources to implement specific activities related to sustainable agricultural production and environmental conservation.

The Southern Highway Project will address an important infrastructural constraint in the agricultural sector, by improving 260 km. of roads, mainly in the southern part of the country. The GOB, with financial support from the IDB, is constructing the Southern Highway linking Toledo and Stann Creek with the rest of the country. It will facilitate transport of products and facilitate marketing, particularly for small farmers that are scattered throughout remote areas in that part of the country.

In addition to these projects, the government has a portfolio that includes various project profiles. Some of these are aimed at overcoming particular constraints faced by small farmers, while others are activities that support the continuation of previous actions (TABLE A.29).

## 5.2 Small Farm Characteristics<sup>66</sup>

Small farmers comprise one of the most important farming groups in Belize. However, there is no single definition of small farmers. The definition of this farming group varies due to limited information available, type of production activity and much variation in the farming systems in the country. For example, small farmers engaged in export crops (sugarcane, citrus and bananas) have larger farm sizes than those in subsistence farming. Similarly, those involved in beef cattle production have a larger herd size than those in dairy farming. If the size of farm holdings is used to distinguish small farmers, then they could be identified as those operating holdings of less than 8.1 ha (< 20 acres)<sup>67</sup>.

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<sup>66</sup> Much of the information in this section is based on the 1984-84 Agricultural Census, Seepersad (1991) and USAID (1989).

<sup>67</sup> For purposes of simplicity and consistency, this study classifies farmers with less than 8.1 ha. (20 acres) as small farmers. This plot size is also the area allocated to settlers seeking land from the government for agricultural production.

Although the holding size is an important criterion in characterizing small farmers, the Caribbean Agricultural Extension Project (CAEP) used other criteria to identify this group, based on their farming systems, land clearing, cultural practices and crops cultivated. In this regard, small farmers that cultivate rice and corn are characterized as those that: (i) slash and burn; (ii) cultivate purestand rice and intercrop corn with other food crops; (iii) cultivate under rainfed conditions; (iv) produce mainly for home consumption with a surplus for sale; (v) do not live on the farm; and (v) also have backyard farm operations. Similarly, small farmers that cultivate permanent crops have special characteristics, such as not being involved in the production of export crops, low input use, may or may not be a full time farmer, etc.<sup>88</sup>

Based on a farm size criterion of less than 8.1 ha, and assuming that each holding is operated by a single farmer, almost one-half of the 11,000 holdings, comprising 6% of the total acreage that was reported in the 1984-85 Agricultural Census, could be considered as small farms (TABLE V.1). Of the various districts, the Belize, Corozal and Stann Creek districts recorded a higher proportion of small farms, while Cayo and Toledo had the highest land area occupied by this group of farms, compared to the national average.

TABLE V.1  
PROPORTION OF SMALL FARMERS  
BY DISTRICT, 1985 (%)

DISTRICT	HOLDINGS	ACREAGE
BELIZE	58	3
COROZAL	50	3
CAYO	47	14
ORANGE WALK	44	8
STAN CREEK	52	4
TOLEDO	48	10
COUNTRY	49	6

SOURCE: 1984-85 AGRICULTURAL CENSUS.

A USAID small farm study of 1989 showed that the size of these farms varied between the districts. Based on a sample survey of 141 small farms, the average farm size was 7.7 ha, with relatively larger plots located in Corozal (9.6 ha) and Orange Walk (8.9 ha) districts (TABLE A.30)<sup>89</sup>. Sugarcane cultivation in these districts was the principal factor that contributed to a larger average farm size. In the Cayo district, the average small farm approximated the national average, but smaller in Toledo and Stann Creek, where rice and citrus were the main cash crops.

An additional characteristic of small farmers is provided by the tenure status of the holdings. In Belize, there are large tracts of farmland that still lack a definition of their tenure status. According to the 1984-85 Agricultural Census, 28% of all holdings were operated by farmers with full, unrestricted title to their land (TABLE A.31). In other words, 72% of the

<sup>88</sup> CARDI & CTA., 1992.

<sup>89</sup> USAID 1989.

holdings, comprising 38% of total farm acreage, were not legally owned at the time they were farmed. The small farm group had the majority of holdings without legal ownership, accounting for only 7% of all holdings with full ownership.

The distribution of agricultural land indicated a skewing against small producers. According to the 1984-85 Agricultural Census, about 10% of the holdings comprising 6% of the area was farmed by landless farmers (TABLE V.2). The district of Cayo had the highest concentration of holdings of this group. Another 22% of all holdings (< 5 acres in size), comprising about 0.8% of all agricultural land, was occupied by small farmers. This group was more concentrated in the Belize and Toledo districts.

TABLE V.2  
DISTRIBUTION OF AGRICULTURAL HOLDINGS BY DISTRICT, 1985 (%)

DISTRICT	WITH NO LAND		< 2.0 HA		2.0 TO < 20.3 HA		> 20.3 HA		TOTAL	
	AREA	NUMBER	AREA	NUMBER	AREA	NUMBER	AREA	NUMBER	AREA	NUMBER
BELIZE	0.05	6.46	0.52	38.61	8.38	37.86	91.05	17.07	16.32	10.96
CAYO	0.06	23.25	0.41	16.76	7.99	31.44	91.54	28.55	31.32	21.95
COROZAL	0.08	8.67	0.95	19.59	39.69	57.40	59.28	14.34	9.63	19.70
ORANGE WALK	0.06	6.10	0.72	19.03	22.69	55.79	76.53	19.07	20.65	22.19
STANN CREEK	0.04	9.03	0.41	22.91	11.53	59.03	88.02	9.03	12.90	9.55
TOLEDO	0.01	1.57	2.25	25.07	24.26	65.87	73.48	7.49	9.18	15.65
TOTAL	0.06	9.98	0.71	22.11	16.09	50.69	83.14	17.23	100.00	100.00

SOURCE: 1984-85 AGRICULTURAL CENSUS.

Given the relative abundance of Belize's land resource, land availability may not be considered as a constraint for small farmers. However, as the demand for land by different groups increase and the more accessible regions of the country are occupied, this situation could change, as in certain areas where shortages of good agricultural land appear to be developing. For example, in Corozal, where the demand for agricultural land has been expanding, the average farm size has declined<sup>90</sup>.

Small farms in Belize are predominantly family-owned and -operated enterprises. Both the 1984-85 Agricultural Census and the 1989 USAID survey showed that small farms are usually owned by a single holder, particularly a male. The Census indicated that the proportion of small farms owned and/or managed by males was almost 85%, while the 1989 survey revealed that it was 88 percent. The holder supplies much of the labor (sometimes supported by family labor and occasionally by hired labor), having responsibility for land preparation, cultivation, harvesting and marketing. In the case of livestock, the owner does purchasing of animals, feeding and marketing. In addition, the survey found that although women-owned and operated farms were generally mixed enterprises, almost 30% of them raised poultry as the principal activity.

<sup>90</sup> The 1984-85 agricultural census indicated that the average size of holdings in this district was less than one-half the country's average.

Both data sources also indicated that the average age of small farmers was approximately 45 years, with the Belize and Corozal districts having slightly older farmers, and the Cayo district having a younger small farming group. The USAID survey showed that the average smallfarm household size was about six persons per household. Except for Toledo and Stann Creek, where the average household size was seven persons, there was very little variation between the other districts.

### 5.3 Small Farm Production

As indicated, there are 14 major agricultural production systems in Belize (APPENDIX B). Although most of these are utilized by small farmers, a few are practiced only by this farming group, such as the milpa, cassava-fishing and fruit tree systems. The major characteristic of small farmers is operation of a diversified production system (mixed farming), producing crops and/or livestock for both home consumption and income. According to the USAID survey of 1989, mixed farms accounted for more than two-thirds of small farms surveyed. The adoption of a mixed farming system by small farmers reflects their sensitivity to production and market risks that result from overdependence on a single or few crops.

Small farmers can be divided into two main groups: milpa producers, who practice shifting cultivation, and permanent cultivators. In 1961, there were 3,200 milpa farmers who cultivated a total of 2,998 ha<sup>91</sup>. By 1985, the number of milpa farmers had doubled (to 6,465), and the corresponding area cultivated increased by more than threefold to almost 10,400 ha, planted in mainly corn and rice (TABLE V.3). According to the 1984-85 Agricultural Census, milpa growers accounted for 50% of the total area planted with rice, and 63% of that with corn.

TABLE V.3  
CULTIVATION OF RICE AND CORN BY MILPA FARMERS BY DISTRICT, 1985

DISTRICT	RICE		CORN		TOTAL HA
	HA	HOLDINGS	HA	HOLDINGS	
BELIZE	136.4	80.5	267.7	113.0	404.2
CAYO	107.7	76.5	2,716.0	454.4	2,823.8
COROZAL	10.9	10.5	561.3	217.4	572.2
ORANGE WALK	126.7	63.1	1,898.3	451.5	2,025.1
STANN CREEK	131.6	57.9	380.7	117.8	512.3
TOLEDO	1,010.9	402.5	3,051.0	572.7	4,061.9
TOTAL	1,524.5	691.3	8,875.2	1,927.0	10,399.7
% OF CROP	50.7	94.8	62.9	87.6	60.7

SOURCE: 1984-85 AGRICULTURAL CENSUS.

In general, the principal crops cultivated by small farmers are rice, corn, beans, vegetables, bananas, plantains, citrus, sugarcane and fruits. Small farms cultivated with purestand cash crops such as sugarcane, cacao, and citrus were relatively larger, compared

<sup>91</sup> Nuñez 1979.

to those with mixed plantings<sup>92</sup>. Small farmers are not involved very much in banana and mixed mechanized farming systems. They are mostly engaged in production for both the domestic market and for their own consumption, although some participate in the production of export crops, particularly sugarcane, oranges and grapefruit. Except for citrus and rice in the mechanized system, monocropping is not widely practiced. Some farmers have a limited, pure stand production system, but the majority are involved in intercropping (such as rice and corn-beans respectively in the milpa system). In the Toledo area, some farmers cultivate up to 10 acres of rice using mechanization, while others plant a similar area with citrus in Stann Creek or are involved in mixed farming. Livestock enterprises are also mixed, having combinations of various types including cattle, pigs, poultry and bees. The size of these farms usually have no more than 20 heads of beef cattle, one to five dairy cows, 10 to 15 pigs, or up to 200 units in the case of poultry.

Although these farmers are generally scattered throughout the country, there is a strong concentration of production activities by region. The main farming activities of this group for the various districts are as follows: Stann Creek (citrus); Belize and Cayo (vegetables); Belize and Corozal (fruits); Belize, Cayo and Orange Walk (poultry); Toledo and Stann Creek (rice); and Cayo, Belize and Orange Walk (beef). Corn and beans, on the other hand, are produced in all regions of the country by small farmers. These crops currently represent the third and fourth largest area, respectively (after sugar cane and citrus) of all cultivated land.

Belize's small farm sector is also characterized by a strong relationship between ethnic groups and geographic concentration of specific production activities. For example, the Garifunas are involved in the cassava-fish system in the central and southern coastal areas, while the Maya farmers have a corn-rice and corn milpa systems in southern Toledo, and in the corridor along the road between Cayo and Stann Creek.

Small farmers make an important contribution to domestic food production, total agricultural output and employment. They comprise the major food producing group in the country. Based on the 1984-85 Agricultural Census on cropping activities and animal production, TABLE V.4 provides a rough estimate of the minimum contribution by small farmers to total output of selected items<sup>93</sup>. Based on these estimates, they contributed at least 3% to the total value of agricultural exports and 8% to the traditional export crops. The census data also showed that 33,000 persons were employed on a full and part-time basis, of which 38% worked in the smallfarm subsector<sup>94</sup>.

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<sup>92</sup> USAID 1989.

<sup>93</sup> The data in Table IV.5 compares favorably with data from other sources (Hebblethwaite et al.). The grouping of farm sizes in the Census precludes a better estimate of small farmer's contribution.

<sup>94</sup> This figure may overestimate the actual employment on farms. It does not take into account the possibility that the same person(s) could be hired by any farmer, irrespective of size of holding. In addition, the census underestimated the participation of women in the agricultural labor force.

TABLE V.4  
ESTIMATED MINIMUM CONTRIBUTION OF  
SMALL FARMERS TO TOTAL OUTPUT, 1985

PRODUCT	PERCENT
MAIZE	21
RICE	17
BEANS	17
ORANGES	6
GRAPEFRUIT	8
BANANAS	4
SUGAR CANE	9
CATTLE	5
PIGS	39
POULTRY	23

SOURCE: BASED ON THE 1984-85  
AGRICULTURAL CENSUS

#### 5.4 Employment and Income

In general, the small farm owner/operator provides much of the labor input, supported by family labor and occasionally hired labor. According to the 1984-85 Agricultural Census, small farms accounted for almost 40% of the males and 65% of the females employed (full and part-time employment) on all farms in the country. A higher proportion of females were employed on small farms compared to males, and most were part-time employees. The USAID survey indicated that the average employment per farm was small (< 1 person), and seasonal employment was higher in those districts where export cash crops were concentrated and off-farm employment more readily available (such as the Belize and Corozal districts).

The level of small farmers' income varies between production activities. The USAID survey showed that a large proportion of their income came from domestic crops, rather than mixed farming or export crops. Except on those farms where livestock production was the principal farm activity, it was the least important income source. Of the individual production cropping enterprises, citrus and sugarcane generated the highest gross income, BZ\$10,000 and BZ\$7,600 respectively.

The information available on income levels in Belize's small farm sector is not sufficient to provide an indication of the relative welfare status of small farmers. However, some data suggest that the Maya living in the southern part of the country, particularly those in the southern Toledo and Stann Creek areas seem to be the most disadvantaged group among the country's farm population. The Maya are small full-time farmers practicing the traditional method of milpa cultivation associated with extensive, slash and burn agriculture. They use family labor and to a lesser extent, they do communal work on specific projects. In general, they grow corn, beans, root crops and rice for food, and as their main source of cash income.

According to IFAD, the average cash and in-kind income of the Maya farmer in 1988 was between BZ\$800 and BZ\$1,400<sup>95</sup>. Assuming that their income sources and output levels remained the same, the value of their income for 1991 was estimated to be between BZ\$890 and BZ\$1,550<sup>96</sup>. This was equivalent to between 15% and 25% of the average income earned per employed person in the rural area in the same year<sup>97</sup>. These figures place the Maya farmers among the lowest 5% of income earners in the country.

The above conclusion is supported by a recent study based on a random sample of 15% of farmers living in selected villages in the Cayo, Stann Creek and Toledo districts<sup>98</sup>. According to this study, farmers in Toledo were almost entirely native Mayas, while those in the other two districts included 40% and 46% of migrants, respectively. Most farmers in Toledo practiced shifting agriculture under the milpa system; those in Stann Creek and Cayo were settled farmers that practiced continuous cropping systems.

The estimated gross income per farmer in Toledo averaged BZ\$1,636 per year, or about 22% and 19% respectively of the average income of the other two districts (TABLE V.5). The income levels amounted to 0.3, 1.5 and 1.8 times the minimum-wage salary of BZ\$4,800 in that year. This means that only about 5% of the Toledo farmers earned more than the minimum salary, which compares poorly with the situation observed in Stann Creek (21%) and Cayo (48%).

TABLE V.5  
ANNUAL GROSS INCOME BY FARMER IN SELECTED TARGET  
AREAS, 1993(BZ\$)

SOURCES	TOLEDO	STANN CREEK	CAYO
GRAIN CROPS	718	811	2,151
VEGETABLES	143	108	2,302
CITRUS		4,211	
OTHER PERENNIALS	186	227	389
LIVESTOCK	332	53	3,129
GROSS FARM INCOME	1,379	5,410	7,911
NON-FARM INCOME	257	2,016	811
TOTAL GROSS INCOME	1,636	7,426	8,782

SOURCE: NARMAP 1993.

The study also indicated that grain crops (mostly rice and beans) generated over 50% of the gross farm income in Toledo. The leading income earner was citrus (78% of total gross farm

<sup>95</sup> Hebbletwhaite et al. 1992.

<sup>96</sup> Based on the changes in the Consumer Price Index.

<sup>97</sup> Estimate based on labor force survey and minimum wage level.

<sup>98</sup> NARMAP 1993.



income) in Stann Creek, and livestock (39%) in Cayo. The production activities that contributed to farm income were more diversified in the latter district. Moreover, off-farm income was less important in Cayo than in Stann Creek and Toledo. In the Stann Creek district, citrus is the main agricultural activity and its production requires a relatively large amount of seasonal labor, while in Toledo, grain crops are important, and they are cultivated by mostly family labor.

Another study showed that most farmers in the southern districts earn a cash income of less than BZ\$4,000 per year<sup>99</sup>. The cash income of these farmers does not exceed that earned from unskilled employment. However, with the use of improved technology, it is possible that the incomes of these farmers could be increased beyond that of a full-time unskilled wage earner.

### 5.5 Support System for Small Farm Development

The support system for agriculture comprises the provision of several services by the MOA and institutions in the sector (these are discussed more fully in Chapters V.II and V.III). Those services that make an important contribution to the development of small farmers are discussed below. These include the extension service, agricultural credit and marketing.

**The extension service:** A rough estimate of the number of small farmers indicate that there are at least 6,750 of these operators presently in Belize<sup>100</sup>. This means that if all small farmers are to be assisted by the MOA's extension service, each extension officer would have responsibility for approximately 422 small farmers, considered high<sup>101</sup>. Apart from insufficient personnel, there are specific factors that affect the effectiveness of the extension service. One important factor is the difficulty to access production areas<sup>102</sup>. Limited extension support is provided, due to inadequate infrastructure (roads and bridges), insufficient transport facilities and topography. While these constraints exist for most parts of the country, they are more acute in the southern part, where a large proportion of the more disadvantaged small farmers are located.

The service is also constrained by its inability to give special consideration to the role of women in agriculture. A few attempts were made in the early 1980s to institutionalize extension activities aimed at improving rural family welfare, and to give selective attention to the woman's role in the farm. More recently, the government made efforts to set up a special extension program for women, with the purpose of addressing nutritional deficiencies and improving the living standards of small farm families in southern Toledo. Most of these efforts

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<sup>99</sup> King et al. 1993.

<sup>100</sup> This estimate is based on data from the 1985 Agricultural Census and the growth of the rural male farm population. The number of small farmers is estimated to be higher due to the number of refugees/immigrants that have settled in Belize.

<sup>101</sup> Presently, the MOA has only 16 extension officers in the field.

<sup>102</sup> There is also a language barrier created by immigrants from other Central American countries who are small farmers.

emphasized smallfarm operations of animal and vegetable production, backyard gardening, beekeeping and changes in the family's diet to improve nutrition. They also focused on income generating activities for women, given their important role in family care. However, they have been affected by inadequate organization and funding, as well as insufficient experience of the technical staff in such matters. As a result, their impact on family income, output and increased learning abilities were not successful<sup>103</sup>. Despite these constraints, the extension service seems to have developed good linkages with farmers in some areas. This is critical as it provides a good foundation for the future, for facilitating problem identification at the farm level, strengthening the relationship between farmers and researchers and improving the effectiveness of the service.

**Agricultural credit:**<sup>104</sup> Most of Belize's agricultural credit is supplied through the institutional credit system, comprising commercial banks and the DFC<sup>105</sup>. Producer associations, cooperatives, credit unions, and NGOs also provide credit, but on a more limited basis and to smaller producers.

Credit is channeled to export crops and to farmers with good credit ratings and higher capacity for loan repayment. Small farmers, on the other hand, have limited access to financing from institutional lenders, and have to rely mainly on their own resources. Most lack the required collateral to access loans from institutional sources, as well as the capability to adequately manage the loans once these have been obtained. Other factors which limit their access to credit include: (i) their use of or even the need for credit is limited due to the inadequacy of other complementary support services and inputs (extension, marketing, equipment, etc.); and (ii) high interest rates. Institutions also have certain constraints that affect their effective disbursement of credit to these farmers such as insufficient resources, limited accessibility to small farmers due to their widespread dispersion in the country and inadequate infrastructure, inadequate complementary support services and limited adoption of new technology by some farmers.

**Marketing:** With the exception of export crops, most small farmers market their products at the farm gate, by the road side, in local markets and in the municipal markets in urban areas. They are also supported by two organized local marketing channels: the BMB for rice, and the BFAC in the Cayo district, which sells its members' products. The lack of information on marketing of small farmers products makes it difficult to identify their most important outlet. The major marketing outlet(s) will undoubtedly be influenced by factors, such as the geographic location of the farm, type of product, road infrastructure and access to the various outlets.

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<sup>103</sup> CAEP Evaluation Team 1984, and IFAD 1992.

<sup>104</sup> An expanded discussion on agricultural credit is provided in Chapter V.III.

<sup>105</sup> This is the GOB's development bank.

In general, the marketing system for all farmers for both inputs and outputs is not adequately developed in Belize. In the case of small farmers, their production volume is low and their access to, as well as the supply of marketing facilities in rural areas are limited. Their products are sold usually in fresh form, with little attention paid to grading and packaging. There is some informal grading of products, which is reflected in the variation in the price for the same type of product (e.g., different prices for mangoes or oranges).

Due to the low volume of their marketed output, small farmers are unable to influence market prices. Although the cost of production could be used as a guide to price determination, this is often difficult because this varies among farmers and across districts. As a result, prices are often determined by market forces, which can be lower than the production cost, and it is not unusual for small farmers to sell their products at a loss<sup>106</sup>.

## **5.6 Major Constraints to Small Farm Development**

The major constraints to the development of small farmers can be grouped into five areas: land insecurity and inadequate access to land; depletion of the natural resource base; inadequate provision of agricultural support services; limited organization; and inadequate infrastructure.

Land security is a major problem of small farmers. Most do not have adequate security to the land presently occupied, and the government's land administration system has very limited resources to resolve this problem in an easy and expeditious manner. The present land titling system is overburdened with numerous conflicting and overlapping claims. Moreover, it has several constraints that need to be addressed, before farmers (in general) can have adequate security for their holdings and be able to easily access agricultural support services.

A critical issue is the situation of squatters who farm (on a temporary basis) on private or government land. Squatters, by definition, pay neither rent nor taxes, and have no title to the land. However, many have worked on the land they occupy for a long period; in such instances, they are recognized by local neighbors as having possession, if not outright ownership, of the land. Under these conditions, it is possible that squatters can request that the land be allocated to them in the same manner that leaseholders can claim legal ownership. Although the law provides for legal solutions to claims of this nature, it is more difficult to apply them in the event of multiple claims on the same land. This could be the case in the not so distant future, as the demand for land increases and accessibility becomes more difficult. The need for control and documentation of land is therefore essential, to avoid confusion over property rights in the future.

Another problem of the current land titling system is related to unresolved claims on farm lands, in instances where farmers approach old age, and need to sell their land or transfer it to

their legal heirs. The number of such claims has increased over the years and is likely to be a major problem in the future. Presently, many farmers in some areas are over 55 years of age, and they are likely to have problems in the future for easily transferring their land, unless the bottlenecks of the system are removed.

Due to the unresolved land tenure situation and the land security issue of small farmers, agricultural development is likely to be affected in the longer run, because these constraints limit the establishment of more stable and sustainable production systems. Moreover, as the population grows and the demand for suitable land increases, and there are employment opportunities to be found outside of farming, it is likely that land squatting and illegal occupation of lands could increase. Under these circumstances, the land tenure situation will become more difficult.

Closely related to the above issues are the negative implications they have on the natural resource base. The lack of suitable land for agriculture is likely to result in more fragile areas being brought into production<sup>107</sup>. This in turn could accelerate the rate of deforestation and encroachment (low at present). If this occurs in areas having poor, shallow soils, where there are limited regenerative capacity of the native vegetation and exposure of the soil to forces of degradation, additional pressure will be exerted on the limited supply of the land resource base<sup>108</sup>. In addition, lands along the existing roads in some areas are unproductive or already occupied, and new acquisitions by many small farmers are on lower quality, inaccessible lands.

The current public institutional system is constrained by insufficient resources to adequately support small farm development. The system is unable to generate the needed technical information and facilitate the adoption of improved production practices by small farmers. The institutional network involved in research, extension, technical assistance and credit, as well as marketing of both inputs and output, does not function in a coherent manner to address small farmers' constraints and priority areas for development. Furthermore, the MOA has not established pertinent guidelines nor provided well-defined priorities for the small farm sector. This is associated in part with the public sector's limited capability in: (i) generating and analyzing data for policy formulation; and (ii) inadequate planning, project identification, design and implementation, and monitoring and evaluation.

The provision of the major agricultural support services is affected by organizational weaknesses and insufficient resources. Besides the work of CARDI, very little crop and livestock research activities are being done. There are limited technical human resources and physical facilities to support research on the different farming systems and conditions affecting small farmers in the country. As a result, pertinent information on the production systems of these

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<sup>107</sup> The prospects for expanding the agricultural frontier in the medium to longer term are limited, because most of the suitable areas are already being farmed, and new areas that could be brought into cultivation will require substantial investments.

<sup>108</sup> Some evidence exists that population pressures on the land, have resulted in shorter fallow periods within the milpa system of cultivation in the southern part of the country.

farmers, their cultural practices, use of inputs and the income generating capabilities of those systems are inadequate for supporting planning and policy decisions<sup>109</sup>. Furthermore, the absence of such important information limits the effectiveness of the extension and other support services.

In the area of agricultural health, the export subsector is well organized and developed to meet the appropriate export market requirements. Both sugar and citrus are exported as processed products, while bananas and fish are exported under stringent regulations for the external markets. However, small farmers produce food crops and livestock products for the domestic market, but the scope and coverage of the country's animal and plant health support services for these are very limited.

Unlike the traditional exported products, a large proportion of small farmers output is sold in the domestic market, but is constrained by the limited development of the domestic marketing system. They depend on the sale of a few products at the farm gate immediately after being harvested, or in limited marketing outlets, in which they compete with larger farmers and with imports. Other marketing constraints include: (i) inadequate access to inputs, which is associated with limited credit and the poor distribution network; (ii) limited access to facilities such as drying and storing, transformation and processing, transportation, and central and assembly markets; (iii) lack of a market development strategy; (iv) inadequate market information; (v) absence of relevant market regulations and standards; and (vi) small size of the domestic market.

The inadequacy of Belize's basic physical infrastructure also affects development of the small farm sector. Besides the few main highways, the road infrastructure to facilitate the movement of inputs and products is limited and in poor condition. Products are transported by truck and although the number and quality of these vehicles appear to be adequate, most marketing problems in rural areas are associated with the limited road system (main, feeder and local roads). Production costs and market prices are higher, due to the delays in moving agricultural products and inputs in a timely manner, particularly during the rainy season and in the southern part of the country.

Finally, due to the physical characteristics of the country, particularly the low coastal areas, drainage and irrigation systems are required to support agricultural production. Small farmers are unable to undertake these investments due to their lack of resources, inadequate knowledge of the appropriate technologies, and the inadequacies of the credit system in dealing with this type of on-farm investment.

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<sup>109</sup> The milpa system of production is a major one in the smallfarm sector but there is inadequate information on it. Technical information is needed, for instance, on the management of fallow periods which are becoming shorter, seriously limiting output expansion and conservation of resources.

## CHAPTER VI

### AGRICULTURAL INSTITUTIONS

#### 6.1 Public Sector Institutions

The main public sector institution in Belize's agricultural sector is the Ministry of Agriculture (MOA). Other ministries also play an important role in providing direct and indirect support to the sector, including the Ministry of Natural Resources, Ministry of Economic Development, Ministry of Finance, Ministry of Tourism and Environment, Ministry of Trade, Ministry of Human Resources Development, Ministry of Health, Food and Nutrition Policy and the Ministry of Housing and Cooperatives. In addition, there are several statutory bodies with responsibilities for specific commodity areas. These include the Sugarcane Control Board (SCB), Citrus Control Board (CCB), Banana Control Board (BCB), Development Finance Corporation (DFC), Belize Marketing Board (BMB), Fisheries Advisory Board (FAB), the Meat and Livestock Commission (MLC) and the Belize College of Agriculture (BCA).

##### 6.1.1 Ministry of Agriculture

The Ministry of Agriculture (MOA) is one of the largest ministries in the country. Its principal functions are to formulate, execute and monitor the GOB's agricultural policy. The MOA's organizational structure comprises six main operational units: the Toledo Small Farm Development Project (TSFDP), the Policy Analysis Unit (PAU), the Agriculture Department, the Fisheries Department, the Personnel and Accounts Sections (FIGURE VI.1). Of these units, the Agriculture Department is the largest. It comprises four technical divisions - the Research and Development Station at Central Farm, Extension, Projects and the Animal Health and Livestock Production and Health Division (FIGURE VI.2).

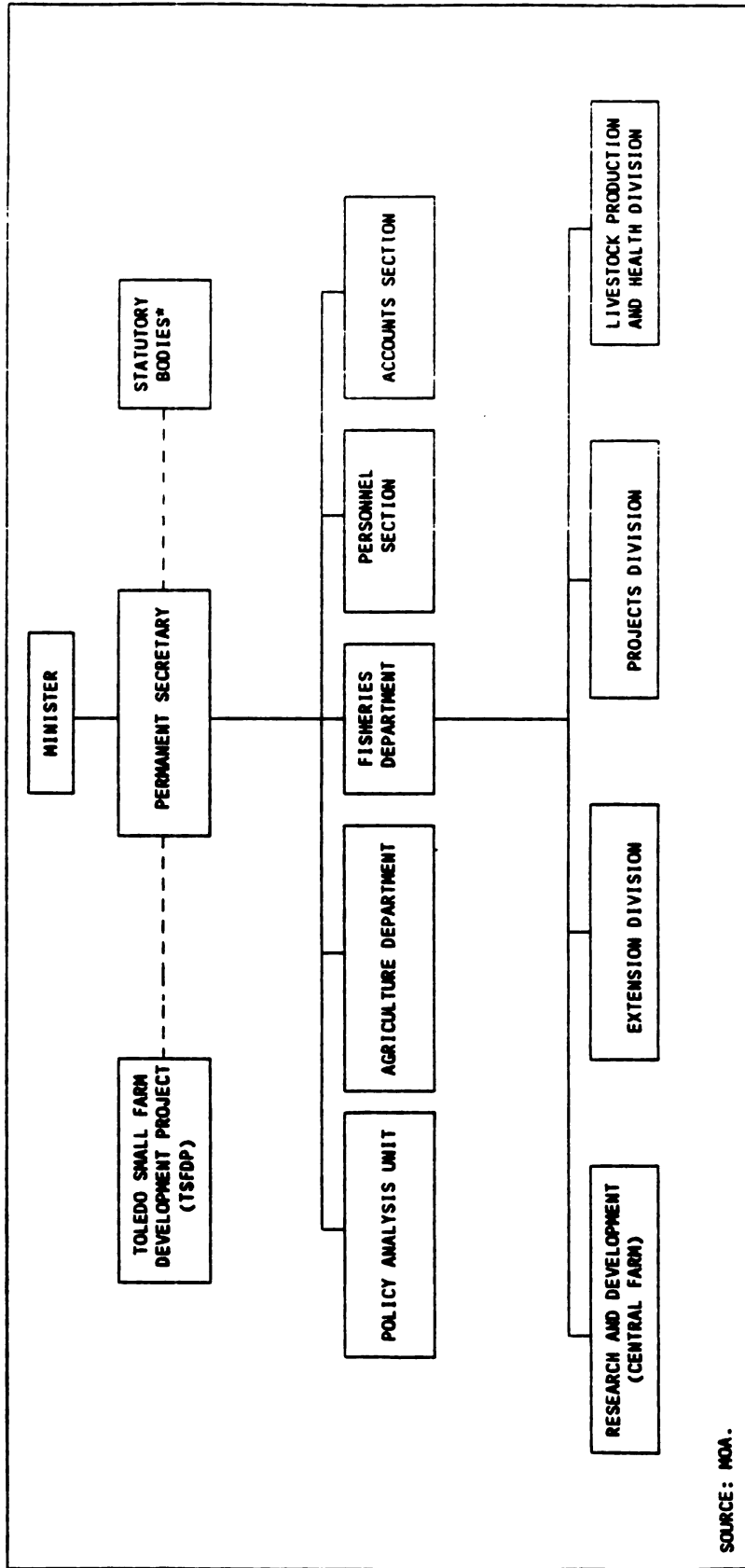
The Ministry has four levels of personnel involved in management and administration. First is the Minister of Agriculture, who has overall political, policy-making and liaison responsibilities with Cabinet and the country's parliament. At the second level, is the Permanent Secretary (PS), who is in charge of the overall administration and day-to-day management of the MOA. Third, are the heads of the six operational units. Among these is the Chief Agricultural Officer (CAO), who heads the Agriculture Department. At the fourth level are the Principal Agricultural Officers (PAO), having responsibilities for each of the four technical divisions under the Agriculture Department<sup>110</sup>.

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The Principal Veterinary Officer (PVO) heads the Livestock Production and Health Division.

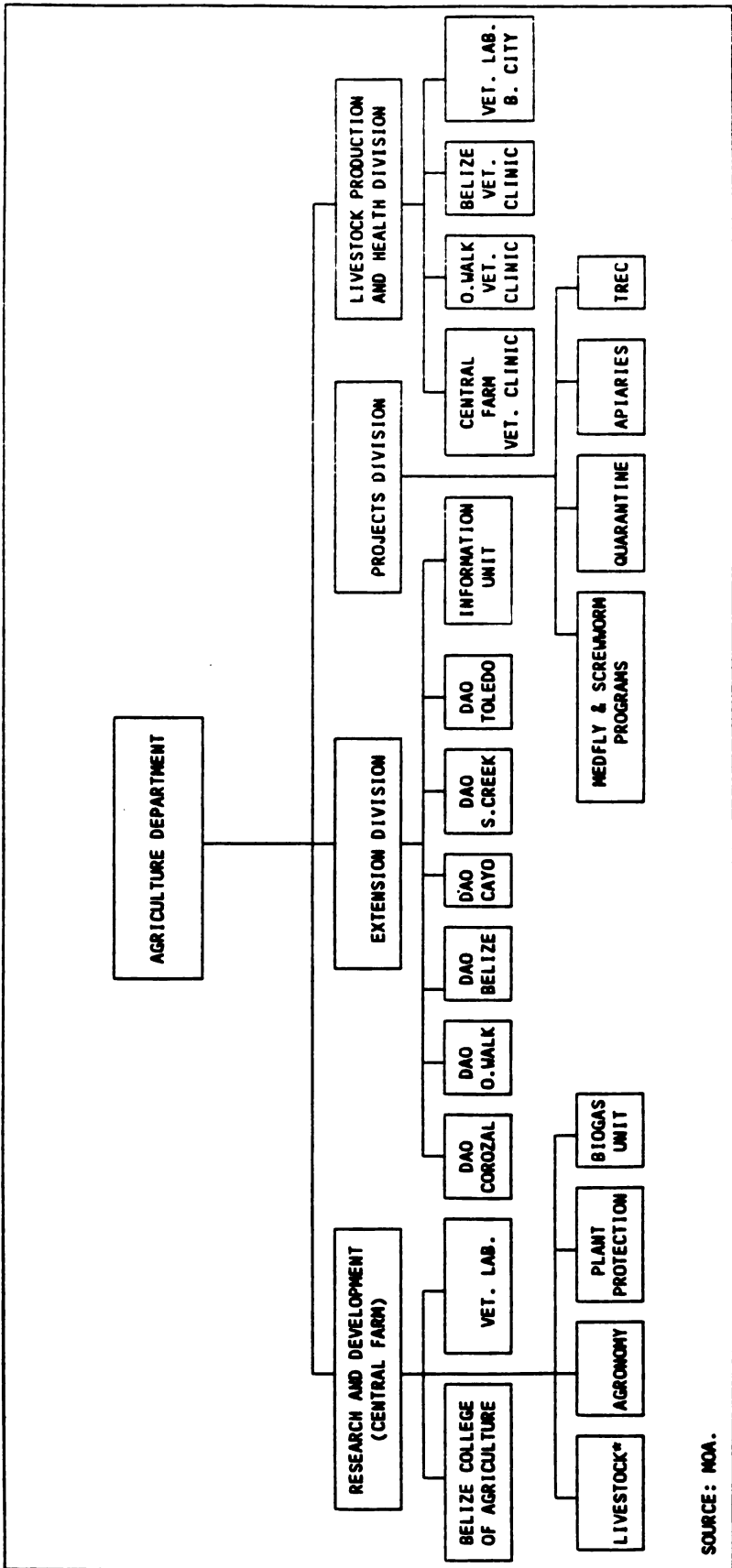
FIGURE VI.1  
ORGANIZATIONAL CHART OF THE MINISTRY OF AGRICULTURE



SOURCE: MOA.

\* SUCH AS THE BANANA CONTROL BOARD, CITRUS CONTROL BOARD, ETC.

FIGURE VI.2  
ORGANIZATIONAL CHART OF THE MOA'S  
AGRICULTURE DEPARTMENT



SOURCE: MOA.

\* THE PRINCIPAL LIVESTOCK OFFICER (PVO) HAS TECHNICAL RESPONSIBILITY FOR THE VET. CLINICS AND LIVESTOCK UNIT AT CENTRAL FARM.



The Extension Division is one of the largest technical divisions in the MOA, providing services in the country's six geographic districts. The Extension Service has a District Agricultural Officer (DAO) as an administrator for each district. The DAO is responsible for providing extension support to the farming community, extension education, as well as being involved in regulatory and research programs at the district level. The DAOs report to the PAO of Extension, who is stationed in Belmopan.

In addition, the management and planning process within the Ministry involves the use of committees, each comprising senior personnel of the institution, and its annual technical staff meeting. The most important committee is the Senior Staff Meeting (SSM), which meets bi-weekly and is involved mainly in short-term planning, reporting and information exchange<sup>111</sup>. The MOA also has a Training Committee (chaired by the CAO), which makes recommendations on personnel training. The technical staff of the MOA meets at least once per year to review and assess the institution's activities.

As part of its functions in the execution of the GOB's agricultural policy, the MOA has direct responsibilities for some bodies and is represented on several boards, committees and task forces (APPENDIX C). A few of these have been inactive in recent years, while the Ministry's role on a few others is not clearly defined.

The Ministry does medium-term and annual planning for the agricultural sector. The medium-term plan usually comprises a four- or five-year agricultural development plan that outlines the main strategies for achieving the government's goals and objectives in the sector. Annual planning is a routine exercise to formulate the yearly work programs of the various units and to meet the annual budgetary requirements of the government.

The process of developing the annual work plan begins at the district level. The District Extension Officers (DEOs) are responsible for developing an annual work program and a budget for each district. These work programs and budgets are then aggregated at a higher level by the PAO. Based on these work programs, the PAOs and the CAO prepare the overall annual budget (in consultation with the PS). The budget is then submitted to the Ministry of Finance for approval<sup>112</sup>.

However, the MOA's annual planning exercise is limited in scope. Besides the annual work plan for the extension service and a few other units, the Ministry does not have a comprehensive annual work program indicating priority areas of action, specific objectives to be achieved, linkages between various actions and operating units in the institution, and linkages to other institutions operating in the sector and in other sectors. In part, this is due to the absence of an agricultural sector

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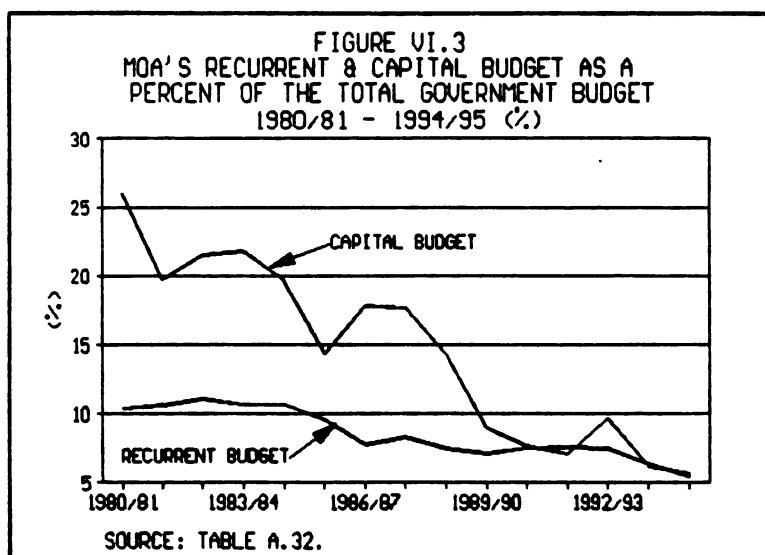
<sup>111</sup> Presently, only the SSM is functional. The Senior Executive Core Committee (SECC) has not been functional for almost three years, while the Policy Committee and the National Agricultural Research and Extension Council (NAREC) have not functioned for the last four years. NAREC is a public/private sector body appointed by the Minister of Agriculture to evaluate on-going research and guide new initiatives. It has not met for the last two years, but efforts are currently underway to reactivate it.

<sup>112</sup> More often than not, the budgetary allocations to the Ministry are lower than the original amount requested.

plan. In addition, the MOA does limited monitoring and evaluation of its own programs and activities, as well as those of other institutions in the sector<sup>113</sup>.

The Ministry is financed by budgetary allocations through the Ministry of Finance (with approval of the Parliament) and to a lesser extent, by external funding for specific development projects. It also receives a small amount of revenue from some services it provides, such as land clearing, preparation and sale of materials and veterinary services. The revenue from the veterinary services is deposited in a revolving fund administered by the MOA; all other revenue is deposited in the Government's general fund, which is not accessible to the Ministry.

Over the years, the MOA's operations have been seriously constrained by limited financial and human resources. As a proportion of the total GOB's budget, the Ministry's budget for both its recurrent and capital expenditures declined steadily since the beginning of the 1980s, with the reduction in the capital allocation being more significant (FIGURE VI.3). In the 1980/81 fiscal year, the budgetary allocations to the Ministry for recurrent and capital expenditures respectively, were 10% and 26% of the GOB's total budget. In the 1994/95 budget, these allocations declined to 5% and 6%, respectively. In addition, external funding to the MOA for development projects also declined in recent years.

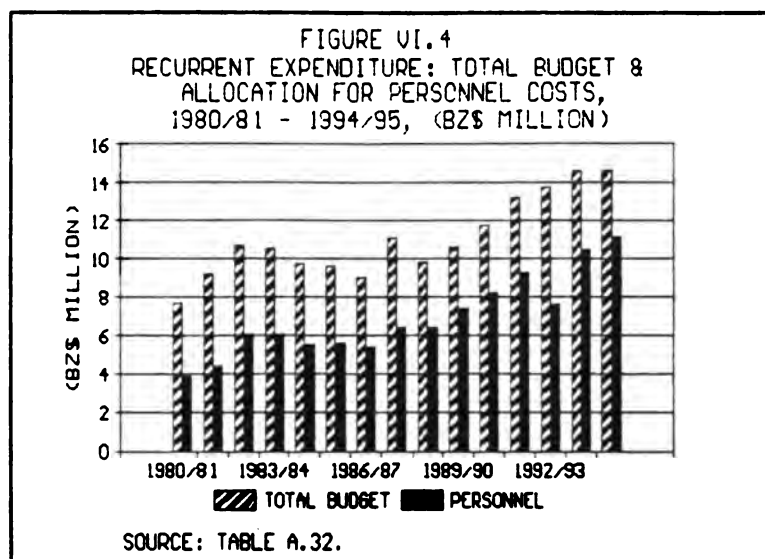


In absolute terms, the MOA's recurrent budget in the 1994/95 fiscal year almost doubled that of 1980/81, while its capital allocation declined by nearly one half during the same period. At the same time, the government's total recurrent and capital budgets increased more than threefold during that period. In real terms, the Ministry's recurrent budget has averaged BZ\$8.3 million per year, while its capital budget was BZ\$3.7 million (TABLE A.32).

<sup>113</sup>

More often than not, the budgetary allocations to the Ministry are lower than the original amount requested.

Although the recurrent budget of the Ministry has steadily increased, a large proportion of it is spent on wages and salaries or personnel emoluments (FIGURE VI.4). In the 1980/81 to 1994/95 period, the annual average allocation for expenditures on personnel was 63% of the budget, with an increasing proportion being spent on wages and salaries in recent years (TABLE A.32). In the 1990s, the allocation exceeded 70%, compared to an average of nearly 61% in the 1980s<sup>114</sup>.



Presently, the MOA's staff comprises 364 persons, distributed among three categories in its various departments and divisions (TABLE VI.1). Almost one half of its employees were in the "unestablished" category (daily paid workers), a group that increased in recent years. The shortage of financial resources has severely affected the personnel situation in the Ministry, resulting in several technical staff positions being vacant for some time. Moreover, due to this shortage, additional responsibilities are undertaken by existing staff.

There are other major weaknesses in the MOA's staff situation that are closely associated with the shortage of personnel. These are: (i) slow upward mobility; (ii) inadequate management capabilities at both the planning and administrative levels; (iii) indecision regarding permanent positions, which provides a disincentive to those who occupy them on a temporary basis; (iv) the need to move technicians around to occupy positions on a temporary basis; (v) low salaries; (vi) the use of unqualified applicants to fill certain positions; and (vii) the inability of acting divisional heads to function effectively when their superiors are away. The end result has been a weakening of the institution's capability to provide effective services in the sector.

Besides the MOA's policy-making and planning responsibilities, it provides various services in support of agricultural development. These include generation of statistics, land clearing and preparation, research and extension, veterinary support and laboratory analyses, plant and animal

<sup>114</sup>

In the 1994/95 budget, the allocation for personnel expenditures increased significantly to 77% of the total recurrent budget.

quarantine, soil testing and analyses, training, feeder road development, provision of improved planting materials, seeds and breeding animals, and management of fisheries resources.

TABLE VI.1  
DISTRIBUTION OF STAFF IN THE MINISTRY OF AGRICULTURE, OCTOBER 1994

SECTIONS	TECHNICAL	SUPPORT STAFF	TOTAL LABORERS	TOTAL STAFF
CENTRAL ADMINISTRATION	8	19	2	29
GENERAL ADMINISTRATION	3	7	-	10
RESEARCH ADMINISTRATION	-	6	-	6
ANIMAL HEALTH	17	4	6	27
BELIZE COLLEGE OF AGRICULTURE	10	2	8	20
BIOGAS	3	1	-	4
EXTENSION	40	4	34	78
FISHERY	14	6	-	20
HONEY PRODUCTION	3	-	-	3
LIVESTOCK	9	3	32	44
MECHANICAL	5	3	56	64
MED FLY SERVICES	7	-	-	7
QUARANTINE	6	-	4	10
RESEARCH/DEBT	9	1	16	26
STATISTICAL UNIT	4	-	-	4
TREC	2	1	9	12
<b>TOTAL</b>	<b>140</b>	<b>57</b>	<b>167</b>	<b>364</b>

SOURCE: MOA.

In general, the MOA's capability for supporting and facilitating agricultural development is limited, due to<sup>115</sup>: (i) absence of an agricultural development strategy; (ii) lack of systematic planning; (iii) a deficient information system; (iv) inadequate financial and human resources; (v) insufficient monitoring and evaluation of programs and activities; and (vi) inadequate coordination between the MOA and other public and non-public institutions.

### 6.1.2 Other Ministries<sup>116</sup>

There are several Ministries that also provide support services to the agricultural sector. The more important of these are discussed below.

**Ministry of Natural Resources (MNR).** This Ministry has responsibilities for the forestry subsector and management and distribution of national lands<sup>117</sup>. The MNR's activities are closely linked to agricultural development and include: (i) classification, demarcation, surveying, mapping, leasing, titling and registration of lands; (ii) acquisition and redistribution of lands for individual or community uses; and (iii) utilization, preservation and protection of ecologically-sensitive areas.

<sup>115</sup> Chapter VII also identifies some specific constraints of the MOA.

<sup>116</sup> This section benefited from the work done by Scott 1993.

<sup>117</sup> National Lands Act of 1980.

Moreover, it has overall responsibility for the National Resource Management and Protection Project (NARMAP) and the Belize Forest Planning and Management Project (BFPMP)<sup>118</sup>.

**Ministry of Economic Development (MED).** This Ministry has an impact on the agricultural sector through: general long-term macroeconomic planning for the country; public sector investment; coordination of technical and financial assistance from international organizations; provision of investment concessions<sup>119</sup>; and inter-sectoral coordination for preparing, executing and monitoring the country's five-year development plan.

**Ministry of Housing, Cooperatives and Local Government.** This Ministry interfaces with the agricultural sector through its Department of Cooperatives and Credit Unions. Among other activities, the department promotes and facilitates the development of cooperatives, including those in the agricultural sector through: registration of cooperatives; execution of training programs; regulation and supervision of cooperatives and credit unions; and assistance to cooperatives in identifying funding sources.

**Ministry of Finance (MOF).** The Budget Division of this Ministry is in charge of financial allocation and the release of funds to all ministries, including the MOA. Moreover, it has control over: (i) the creation of new positions in the MOA; (ii) the Central Statistical Office (CSO), which also collects, organizes and analyzes agricultural statistics; (iii) public financial institutions; and (iv) provision of fiscal incentives. Together with the Central Bank, the MOF deals with general economic management of the country and government finance.

**Ministry of Trade and Industry (MTI).** Besides overall administration of trade regulations, the MTC has responsibilities for implementing price control on basic food commodities (such as rice and flour), and administering export and import licensing.

### **6.1.3 Development Finance Corporation**

The Development Finance Corporation (DFC) was established in 1963 by a group of local businessmen, with support from the GOB. Its primary objective was to "provide financial assistance for development by promoting and facilitating private investment<sup>120</sup>." The Corporation was reactivated in 1973, when it was taken over fully by the GOB due to poor performance. Its principal objective was changed to providing financial support to the economy, through "the development of agriculture, industry, tourism and public utilities<sup>121</sup>."

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<sup>118</sup> NARMAP is funded by USAID and the GOB, while the BFPMP is funded by the ODA.

<sup>119</sup> The MED administer measures under the Fiscal Incentives Acts.

<sup>120</sup> FAO 1986.

<sup>121</sup> Ibid.

The DFC is administered and controlled by a seven-member Board of Directors, appointed by the Minister of Finance for a period of two years. Three of the members are selected from the Ministries of Agriculture, Finance and Economic Development, respectively, and four are from the private sector. Day-to day management of the DFC is the responsibility of a General Manager (GM) who is appointed by the Board, with the concurrence of the Minister of Finance. The GM is assisted by a management team comprising an Assistant General Manager, a Financial Controller, a Manager of Projects and a Human Resources Manager.

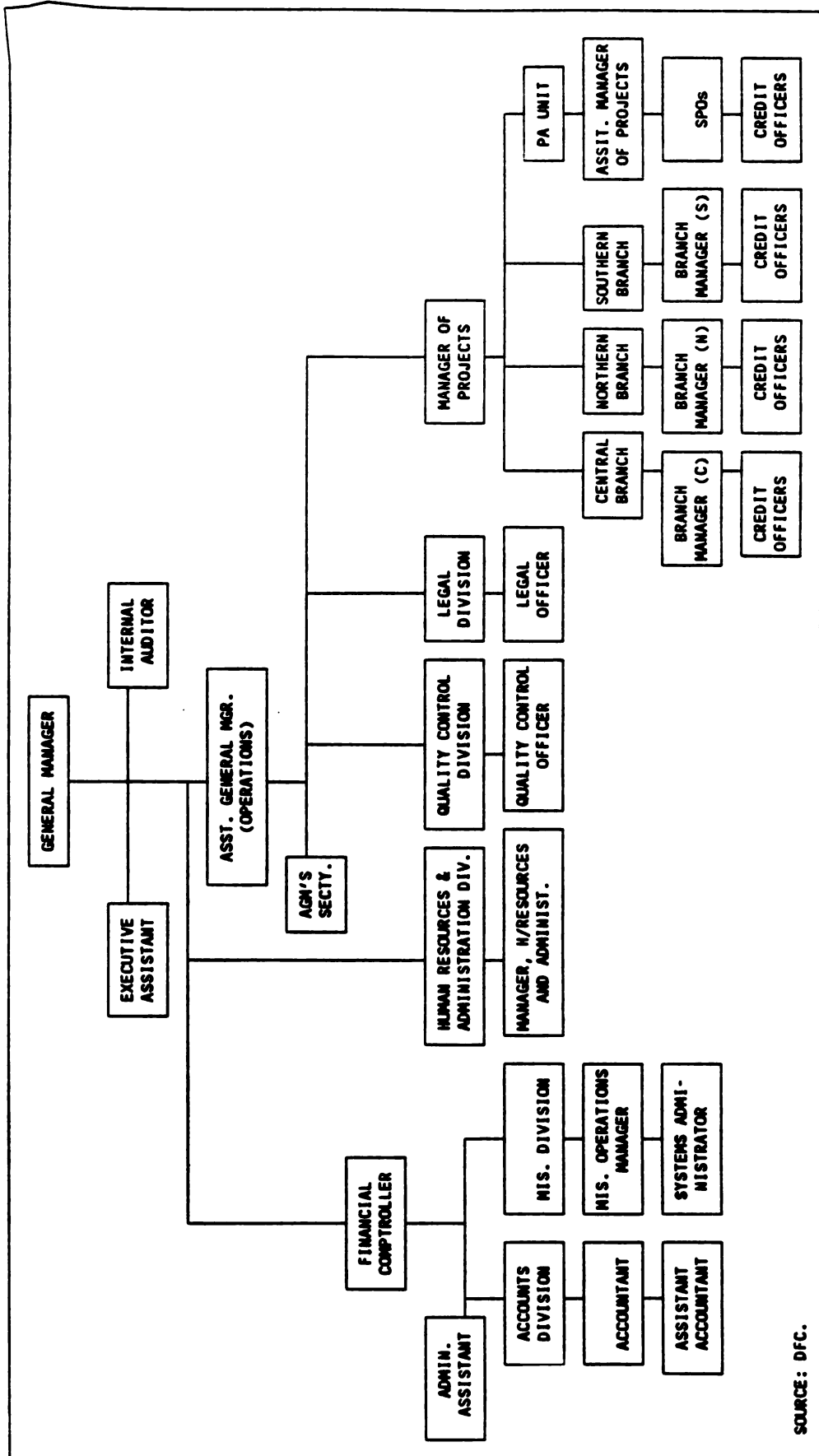
The DFC has its head office in Belmopan, where the majority of its staff is located, and branch offices in three regions - North, South and Central. The structuring of the DFC to include branches in various regions was largely based on the need to improve the institution's credit delivery system. However, the system is still in transition, and its activities are constrained by an inadequate information system. Nevertheless, the current design of the DFC's structure is appropriate for responding quickly to loan requests throughout Belize.

The Corporation has six divisions, two of which, the Accounts Division and the Management Information Systems, report to the Financial Controller (FIGURE VI.5). The Projects, Legal and Quality Control Divisions report to the Assistant General Manager, while the Human Resources Division reports to the GM. The Manager of Projects has responsibility for the three branches.

All loan applications are processed in the Projects Division and at the branch level. Three Senior Project Officers, a Manager and three Credit Officers at the Head Office are responsible for appraising loans in all sectors. In addition, each branch office has two or three credit officers involved in project appraisal.

The DFC obtains its funding from local and external sources. The GOB has been a major source of equity in the form of share subscriptions. Other local sources of capital were the Belize Social Security Board and the DFC's own equity. In the 1980s, a sizeable part of the Corporation's funds also came from external sources at concessionary rates. The Caribbean Development Bank (CDB) has provided much financing since the DFC's reactivation in 1973. External funding was also procured from the Canadian International Development Agency (CIDA), the European Development Fund (EDF), the European Investment Bank (EIB) and the Commonwealth Development Corporation (CDC), and from IFAD (for the first time in the 1990s). By 1991, approximately BZ\$76.3 million were provided by foreign lending agencies.

FIGURE VI.5  
ORGANIZATIONAL CHART OF THE DFC



SOURCE: DFC.

Although the DFC's lending policy is different from those of other commercial financial institutions, it was designed to complement the other institutions. Under its policies: (i) credit is provided on a project-by-project basis, with borrowers required to have technical and financial capability to manage the loans under DFC's supervision; (ii) loans should cover up to 80% of the total project costs; (iii) collateral requirements vary according to the specific activity being financed (for example, a lien is placed on production and sale of the output in the case of small and short-term crop loans); (iv) repayment periods vary between one and ten years depending on loan use, and grace periods are also provided when deemed necessary; and (v) interest rates are set at 12-13% per year on the outstanding balance.

Loan approvals by the DFC are based mainly on their size, and to a lesser extent on their use. Decisions on agricultural loans up to BZ\$30,000 are made by the Manager of Projects; those up to BZ\$50,000 are made by the Assistant General Manager. For loans up to BZ\$150,000, approval is required by the Corporation's Management Credit Committee. For those above this amount, approval is required by the Board, after initial screening by the Management Credit Committee.

The Corporation has played a critical development role in the agricultural sector, by being the principal financial intermediary providing credit to small and medium-size farmers. Up to 1989, loans of less than BZ\$5,000 comprised over 75% of all loans granted, and less than 13% of the total amount loaned by the DFC. Most of these funds were channeled into the agricultural sector, with some specifically targeted towards the development of small farmers. For example, it provided credit to individual farmers directly, or through cooperatives and farmer groups. The major group of beneficiaries were 2,860 small sugarcane growers who received BZ\$6.1 million to rehabilitate some 5,387 ha with smut-resistant varieties. Approximately BZ\$7.2 million were also allocated to 288 small- and medium-size citrus farmers for rehabilitating and replanting 3,443 ha. Furthermore, it completed disbursing BZ\$1.0 million from a revolving fund, to help small farmers in Corozal and Orange Walk diversify away from sugarcane production<sup>122</sup>. Presently, it is implementing the BZ\$1.5 million credit component of the TSFDP, financed by IFAD. Loans ranging between BZ\$500 and BZ\$20,000 are provided to assist 1,100 small farmers in developing their land, growing corn, rice, beans, citrus and raising livestock.

The DFC has been the principal financing agency supporting diversification away from sugarcane, by providing credit for new crops which commercial banks were reluctant to finance. Moreover, more than 50% of the resources received from external sources were channeled to agriculture and related activities. However, its allocation of loanable funds in the second half of the 1980s indicate a smaller proportion went into agriculture. Its credit to this sector grew steadily from 25% of all loans made in 1980 to 57% in 1985, leveled off in 1986, and declined thereafter to 37% in 1991. In 1994, the Corporation programmed BZ\$6.1 million, or 40% of its projected loan approvals, for the agricultural sector.

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<sup>122</sup>

This fund was created with USAID support.



It was also instrumental in channeling resources for humanitarian projects. For instance, it managed funds provided by the United Nations High Commission for Refugees (UNHCR), to assist Central American refugees cultivate short-term cash crops in designated areas. It disbursed funds provided by CARE to small farmers, for financing production of annual cash crops, and medium-term loans for the purchase of equipment and land development.

Despite its efforts to finance agricultural activities, the DFC's capability to meet the credit needs of the sector is inadequate. According to the 1984-85 Agricultural Census, agricultural loans approved by the DFC reached no more than 13% of all farmers. Although it has channelled larger amounts to agriculture in recent years, much of this has gone into the traditional sector (sugarcane, bananas and citrus). At the same time, it is important to note that the ability of much of the farming community to absorb credit successfully is limited, due to inadequate complementary support services and other factors which prevent farmers from implementing projects.

The DFC's financial performance was poor and it recorded successive losses for several years, resulting in an erosion of its equity situation. Consequently, the GOB (with technical assistance from both the World Bank and the CDB) decided to restructure the institution, adopting improved financial policies and operating procedures. In addition, the government agreed to accept the foreign exchange losses incurred by the Corporation in its foreign borrowings, and to absorb losses incurred when it executed transactions on behalf of GOB.

Besides institutional restructuring (which is still going on), the DFC took steps to cut costs through staff reductions, and improve its operations and effectiveness. Between 1989 and 1992, it reduced its staff by 27%, from 92 to 67 employees (TABLE VI.2), resulting in a significant increase in loan approvals and disbursements per staff member, and a decline in administrative costs from 5.3% of average assets in 1990, to 4.6% in the 1992 fiscal year<sup>123</sup>.

TABLE VI.2  
VALUE OF LOANS APPROVED AND DISBURSED PER STAFF MEMBER, 1989-1992

ITEM	1989	1990	1991	1992
NO. OF STAFF	92	85	81	67
VALUE OF LOANS APPROVED (\$MN)	2.5	6.4	10.3	15.0
VALUE OF LOANS APPROVED PER STAFF MEMBER (BZ\$'000)	0.027	0.075	0.127	0.224
VALUE OF LOANS DISBURSED (\$MN)	4.1	6.1	5.7	11.3
VALUE OF LOANS DISBURSED PER STAFF MEMBER (BZ\$'000)	0.045	0.072	0.070	0.169
VALUE OF LOANS APPROVED AND DISBURSED (\$MN)	6.6	12.5	16.0	26.3
VALUE OF LOANS APPROVED AND DISBURSED PER STAFF MEMBER (BZ\$'000)	0.072	0.147	0.197	0.393

SOURCE: DFC.

In addition, the Corporation made efforts to maintain its level of geographic coverage, while reducing the cost of its service. It trained its technical staff to appraise loans in all the sectors to which

<sup>123</sup>

The institution's policy is to establish a ceiling on administrative costs, determined as a certain proportion of its loan portfolio.

loans are made. Its operations were streamlined with a view to developing a more thorough project appraisal system, increasing security requirement, monitoring more closely the status of loan securities, and placing limits on risk exposure in particular subsectors. In the financial area, it implemented measures to improve its profitability. For example, its interest rate policy is to charge rates on projects which are similar to the domestic market rate, taking into account the cost of borrowing, loan losses, the cost of administration and an allowance for a reasonable return on assets.

In the last three years, the Corporation took steps to classify its loan portfolio, provide greater financial flexibility for non-performing loans, institute write-offs and move aggressively to recover outstanding loans. It also introduced a policy that classifies loans in arrears in excess of three months as non-performing. Interest will not accrue on such loans, but strong steps will be taken to recover them. Loans which have been classified as non-performing in excess of six months will be subject to a provisioning policy. This policy categorizes these loans into two groups: those under BZ\$10,000 and those over BZ\$10,000<sup>124</sup>.

The implementation of these stringent policy measures contributed to an improved performance by the DFC. Non-performing loans were reduced from 53% in 1989, to 40% and 26% in 1990 and 1991, respectively. In addition, the Corporation realized a net profit for the first time in its history; BZ\$300,480 in 1991 and BZ\$400,000 in 1992 (TABLE VI.3).

The DFC's information system (developed under a World Bank consultancy) facilitates preparation of financial statements, statistical information for its creditors and the reports required for loan monitoring more timely. However, although a computerized system exists at headquarters, implementation of this system in its branches has been delayed due to a shortage of financial resources and trained personnel. The DFC has recognized these deficiencies and is addressing them.

The Corporation supports new economic activities to diversify the production base and implements a supervised credit system as part of its overall policy. However, this places both an administrative and financial burden on the institution, since its needs to execute thorough project appraisal procedures, provide adequate coverage in more remote and sparsely peopled areas, recruit better trained staff and provide continued training to maintain staff competence. Other areas that need to be addressed if the DFC is to improve its effectiveness in the sector include: (i) low retention of competent staff at the senior and middle management levels due to uncompetitive salaries<sup>125</sup>; (ii) with decentralization of decision-making, staff in the branches will need further training in project appraisal and loan administration to improve their efficiency; (iii) a need for the Financial Controller to be trained in financial planning and budgetary controls; and (iv) greater coordination with other institutions providing support services (marketing, extension and research, technological packages, etc.) to agriculture.

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<sup>124</sup> The DFC will reschedule loans only after attempts have been made to recover all arrears of principal and interest. Rescheduled loans will be subject to an increase in the rate of interest as a penalty.

<sup>125</sup> Partly due to low salaries, the position of General Manager remained vacant for almost two years, until it was filled in September 1992.

TABLE VI.3  
PERFORMANCE INDICATORS OF THE DFC, 1989-1993, (BZ\$ '000)#

ITEM	1989	1990	1991	1992	SEPT. 1993
TOTAL ASSETS	36.1	36.0	37.9	42.7	48.3
- LOANS RECEIVABLE	29.6	26.9	27.2	33.5	39.6
TOTAL LIABILITIES	38.5	41.2	41.3	40.1	44.5
- LOANS REPAYABLE	32.6	35.4	34.2	32.2	38.6
NET WORTH	(2.4)	(5.2)	(3.4)	1.7	3.8
- DFC AUTH. SH. CAP.	10.0	10.0	10.0	10.0	10.0
DFC ISSUED AND FULLY PD. SHARE CAPITAL	4.2	4.6	7.3	8.8	8.8
DFC UNISSUED AND FULLY PD. SH. CAP	-	1.1	-	3.0	4.0
GOB EQUITY	-	1.35	1.5	4.5	1.0
TOTAL INCOME	5.0	3.3	5.5	5.3	4.0
- INTEREST INCOME	3.5	2.9	2.7	3.6	3.1
TOTAL EXPENSES	10.3	7.5	5.2	4.9	3.6
- INT. EXPENSE	2.1	2.1	2.1	2.0	1.5
- PERSONNEL EXP.	1.8	1.9	1.9	1.8	1.3
NET PROFIT (LOSS)	(5.3)	(4.2)	0.3	0.4	0.4
LOAN APPROVALS	2.5	6.4	10.3	15.0	9.4
LOAN DISBURSEMENTS	4.1	6.1	5.7	11.3	10.7
NO. OF STAFF	92	85	81	67	67

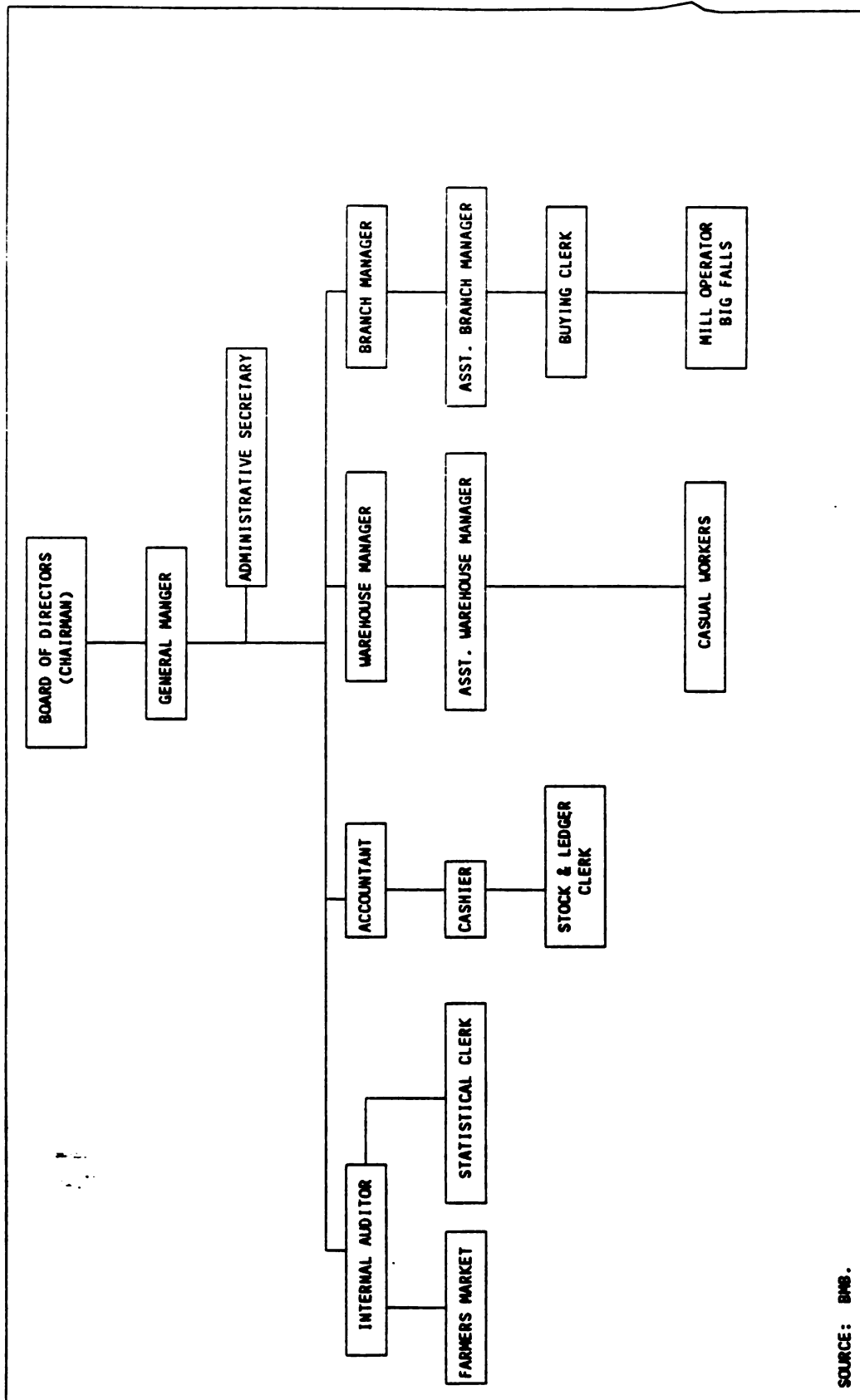
# DATA FOR 1993 IS UP TO SEPTEMBER.  
SOURCE: DFC.

#### 6.1.4 Belize Marketing Board

The Belize Marketing Board (BMB) was established in 1948 as a legal public entity to support the marketing of agricultural products. Its broad mandate was to buy and sell products, operate processing plants, establish market depots and agencies, assist agricultural producers to market their output and stabilizing prices.

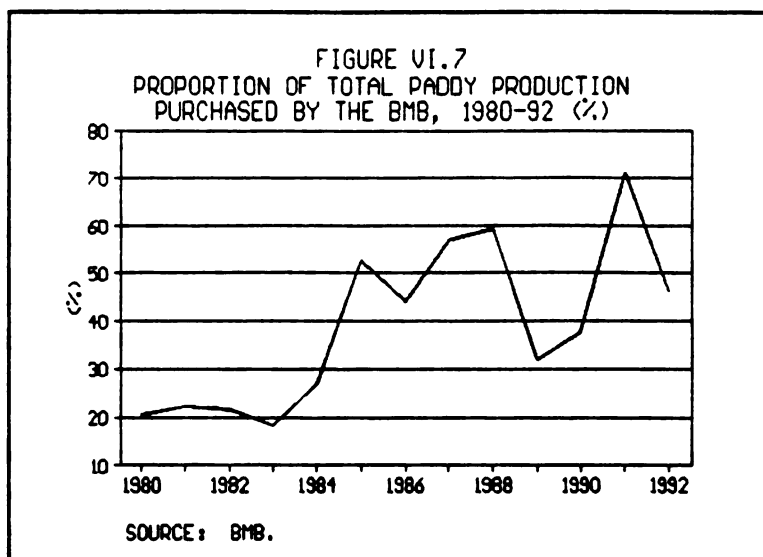
Overall responsibility for the BMB lies with an eight-member Board of Directors which is appointed by the Minister of Agriculture. A General Manager has responsibilities for day-to-day management and administration of the institution and is supported by four management personnel: an Auditor, an Accountant, a Warehouse Manager, and a Branch Manager (FIGURE VI.6). Currently, it operates a marketing facility in Belize City and a rice processing and storage facility at Big Falls.

FIGURE VI.6  
ORGANIZATIONAL CHART OF THE BELIZE MARKETING BOARD



SOURCE: BMS.

Previously, the BMB was involved in purchasing and selling several crops including rice, corn and beans. However, in recent years, it concentrated on purchasing, processing, storing, importing and selling rice. Since 1980, the Board purchased an increasing proportion of the domestic rice paddy production for processing, ranging from a low of 0.7 million kgs in the 1980s to 3.4 million kgs annually in the 1990s (FIGURE VI.7). Rice paddy is purchased from farmers, and processed and stored at its Big Falls Mill.



The Board is the sole legal importer of rice in Belize, purchasing from abroad to supplement local production. Through its local purchases and rice imports, the BMB controlled the domestic rice market and stabilized rice prices. In addition, it compensated its losses on local purchases and processing with profits made on imports. The projected paddy output for the 1993-94 crop year is about 13.6 million kgs, which should exceed the local requirement. As a consequence, imports may not be necessary, but the Board may incur higher losses from its domestic rice operations<sup>126</sup>.

In addition to supporting rice production, the BMB channels credit for corn and red kidney bean production. This is done by providing low interest loans (8.25% per year) to major buyers of these grains, for purchasing them from farmers at fixed prices. In this way, the BMB supports farmers to market their output through private marketing channels, and avoids any financial losses which it may incur from these activities.

Like most public marketing agencies in developing countries, the BMB experiences financial losses from its operations and is heavily dependent on the GOB for support. This is provided through annual and occasional supplemental subventions from the government. Although it provided a guaranteed market for rice farmers, its price stabilization measures were unsuccessful, due to inefficient processing operations, management problems and high operating costs.

<sup>126</sup>

Moreover, the Board may be required to export surplus rice at a loss.

The Board is unable to compete with the private sector in marketing. It faces the dilemma of increasing its operating efficiency significantly if it is to be competitive with private institutions, a task that would require major restructuring and institutional strengthening, or shifting its operations to other products or marketing functions. As regards the first alternative, the Board would have to modify its payment methods to farmers, reducing present subsidy levels by adopting more strict purchasing practices, and develop a technology transfer mechanism to upgrade the production methods of farmers. However, the least efficient and smaller rice producers may not survive if this alternative is pursued.

If the Board is unable to eliminate completely its financial losses on rice operations, financial support would be required from the GOB on a sustained basis<sup>127</sup>, or it could be given the authority to import and sell other commodities. The latter option may conflict, however, with a previous decision that the Board should serve only as a price stabilization entity.

Presently, the future role of the BMB in agricultural marketing is under review. Although its role is mainly in price stabilization, privatization of the Big Falls Grain Complex and Rice Mill has not materialized as recommended previously<sup>128</sup>. The BMB also has a facility at Belmopan which was initially built as a feed mill and corn storage depot. It has been idle for several years and would require much additional capital for it to become operational.

## **6.2 Private Sector Organizations**

Private sector organizations operating in Belize's agricultural sector include producer associations and cooperatives. The large producer organizations include the Belize Livestock Producers Association (BLPA), Cane Farmers Association (CFA), Citrus Growers Association (CGA), Banana Growers Association (BGA), Papaya Growers Association (PGA), Grain Growers Association (GGA) and the Cocoa Growers Association. There are also several agricultural cooperatives in Belize, including three federations of cooperatives. These are the Belize Federation of Agricultural Cooperatives, the Federation of Honey Producers and the Belize Fishermen's Cooperative Association.

In addition, there are other private sector entities that function as businesses, operate in other sectors and in agriculture, or serve as umbrella organizations for private sector interests. This is the case of the Belize Chamber of Commerce and Industry (BCCI), the Belize Export and Investment Promotion Unit (BEIPU) of the BCCI, the Belize Agribusiness Company (BABCO) and the Mennonite Community. Some of the private sector organizations operating in the sector are discussed below.

### **6.2.1 Belize Livestock Producers Association**

The Belize Livestock Producers Association (BLPA) provides the broadest representation to producers in the livestock sector. It is involved in marketing and other support activities, such as

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<sup>127</sup> The BMB management estimates that a yearly subsidy of about B\$250,000 would be required to continue its paddy purchases from only farmers in the Toledo district.

<sup>128</sup> In 1985, the GOB and USAID agreed that the grain complex would be privatized in return for AID assistance.

operation of the central livestock facility and a credit program (known as the Cattle Fund), and is responsible for the registration of cattle brands in the country.

The BLPA obtains an income of some BZ\$70,000 per year from a cess levied on livestock slaughtered and exported, plus a smaller amount from brand registration and renewal. To cover the cost of its livestock auction operations, it charges a 3.5% fee on the value of the animals, plus a BZ\$2.00/head per day yardage fee. The Association also receives a fee of B\$3.50/head per month to manage the Cattle Fund.

The BLPA has played a key role in the implementation of the Belize Livestock Development Project, particularly Phase II. The goals of this project included increasing the income and welfare of livestock producers through improved productivity, and expanding marketing outlets and the volume of marketed livestock products. An evaluation of this project in early 1993 concluded that it failed to increase domestic pork and dairy production, but succeeded in establishing the Cattle Fund, the Central Livestock Market (CLM) facility, training personnel, and involving the BLPA in strengthening livestock industry programs<sup>129</sup>.

In 1991, the GOB, together with the BLPA, established the Cattle Fund, a financial facility to provide production and marketing credit to livestock farmers. It started with a government loan of BZ\$600,000 and a yearly subsidy of BZ\$40,000 to cover operating costs. The Fund provides credit support to cattle farmers, by loaning funds to purchase steers, minerals and veterinary supplies and to transport animals.

Operationally, the beneficiaries of the Cattle Fund are required to provide collateral equivalent to 25% of the value of the loan, have adequate management capability, and demonstrate that pastures, fencing, drinking water and corrals are adequate. After the loan is approved, the BLPA delivers the cattle and supplies and supervises project execution at monthly intervals until the animals are ready to be marketed. When the animals are sold, the Association deducts the value of the loan, plus interest and other expenses, and pays the remainder to the farmer. It is still too early to evaluate the impact of the credit program, since only a small number of farmers have benefitted from it, and many of the beneficiaries have not yet marketed the livestock that was supported by the Fund<sup>130</sup>.

Although the Cattle Fund was started and the CLM facility constructed to facilitate organized marketing of livestock, neither of these are fully operational as originally planned. By the end of 1993, only one cattle auction had taken place. In the future, the Association plans to increase its use of the facility by sponsoring one livestock auction per month. However, with the possible withdrawal of USAID from Belize and the GOB's announcement to terminate the current yearly operating subsidy paid to the BLPA, the future of these operations is uncertain.

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<sup>129</sup> Rai, *Op. cit.*

<sup>130</sup> At the end of 1993, the available money in the Fund was loaned to 20 cattle farmers.

The BLPA recently completed a pre-feasibility study for the construction of a slaughterhouse at Burrel Boom, off the Northern Highway. This facility is expected to meet the standards of the United States Department of Agriculture (USDA), for exporting meat to the U.S. market. This facility is a necessity for supporting continued growth of the livestock sector. The project's estimated cost is BZ\$1.4 million; the BLPA plans to issue shares to raise BZ\$0.33 million and borrow the remainder.

The Association suffers from two main weaknesses. First, its organization and management capabilities need to be strengthened if it is to effectively represent the livestock sector. Second, it lacks sufficient funding to support development activities. One option for securing additional financing is for the BLPA to include poultry producers in its membership. It could provide a variety of services to this group, such as timely detection of diseases, quality certification of feeds and meat and identification of products and markets<sup>131</sup>.

### **6.2.2 Citrus Growers Association**

The Citrus Growers Association (CGA) was founded in 1967 as a non-profit organization. It has approximately 650 members who cultivate about 19,040 ha of citrus, with each member having a minimum of 2.0 ha. The CGA's membership includes the two companies involved in citrus processing, which also own extensive citrus groves. The primary functions of the CGA are to: (i) negotiate fair prices with processors, for fruits delivered; (ii) provide basic agricultural inputs to citrus growers; (iii) disseminate information to growers about improved production technology; and (iv) conduct research and extension activities.

The Association is financed through a combination of: (i) a cess charged to growers for fruits delivered; (ii) income derived from sales of fertilizer, agricultural chemicals, rootstock and budded plants; (iii) income from machinery and equipment services, sales and rentals; (iv) sales of fruit from the association's own farm; (v) income from credit loans to members; and (vi) membership fees, interest on term deposits, etc.

The CGA's principal activities are providing technical and financial assistance to its members for improving citrus production, and negotiating on behalf of its members. It has a Research and Extension Unit that provides technical advice and services to citrus growers. The Unit maintains a fully-equipped laboratory, while its research staff carries out a variety of trials in the areas of plant protection, weed and pest control, fertilizer response and trials for a variety and rootstock materials. Over the years, the CGA's research activities have been constrained by a shortage of trained personnel and finance.

### **6.2.3 Mennonite Community**

The Mennonite community has the largest and most efficient agroindustrial complex in Belize. It consists of Mennonite immigrants (and those born in Belize) who came to Belize from Mexico and Canada in the 1950s. It comprises groups located in Spanish Lookout, Ship Yard, Blue Creek, Baron

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<sup>131</sup> Rai, *Op. cit.* 1993.



Creek and Little Belize that are involved in production, processing and marketing activities. The community operates as a closed political-socioeconomic communal-based system which pools its resources to farm, purchase equipment and supplies and provide services. Most of the production activities are integrated and done on a large scale, utilizing improved technology.

The output of these groups together accounts for more than 90% of the poultry meat and eggs, and a large proportion of the corn, rice, beans and feeds produced in Belize. Presently, the groups established processing facilities and are competing in the same market with other Belizeans, as in the case of poultry and rice. Besides farm production and processing, the Mennonites have transport facilities and a distribution system throughout the country, that also involves private non-Mennonite wholesalers.

The community located at Spanish Lookout is one of the largest Mennonite groups in Belize (TABLE A.33). It developed an integrated production, processing and service system, utilizing technology that is improved compared to other Belizean producers. This group specializes in grain (corn, rice, sorghum and beans), milk and poultry production, which are linked to agroindustrial operations for producing feed, dairy products, eggs and meat. It is also involved in servicing machinery and equipment, and has established a community store through which it trades in food, dry goods, clothing, housewares and agricultural inputs.

In general, the Mennonite's production activities and agroindustrial operations have developed independently, with limited public sector support. This is largely due to the community's organization as a cohesive political, social and production entity, supported by a strong work ethic, technical capabilities, organizational capacity, access to technical and financial resources, and a sense of independence.

Unfortunately, the accomplishments of the Mennonite settlers are a special case and have been difficult to replicate by non-Mennonite groups in the agricultural sector of Belize. Moreover, even though their production operations have strong forward linkages, these are limited to local farmers and processors. Their purchases from the non-Mennonite community are not significant and they hire farm labor occasionally.

#### **6.2.4 Belize Chamber of Commerce and Industry**

The ~~Belize~~ Chamber of Commerce and Industry (BCCI) is a non-profit organization formed in 1920 to lobby on behalf of the private sector. It is the leading private sector organization in the country with approximately 600 members. Its operating budget is about BZ\$1.5 million, 20% of which is from membership dues, with the remainder provided by international donors, especially USAID. In recent years, the BCCI has adopted a broader developmental role, sponsoring initiatives such as the promotion of handicraft activities, employment generation and non-traditional export promotion.

The BCCI has played an important role in crop diversification and non-traditional export promotion, sponsoring the formation of the Belize Export and Investment Promotion Unit (BEIPU)

in December 1984, with support from the GOB and grant funding from USAID<sup>132</sup>. BEIPU's role was developmental, focusing on investment promotion and exports of local products, with a view to generating employment, income and foreign exchange earnings and/or savings in the local economy. It formulated an Export Development Program for exporting a small number of non-traditional priority products such as mangoes, papaya, ginger, and wood furniture. As a member of the Belize Agribusiness Company (BABCO), BEIPU contributed to the promotion of papaya exports to the U.S. market.

In association with the GOB, the BCCI established an Export Development Strategy Council, to focus on non-traditional export promotion. However, this Council lacks the necessary financial resources to play an effective role. Moreover, with the phasing out of USAID's support in Belize, there is uncertainty as to the future of certain activities promoted by the BCCI, such as the continuation of its agricultural diversification and export promotion work. Presently, the organization is negotiating with the GOB to establish a lottery, for generating revenues to support its activities.

### 6.2.5 Belize Agribusiness Company

The Belize Agribusiness Company (BABCO) was established by the GOB with USAID support, as a non-profit company representing public and private sector interests. It was conceived in the early 1980s as a research and development project, to assist sugarcane farmers in the northern part of the country in finding alternative export crops, due to falling sugar prices. BABCO was created as the vehicle through which the private sector component of the commercialization of alternative crops project would be implemented<sup>133</sup>. After failing to gain entry into the USA market for winter vegetables, BABCO focused its attention on tropical fruits.

In 1985, BABCO signed a cooperative agreement with USAID to research and develop at least two export and one import substitution crops. BABCO's role also was to provide logistical and operational support to a USA company responsible for executing the project. In addition, the original plan included the withdrawal of BABCO from the activities, once USA marketing firms consolidated direct relationships with Belizean farmers. However, due to non-interest in the project by USA marketing firms, BABCO took responsibility for executing the project.

BABCO was funded fully by USAID from its establishment until mid-1992. In 1992, the company became involved in export marketing of papayas, by negotiating a two-year marketing agreement to supply up to 10,000 boxes per week to a U.S. company. Due to the inability of local farmers to meet the export market requirement, and the need to consolidate itself in the U.S. market, BABCO became involved directly in papaya production. As a result, output and exports of papaya increased, and the Company became ... "a central figure in the fledgling papaya industry in Belize, possessing the technological capability, a committed staff and the financial potential to sustain

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<sup>132</sup> BEIPU is no longer functional. Its operations were phased out in 1994 due to lack of funding, particularly from USAID.

<sup>133</sup> This project was developed in the 1980s with support from USAID.

itself..."<sup>134</sup>. In 1992, papaya exports totalled 1.5 million pounds, valued at US\$1.0 million. Of this total, less than 1% came from members of the Papaya Growers Association (PGA)<sup>135</sup>. Presently, BABCO has 23.5 ha under papaya cultivation and is expanding its operations with an additional 8 ha.

In August 1992, USAID terminated its grant funds to BABCO, and an assessment of the Company concluded that it could be a financially viable entity<sup>136</sup>. This conclusion, however, was based on assumptions that its research and development activities would not be expanded to include other crops, and that there would be no serious constraints affecting the profitability of papaya production.

In general, the export market for non-traditional products, particularly in the USA is good. This provides BABCO favorable opportunities to promote exports of other non-traditional agricultural products, and to sustain its operations in the future.

### 6.2.6 Belize Federation of Agricultural Cooperatives

The Belize Federation of Agricultural Cooperatives (BFAC) is an umbrella organization of nine producer cooperatives and six affiliates (other cooperatives and women groups). It has 464 members, who are small farmers located mainly in the Cayo district. Conceived as a service organization for member cooperatives, BFAC focuses on helping its members to overcome problems related to high production costs, low yields, selection of alternative crops, inefficient production methods and access to markets.

Among the various activities carried out by BFAC, the promotion of crop diversification is one of the most important. It encouraged its members to gradually shift their production activities from corn and beans to other non-traditional products such as cabbages, peanuts and hot peppers. However, the experiences in cabbage production have not been successful.

The Federation has been relatively more successful with the production of peanuts, a crop believed to have good export marketing opportunities in Jamaica and Barbados. In recent years, it exported peanuts occasionally to the Caribbean. Presently, it is planning to produce hot peppers, with participation of Grace Kennedy as a possible exporter. Based on its experiences with cabbage production, BFAC has adopted a cautious approach, and it is selecting farmers to be involved in hot pepper production.

Due to various constraints, BFAC has experienced financial losses. In the early 1990's, it lost US\$ 22,000, due to inadequate production experience, difficulties in importing inputs and problems in assembling the farm output of its members during the rainy season. As a result of this experience, BFAC advised its members to market their crops themselves.

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<sup>134</sup> Miller et. al. 1993.

<sup>135</sup> This organization has an agreement to supply BABCO with 5,000 boxes per week.

<sup>136</sup> Miller et. al. 1993.

BFAC also assists its members to procure production credit. Previously, it obtained credit from the Social Security Fund and through the Belize Marketing Board, and reached an agreement with the National Development Foundation of Belize (NDFB) to make production credit available to farmers through its member cooperatives. Furthermore, it provides loans through a credit union associated with one of its member cooperatives. The Federation, however, has limited financial resources and access to credit. Consequently, its credit activities are limited in scope, assisting only a small number of its members. BFAC also provides technical assistance to farmers through its extension agents. To improve the technical capabilities of its extension personnel, it reached an agreement with the Caribbean Agricultural Research and Development Institute (CARDI) to provide extension support.

Like most cooperative federations, BFAC relies on external sources to finance its operating costs. These sources included the Canadian Cooperative Association, the Inter-American Foundation and the GOB. Funding from these institutions has enabled BFAC to compensate its operating losses.

Despite its potential as a vehicle for organizing small farmers, the cooperative movement in general, and BFAC in particular, has had limited success in promoting any cohesive organization among farmers, or within specific sub-sectors of the smallfarm community. Like other cooperative organizations in Belize, BFAC's administrative and technical staff is excessively preoccupied with short-term considerations regarding markets and prices. Much effort is devoted to finding marketing outlets for its member's output, and limited time is spent on strengthening the organization through education and training. To a certain extent, the lack of resources and limited management and organizational capabilities hinder institutional strengthening of BFAC. The effectiveness of the Federation in supporting its members has also been constrained by inadequate public support services.

### **6.2.7 The Belize Fishermen's Cooperative Association**

The Belize Fishermen's Cooperative Association (BFCA) is an umbrella organization of six fishermen's cooperatives - Northern Fishermen Cooperative, National Fishermen Producers Cooperative, Placencia Producers Cooperative, Caribena Producers Cooperative, Toledo North Cooperative and the Independence Fishing Cooperative<sup>137</sup>. The Association represents the interests of these cooperatives and provides advisory services to the GOB on fisheries policies.

The BFCA provides representation to nearly 1,200 fishermen and fish farm operators who are members of the cooperatives. Most are small and medium-size fishermen, operating boats ranging from 6 to 9 meters in length. The largest cooperatives are the Northern Fishermen Cooperative, with almost 450 members, and the National Fishermen Cooperative, with 300 members, while the smallest is the Toledo North Cooperative, with about 30 members. The cooperatives provide freezing, cooling, processing and marketing facilities for its members. In addition, they provide credit for fishing equipment and other inputs, with repayment made when the catch is sold to the cooperative. In the case of the National Fishermen Producers Cooperative, members subscribe to a pension fund and

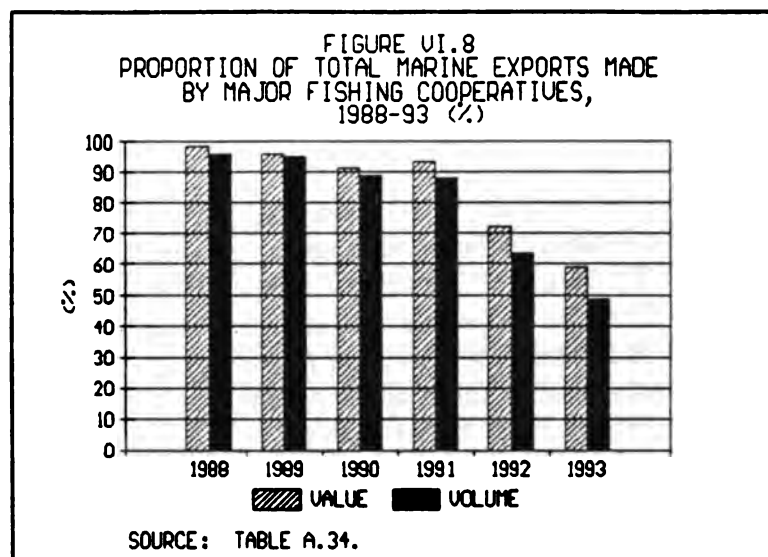
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<sup>137</sup>

Most fishermen involved in off-shore fishing belong to a fishing cooperative.

receive free medical service; their family receives a grant for their burial at the time of death. Scholarships are also provided to members' children with the best academic performance.

The formation of the BFCA and the fishing cooperatives (with GOB's support) provided a significant contribution to the organization of Belize's fishing industry, and the processing and marketing of marine products. Although the major fishing cooperatives continue to make a significant contribution to the country's exports of marine products, this has steadily declined in recent years (FIGURE VI.8), largely due to increases in output by independent producers and fish farms. Other factors contributing to this decline include lower production by some fishermen (due to low capitalization and insufficient training), and the decision of some fishermen to move into alternative employment, particularly in the tourist sector.



### 6.3 Non-Government Organizations

There are several non-government organizations (NGOs) operating in Belize, as individual institutions and as umbrella organizations. These were established with the purpose of improving the social and economic well-being of specific groups of people. In Belize's agricultural sector, NGOs are mainly concerned with providing technical assistance and credit for improving production, agricultural diversification, environmental conservation, the establishment and management of small-scale enterprises, as well as with supporting special groups such as refugees, women and children.

NGOs implement their activities through self-help projects that are designed for a target clientele, usually small farmers, women or youths belonging to a specific geographic area. Most of these activities are funded from external sources. Although the government has provided support for specific projects (e.g., refugee resettlement), NGOs have a limited continuous, joint-venture relationship with the GOB.

Like in most countries, the role of NGOs in Belize's agriculture is developmental, providing services that are complementary to those supplied by the public sector. Three features of their operations make them a valid option for complementing the government's efforts for small farmers' development: (i) they have maintained a close rapport with farmers, stressing work methods based on the active participation of all members of the target groups; (ii) they are integrally involved at the farm level in identifying problems and providing solutions; and (iii) most NGOs have demonstrated the willingness and ability to cooperate with other NGOs in sharing experiences.

In the 1980s, NGOs expanded their activities in Belize, due to increased donor allocation of resources to these institutions for development activities. In the 1990s however, donor support has declined. In small countries like Belize, the dependence of NGOs on external resources makes them vulnerable. This could produce two results. First, competition among NGOs for donor resources is likely to increase, which may affect the scope of services provided by and the viability of the weaker organizations. This could result in a few dominant NGOs remaining in the country. Second, target groups are likely to be adversely affected since NGOs may be unable to provide services on a sustained basis.

Despite scarce resources, NGOs remained fairly active in Belize's agricultural sector. The most well-known ones operating in the farming and rural community are the Belize Enterprise for Sustained Technology (BEST), Help for Progress Limited (HELP), the Belize Rural Women's Association (BRWA) and the Christian Reformed World Relief Committee (CRWRC). Most NGOs are affiliated to the Association of National Development Agencies (ANDA), an umbrella organization that provides a forum for addressing issues and establishing linkages with other regional and international organizations, to share experiences and gather relevant information.

### **6.3.1 Belize Enterprise for Sustained Technology**

The Belize Enterprise for Sustained Technology (BEST) is a private, non-profit NGO that was chartered in 1985. It has a ten-member Board of Directors, with a Managing Director responsible for overall administration and management of the organization. Its work is supported by 11 staff members comprising technical and support personnel. Its donors and sponsors include the Inter-American Foundation, USAID, Canada Fund, EC, UNDP and NARMAP<sup>138</sup>. In the 1991-93 period, BEST received just over BZ\$1.0 million annually in the form of grants and financial support.

The primary goal of BEST is to improve and sustain the economic well being of the poor, by strengthening the ability of community-based enterprises to sustain their own development. BEST's activities are consistent with the GOB's overall development strategy, and it works closely with existing and newly-formed production, processing and marketing cooperatives, farmer groups, federations and micro-enterprises.

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<sup>138</sup>

USAID support to BEST through provision of operating funds ended in 1992.

BEST's clients are distributed throughout the country. In 1993, they comprised 19 cooperatives, associations and producer groups whose total membership was close to 9,100, engaged in small farm agriculture, agroindustry or natural resource development activities (TABLE VI.4). The main focus of its work continues to be with micro-enterprises, particularly with regard to their development, and the implementation and evaluation of their business operations. Its program for women offers female groups the opportunity to participate in the establishment, development and operation of three community banks, and promotes their participation in networks for identifying other economic opportunities. BEST also operates a revolving loan scheme from a grant provided by the Inter-American Foundation.

TABLE VI.4  
GEOGRAPHICAL DISTRIBUTION OF BEST'S CLIENTS AND BENEFICIARIES, OCTOBER 1993

DISTRICT	MEMBERSHIP		COMMUNITY	BENEFICIARIES
	MALE	FEMALE		
TOLEDO	104	70	300	917
STANN CREEK	1	52	1,800	2,065
BELIZE	460	84	1,500	2,720
CAYO	205	172	0	685
ORANGE WALK	62	34	5,800	29,458
COROZAL	23	38	400	280
GRAND TOTAL	855	450	9,800	36,125

SOURCE: BEST.

Recently, BEST established a program of natural resource management centered around the promotion of sustainable agricultural technologies. In addition, it was selected and contracted as a coordinating NGO to implement technical and administrative aspects for the Global Environmental Facility/Small Grant Program. In 1994, BEST's activities are expected to provide direct client benefits to nearly 7,000 individuals, 85% of whom are located in the Orange Walk district.

### 6.3.2 Help for Progress Limited

Help for Progress Limited (HELP) was established in 1981 as a private, non-profit development agency, to respond to various constraints affecting the development of rural communities in Belize. HELP's purpose is to promote activities at the grassroots levels that involve the full participation of given communities in identifying, planning, organizing, implementing and evaluating specific projects for their own benefit. It is governed by a nine-member Board of Directors, a Managing Committee of eight members and a Chief Executive Officer, who is the Program Director. Its work is supported by nine staff members, and its main sources of funding have been a variety of donor and support agencies in Europe and North America.

HELP's 1992-94 plan of operation comprised six major program areas: human resource development, agriculture/agroindustry, machinery services, women's affairs, youth in development and networking. The organization expects to allocate BZ\$1.5 million to execute its activities, of which it will contribute BZ\$105,483 (7%) from its own resources.

HELP's clients are located primarily in rural areas. In 1992, its clients consisted of 30 farmer groups and cooperatives, comprising approximately 600 small farmers, women and refugees located in all six districts of Belize<sup>139</sup>. Presently, it is involved in 38 projects which provide direct benefits to nearly 600 persons. These projects are involved in a range of activities to support rural development, including assistance to farmers and communities for improving their use of land and forest resources, improving crop and livestock production, supporting the development of women and youths, improving literacy, training and providing machinery services.

Its most recent endeavor is a youth program, aimed at raising awareness and confidence among young rural people, through training and the organization of rural youth around community-based micro-projects and farming activities. Its literacy program provides training and technical support to refugees, helping them to establish a minimum social and economic base for sustained self-growth, and facilitating their gradual assimilation into the Belizean society. The women's program seeks the full integration of women into the development of the community, by pursuing specific activities to improve and widen their role.

Small farmers can also rent, at subsidized fees, agricultural machinery and equipment from HELP's machinery pool; or, they can contract mechanical services for land preparation, planting, as well as for transporting inputs and products to and from their farms. The agricultural program encourages small farmers to carry out economically viable and sustainable projects that diversify their production base. In this regard, HELP provides support to such farmers by: (i) assisting in project identification and preparation; (ii) securing the resources needed to implement the projects from its revolving fund; and (iii) improving its market intelligence services through increased collaboration with other organizations.

HELP's 1995-97 work program intends to: (i) expand the scope of its credit facilities; (ii) promote sustainable agricultural practices; (iii) forge closer links with the GOB and other NGOs involved in community development, to ensure that the concerns of its constituents are heard; (iv) intensify efforts to integrate Central American refugees into Belizean society; (v) continue supporting micro projects to intended to enhance the role of rural women and youth; and (vi) upgrade the technical capability of its staff, particularly in project appraisal and preparation of feasibility and marketing studies.

### **6.3.3 The Belize Rural Women's Association**

The clientele of the Belize Rural Women's Association (BRWA) comprises member groups and individual members located throughout the country's districts. BRWA is mainly concerned with rural health, education and dissemination of information on gender issues, as they affect rural women and children. In doing so, the Association provides a national forum to encourage rural women to share their concerns regarding social, health and related issues, and it collaborates with other NGOs in achieving its goals and objectives. It also supports women's groups in identifying and implementing

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<sup>139</sup>

Participating groups are represented on both the Board of Directors and the Managing Committee.



income-generating projects (such as handicrafts), and provides training and technical assistance for self-help rural development. Its revolving fund provides financial support for project start-up and implementation.

#### **6.3.4 The Christian Reformed World Relief Committee**

The goals of the Christian Reformed World Relief Committee (CRWCR) can be summarized as: increasing basic food production; improving family health through nutrition, especially child nutrition; diversifying agricultural production to increase farmer income; and strengthening local organizations. It has given support, with varied success, to small sugarcane farmers in northern Belize, small farmers in the Cayo district and to Salvadoran refugees located in the Valley of Peace.

### **6.4 Development Support Institutions**

Several bilateral and multilateral institutions supporting the country's agricultural development. These include USAID, EC, UNDP, CDB and the Caribbean Agricultural Research and Development Institute (CARDI).

#### **6.4.1 USAID**

This is the leading foreign agency in the country, providing development support to the agricultural sector. During the last decade, USAID supported several important activities in Belize, particularly in the area of agricultural diversification, with important marketing components. Its support to the GOB included an assessment of Belize's agricultural sector, strengthening agricultural planning and statistics, the Toledo Agricultural Marketing Project and the Livestock Development Project (Phase II) and the NARMAP project. In addition, it supported private sector organizations (BCCI and BEIPU) and NGOs. However, the USAID has planned to phase out its programs in Belize by September 1996, which is likely to affect the activities of several institutions in the sector.

#### **6.4.2 Caribbean Agricultural Research and Development Institute**

The Caribbean Agricultural Research and Development Institute (CARDI) is a regional organization established in 1975 to serve the agricultural research and development needs of the CARICOM-member countries. Accordingly, CARDI undertakes adaptive and applied research on selected crops and animal production problems, by developing new technologies and testing, validating and disseminating these to end users.

CARDI's activities in Belize started in 1976, at the MOA's Central Farm location. In 1982, it established its field station in Belmopan, where it has operated ever since. Presently, its research and development support activities in Belize are mainly crop-oriented. They are focused on achieving three main objectives: (i) to increase agricultural diversification; (ii) to improve productivity and profitability of basic priority crops; and (iii) to expand output for utilization in agro-industrial activities.

CARDI's work program is developed in consultation with the MOA, and it provides support in improving that institution's Research Development and Technology System (RDTS). It plans, monitors and evaluates its activities and provides detailed technical reports on these and its achievements. It is currently carrying out extensive research on oilseed crops, especially soybean and sesame, with the view to increasing domestic self-sufficiency of protein concentrate for animal feed, and oils and fats for human consumption.

The Institute has successfully developed a technological package for peanut production for small farmers, as well as locally-manufactured equipment and implements to enhance production and post-harvest activities. In addition, it is researching and developing pigeon pea and ginger for the export market, and is supplying limited quantities of seeds for crops which it has researched. Over the 1987-92 period, improved crop production technologies recommended by CARDI resulted in increased yields of at least 120% and 150% for peanut and rice, respectively, while maintaining or improving product quality.

CARDI has also provided support to other organizations in the sector. These include: advising and training the professional staff of BFAC and its client farmers in crop production and marketing; providing advisory support to BEIPU for production and post-harvest handling of ginger and pineapple; providing technical support and advisory assistance to BEST and its client farmers for soybean and peanut production; and providing technical guidance to HELP and its client farmers, mainly soybean and peanut producers.

The number of CARDI's professional staff is small, declining in the last five budget years (1988-93). In the 1992/93 year, it employed two professionals, compared with seven in the 1988-89 year (TABLE A.35)<sup>140</sup>. Moreover, personnel emoluments increased in the last five years, while its budget for operations decreased by almost 32% (TABLE VI.5). The ratio of operations to total costs during the period ranged between 54% and 37%, which are considered satisfactory.

TABLE VI.5  
CARDI's ANNUAL EXPENDITURES (1988-1993)

BUDGET YEAR (SEPT-AUGUST)	EXPENDITURES BZ\$			RATIO O/T (%)
	TOTAL	EMOLUMENTS AND WAGES	OPERATIONS (O)	
1988-1989	322,124	151,497	170,627	53
1989-1990	388,486	214,290	174,196	45
1990-1991	302,393	140,569	161,825	54
1991-1992	283,176	178,109	105,067	37
1992-1993	295,939	180,623	115,316	39

SOURCE: CARDI.

<sup>140</sup> One of the Diploma-level professionals for each year has been an Extension Officer assigned as a trainee to CARDI by the MOA.

## CHAPTER VII

### BASIC AGRICULTURAL SUPPORT SERVICES

#### 7.1 Agricultural Planning and Statistics

The MOA is the principal institution responsible for agricultural planning and executing the government's agricultural policy in the country. Much agricultural planning is done at the district and division levels in the MOA, and decisions are taken at a higher level involving the Minister, PS, and divisional heads. The Policy Analysis Unit (PAU) of the Ministry provides important inputs to the planning process and coordinates planning activities in the institution.

The PAU's functions also include policy analysis, economic analysis, compiling and disseminating agricultural statistics, preparing position papers, representing the MOA on various boards and committees, reviewing applications for concessions and other responsibilities assigned by the Minister and the PS. Although the Unit has responsibilities for conducting policy analysis and preparing position papers on specific issues to guide decision making, its numerous liaising and administrative responsibilities limit its involvement in policy analysis. As a result, very limited policy analysis is done by the Ministry.

The Unit collects agricultural statistics through various units of the MOA, from other Ministries, public sector institutions (e.g., Central Statistical Office) and commodity organizations. Within the MOA, statistics are collected annually on farm level activities, via a questionnaire sent by the PAU to the DEOs. Information is compiled on production, cultivated and harvested area and yields per district. Data on the fishing sector is provided by the Ministry's Fisheries Department.

The PAU also generates information through quick commodity surveys on products such as corn, rice and red kidney beans. Surveys are also done occasionally for other crops. The data collected from such surveys are processed and a performance report (of the particular sub-sector) is prepared by the Unit. Price and other market information is not collected regularly by the MOA, except data provided on rice by the BMB. Presently, no digest or document containing statistical data is produced systematically by the Ministry<sup>141</sup>. There is much information scattered in various documents in the MOA, but it lacks organization.

In the area of project analysis, the MOA's capabilities to identify, design and develop projects are weak. Project ideas are usually initiated by the PS, divisional heads, as well as by political demands on the system. Small projects and project profiles are developed for consideration by external agencies. Other projects are proposed by funding or bilateral agencies to meet specific sectoral needs.

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<sup>141</sup> Previously, the PAU prepared an annual report that provided information on the sector's performance and some basic agricultural data.

In summary, the major constraints of the MOA in the area of agricultural planning and statistics include: (i) lack of a comprehensive planning activity; (ii) limited policy analysis; (iii) absence of a regular comprehensive sector review; (iv) inadequate coordination with other institutions operating in the sector; (v) lack of an organized information system to support planning and policy decisions; (vi) inadequate dissemination of statistical information; and (vii) weak project development capabilities.

## **7.2 Research, Extension and Training**

Agricultural research, extension and training activities are undertaken by several public and non-public institutions in Belize. These include the MOA, other public sector institutions, producer organizations involved in export crop production (sugarcane, citrus, and banana), NGOs, other private institutions and CARDI. Of these, the MOA is the principal public sector institution providing research, extension and training support in the sector.

The GOB in its Development Plan (1990-1994) recommended the following strategies related to crop research, agricultural extension and training:

- (i) improvement and expansion of research, extension and training activities (particularly those aimed at small farmers), with the objective of identifying, transferring and adapting improved technologies in production, post-harvest activities and energy saving;
- (ii) in cooperation with other organizations, undertake vital research and development for specific crops and livestock, processing of byproducts, development of marketing packages, and control of plant diseases and pests; and
- iii) supporting the Belize College of Agriculture (BCA) in fulfilling its important role in human resource development for middle management positions and for training at the undergraduate level.

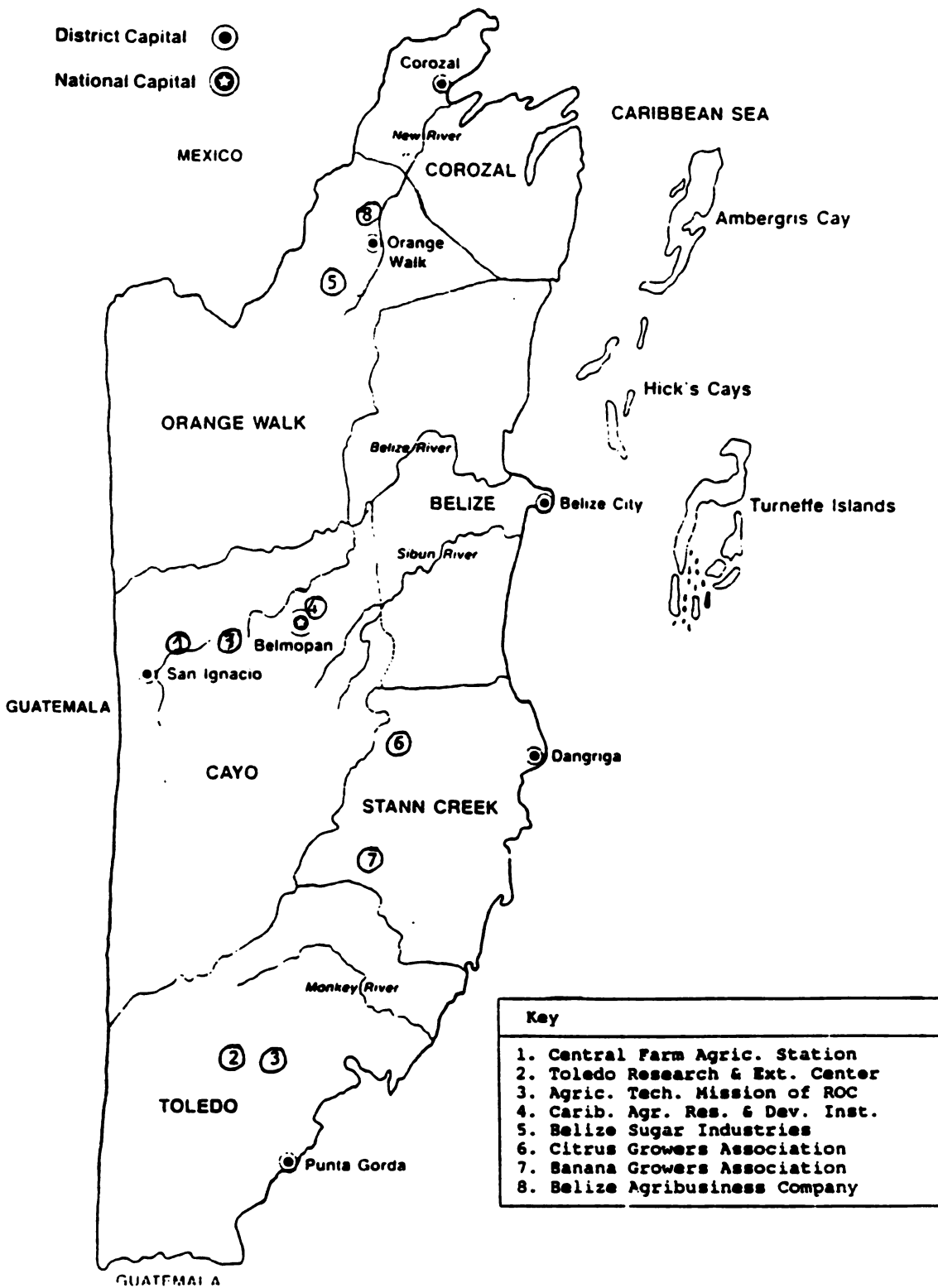
Although these are broad-based strategies for increasing productivity and efficiency and diversifying the production base, there are no well-defined policy measures and direct supportive mechanisms for implementing them.

### **7.2.1 Agricultural Research**

Belize's national agricultural research system (for the generation, adaptation and transfer of technology) comprises components involving the public and private sectors and CARDI. Location of the major research centers in Belize are shown in **FIGURE VII.1**. The public sector component focuses mainly on non-traditional agricultural production, including livestock and fishing. The MOA is the lead institution in this area. Through its Department of Agriculture (DOA), the Ministry executes the country's technology research and development transfer (TRDT) agenda on crop and livestock development. Its Fisheries Department plays a similar, but smaller role for coastal fisheries.

FIGURE VII.1

LOCATION OF MAJOR CROP RESEARCH CENTERS IN BELIZE



SOURCE: MOA.

Research on traditional crops (sugarcane, citrus and to some extent banana) are undertaken by the respective commodity organizations, with inputs from the MOA in plant protection. CARDI's research program provides support to agricultural diversification and food production.

**Public sector research:** The public agricultural research and development system was formally organized in 1949 with the establishment of the Central Farm facility. Until Belize became independent in 1981, the public research and extension system operated under expatriate leadership. Since independence, the MOA absorbed Central Farm in its operations and sought to strengthen the TRDT system for both crops and livestock through its Department of Agriculture, and for fishing through its Department of Fisheries.

Since 1981, the MOA's policies for technology research/development and transfer fluctuated widely in purpose and scope with different political administrations. In the last decade, the strategy to implement its research policy was based on three criteria: category of operators; type of commodities; and budgetary resources. Farm producers (including women) were classified into three groups - small, medium, and large, based on the scale of their operations. Small-scale farmers and fishermen were targeted as a priority group for providing technology support. In recent years, policies focused on generating, accessing and providing valid technologies to improve the production efficiency of small-scale operators (farmers and fishermen), and supported the private sector, including farmer organizations and NGOs to do likewise for medium- and large-scale farmers.

To guide its research and extension service in support of technology research and transfer, the MOA classified commodities into several groups (TABLE VII.1). The areas in which it provided TRDT support were the traditional crops for the domestic market, import substitution and under-exploited crops. With regards to livestock and fisheries, emphasis was placed on products for both the domestic and export market (livestock), while its Department of Fisheries provided technological and other support for coastal fishery and mariculture development.

TABLE VII.1  
CATEGORIZATION OF PRODUCTS FOR TRDT SUPPORT

PRODUCT GROUP	COMMODITIES
TRADITIONAL EXPORTS NON-TRADITIONAL EXPORTS POTENTIAL EXPORTS TRADITIONAL DOMESTIC-MARKET	SUGARCANE, CITRUS, BANANAS PAPAYA, PEANUT, HOT PEPPER, MANGO PINEAPPLE, GINGER, COWPEA, PIGEON PEAS, OTHERS RICE, CORN, DRY BEANS, VEGETABLES (MAINLY CABBAGE, TOMATO, SWEET PEPPERS), PEANUTS, SORGHUM
IMPORT SUBSTITUTION UNDER-EXPLOITED (ESPECIALLY FOR PROCESSING)	RICE, DRY BEANS, VEGETABLES FOR PROCESSING (TOMATOES), PLANTAINS, ROOTS (CASSAVA, AROIDS, SWEET POTATO), TUBERS (YAM), PIGEON PEA, CASHEW AND OTHER FRUIT TREE CROPS.

SOURCE: COMPILED BY MISSION

For the traditional domestic crops (rice, corn, and beans), the MOA did cultivar evaluations on a continuous basis. Its work on corn included the release of two open pollinated varieties (VS 550 and Belgold) in the early 1980's. With CARDI's support on development of rice cultivars, one variety (CARDI 70) was released in 1988, and it is the main one cultivated in the Toledo, Stann Creek and Orange Walk districts.

Presently, the MOA's research program focuses on corn, rice, beans and some vegetables. Most activities are related to testing (validating) cultivars of these crops and providing corresponding plant protection measures. Its research on crops are carried out at its Central Farm Agricultural Research Station and the Toledo Research and Extension Center (TREC). The research activities at the Central Farm Station concentrate on corn, beans, seed production, pests and diseases, and these are done primarily in the Cayo District (TABLE A.36). Currently, the Station's crop research staff consists of three professionals, with support from a limited number of technical staff. Under technical supervision of the MOA's livestock production and health division, Central Farm also does a limited amount of livestock research. However, this declined significantly in recent years due to insufficient resources.

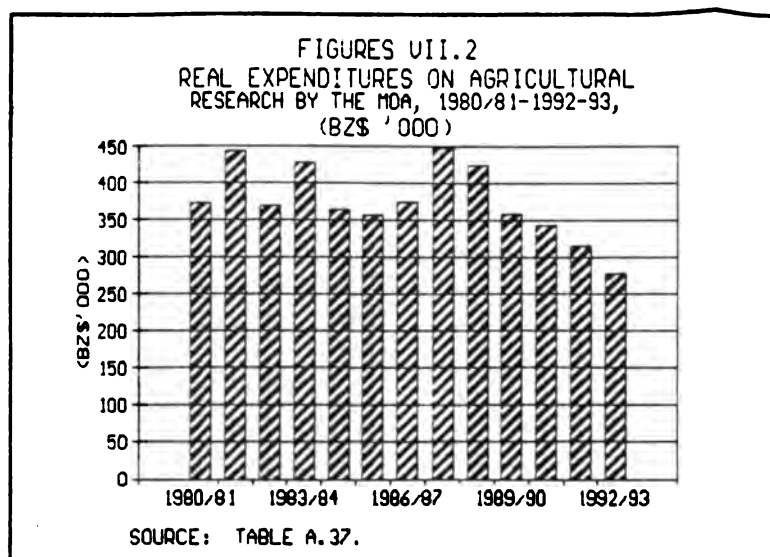
The TREC conducts limited research on low-land and upland rice and seed multiplication in the Toledo District. Apart from these, the Center gives research support to the Toledo Small Farms Development Project in multi-cropping production systems. The TREC also suffers from inadequate human and financial resources; presently, it has only one Agronomist who has limited experiences in research. In the area of fishing, the MOA's Department of Fisheries is largely engaged in administration of the GOB's fishing policies and monitoring the resources. Its capability to conduct research is very limited, but it is supported in this area by the CFRAMP project.

Financial resources for the MOA's research program are provided by the GOB (through its annual budget), and from loans and grants obtained from external sources. In the 1980/81 to 1993/94 period, the Ministry allocated an average of BZ\$0.5 million per year for research, or less than 6% of its total budget. However, available data for the 1981/82 to 1992/93 period shows that the real expenditure level has been declining (FIGURE VII.2). Since 1990, research expenditures declined to less than 3.5% of the MOA's budget. Moreover, a large proportion of this expenditure was on wages and salaries, averaging almost 75% per year in the last five years, while allocations for materials and supplies ranged between 7% and 12% only of the budget<sup>142</sup>. In recent years, the shortage of both finance and personnel has seriously reduced the Ministry's agricultural research activities.

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<sup>142</sup>

FAO views a service having less than 30% of its budget as operational funds as being ineffective. MOA 1993.



Currently, the public agricultural research system is poorly able to implement the GOB's research policies, and is unable to provide sufficient policy guidance to non-public research efforts. Research and development (R & D) activities have almost ceased in the MOA. The acute shortage of financial resources has limited its ability to attract and retain professional personnel. Due to the personnel shortage and the unavailability of authorized posts suitable to the level of responsibility needed within the institution, most technicians have other responsibilities in addition to their main portfolio of either research or extension. The research staff spends approximately 25 % of their time on research activities, and the remainder is devoted to teaching, administration, services and extension. As a consequence, there is limited agricultural research planning and improper research methodologies are used at times without adequate evaluation and reporting of results.

There are also organizational weaknesses that adversely affect the MOA's research system. Although the MOA's organizational structure has certain favorable features, there is overlap of some of its functions, particularly in the regulatory, quarantine, development and administrative areas. In theory, there seems to be a defined role of the various institutions of the research system. In practice, however, there is a lack of coordination and monitoring of research activities. At the MOA level, linkages between various units for achieving specific research objectives are limited. For example, the linkage between the TREC and Central Farm is not clear. As a result, the effectiveness of both TREC and Central Farm is constrained by the lack of a clear-cut organizational structure between the two, and as they relate to other programs in the MOA.

Other major constraints of the research system include: (i) an absence of clear-cut research policies, objectives and priorities; (ii) an inadequate funding mechanism; (iii) inadequate coordination and monitoring of public and private research activities; and (iv) limited feedback from farmers on the R & D system.



***Non-public agricultural research:*** Agricultural research undertaken by non-public institutions include those by the commodity and other private organizations, CARDI and the Chinese Technical Mission (CTM) to Belize. There are three major areas of contrast between public and private research and development (R & D) activities. First, much of the work of the non-public sector is focused on specific commodity areas, and involves the transfer and adaptation of technology from both external sources as well as those generated locally. Second, the private sector allocates a larger proportion of its budget for operational activities. Third, the data and experiences of private R & D activities have not been collected, reviewed or analyzed for possible further use by the public sector.

The **Belize Sugar Industry (BSI)** has been operating a small research center since 1973. Its main research goal is to contribute to the sugar industry's development, through the generation and transfer of appropriate technology to sugarcane farmers (TABLE A.38). Its nursery provides improved varieties of sugarcane to farmers, and it conducts field trials on new cultivars having pest and disease resistance and high yields, as well as on fertilization and weed control practices. Much of the research (about 75 %) is devoted to varietal selection, and it has been consistent in using research methodologies for cultivar selection. Presently, the BSI staff includes two professional researchers and three technical assistants.

The **Citrus Growers Association (CGA)** conducts research in the areas of citrus production and protection and the dissemination of new technology (TABLE A.39). Until recently, no extensive research was carried out on citrus in Belize. The CGA's R & D activities are executed through its Research and Extension Unit, which provides technical advice and services to citrus growers. The Unit maintains a fully equipped laboratory and the research staff carries out trials in the areas of plant protection, weed and pest control, fertilizer response and rootstock material selection. Recently, it started extensive work in monitoring pests and diseases, especially for Citrus Tristeza Virus. Over the years, the shortage of personnel and financial resources have constrained the CGA's R & D program; presently it has one professional and three technical support personnel.

The **Banana Growers Association (BGA)** is the governing body of the Banana Industry and it represents all banana growers in Belize. In 1991, the BGA took over responsibility of the banana industry. Its R & D program is relatively limited compared to the other commodity associations. Its main activity in this area is providing technical assistance in the areas of pest and disease control and improvement in production and fruit quality.

The **Belize Agri-Business Company (BABCO)** commenced operations in 1986 to promote agricultural diversification and exports of non-traditional activities. Its R & D program focused on commercial production of alternative crops, particularly papaya. It has been providing technical support (with the MOA) to farmers and developed its own farming activities. Besides papaya, BABCO maintains a germplasm bank containing several tropical fruits.

CARDI's research activities support the MOA's agricultural diversification and food production programs (TABLE A.40). The Institute undertakes adaptive and applied research to develop, test, validate and assist in disseminating new technologies to farmers on selected crops. CARDI's contribution to R & D includes the development of a new rice cultivar, technological packages for peanuts and soybean, and the introduction of these into the country's cropping systems. In recent years, its research focused on oilseed crops for import substitution, and it is also concentrating on pigeon pea and ginger for the export market.

The Agricultural Technical Mission of the Republic of China to Belize has been involved in R & D activities since January 1991. The Mission is conducting varietal evaluation for irrigated lowland rice, corn, and several vegetables.

**Constraints to research:** The main factors constraining agricultural research in Belize include the following:

**(a) Absence of a long-term policy direction:** Both the efficiency and effectiveness of agricultural research is constrained by the absence of a clear, well-defined agricultural research policy by the GOB. Research priorities are lacking and these limit efficient resource allocation, particularly in the public sector. Due to this and other factors (discussed below), the present agricultural research system is not able to contribute to increasing agricultural output, diversification of production, or to compete successfully in the export market and with imports in the domestic market. Furthermore, appropriate research policies and programs are not in place to meet the new challenges of Belize's agriculture.

**(b) Inadequate planning and coordination of R & D activities:** Inadequate planning and management has limited the effectiveness of agricultural research, resulting in duplication and dissipation of efforts, neglect of critical areas and the discontinuity of critical research programs. As pointed out, a variety of R & D activities are done in Belize, but these are not coordinated or integrated at a central policy level because of the absence of a relevant mechanism. Moreover, due to the absence of an effective, central body with authority over national agricultural research, decisions on resource allocation are less likely to be guided by priorities and more by the biases of individual researchers or administrators. This can lead to duplication of effort while diminishing the appropriateness, quantity and quality of research outputs.

**(c) Weaknesses in organization and management:** For all practical purpose, the Ministry's DOA is mainly a service structure. It does not engage in organized technology research/development and transfer. At best, it facilitates utilization of practices borrowed from outside sources.

The organizational chart of the MOA indicates at least three basic problems: (i) absence of a clear structural hierarchy (e.g., Department, Division, Unit and Section); (ii) absence of specific institutional functions and roles (e.g., roles in crop/livestock research and development); and (iii) fragmentation and dispersion of activities. In addition, the boundary between core and

support functions in the institution is unclear. For example, to pursue technological modernization of the agricultural sector, technology research/development by Central Farm and its transfer by the extension service are not shown as being at the core of MOA's TRDT agenda. These are placed on the same organizational level as Veterinary Medicine (a technical support service) and Projects (an administrative unit). Furthermore, the structure facilitates the decision-making style to bypass hierarchical responsibility or authority.

The atomization of functions around individuals rather than grouping them by process in the MOA precludes a team approach to address complex TRDT problems. The mere improvement or promotion of a discrete, isolated technical component (e.g., release of the higher-yielding corn variety *Belgold*), does not necessarily lead to providing a valid technological package required by target farmers. The same applies to fisheries.

The organizational weaknesses of the MOA are compounded by its budget structure which is designed along various sub-structures, under the label Unit/Division. These however, do not correspond to the institution's TRDT sub-structures. The operation of TRDT system is further affected by staff turn-over and limited resource management, inherent in the civil service administration of most CARICOM countries, including Belize. As a result, available records of the DOA's TRDT actions showed a low level of concrete achievements and institutional efficiency. Consequently, the technological needs of farming community, especially small-scale producers, are not met adequately.

**(d) *Inadequate monitoring and evaluation:*** Related to the above is the absence of monitoring or evaluation of both public and private research programs. A major deficiency is information on the timeliness, relevance and impact of these activities at the farm level and on the welfare of the farming community. There is no doubt that some research activities have positively impacted the country, but there is little documented information on these experiences.

**(e) *Shortage of resources:*** Although both the public and private sectors have been constrained by inadequate resources, the situation in the public sector is more acute and has actually worsened in recent years. The MOA is the core institution responsible for designing and implementing the GOB's research policy, but it is currently poorly able to execute these due to insufficient resources. With the exception of crop management research in the monocultures for export, little R & D work is currently done on non-traditional crops and livestock.

**(f) *Weak extension service:*** An effective agricultural research system requires close linkages to and the existence of a strong extension service. However, Belize's public extension service is weak; it is not capable (in quality and scope) of absorbing and transferring research results effectively to farmers (Section 7.2.2).

**(g) *Technological deficiencies:*** Except for sugarcane research, Belize has not demonstrated a sustained research and development effort in recent years directed specifically at improving technology for the smallfarm sector. Consequently, smallfarm agriculture is characterized by poor farming practices, low productivity, high production costs and pre- and post-harvest losses.

Vegetable production has been constrained by the lack of improved technologies for managing pests and diseases and inadequate irrigation.

*(h) Inadequate information:* In general, information is lacking on agricultural R & D activities. Documentation of research information, material needs and expertise available are scattered and often not easily accessible. In part, the limited formal coordination between the various components of the research system (public, private and NGOs) has contributed to the poor information base.

*(i) Limited contacts with regional and extra-regional TRDT systems:* The TRDT system in Belize has established little, mostly informal cooperation with TRDT structures within or outside the CARICOM region. External TRDT structures identified by the national system as most relevant for future or closer inter-institutional cooperation on technology, research and development are listed in TABLE A.41.

### 7.2.2 Extension Service

The agricultural extension system comprises three components: the public service operated by the MOA; the private extension service of commodity organizations; and the service provided by NGOs. The system operates in three major areas: (i) export crops; (ii) domestic food production and import substitution; and (iii) agricultural diversification. Basically, the primary goal of the extension system is to facilitate technology transfer to farmers for optimizing productivity and reducing output losses.

**Public extension service:** The MOA provided a variety of extension services (TABLE A.42) including: (i) farm visits to resolve production, marketing and related problems; (ii) providing technological packages and demonstrations of recommended production practices; (iii) support services such as supplying seeds, seedlings and improved animal stock; (iv) collecting information on crop acreage and yields; and (v) organizing seminars, meetings and training activities for farmers. The service focuses mainly on smaller farmers, producing corn, rice, vegetables, root crops, peanuts, beans, honey, livestock and fishing.

Within the MOA's structure, the extension division is located in the Department of Agriculture. It is headed by the Principal Agricultural Officer (Extension) who reports to the CAO. Presently, the division's staff has 36 persons, of whom only 16 provide support in the field (TABLE VII.2). Under the PAO are District Agricultural Officers (DAO), one assigned to each of the country's six geographic districts. The DAO has responsibilities for the MOA's extension work, as well as executing regulatory and research programs in the district. The DAO is supported by Extension Officers (EO) who provide services to farmers directly. The EOs are expected to provide extension services to the country's 29 geographic zones.

TABLE VII.2  
NUMBER OF EXTENSION OFFICERS IN THE MOA, OCTOBER 1994

CATEGORY	ESTIMATES (1994/95)	CURRENT STAFF #	IN FIELD*
GRADE 1	8	7	3
GRADE 2	25	22	11
GRADE 3	14	7	3
TOTAL	47	36	16

# SOME OFFICERS ARE ON STUDY LEAVE AND A FEW HAVE BEEN ASSIGNED TO OTHER PROJECTS.

\* THOSE PRESENTLY WORKING IN THE FIELD.

SOURCE: MOA.

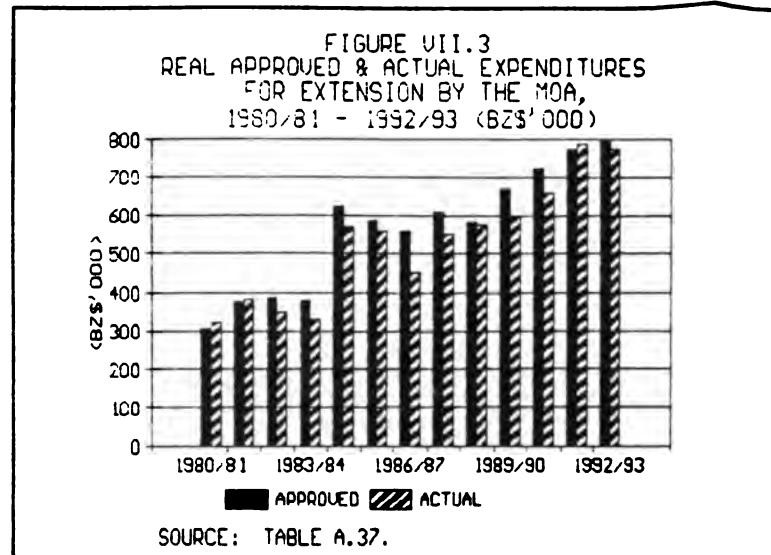
At the district level, each extension office has positions for an Extension Supervisor of Education (ESE) and an Extension Supervisor of Services (ESS). The ESE is responsible for coordinating the work of the EOs related to educational aspects of extension, while the ESS has responsibility for the local agricultural station(s), which provide improved plant and animal stock to farmers. Both the ESEs and ESSs are supervised by the DAO, who coordinates their activities with those of others in the district. In addition, extension support is given by the Apiary Section (for honey production) and by veterinary and livestock officers (for livestock production and animal health).

The activities of the extension division are programmed within a work plan defined jointly by the EO's and each DAO. These are then aggregated for the various districts and adjusted by the PEO to form the national work program. This program is finalized through coordination with other units in the MOA (PS, PAOs, Central Farm), and with the DFC, the BMB, CARDI, and the private sector.

The extension service is funded by the GOB through the Ministry's budget. In the first half of the 1980s, expenditures on extension averaged about 4% of the MOA's total budget. Since then, both the level of real financial resources allocated and the level of actual expenditures steadily increased (FIGURE VII.3)<sup>143</sup>. In recent years, actual expenditures averaged almost BZ\$1.0 million, or about 8.6% of the MOA's total budget. The proportion of money allocated for personnel costs (wages and salaries) in the extension service has been one of the highest in the Ministry, averaging almost 86% in the last five years.

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The budgetary allocation is only for the Ministry's sub-head titled Agricultural Extension Service.



The MOA's extension service has several deficiencies. Theoretically, the service is supposed to facilitate technology transfer and provide training to farmers for improving production of non-traditional products (food and import substitution commodities). However, it has been unable to execute its work program in a systematic manner and support the farming community effectively. Its principal constraint is the acute shortage of financial and human resources. Despite the upward trend in the Ministry's budgetary allocation for extension, the quantum of resources has been insufficient, and the MOA has been having a difficult task to allocate its limited resources very efficiently. Mechanisms exist to set extension priorities and objectives in the Ministry, but it has been extremely difficult to implement these due to high demands on the system. As a result, extension activities are largely executed based on the capabilities of the individual extension officer, rather than on the MOA's overall policy.

The severe shortage of field staff places a high burden on existing ones, since they are required to cover a broad geographical area with responsibilities for a range of activities. Presently, the quality of farmer contact is not given sufficient emphasis and there is absence of a well-designed program for close on-farm collaboration. Moreover, funds for in-service training and publications are currently non-existent. With regard to organizational aspects, the MOA's service works in three areas where program distinctions sometimes become blurred: between services and education, between animal husbandry/health and crops, and between private and public extension activities in certain export commodities. In addition, the Ministry is unable to fill the gaps or meet farmers' needs in areas where private services are limited.

Other factors affecting the MOA's service includes: (i) dilution of efforts due to the resource shortage and the range of commodities covered; (ii) insufficient "hands-on" experience of the majority of field staff to work in the priority areas; (iii) inadequate coordination with other organizations involved in extension and with those providing support services; (iv) limited support facilities for extension personnel, transportation and housing; (v) limited exchange between research and extension (partly due to limited research work); (vi) insufficient in-service

training of EOs; (vii) absence of guidelines regarding the intensity and frequency of meetings with farmers and group training; and (viii) as a consequence of the above, staff motivation is low and this contributes to reduced effectiveness of the service.

***Private extension service:*** The private sector provides extension services through the commodity organizations and NGOs. These include the BSI (for sugarcane), the CGA (citrus), the BGA (banana) and a few NGOs. The commodity organizations provide extension services to their members in specific production areas. On the other hand, the NGOs, particularly HELP, BEST and the BFAC offer a range of extension support to various groups of small farmers. Besides support to increase production, their services include business management support, and promoting sustainable farming practices that are both economically viable and environmentally positive. However, due to inadequate resources, the scope of the extension support by NGOs is limited.

**Constraints of the extension service:** Other constraints that limit the effectiveness of Belize's agricultural extension service include:

**(a) *Absence of a long-term policy direction:*** In general, the country's research and extension system suffers from the absence of a long-term policy direction. This is largely due to the lack of a comprehensive agricultural strategy for the country.

**(b) *Quality and extent of extension coverage:*** Both public and non-public institutions that provide extension support are limited in their coverage of the farming community. The inadequacy of resources together with the absence of a national research and extension policy reduce the effectiveness of the extension system.

**(c) *Weak linkages to research activities and the private sector:*** There are no mechanisms for providing periodic and effective communication between research and extension in Belize. Existing communications are mostly on an ad hoc and informal basis. Interchanges between the MOA and private producers groups, NGOs and input suppliers are limited.

### **7.2.3 Training**

Formal training in agriculture takes place at four levels: primary education, high school or secondary level, post secondary education and specialized in-service training. At the primary school level, there is the Relevant Education for Agricultural Production (REAP) program, which introduces students to the basic concepts and practices. Those wishing to pursue further studies in agriculture after leaving primary school can enter one of the following institutions:

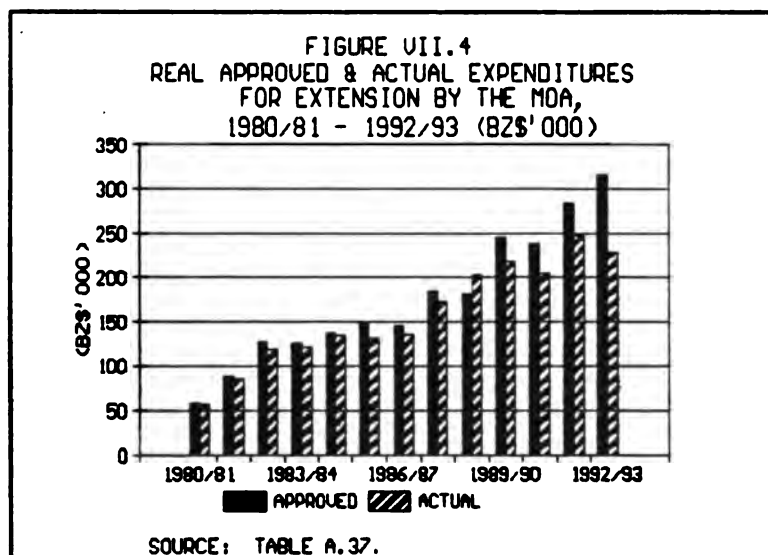
- the 4-H Center, which provides a 3-month training in basic agricultural skills;
- Belize Youth Development Center that offers a 1-year training in vocational skills including agriculture;
- Belize Junior School of Agriculture which has a 2-year training in agricultural farming skills; and

- Technical Secondary Schools which have an agricultural course (along with other subjects) up to the Caribbean Examinations Council (CXC) Level.

In the secondary level institutions, classroom instruction is supported by orienting students in several practical aspects of agriculture. The training program of some secondary senior and comprehensive schools prepares students for the CXC examination in agriculture. Constraints in administering these programs include inadequate training facilities, farm land, livestock and equipment.

After graduating from High School or the Technical Secondary Schools, those that are eligible can enter the Belize College of Agriculture (for an associate degree in agriculture) or attend institutions outside Belize (such as ECIAF and JSA). The Belize College of Agriculture (BCA) is the primary post-secondary public institution in Belize providing formal agricultural training. It is under the MOA's responsibility and offers a two-year Associate Degree in applied science in general agriculture. The objective of BCA's program is to provide specialized training to students wishing to have a career as technicians, managers and farmers in the sector, and for further training. The program includes both theoretical and practical training, and students spend approximately 50% of their time in each of these areas.

Financial support to the BCA is provided through the MOA's budget, and this has steadily increased over the years. Both the budgetary allocation and actual expenditures exhibited an upward trend in the 1980/81 to 1992/93 period (FIGURE VII.4). Since 1988/89, real expenditures by the BCA averaged more than BZ\$0.2 million per year or almost 2.5 % of the MOA's budget, compared to 1.5 % in the first half of the 1980s.



For both undergraduate and graduate-level training, most Belizeans go to universities in the U.S., Mexico, Cuba, Costa Rica, Honduras and the Caribbean. At this level, the majority



of students are sponsored either by the government or by external funding agencies such as USAID, CIDA and the Mexican and Guatemalan governments.

In-service training is done by most institutions providing support to the agricultural sector. It consists of short training courses, workshops, conferences and seminars to strengthen skills and improve the knowledge base in specialized areas, where there is need for an immediate application/implementation of ideas. Such training is also geared to prepare technical personnel to implement specific activities of new projects. In both public and non-public agricultural institutions, the professional and technical support staff received in-service training in various disciplines, either within the country or overseas.

Although Belize does not have a formal organization to provide systematic training to farmers, most institutions have training activities for farmers in selected areas, to support technology transfer, extension, or introduction of new techniques. Much of this training is sponsored by local as well as international organizations.

**Constraints:** The major constraints on agricultural training include: (i) an acute shortage of qualified training personnel; (ii) absence of a consistent training program for the MOA's staff, to upgrade their competence in agriculture and agricultural technology at all levels; (iii) some trainers/lecturers have limited training in teaching methods and experience; and (iv) inadequacy of training facilities, both for technical personnel and for farmers.

### **7.3 Animal and Plant Health**

#### **7.3.1 Animal Health**

The MOA executes the GOB's policies and programs in animal health. It provides various services including: (i) organization and administration of and information about the service; (ii) animal quarantine; (iii) diagnostic and surveillance; and (iv) control and eradication of pests and diseases.

The MOA's Veterinary Section coordinates all animal sanitation actions throughout the country, from its headquarters in Belmopan. The Principal Veterinary Officer (PVO) has responsibilities (both administrative and technical) for livestock production, animal health and quarantine services provided by that institution. Support is provided by an analytical biochemist and Veterinary Officers (VO). Some services, however, such as the quarantine and animal health component of the BLPA, are coordinated by the PAO (projects). At the district level, the Corozal, Stann Creek and Toledo districts do not have a resident veterinary service<sup>144</sup>.

The animal health section provides ambulatory services to livestock farmers, as well as extension advice on animal husbandry and management. Due to the shortage of resources and

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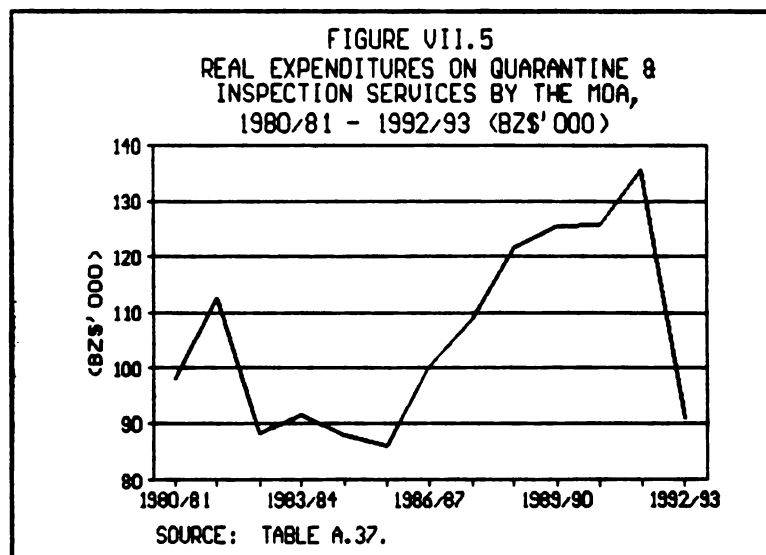
<sup>144</sup> It should be noted that there is little livestock in Stann Creek. A Veterinary Officer would not be fully utilized in this area. In the Toledo district, vet. services were provided as part of the TSFDP.

the need to improve the output efficiency of the staff, a preventive medicine/farm management-type service was offered to cooperative groups rearing livestock. In recent years, the emphasis has been on providing ambulatory services, and promoting the adoption of critical practices such as vaccinating against diseases, deworming, utilization of mineral supplements, use of a planned breeding program and a commercial approach to livestock farming.

Presently, animal health regulation relies on a 1958 Act, which covers various aspects including the official declaration of the presence or absence of animal diseases and provides requirements for moving animals from one district to another, or for importing animals or products. A new draft Act called the "Animals and Diseases Act of 1991" is under consideration, and will probably replace that of 1958.

**Animal quarantine:** The Animal Act of 1958 prescribes regulations governing various aspects of animal importation, movement, inspection procedures and diagnostic tests. Quarantine services are administered by PAO (projects) and quarantine inspectors located at ports of entry. Support services to the quarantine inspectors for imports of animals and livestock products are provided by the VO (located at the Central Veterinary Laboratory in Belize City), plant pathologist and entomologist at Central Farm.

In the second half of 1980s, the Ministry increased its real expenditures on quarantine and inspection services (FIGURE VII.5). Between 1982/83 and 1992/93, expenditure on these services averaged about BZ\$0.1 million or about 1.4% of the MOA's total budget. Since 1988/89, expenditures on personnel alone absorbed an increasing portion of the budget, averaging almost 90%, compared with an average of 75% in the 1980-85 period.



**Diagnosis and surveillance:** Diagnostic services are done by the veterinary section of the MOA, through its Veterinary Investigating Office (VIO). These are provided by a senior laboratory

technician, three laboratory technicians, three assistant laboratory technicians and other support staff. For technical and surveillance work, the VIO has one coordinator based in Belmopan and three veterinary doctors that work in Orange Walk, Belize and Cayo. It also has two meat inspectors and eight animal health assistants.

At the district level, the MOA provides animal health services, through its three veterinary clinics located in Belize, Orange Walk and Cayo respectively. Previously, laboratory services were provided only to those who visit the clinics, and often at no cost. Presently, fees are charged for all services (since 1992), but these are subsidized by the MOA.

The Belize facility includes a veterinary clinic and a central veterinary laboratory to conduct hematology, brucellosis and parasitology tests. Its staff consists of only one vet. doctor and a technician. Previously, the Central Veterinary Laboratory diagnosed about 9,000 tests (on 1,600 samples) per year, but this was reduced to only about 100 tests/year<sup>145</sup>. In addition, no virological, histopathological, biochemical, or leptospirosis tests are currently done as before. Inadequate resources and support facilities, and declining interest from meat exporters affected the work of this facility. Animal health technicians also use the laboratory for diagnosis, but this is limited to hematology, parasitology, urinalysis, gram staining and basic serology.

The Orange Walk clinic is served by a veterinary doctor and one animal health assistant. Services are provided to the Cayo, Stann Creek and Toledo districts from Central Farm which has two vet. doctors, two animal health assistants and one laboratory technician. The Farm has a small laboratory which conducts various tests such as hematology, parasitology, and bacterial stains.

In recent years, declining resources severely limit the work of the MOA's animal health service. Due to inadequate planning and limited resources, support activities are not executed in a systematic manner and information is collected on an ad hoc basis. There is no surveillance program to provide information on the health status of the livestock sector.

Presently, the veterinary service operates at a minimal level and no diagnosis and testing is done, as support facilities are almost non-existent. The service can respond only to a limited number of requests and it does little sampling at the farm level. In general, surveillance of animal diseases is weak; those done are on brucella and tuberculosis in dairy animals. Due to the absence of laboratory services for the detection of heavy metals, hormones, pesticide residues and other tests required for exportation of animals or animal products, samples are sent for testing in neighboring Central American countries (Honduras, Guatemala, etc.), which present various logistical problems.

There are also private veterinary services, located in Corozal, Belmopan and Punta Gorda. However, these are limited to the provision of a resident service only. Moreover, there

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<sup>145</sup> The Central Veterinary Laboratory is supposed to be the country's main diagnostic center, but presently it is not functional.

are no regulations to monitor and standardize this services for ensuring a quality output. Recently, the MOA's veterinary section has made efforts to document the private services.

Despite various constraints, Belize appears to have a fairly good animal health status. In fact, animal health was not a major problem in the country's livestock sector, largely due to: (i) low livestock numbers; (ii) an extensive livestock system; and (iii) few imports from countries that have been exposed to various diseases.

**Registration and control of veterinary products:** Presently, there is no registration system for veterinary drugs, except for those pesticides registered for animal use that are handled by the Pesticide Control Board (PCB). The Food and Drugs Act of 1985 only provides for inspection of slaughter houses and for food additives. Some veterinary products such as cloranfenicol (banned in Belize), are being used in animals, because these are registered for human or plant use. Moreover, there is no license requirement for selling veterinary drugs, even though the PVO is required to authorize their importation.

**Control and eradication campaigns:** The recently completed screwworm eradication program was very successful. It is one of the few successful eradication programs in recent years<sup>146</sup>. The program was supported by the MOA and the Mexico-USDA Commission. It dispersed approximately 566 million flies in Belize from the Tuxtla Gutierrez Laboratory in Mexico. As a result of the program, Belize was declared free of the pest in June 1992, with an estimated savings in drugs valued at about BZ\$1.5 million per year. The program is currently in a surveillance phase in which field inspectors visit farmers throughout the country.

The country still experiences other animal health problems, such as a high incidence of vampire bat bites, beefworm and ticks. During the latter part of 1992, the MOA initiated a National Vampire Bat Education and Control Program, to alleviate the serious problems presented by this pest, including rabies transmission to humans and the possibility of screwworm infestation. However, this program was discontinued due to the diversion of resources for controlling the outbreak of medflies. The program would have provided significant benefits to livestock producers, as well as reducing the risk of screwworm re-infestation.

### **7.3.2 Plant Health**

Plant health services are provided by the MOA through its Plant Protection Section (PPS) located at Central Farm. These include diagnostic and surveillance, control and eradication campaigns, information gathering and dissemination, and liaison and advisory services to the quarantine organization and to the Pesticide Control Board (PCB). Theses activities fall under research, extension and training. The quarantine services and the Comprehensive National

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<sup>146</sup> Its success is due in part to a promotional campaign that increased peoples' awareness of the problem. Items such as wall and pocket calendars, keyholders, caps, T-shirts, cigarette lighters, coffee mugs and farmer bags were distributed as part of the campaign.

Survey (CNS) for the Mediterranean fruitfly (medfly) are supervised by the Principal Agricultural Officer in charge of projects.

Regulations governing plant health are based on the Plant Protection Act (Chapter 122 and Chapter 178 of the Laws of Belize)<sup>147</sup>. However, these laws are inadequate to support an effective service; a new Plant Protection and Quarantine Act is currently being proposed by the GOB for enactment.

Presently, the government has provision for only one plant pathologist and one entomologist in the area of plant protection. The plant pathologist's post is occupied by a Belizean on temporary contract, and the entomologist's by a volunteer from the Voluntary Services Overseas (VSO) of the United Kingdom. To improve this situation, the GOB requested and obtained a 3-year project from the Overseas Development Administration (ODA) which began in 1992. The project provided a plant pathologist, training for two Belizean nationals to permanently fill the posts of plant pathologist and entomologist, short term consultancies, and other resources for strengthening the national plant health service.

**Plant quarantine:** Permits for importing plants and related products are issued by the office of the PAO (Projects). Senior officers (DAOs and up) can issue phytosanitary certificates for exporting plants and plant products.

There are six official points of entry into Belize from abroad: the borders with Mexico and Guatemala (Benque Viejo; Punta Gorda; Big Creek); border with Mexico (Santa Elena); the Phillip Goldson International Airport; and the Belize City Port. These entry points are manned by quarantine inspectors who are responsible for both animal and plant movements, and they also assist the PCB with documenting the actual movements of pesticides into the country. These points had incinerators provided by Mexico, but these have become obsolete and are being replaced by ones provided by the ODA project.

Official data on the quantity of agricultural products passing through the country's borders with neighboring countries indicate that it has been increasing in recent years. Data for for January to October 1993 showed a monthly average value of BZ\$408,386 of agricultural and related products were imported from Guatemala through the western border station at Benque Viejo. The products included agriculture and food commodities, forestry products and agrochemicals. At the border with Mexico in the north, the value of products in transit through the station averaged BZ\$76,803 per month, a figure that was higher compared to previous years.

**Diagnostic and surveillance:** Diagnostic and surveillance services are provided by the staff of the PPS. The staff is based in a small laboratory at Central Farm. This facility has a good reference collection of insect pests of crops (850 species), but information on weeds, nematodes, diseases, rodents and other pests are inadequate. The sugar, citrus and banana sub-

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There is separate Act for pesticide control.

sectors have surveillance systems. Their staff focuses exclusively on pest control activities and has direct contact with the MOA's PPS. Requests from the Mennonite farmers for services from the PPS have been increasing.

**Registration and control of pesticides:** All matters pertaining to pesticides in Belize are controlled by the Pesticides Control Act of 1985, and subsequent regulations made under the Act. Original recommendations were for the PCB to be under the PPS, but the current consensus is that the PCB be an autonomous body.

The PCB is made up of fourteen members, representing producers, importers, wholesalers and retailers, GOB representatives and others. It meets quarterly to consider matters that relate to monitoring, evaluation and registration of pesticides. The Board has several committees, including the Registration Committee which meets before each Board meeting, and the Monitoring, Training and Finance Committees.

The PCB has regulations for labeling and packaging pesticides and its operations include registration, granting licenses to importers, manufacturers, formulators, wholesalers and retailers of pesticides. It also provides some training to farmers and other users of pesticides. Registration is usually requested only for active pesticide ingredients, since it is not necessary to register formulas or commercial products, fertilizers and others. It is granted only once and the process needs to be completed within a three-month period. It does not include field testing or chemical analysis for quality control. There is also no laboratory facility to provide support for controlling pesticide residues in food or the environment.

The PCB has been financed by grants from the GOB and from licensing fees for importing and selling pesticides. Grants were approximately BZ\$57,400/year (in 1988 and 1989), BZ\$50,000 for 1990 and only BZ\$5,000 for 1991, while an average of BZ\$25,000 per year was collected. Even though fees are charged for its services, its operating deficit has averaged more than BZ\$50,000 per year. To eliminate this deficit, the PCB has proposed a 2% duty on the value of pesticide imports (BZ\$7.0 to BZ\$10.0 million), which could realize between BZ\$140,000 and BZ\$200,000 per year<sup>148</sup>. To raise additional funds for covering pesticide registration and control activities, it also proposes to register trademarks instead of active ingredients. The proposed fee for this is BZ\$100 for each of the 200 trademarks in the market, which would result in BZ\$20,000 in additional revenue.

Inspection of imports at the border is handled by quarantine inspectors, who usually detect small amounts of pesticides brought in by people coming mainly from Guatemala. Legal imports of pesticides reported for the 1982-90 period averaged 760 metric tons per year, comprising insecticides (42%), fungicides (25%), herbicides (23%) and other types (11%).

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<sup>148</sup> Presently, there are different duty rates on imports: agricultural pesticides (0%), rodenticides and domestic pesticides (30%) and others (14%).

**Control and eradication:** Since 1987, Belize has experienced sporadic outbreaks of the medfly. The country was required to maintain a medfly-free status to qualify for shipping fresh fruit without chemical treatment to the USA and other medfly-free countries. The northern part of Belize has consistently maintained a medfly-free status by USDA/APHIS. However, this status is dependent on a Comprehensive National Survey (CNS) for detection and eradication of medfly should any be detected. In 1993, several fertile medflies were detected and Belize spent approximately BZ\$250,000 for their eradication. Presently, the CNS program employs seven full-time trappers to monitor about 1,200 Jackson traps and provide weekly reports to USDA/APHIS.

Other major plant health problems include white flies, which need to be addressed by the MOA, in collaboration with private farmers and cooperatives. These include a high incidence of virus transmitted by white flies/virosis problems, the black sigatoka disease of bananas, weeds, post-harvest problems and others. The citrus tristeza virus (CTV) has been detected in a very small percentage of trees. Its very efficient vector is not present in Belize, but if it affects the citrus industry, the estimated losses could be BZ\$ 13 million<sup>149</sup>.

A preliminary estimation of crop losses due to pests and diseases in Belize is approximately BZ\$48.5 million (TABLE A.43). Presently, the shortage of resources constrains the MOA from implementing any effective program (like the medfly eradication project) for the eradication of important pests. Emergency funds to handle exotic pests detected in the country are not available.

**Constraints to animal and plant health services:** The major constraints of Belize's animal and plant health services include the following:

*(a) Absence of an overall animal and plant health policy:* A major problem is the absence of an animal and plant health policy of the GOB and its lack of commitment to provide an overall development framework for the various services. Planning is not done adequately and policy direction is missing; these problems are compounded by a severe shortage of resources.

*(b) Inadequate resources:* The services almost totally dependent on the GOB for financial support and most of its services are provided free. Although the MOA has increased its allocation of funds for certain animal and plant activities over the years, the amount is insufficient given the volume of work to be done<sup>150</sup>. For animal health services (excluding quarantine and inspection), the total approved recurrent expenditures in recent years declined (BZ\$0.55 million for the 1990/91-93/94 period compared to BZ\$0.57 million in the 1986/87-89/90 period). For animal production, (livestock improvement and pig production), the situation was the same: BZ\$0.64 million versus BZ\$0.61 million for the corresponding periods. On the other hand, budgetary allocations for the provision of medfly control services increased from an

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<sup>149</sup> ODA Project Inception Report for Strengthening Plant Protection Service 1992.

<sup>150</sup> For certain activities, the MOA's funding has been complemented by external resources.

average of BZ\$2,695 to BZ\$106,965 per year over the same period. This was possible because Belize needed to meet the USDA/APHIS requirements by having a medfly-free status to ship fresh fruit to USA.

Regarding veterinary drugs, there is a revolving fund of BZ\$140,000 for purchasing drugs for the MOA's veterinary clinics. However, no funds were available to purchase reactives in the last five years, resulting in a reduction in the number of laboratory tests. In the past, an average of 9,000 tests were done per year (costing approximately BZ\$60,000); in recent years, only about 100 have been possible.

The MOA also has an acute shortage of professional and technical staff to support the service. Besides the PVO, there are only three veterinary investigation officers in the Ministry. In the area of animal health, the staff declined over the years and this has affected both the scope and quality of services provided to the livestock sector. Critical positions were not created while others have been vacant for several years, including that of the veterinary officer for Public Health, veterinary officer to manage the diagnostic laboratory and a livestock Officer for animal breeding and genetics. Likewise, the PPS has been affected by a limited staff. In addition, the service's support facilities (vehicles, offices, housing, etc.,) have steadily deteriorated.

There is insufficient personnel to operate a national alert system, with periodical collection of samples at the field level, and determination of pests detected at the country's ports of entry. The plant health service does not have sufficient support in the entomology and nematology areas. Moreover, none of the quarantine inspection stations has pre-diagnostic equipment to make a quick identification of pests found in imported vegetables, or in the vehicles or crates in which those imports are transported. Samples of suspected pests have to be sent to the Central Farm office for analysis, thus delaying the movement of plant material.

Due to the resource shortage, there is a deficiency of veterinary supervision of existing slaughterhouses, with no collection or analysis of samples from infected animals. In addition, public health inspectors who perform this function do not have the necessary training in vet. medicine. As a result of these and other deficiencies, no slaughterhouse in the country has approval for exporting meats to the U.S. market<sup>151</sup>.

There is no animal epidemiology unit to support animal health and quarantine, and the PPS does not perform adequate surveillance and monitoring, in order to promptly control or eradicate endemic and or exotic sanitary problems. Surveillance activities do not include the detection of changes in the endemic stability of diseases and pests and introduction of new ones. Without this information, it is not possible to perform adequate economic or risk analyses of these problems, which are needed for decision-making on control and/or eradication.

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<sup>151</sup> Even if Belize had a pesticide residue laboratory service, these deficiencies would prevent it from exporting meat.



**(c) Inadequate information system:** The absence of a computerized information system to facilitate storage and easy retrieval seriously affects the efficiency of all aspects of animal and plant health service. For example, the information system to keep records of diseases detected at the field level, and that generated at the slaughterhouse level is inadequate. As a consequence, surveillance is only problem-oriented.

**(d) Weak structure:** The organization of the service limits adequate planning, management and coordination. Due to the location of different components of the service and institutional responsibilities, compounded by a personnel shortage, there is inadequate planning and coordination of the various activities of the service. Ideally, the service would be more efficient in the areas of legislation, information and quarantine if it operates under a single structure, as this would improve efficiency and coordination.

In the past, the MOA attempted to develop closer working relations with private sector groups and official agencies interested in sanitary matters. For this, efforts were made to form several committees. These attempts, however, were not well coordinated with the MOH. Despite the limited success of these efforts, a coordinating mechanism is needed between the MOA, MOH, private sector groups (including NGOs) and regional and international organizations in the plant and animal health area.

**(e) Inadequate monitoring:** The shortage of resources has limited the scope of monitoring done by the MOA's animal and plant health service. Although the country's agricultural health situation is fair, there is limited information on the various pests and diseases which may be present in Belize. For example, almost no surveillance is done on the animal health situation. For brucellosis and leptospirosis, extensive surveillance and testing is needed to provide the true situation in the country. In the case of hog cholera, although Belize has not experienced any case in the last six years, the country needs a program to declare it as free of this disease, or it cannot export any pork or pork products.

With regards to the poultry industry, the veterinary section of the MOA has little information on its disease status. Accessibility to inspect production operations in the Mennonite community is difficult. Moreover, the existing legislation does not provide the MOA with the necessary support to allow inspection of the Mennonites' operations. As a result, the industry relies on excessive antibiotic use and the possible slaughter of suspect flocks that fail to respond to medication.

**(f) Absence of training programs:** Besides the occasional attendance by senior officers to seminars and meetings abroad, there is no systematic in-service training of technicians. Since the service lacks a structured training program, its quality continues to decline and the staff's morale has been affected. Some technicians (such as Animal Health Assistants) are locked into a position which offers very little upward mobility or refresher training.

The majority of veterinary and extension staff do not have adequate training in farming systems, and are unable to provide an effective service to small farmers involved in subsistent-

type livestock production. Given farmers' constraints, most technicians are unable to adequately diagnose and provide the appropriate advice. The veterinary section estimates that a major deficiency in two of its eight field veterinarians in animal production or clinical laboratory medicine reduces the existing supervisory staff's effectiveness by about 25%, and affects almost 50% of area covered in the country. The veterinary service has no input into slaughterhouse or dairy plant inspection, and veterinarians do not have the necessary training to function in these areas, since they are under the responsibility of the Ministry of Health (MOH)<sup>152</sup>.

Previously, linkages between the field staff and the diagnostic laboratory were strong, but they have deteriorated from a voluntary participation of veterinary officers to make accurate diagnoses to a situation where the response to treatment is the "norm." This is a reflection of both the inadequacy of laboratory facilities and a trained, experienced laboratory supervisor to provide sufficient support to improving the performance of the field staff.

**(g) Inadequate legislation:** The legislation to support an effective animal and plant health service is inadequate. Much of it needs to be updated to: (i) give improved access to technicians for inspection and surveillance; (ii) provide for adequate registration and use of drugs; and (iii) provide the necessary framework for the private sector to supply essential health services if the GOB is unable to implement them.

The old quarantine legislation refers only to human diseases (such as cholera) and makes little provision for dealing with the wide range of plant and animal diseases. In the case of animal diseases, the Minister of Agriculture is required to declare an area infected before quarantine activities can be implemented. In addition, there is insufficient legal basis for quarantine officers for searching and seizure, and for the imposition of fines or service charges to raise revenue for the service<sup>153</sup>.

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<sup>152</sup> Legislation places the responsibility for inspecting slaughterhouses under the MOH.

<sup>153</sup> Assistance was provided by the ODA to the PPS and Animal Health Section to improve the respective legislation.

## CHAPTER VIII

### COMPLEMENTARY SUPPORT SERVICES

#### 8.1 Agricultural Marketing

##### 8.1.1 General Characteristics

Belize's agricultural marketing system varies in structure and efficiency. It is based on a traditional retail structure, with a large number of small retail outlets, specialized retailers and a few public markets. Most retailers are small, traditional business operators concentrated in Belize City, in small towns (such as San Ignacio and Corozal Town) and neighborhood areas. They carry a limited range of products and undertake no promotional activities. In addition, there are several supermarkets that retail a variety of food products, a large proportion of which is imported, processed foods. These are larger, more organized operations located mainly in Belize City and small towns.

Like other countries, the organization and structure of the marketing system is a function of certain economic variables such as population size and its spatial distribution, employment and income levels, consumer preferences, nature of the products, size of the production units and the degree of specialization. Belize's market size is limited due to its small population. In 1993, the country's population was slightly under 200,000, with 47% concentrated in a few urban centers.

The domestic market is also small due to the level of unemployment (10% in 1993), as well as income levels and their distribution. Although real incomes have expanded steadily since 1980, there has not been a corresponding increase in the demand for locally produced commodities and processed foods. In response to adjustments in income and other economic factors, consumer tastes and preferences have changed, particularly those of urban consumers. To a large extent, higher incomes have impacted on consumers' preferences for more quality products, processed and convenience foods, most of which is imported. The emergence of several organized supermarkets and larger food outlets over the years, reflects the changes in consumption patterns. At the same time, traditional retailers and marketing outlets have been affected more severely, as consumers switched to the services provided by organized enterprises.

The market characteristics are also directly related to the profile of producers and the degree of development of the production-marketing system. Based on these, three different marketing systems for agricultural products exist in the country. The most developed is that of traditional products (sugar, citrus concentrates and bananas) for the export market<sup>154</sup>. This system is characterized by a production system oriented to meet specific market requirements, existence

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Exported fish can also be included in this category.

of integration arrangements or contract mechanisms between producers and marketing agents, strict grading standards, financing mechanisms and commercial information.

A second system corresponds to the processed products that are domestically marketed, such as dairy, poultry and beef products. This system involves integration or contractual arrangements between producers and marketing agents. It also has certain characteristics such as limited, organized post-harvest activities (storage, processing and distribution), financing, grading and information systems. As in the first system, production is organized to meet market demand, in terms of product quality, prices and product delivery.

The third is the least developed system, and it corresponds to the marketing of basic, locally-consumed non-traditional products, including grains, vegetables, root crops, fruits, meat and fish. These are produced by a large number of medium-sized, small or subsistence farmers whose outputs range in quantity, quality and timeliness of delivery. The marketing system for these products is relatively underdeveloped, has a low efficiency and has evolved slowly in response to consumer needs. Production is mostly seasonal, resulting in periodic market gluts and wide price swings, and there is virtually no integration or contractual arrangements between farmers and marketing agents. In addition, post-harvest losses are high, due to inadequate handling, limited processing and storage facilities throughout the marketing chain.

Unlike many developing countries, the government's involvement in agricultural marketing in Belize is limited. The BMB is the only state agency involved in marketing and trading, but the range of its products decreased to only rice. However, there are other areas in which the public sector has supported marketing, such as through the provision of market infrastructure and facilities.

### **8.1.2 Product Marketing**

**Traditional exports:** The marketing of Belize's traditional exports, sugar, citrus, bananas and cocoa is highly organized and developed. These products are sold to preferential markets under contractual agreements.

Sugar is Belize's most important agricultural export, contributing about 60% of export earnings. Sugarcane is produced by the BSI, and by cane farmers who have contractual arrangements (for price and quotas) with the two processing plants. Processed sugar is sold in three main markets: the UK (under preferential arrangements), the USA (under restricted quota agreements); and the domestic market.

Citrus contributes approximately 10% to the country's exports earnings. Growers transport their fruits to the processing plants, which purchase all the fruits delivered. Unlike the case of sugarcane, there are no delivery quotas for citrus, because the processing companies operate below their full capacity. Prices are negotiated between the CGA (on behalf of growers) and processors based on an agreed formula. Citrus concentrates are marketed abroad, mainly in the USA (under the CBI arrangement) and in Caribbean countries.

Bananas enjoy a protected market in the UK under the ACP-EC LOME convention. It is marketed under contractual arrangements negotiated annually with Fyffes, a foreign private company. The banana industry was privatized and marketing of the fruit is done by the BGA. Farmers are responsible for preparing the fruit for export and delivering it to the wharf at Big Creek. Regarding cocoa, all production is purchased by a private company, Hummingbird Hershey Ltd., located in the Sibun River Valley. The company supplies farmers with seedlings, provides technical assistance and an assured market for their product.

**Grains:** With the exception of rice, the other grains are produced by small and medium-sized farmers using less intensive cultivation methods, characterized by limited use of modern inputs, lack of irrigation and limited drying and storage facilities. Compared to rice, the marketing chain for these products are longer and underdeveloped.

Rice is subject to a high level of government regulation. The BMB is the only entity authorized to import rice, and it has been the principal buyer of the local production for the last ten years<sup>155</sup>. The government has established maximum wholesale and retail prices for this product. Traditionally, the BMB has imported grain to cover the difference between domestic production and consumption. The Board's monopolistic position in the market allowed it to obtain profits on rice imports and use this to pay a subsidized price to local producers. The BMB absorbed the costs associated with (i) foreign matter content; (ii) damaged grain due to high moisture level and improper drying; (iii) drying, storage and handling costs<sup>156</sup>; and (iv) production of low-quality rice.

Corn and red kidney beans are the two other main grains produced and marketed locally. Until a few years ago, the government participated in the marketing of these products through the BMB, but the Board stopped marketing them due to high losses caused by poor storage and handling, and inadequate pricing. In the 1992/93 crop year, the BMB channeled funds to the country's four major exporters of red kidney beans at a preferential interest rate (8.25 % versus 14-16% in the commercial market), in exchange of a compromise for them to pay a fair price to producers.

**Fruits and vegetables:** The marketing system for locally produced fruits and vegetables is underdeveloped, and a large proportion of these products is distributed through unorganized markets. To a large extent, the characteristics of fruit and vegetable marketing are related to the production system. Although, Belize produces a variety of fruits (such as mango, bananas, citrus, avocado, papayas, melons, blackberry, guava, and passion fruit), only a few are done on a large scale. A variety of vegetables is also grown in the country, but their quality is low and their supply is unreliable and seasonal. There are few commercial producers of vegetables, most

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<sup>155</sup> Producers in the Toledo area sell their paddy to the BMB regardless of the quantity produced. In terms of quality, the single requirement faced by farmers is to keep the foreign matter content below 4%, and the moisture content below 14%.

<sup>156</sup> It is estimated that the total value of the annual subsidy paid to farmers amounted to BS 250,000. However, this figure should be taken with caution, as it may not reflect the full cost to the BMB.

of which are grown on small plots. Due to the traditional system of production, gluts and shortages occur, and it is not unusual for farmers to over-produce certain commodities, particularly cabbages, tomatoes and sweet peppers. As a result, domestic requirements are not easily met by local production, and the country imports an estimated 80% of its vegetable requirements (about B\$4.0 million per year), consisting mainly of potatoes, tomatoes, cabbages and carrots.

The current production and marketing systems for most fruits and vegetables are not sufficiently organized and developed to supply stable quantities having a uniform product quality. This is a consequence of: (i) the seasonal nature of local supplies, as most growers lack irrigation systems; (ii) inappropriate production technology and inadequate support services at the farm level; and (iii) deficiencies in the transportation network, which do not permit a regular flow of products. As a result, major wholesalers, retailers and institutional consumers do not rely on local suppliers, and resort to the importation of a large proportion of these products from neighboring countries (principally from the USA, Mexico and Guatemala).

**Livestock products:** Compared to fruits and vegetables, the marketing system for livestock products is relatively more organized. Components of this system include marketing of live animals, fresh meat, and frozen and processed products. Live cattle and other livestock are wholesaled and retailed mainly in rural markets. Most marketing activities are done traditionally, without the support of grading and information systems. Fresh meat is sold in neighborhood areas, in small retail outlets and in public markets. Frozen and processed livestock products (including those imported) are marketed in supermarkets, as well as in smaller retail outlets.

In general, production and marketing costs are high for livestock products due to constraints associated with inadequate numbers of improved breeding stock, high input cost, unreliable delivery of commercial feeds and imported protein concentrates and inefficient production practices. Factors that contribute to high marketing costs include: (i) power shortages that impede continuous operation of refrigeration facilities; (ii) high costs of electricity; (iii) high tariffs on imports of refrigeration, air conditioning equipment and packaging materials; (iv) a high level of informal slaughter and inadequate slaughtering facilities; (v) limited contractual agreements between growers and processors, which cause periodic over-production and shortages of live animals flowing to the market; and (vi) atomization, inadequate technology and informality at the wholesale and retail levels.

**Fish:** The marketing of fish varies in Belize. In the domestic market, fish is marketed in a rudimentary fashion, with fishermen selling their catch directly to consumers and to local retailers who operate in public markets adjacent to unloading sites. In Belize City, retailers operate in a temporary marketing facility, until a new one is provided in the Commercial Center. Throughout the marketing chain, the product is handled with minimal refrigeration. Exported fish is marketed in a highly organized manner. Improved storage and transport facilities are used and product sorting is done in order to meet market requirements.

**Dry goods:** Most dry goods (non-fresh and non-frozen food products), canned and otherwise are imported and distributed through organized retail outlets and small shops. Some of these products are not produced locally; for others, both the production and the domestic market size are too small to justify local processing.

### 8.1.3 Marketing Agents

Belize's agricultural marketing system has a large number of agents, comprising various farming groups, producer associations, corporate entities, wholesalers and retailers, rural assemblers, truckers and shippers. With regard to the farming groups, the majority of Belizean farmers are small, and are engaged in the food production mainly for home consumption and for sale in the domestic market. There is a smaller group of medium- and large-scale farmers who are commercial oriented, producing for both the domestic market and for export.

**(a) Milpa farmers:** These are small-scale producers located predominantly in the Toledo, Corozal and Orange Walk Districts. Their production activities are oriented principally to meeting the subsistence needs of their families, and they market small volumes of their surplus output to satisfy other household requirements. As a smallfarm group, milpa farmers are unorganized and market their products independently. Their production and organization characteristics prevent them from: (i) adopting uniform production practices; (ii) scheduling production so as to prevent market saturation; (iii) benefiting from economies of scale in transportation, processing and storage; and (iv) having sufficient leverage in the market place. Moreover, product collection and storage are costly due to the atomization and dispersion of these producers, limited marketable surplus and the heterogeneous quality of their products.

**(b) Medium-scale farmers.** This group cultivates permanent crops for domestic consumption and exports (such as sugarcane and citrus). Even though the production capacity of these farmers is much larger than that of the "milpa" group, they experience similar marketing problems, due to low volumes of marketable surplus, lack of organization and the small domestic market size. However, these problems are relevant only to products marketed domestically. The few farmers in this group that are organized are constrained by the traditional marketing activities of wholesale and retail agents, the absence of appropriate marketing infrastructure in rural and urban areas and unavailability of market information.

**(c) Large-scale farmers.** This group (includes the Mennonites and BABCO) cultivates food crops, export crops and engages in livestock production activities. Due to their larger operations, increased capacity to access formal credit, use of improved technology and better organization, they established their own assembly and/or distribution systems. In the case of the Mennonites, their production activities are closely linked with processing operations and distribution<sup>157</sup>. This group distributes their output directly either to large processors or to smaller retail markets, thus

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<sup>157</sup> Grain production is linked to feed processing, which in turn is linked to livestock production, and processing of meat and dairy products.

bypassing the traditional product assemblers, small-scale processors *and* urban wholesalers. Their growth is constrained by the limited size of the local market and limited exploration of regional market opportunities.

**(d) Farm corporations:** These entities farm approximately 60% of the country's agricultural land under cultivation. They are engaged in the production of export crops such as sugarcane, citrus and bananas, and their production-marketing system is relatively well-developed. The expansion of their operations is constrained by: (i) limits imposed by the marketing agreements between Belize and the foreign countries to which the products are exported, and (ii) their ability to compete successfully in non-preferential markets.

**(e) Producer organizations:** There are two types of producer organizations that are also involved in various aspects of agricultural marketing: associations and cooperatives. The first includes producer groups such as the CGA and the BLPA, while the second includes the BFAC and the National Fishermen Producers Cooperative.

Most producer organizations were supported in their formation by the government or international donors to enable them to play a relevant role in marketing. Those whose members are involved in cultivating crops for export and agro-processing have a better organized production, marketing and distribution system. The least effective and weaker organizations are involved in non-traditional crops which are not processed or internationally traded and have unorganized marketing systems.

**(f) Rural assemblers and truckers:** Assembling of products at the farmgate and rural levels are done by independent collectors who operate in primary rural collection centers. They collect farm products and transport these to rural and urban markets to be wholesaled and retailed. These assemblers are involved in established geographical areas for specific products, usually developing strong commercial ties with producers. Information regarding the number of these operators, their distribution by region, product lines, sources of financing and operating procedures is unavailable.

**(g) Wholesalers and retailers<sup>158</sup>:** Wholesaling and retailing of agricultural and food products are done by different agents having different characteristics. For example, fruits and vegetables exhibit excessive product specialization and centralization at the wholesale level, and atomization at the retail level. At both levels however, there is the prevalence of traditional trading methods, limited competition at the wholesale level and adoption of innovations to increase operating efficiency, reduce costs and increase sales.

Most of the country's wholesale and retail activities are concentrated in Belize City. The estimated numbers of wholesalers and retailers operating in this area in the different food categories are shown in TABLE VIII.1. The number of wholesale establishments are limited;

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<sup>158</sup> This section is based upon observations and interviews with marketing agents and government officials in Belize City and with Mennonite farmers in the Spanish Lookout area.



those involved in retailing fruits, vegetables and dry goods dominate the wholesale and retail activities of this area.

**TABLE VIII.1**  
**ESTIMATED NUMBER OF WHOLESALERS AND RETAILERS**  
**IN BELIZE CITY**

PRODUCT GROUPS	WHOLESALERS	RETAILERS
FRUITS AND VEGETABLES	7	3 (S)
		150 (PM)
		200 (SV)
DRY AND CANNED GOODS	9	3 (S)
		350 (NS)
		30 (PM)
		20 (SV)
MEATS	3	3 (S)
		8 (PM)
		40 (NS)
FRESH DAIRY PRODUCTS		3 (S)
FISH		5 (PM)

S - SUPERMARKETS; PM - PUBLIC MARKET; SV - STREET VENDORS;  
NS - NEIGHBORHOOD SHOPS.  
SOURCE: MISSION ESTIMATES.

In general, the wholesale marketing system for fresh produce is underdeveloped, fragmented and inefficient. Due to the limited number of wholesalers, competition is low, marketing costs are high and the services provided to producers and consumers are not adequately developed. Moreover, the system does not perform critical functions related to collection, storage, post-harvest handling, financing and risk-taking. Some of these functions are left to farmers, who perform them inefficiently. Furthermore, the system does not provide adequate incentives to farmers to produce higher-quality products.

In Belize City, wholesaling activities take place on Saturday mornings in the Queen Square Market. This site is in a central urban area and it serves as the major market for products, as well as the leading wholesale and retail distribution center in the city. In addition, there are five product wholesalers in the Belize City area who purchase from the Queen Square market and supply the leading supermarkets. These are traditional operators that carry a limited range of products, having an irregular quality and presentation. They lack suitable storage and refrigeration facilities and do not have control over the quality and product assortment provided by growers. Moreover, these wholesalers (with one exception) have not diversified or modernized their operations<sup>159</sup>. Due to these deficiencies, this group is not a reliable supply source to leading supermarkets and institutional consumers.

<sup>159</sup>

The exception is Farm-to-U Foods Ltd, a broader-line wholesaling enterprise.

Wholesaling of dry goods is done by agroindustrial establishments and importers. These are firms that have appropriate warehousing facilities, well-established distribution systems, access to formal credit sources and adopt modern management practices. Most are medium-sized companies, but a few are large and are also involved in exporting. An example of a large company involved in wholesaling is that of Grace Kennedy Ltd. This company imports tomato ketchup, drink mixes, chicken sauces, corned beef, cocktails, and cocoa. Even though imports represent 80% of its business, the company also exports marine products, blackeye peas, peanuts, citrus and mango concentrates, shrimp and timber. The exports are conducted on a commission basis and are directed mainly to other Caribbean countries where the company also has operations.

Fish and meat wholesaling are done by few large enterprises. Much of the fish are sold by fishermen or their cooperatives to retailers and consumers, while beef and pork are retailed directly to large supermarkets, other retailers and consumers. Running W, located on the Western Highway is the largest meat processor in the country. Its output is sold to supermarkets and institutional consumers throughout the country.

Quality Poultry is the leading poultry supplier, having its own nationwide wholesale distribution system, through which it sells between 4,000 and 5,000 kgs per day. Its operations are integrated with the hatchery and poultry producers in the Spanish Lookout area. It has also established a rendering plant to process offal and feathers and produce meat ingredients, which it sells to the Mennonite feed mill in the same area.

A large proportion of dairy products (such as processed milk, cheese and butter) are imported by a few, large commercial enterprises. These products are distributed to supermarkets and retail outlets. Domestic processing of milk is done by two companies, Western Dairies and Macal. The first is the larger establishment with a wholesale distribution system supplying between 650-850 gallons of milk per day to retailers and institutional customers<sup>160</sup>. Macal is a dairy cooperative located in San Ignacio in the Cayo District. Currently, it produces approximately 150 gallons of milk per day. Even though its output increased almost two-fold in 1992, it experienced problems of irregular milk supplies, partly due to insufficient commitment and interest by milk producers. Additionally, it faced technical and managerial problems which have affected product quality.

Food is retailed by supermarkets, small traditional shops, stall vendors in the public market and street vendors. In Belize City, there are three large and relatively modern supermarkets (Save-U, Romac's and Brodies), approximately 100 smaller traditional neighborhood shops, and between 300 to 600 public market stall operators and street vendors. The development of supermarkets has been limited in Belize, being restricted by their dependence on imported foodstuffs, inadequate capital, low entrepreneurial skills and market size. With the exception of one establishment whose facility was designed for such operations,

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<sup>160</sup> Western dairy also processes limited amounts of cheese.

the supermarkets were established in adapted physical facilities in which they have gradually expanded over time.

The existing supermarkets serve mainly higher- and middle-income consumers, selling predominantly imported foods (almost 90%). Although they purchase various items locally, their fresh produce department are stocked with imported products (up to 70% from the USA). These establishments do not rely on Belizean suppliers, as none can offer a regular year-round supply of an acceptable quality product having the necessary characteristics (presentation, size, packaging, etc.). Because of these deficiencies of domestic suppliers, supermarkets prefer to import a large proportion of their fruits and vegetables. The average weekly volume purchased by two of the leading supermarkets in Belize City is approximately 3,600 kgs per week, much of this being imported (TABLE A.44).

All the supermarkets are owned by major food importers in the country. The largest and more modern supermarket, Save-U, is the retail division of Santiago Castillo, the largest food importer. Both Romac's and Brodies are also leading wholesalers and product distributors throughout the country. Only Brodies operates two retail outlets, one in Belize City and the other in Belmopan.

The neighborhood shops are small retail establishments serving the needs of the local community. They sell a range of food products but the volume marketed is small. A large proportion of the food sold by these establishments are processed (dry and canned). Most of these outlets generally have limited refrigeration facilities and carry few perishables.

Fruit and vegetable retailing are done by a large number of traditional public market stall operators and street vendors in Belize City and rural towns. In Belize City, a large proportion of these marketing agents are concentrated in three principal markets - Queen Square Market, Commercial Center and Temporary Market<sup>161</sup>. They carry limited volumes of a narrow range of products, have no suitable refrigeration and storage facilities and lack access to formal credit sources. Most public market retailers occupy small, makeshift structures, that inhibit sales and increase product spoilage and post-harvest losses. Street vendors retail fruits and vegetables in the principal streets in the city and rural towns, using wheeled carts. There are no training programs either by the public or private sectors to address the needs of these traders.

Meats are sold by retailers in public markets and in small rural butcher shops. Beef retailers handle limited volumes of products, generally no more than one or two carcasses per week. Fish is sold in the Temporary Market, directly from retailers to consumers.

(h) **Shippers:** The principal shippers in the country are Hybur, Carol, Tropical and Fyffes. The first three companies do shipping once per week (Hybur on Mondays, Tropical on Wednesdays, and Carol on Thursdays or Fridays). Carol and Tropical have connections with

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<sup>161</sup>

On Saturday mornings, the Queen Square market also serves as a wholesale market in the city.

Europe, mainly the UK, while Hybur serves the USA market<sup>162</sup>. During the main production season (December to July), Hybur ships products once per week, and once bi-weekly during the rest of the year. Currently, it exports about 800 containers per year, mainly citrus concentrates, and three 40-foot containers per week with papaya exports to the USA<sup>163</sup>. Fyffes handles only banana exports to Europe and these are done through the Big Creek Port.

The country's shipping facilities are limited by the absence of a deep water port in Belize City. In addition, the sale of a few products to traditional export markets and small market size in Belize have limited the frequency of shipping activities. Presently, it is reported that vessels come into Belize loaded but leave relatively empty due to insufficient exports. This is why north-bound shipping traffic is very attractive for Belizean exporters.

#### 8.1.4 Market Development Activities

The GOB has consistently emphasized the importance of marketing for Belize's agricultural development. In the last decade, it supported several activities to improve the marketing system, as well as diversification of production and promotion of non-traditional exports. Even though these initiatives contributed to improving the marketing system, they did not eliminate the principal bottlenecks that affect efficiency. Some of the major actions supported by the GOB in the last decade, which specifically addressed marketing or had an important marketing component are discussed below.

**(a) Marketing facilities:** The GOB elaborated a proposal for constructing several marketing facilities including: (i) renovation of the two largest market buildings in Punta Gorda and providing a separate fish market<sup>164</sup>; (ii) relocating the Orange Walk market to accommodate nine butchers and 36 vendors and renovating the slaughterhouse; and (iii) the TSFDP and the Toledo Agricultural Marketing Project (TAMP). The first project was funded by IFAD and it established two depots for improving storage, processing and marketing of agricultural products. Presently, the depots function only as input supply facilities.

The TAMP project, designed by USAID in 1987, sought to accelerate the transition from slash and burn agriculture to a modified cropping system in the Toledo District. It also included the upgrading and reorganization of the Big Falls Rice Mill and Grain complex and the establishment of three market depots (Multipurpose Service Centers) in the Big Falls, San Antonio and San Jose areas. These depots were intended to facilitate buying agricultural products and selling agricultural inputs, but they were not successful.

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<sup>162</sup> Carol is the only line serving Caribbean routes, through Jamaica.

<sup>163</sup> This company is willing to increase the number of shipping trips if there are additional exports, given a requirement of having a minimum of 25 and up to 56 containers per ship.

<sup>164</sup> The project entailed construction of a meat and vegetable market on a new site to accommodate 9 butcher stalls and 36 vendor stalls, as well as a slaughterhouse.

**(b) BLPA - Phase II:** This project, a follow-up to Phase I, focused on increasing the income and the economic welfare of livestock producers by expanding marketing outlets and increasing the marketed volume of animals and meat. It failed to increase domestic pork and dairy production, but succeeded in establishing a Cattle Fund system and the Livestock Central Market (LCM), training personnel, and involving the BLPA in livestock industry programs.

The LCM was established in Belmopan to play a central role in livestock marketing in the country, by facilitating contacts between suppliers, processors and traders at a single site; serve as a center for disseminating market information; and for distributing technical information and samples of promising new grasses and legumes. To date, the facility has not been successful for several reasons including: (i) some farmers preferred the traditional marketing system (although it is costly and may be unfair), because it has the advantage of the farmer making a sale without leaving the farm, and not incurring risks associated with transportation and taking care of the animals until they are sold; (ii) the facility does not provide benefits to certain groups, such as larger livestock processors who already have purchasing agreements with selected producers; and (iii) the LCM is not located close to a slaughtering facility, thus imposing a cost to a buyer since animals have to be transported to another location for processing.

**(c) Upgrading slaughterhouses:** The BLPA recently completed a feasibility study for constructing a slaughterhouse at Burrel Boom. This facility is designed to meet USDA's export requirement standards, and is considered to be critical for the continued growth of the livestock industry. Execution of the project has not commenced.

**(d) Meat residue testing laboratory:** This was established in 1986 to assess residues of pesticides in meat for export. Unfortunately, it never became operational due to the lack of certain equipment. The scientist that was trained to head the facility moved to the private sector, after waiting about three years for it to become operational. A consultant made an evaluation of the laboratory and determined that about US\$200,000 would be needed to acquire the necessary equipment and reactives.

**(e) Commercial center and retail fish market in Belize City:** The Belize City Council recently completed construction of a major building in the city's center to replace the former retail market. The three-story facility will house produce retailers on the first floor and handicraft shops in the upper levels. Stall occupants for the first floor were selected from among older vendors in the former market and they have been charged relatively low rents<sup>165</sup>. However, most stalls on the third floor are still unoccupied and business is slow, even for existing tenants.

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<sup>165</sup>

It is estimated that the rent charged is insufficient to cover even the cleaning and maintenance costs of the building.

It is envisaged that the market's business will expand after the City Council completes a US\$45,000 fish terminal on the waterfront-side of the building<sup>166</sup>. Even though construction of the new fish terminal in the Commercial Center would increase business for existing first-floor stall operators, it is likely that it would contribute to increased pollution and congestion in the central business district of the city. On the other hand, removal of the fish terminal from its present temporary location would entail a major loss of business for other retailers operating in this market.

**(f) Promotion of non-traditional exports:** The GOB undertook various initiatives, generally with international financial assistance to promote non-traditional exports, diversify production away from the traditional crops and overcome the constraints imposed by the small domestic market. The principal initiatives are associated with BABCO (and formerly BEIPU). The major success was the successful export of papayas to the US market. Given that USAID's support will terminate, an action program to provide continuity for promoting non-traditional exports will be needed.

### 8.1.5 Major Marketing Constraints

Although some efforts were made over the years to address various constraints of the marketing system, major problems still remain. To a large extent, those that were addressed were done inadequately, leading to incorrect or only partial solutions. This situation has occurred where individual problems confined to one segment of the marketing chain (e.g., the producer) or a single marketing function (e.g., information) have been addressed, without taking a comprehensive consideration of the aggregate system, with its diverse agents and functions, regional and product disparities and other support services. Some of the major existing constraints are discussed below.

**(a) Absence of a comprehensive assessment of the marketing system:** In general, studies have not addressed Belize's agricultural marketing system in a comprehensive manner. Even though most development initiatives in the sector stressed the importance of agricultural marketing, these addressed isolated components of the system. This is the case even for projects that have primarily focused on marketing.

**(b) Limited development of marketing firms:** The underdevelopment and centralization of the existing marketing system for agricultural commodities is reflected in the limited development of more efficient institutions, such as broad-line retailers and full-service wholesalers. In Belize City, only three supermarkets offer a broad assortment of merchandise, but these cater mainly to upper- and middle-income consumer groups. Existing wholesalers are over-specialized in each of the major commodity groups (fruits and vegetables, dry goods, beef, dairy products, etc.). As a consequence, much of Belize's population is served by traditional middlemen whose services are inefficient, have high operating costs and carry a narrow range of products.

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<sup>166</sup>

This construction would eliminate the use of the makeshift terminal presently operating in a temporary location next to the BMB.

Throughout the agricultural marketing system, there is a prevalence of traditional operating practices, with limited innovation and adoption of more efficient commercial technologies and procedures, particularly for those products that are domestically traded. The continued existence of the traditional food marketing-distribution system introduces a number of constraints to agricultural development including: (i) inhibiting the introduction of new products; (ii) discouraging the entry of new producers; (iii) limiting the reduction in marketing costs that can result from adopting cost-saving measures such as integration arrangements, modernization of equipment and operating procedures; and (iv) reducing the competitiveness of domestic products vis-a-vis imports.

***(c) Prevalence of a centralized and atomized system:*** Except for export products, a large proportion of the output passing through the domestic marketing system is through traditional wholesale and retail channels. Wholesaling of agricultural commodities is centralized in the hands of a small group of operators, each handling a limited range of products. This is one of the principal weaknesses of the existing system since each product has its own marketing problem.

Because of the market structure, collusive action in price formation is fostered which limits the introduction of new products and innovative practices. This situation is reinforced by the weakness of the other marketing system participants (predominantly producers and retailers). Moreover, the relatively small volumes of each commodity handled reduces scale economies, and traditional wholesalers are reluctant to use innovative distribution mechanisms.

The marketing system is also atomized. A large number of operators (wholesalers and retailers) exists in the country, each having a small enterprise and selling few products. Because of narrow product lines and limited volumes, few agents specialize strictly in wholesaling; most that are involved in wholesaling also have retailing activities. Basically, the system reflects two main problems: underdevelopment and atomization at the retail level; and the lack of organization and dispersion of the production units.

***(d) Lack of horizontal and vertical integration:*** Most marketing operators in the country operate independently. Retailers do not have joint business activities with other enterprises and are generally unaware of the benefits of integrated action for achieving scale economies and lower operating costs. No retailer nor wholesaler-sponsored chains were identified in the marketing system. For unprocessed commodities that are domestically marketed, contractual or integration arrangements between producers and wholesalers or assemblers are rudimentary or non-existent, but there are several cases where these exist for processed goods.

***(e) Limited size of the domestic market:*** This is a critical constraint to marketing and market development in Belize. The country's small population and income level impose severe limitations on the expansion of both farm production and processing activities. As a result, scale economies can not be realized, which this contributes to high production and marketing costs.

**(f) Inadequate information system:** Agricultural product prices in Belize are subject to relatively large swings, due to seasonal production and the limited absorptive capacity of the market. This situation is accentuated by significant transport and distribution costs between production areas and consumption centers. In addition, there is no systematic collection of important information, such as marketing margins, post-harvest losses, distribution costs, volumes of products flowing through the various channels (except exports), and regional distribution/consumption of products. As a result, support to policy formulation in agricultural marketing is weak.

Previous studies pointed out that Belize lacks a system to provide essential market information<sup>167</sup>. This deficiency constrains decision-making at the production level, limits efficiency in distribution and reduces market transparency. To address this problem, the MOA elaborated a proposal in 1990 to contract a Market News Reporter to conduct personal and telephone interviews with various individuals and institutions, for collecting and disseminating market information. This initiative, however, was not implemented.

With regard to international market information, BABCO is connected to the PROEXAG system (which supplies information on selected products in the New York, Miami, Los Angeles and European markets). The BEIPU/ITC proposal, if funded, would have provided a central facility with adequate and updated marketing information and documentation.

**(g) Inadequate transportation:** A major constraint throughout the country is the inadequacy of feeder roads, particularly during the rainy season. This affects the regular flow of products to the marketing centers and induces higher transport costs. Some regions are more affected, such as the Toledo area.

With regard to international trade, the principal infrastructural constraint is the lack of adequate port facilities to accommodate large vessels in Belize city. The port facility is inadequate to support the country's international trading activities.

**(h) Limited role of the public sector:** Despite the importance of agricultural marketing, the public sector's role in strengthening the system has been limited, particularly in recent years. There are eight major areas in which public sector support has been deficient.

First, there is an absence of a unified and comprehensive policy approach by the public sector to agricultural marketing. Responsibilities for this area are widely scattered among various ministries and agencies, while certain functions are not within the sphere of action of any public entity. Specifically, marketing problems of producers, up to the primary assembly point is within the realm of the MOA. The Ministry of Trade is in charge of establishing and overseeing implementation of wholesale and retail price controls. The BMB is responsible for

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<sup>167</sup>

Parks and Cassman 1989; USAID 1984.



marketing rice, while BABCO is engaged in export promotion of non-traditionals, an area in which both the MOA and Ministry of Trade are involved. The City Council is responsible for managing the wholesale and retail markets in Belize City. Coordination between these various institutions is limited and in some cases non-existent. As a result, no public agency in the country has a sufficiently broad perspective to address many of the critical development issues of the marketing system.

Second, public institutions have not adequately addressed the planning and development of marketing facilities, principally wholesale and retail markets. For example, the Belize City Development Plan does not have provisions for addressing the present and future problems associated with the city's agricultural marketing structures. The existing Queen Square Market that serves as a wholesale and distribution center for the country, operates in a makeshift structure and is expanding at the expense of the neighboring residential areas.

Third, sufficient support has not been provided to private marketing operators. In general, little attention has been paid to the situation, needs and the role of private marketing in agricultural development. This is particularly the case of domestic marketing of food. Previous studies concentrated on producers and their organizations, attempting to substitute existing intermediaries and channels with parastatal or producer organizations. While many of these initiatives had limited success, the country continues to lack a comprehensive program for developing private traders which comprise the major component of the marketing system.

Fourth, the MOA plays a limited role in promoting agricultural marketing reform. It is constrained by inadequate resources, does not have a clear mandate nor sufficient coordination with other agencies and private organizations involved in marketing and does not collect market information. To a large extent, it has a narrow focus of marketing, generally restricted to the farm or the rural assembly point.

Fifth, there is uncertainty of the future role of the BMB. In 1985, the GOB and USAID agreed to privatize it, particularly its rice milling facility at Big Falls, while the Board was expected to assume a price stabilization role for beans and rice. This has not been done and the BMB has reduced its marketing activities to only rice<sup>168</sup>.

Sixth, Belize lacks adequate basic market support and development services to facilitate agricultural marketing such as market information, analytical assessments, grading and standardization and sufficient credit. The difficulty to access development finance for marketing activities is a major constraint to the system's development. Several previous studies recommended the need to establish grades and standards, to facilitate meat marketing and induce

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<sup>168</sup> Currently, the GOB is reviewing the operations of the BMB, with the expectation that it will engage less in direct marketing and play a more facilitative role in developing the marketing system in the future.

producers to upgrade product quality<sup>169</sup>. To date however, little progress has been made to implement these proposals.

Seventh, coordination of support services, both at the production and distribution level is inadequate. Marketing is one of several important support services needed for the development of the agricultural sector. However, the coordinating mechanism for the various services (credit, marketing, information, etc.) at the public sector level is weak. A strong marketing system would not be effective if it is not complemented adequately by other services.

Eighth, due to the possible withdrawal of USAID from Belize, there exists uncertainty about the institutional support for promoting non-traditional exports. Presently, BEIPU's operations have ceased and BABCO lacks adequate resources to play a significant role in promoting such exports. This is a very high-risk area and it is reflected by the reluctance of farmers to invest and banks to finance production ventures. There is need for a strong, innovative promotional apparatus to support non-traditionals, but this is currently not in place.

## **8.2 Agricultural Credit**

### **8.2.1 Credit and Investment Policies**

Due to the uncertainty of the preferential markets for Belize's major agricultural exports, the GOB's overall policy is to ensure that producers of traditional products (including those involved in the fishing and forestry sub-sectors) continue to access credit easily. At the same time, the policy is for the banking sector to diversify its lending portfolio by channeling credit to selected non-traditional production areas and to smaller farmers. The policy also includes the encouragement of joint (domestic and foreign) investment ventures in areas where market prospects are good, and where the foreign partner can support the venture through increased access to technology and foreign capital.

Within this policy framework, the GOB sees its role as facilitating and providing the necessary economic climate for investors. Specific areas which the GOB supports include investments in infrastructure, human resource development, improvement in the efficiency of the public sector, providing basic utility services at competitive prices and monitoring the regime of private investment incentives.

Through the GOB's incentive scheme, enterprises (including citrus and banana) are exempt from certain custom duties on inputs<sup>170</sup>. Each applicant for incentives pays a non-refundable fee of between BZ\$5,000 and BZ\$7,000 (depending on the level of investment), accompanied by an application form providing details of the project or activity. In the 1989-93

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<sup>169</sup> Specific proposals to establish a grading and standardization system for agricultural products were recommended by the Midwestern Universities Consortium in 1988 and the IRI Research Institute in 1989.

<sup>170</sup> The MED has the responsibility to grant incentives.

period, the MED granted incentives to various investors in the agricultural sector, with an increasing number in the non-traditional area (TABLE VIII.2). In 1993, six projects engaged in non-traditional production activities received development incentives, compared to three in the traditional area. The incentive scheme facilitated the channelling of more investment resources into papaya, rice and cattle production than in other non-traditional activities.

TABLE VIII.2  
NUMBERS OF ACTIVE AND INACTIVE RECIPIENTS OF DEVELOPMENT  
CONCESSIONS IN THE AGRICULTURAL SECTOR, 1989-93

TYPE OF ENTERPRISE	1989	1990	1991	1992	1993
<b>ACTIVE</b>					
TRADITIONAL EXPORT	4	5	5	3	2
NON-TRADITIONAL	1	1	1	2	3
SUB-TOTAL	5	6	6	5	5
<b>INACTIVE</b>					
TRADITIONAL EXPORT	1	1	1	3	1
NON-TRADITIONAL	1	0	0	0	3
SUB-TOTAL	2	1	1	3	4
<b>TOTAL</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>9</b>

SOURCE: MINISTRY OF ECONOMIC DEVELOPMENT

However, investors have been taking a cautious approach in selecting non-traditional areas for investment. Their preference is to minimize risks by focusing on areas where there are organized and assured markets, a minimum level of research has already been done in the production technology and support is reasonably assured, in the event that there are problems in production and marketing the commodities.

As part of its strategy to improve the supply of credit, the GOB assisted in establishing the Small Farmers and Business Bank Limited (SFBBL) and provided financial support to the DFC<sup>171</sup>. In 1992, the GOB divested its shareholdings in the Belize Telecommunications Limited (BTL) and allocated BZ\$5.0 million from the proceeds of this sale for the establishment of the SFBBL, and injected BZ\$3.5 million in equity into the DFC.

The DFC has been the main development institution implementing the GOB's credit policy. The Corporation's strategy (taking into account the need to survive financially and provide continued development support) has been to:

- (i) **Increase lending to less-risky areas.** As a result, lending in its non-agricultural portfolio increased steadily from 45.3% in 1987 to 64.1% in 1991. Currently, it is considering a decision to keep the size of its agricultural portfolio at around 40%.

<sup>171</sup>

The SFBBL was closed recently.

- (ii) Streamline its identification, appraisal and supervision techniques to ensure that fewer unbankable projects are funded in the agricultural sector.
- (iii) Institute internal efficiency measures and controls (see Chapter VI) to ensure increased institutional productivity.

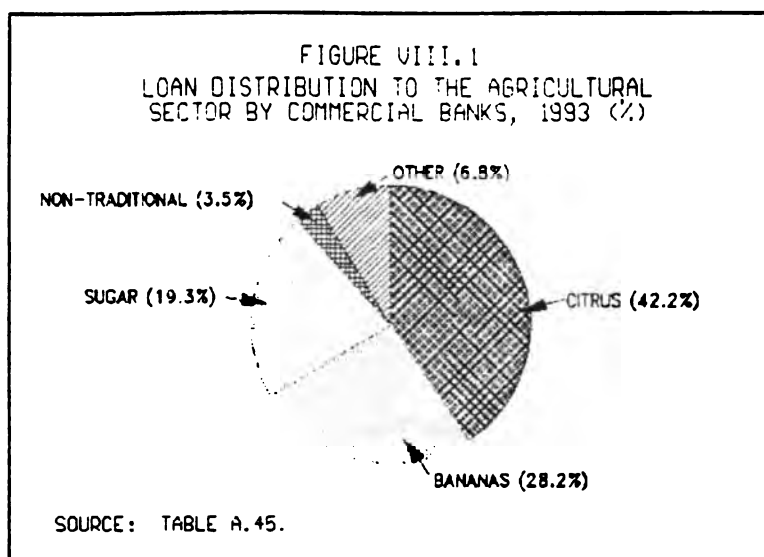
### **8.2.2 Credit Delivery System**

Several institutions supply agricultural credit in Belize. The institutional credit system comprises four commercial banks and the DFC. While the commercial banks make short- to medium-term loans, the latter focuses on medium- to long-term lending. The commercial banks are Barclays Bank (PLC) and the Bank of Nova Scotia (BNS), which are branches of foreign commercial banks; the Belize National Bank (BNB); and the Atlantic Bank Ltd., which have mixed foreign and domestic ownership. Non-bank financial institutions, especially credit unions and insurance companies are important vehicles for domestic credit mobilization and credit extension in the country. Producer associations, cooperatives and NGOs also provide agricultural credit, but on a more limited basis. In the informal sector, money-lenders exist, but their activities have gradually declined as formal organizations made inroads into the rural areas to reach smaller farmers.

Although commercial banks have played an important role in supporting economic development, except for agriculture and real estate, lending to the other productive sectors (mining and manufacturing) and tourism has been relatively low, while a large part of their allocations have financed trade (mainly imports) and consumption expenditures. In recent years, 75% of their total credit allocations were made to construction (22%), distribution activities (21%), personal loans (17%) and agriculture (15%).

Credit from commercial banks is allocated to more stable and less risky activities, where repayment periods are relatively shorter and there is virtually no supervision of borrower activities. Repayment periods vary with the loan's purpose (development or operation), but long term loans do not exceed seven years. These are provided at market rates, ranging between 12% and 15% in recent years. Arrears in the agricultural portfolio are less than 5%, reflecting more conservative lending practices employed by these institutions.

Most commercial bank credit to the agricultural sector has financed traditional export commodities, mainly citrus, bananas and sugar. In 1993, the commercial banks had allocated almost 90% of their agricultural portfolio to these sub-sectors (FIGURE VIII.1). Only 3.5% of the loans were made to non-traditional agriculture - to poultry (1.5%), cattle and dairy (0.8%), rice (1.0%) and honey production (0.1%).



The major part of the agricultural portfolio of Barclays Bank is in the citrus, banana and marine sub-sectors. About 17% of the BNS's total portfolio comprises agricultural loans. The major part of its agricultural portfolio is in the sugar industry and the balance is mainly distributed between the citrus and banana sub-sectors. Much of the BNB's agricultural credit was channeled into citrus production, and to a lesser extent in the banana industry through its Dangriga branch. Its citrus loans are mainly to processors and large growers, and are repayable up to five years. The Atlantic Bank has very little involvement in the sector.

The main recipients of commercial bank credit in the sector are large- and medium- scale farmers and commercial enterprises with sound credit ratings. Loans to small farmers are restricted to those producing export crops, where marketing arrangements between producers and processors facilitate direct and prompt repayment. Long-term financing is severely restricted, with collateral requirements sometimes well above the value of the farm holding. The problems of funding the productive sectors by commercial banks vary and they include an inability of borrowers to meet the banks' stringent collateral requirements, a limited number of rural branches to cater to numerous prospective clients scattered over a wide area and inadequate bank staffing in quantity and quality.

The DFC is the major public sector institution providing agricultural credit and its lending policy was designed to complement those of other financial institutions. Its main lending practices comprise the following:

- (i) Credit is provided on a project basis and borrowers must demonstrate financial viability and agree to DFC's supervision regarding the use of the resources. Loans cover up to 80% of the project costs.

- (ii) Collateral is set according to the specific investment activity, as a lien on the production being financed, particularly in the case of small, short term cropping projects. In most cases however, mortgages are required based on 65 % of the farm or other real estate's up-front value, particularly for medium- and long-term ventures.
- (iii) Repayment periods of one to 10 years are set according to each project; if needed, grace periods are also provided;

The DFC's on-lending rate to the sector varied over the years, depending on the terms under which its funds were procured. This ranged from an interest-free CIDA loan, to 4% on most CDB loans and 9% on the CDC loan. The DFC's current interest rate policy is to allow a modest return on assets, after covering borrowing costs, loan losses and administrative expenses.

Until its closure recently, the SFBBL provided credit to small farmers and businessmen in Belize. It was established to make sub-loans ranging in size between BZ\$500 and BZ\$15,000, and to complement lending by the DFC to small borrowers. Equity was provided mainly by the GOB which purchased BZ\$1.3 million in preference shares. Another BZ\$50,000 in shares was also sold to the public.

The NGOs that supply agricultural credit include the National Development Foundation of Belize (NDFB), BEST and BFAC. These have partly filled the critical gap left by traditional financial institutions and are important sources of funding for the small farm sector. Loans are not given directly to farmers but rather through cooperatives and farmer groups. Although the resources available are far short of the demand, interest rates are usually lower than those charged by formal credit institutions. In addition, the timing of disbursements of the resources are usually more consistent with farmers' requirements compared to other institutional sources. In some cases, farmers are requested to attend training sessions dealing with specific aspects of the project being financed, or with issues regarding their participation in the organization or group through which the loan was secured<sup>172</sup>.

The NDFB is a private, non-profit and voluntary organization limited by guarantee and lacking share capital. It was registered under the companies ordinance, and its purpose is to provide loans and technical assistance to small business projects that do not normally qualify for credit from formal financial intermediaries. The NDFB sees itself as a "grassroot" organization, and is structured to supply the credit needs of the small farm sector. Most of its funds are from grants and soft loans. It charges an interest rate of 12% per annum and an administrative fee of 2%, with repayment periods of one to five years and a grace period if needed. The collateral required consists of some form of retention of the borrower's title of ownership of his farm or his assets. For loans to finance micro projects, guarantors are accepted in lieu of collateral.

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An example is the participation of individuals and groups in BEST's community banking program.

**BEST** provides credit to smaller producers in the agricultural sector. It is funded through grants, and by fees paid by clients for services rendered, which account for approximately 20% of its income. It also supported credit mobilization, through a pilot community banking program which established five rural banks operated by women's groups. The banks provide loans of up to BZ\$400 to be repaid in 16 weeks at an interest rate of 12% per annum.

The **BFAC** supplied loans through a credit union associated with one of its member cooperatives. However, its loans are very limited and it provides credit only to a few of its members. Recently, it reached an agreement with the **NDFB** for making production credit available to producers through **BFAC** member cooperatives.

Several credit unions also operate in the country, most of them in Cayo, Corozal and Orange Walk districts. They usually allocate less than 10% of their resources to meet agricultural credit demands from members<sup>173</sup>. Loans are usually short-term (one year or less), although they may be for periods of up to three years (e.g., in the case of land clearing). They are provided on the basis of the borrower's good standing and are secured, at least partially, by his/her shareholdings in the organization.

The **Confederation of Cooperatives and Credit Unions of Belize (CCCB)** is an umbrella organization through which funds are channelled to the **Belize Credit Union League**, which in turn provide loans to approximately 33 credit unions and 17 cooperatives. About 75% of its capital is from members' savings and the balance is supplied by commercial banks and other sources.

Producer organizations such as the **BCFA** and **CGA** provide limited, short-term loans to small farmers for the purchase of inputs. In addition, a few processing enterprises such as the **Citrus Company of Belize** and the **Belize Food Products Limited** make short and medium-term loans to farmers for inputs, equipment and machinery. Loans are repaid through deductions from the sale of farmers' output to these enterprises. This scheme has provided a guaranteed market for the farmer's product(s).

In 1991, the **BSI** implemented a pilot lending program in which it gave interest-free loans (amounting to BZ\$180,000) to 225 of the more progressive small farmers for preparation approximately 500 ha of sugarcane lands. The loans were to be repaid from payments deducted from sugarcane delivered to the sugar mill within the same crop year. As part of the program, farmers were encouraged to adopt recommendations regarding the use of improved varieties, cultural practices and transportation methods, which in turn would contribute to improve both the yields and the quality of sugarcane delivered for processing.

The **Fondo Ganadero Partnership** is a special program funded under a 1992 Grant Agreement between **USAID** and the **MOA**. It is operated by the **BLPA** and the **MOA** and its purpose is to contribute to improving livestock production in the country. The **Fondo** is designed

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Loans can not exceed twice the value of the borrower's shares in the organization.

to provide short- and medium-term credit to selected farmers, by supplying them with high-quality livestock, production inputs and transportation. Farmers pay an interest rate of 6% and a management fee of BZ\$3.50 per month per animal supplied. The BLPA deducts the loan and charges from the sale of animals.

### 8.2.3 Evolution of Agricultural Credit

Historically, credit to the agricultural sector was directed to the less risky and more prosperous activities, having sufficient collateral and short-term results. Before the DFC was established in 1963, commercial banks provided long-term credit and overdraft facilities to only large operators producing agricultural commodities for processing and export. The sugar sub-sector was the principal beneficiary of such loans. Small operators obtained loans from either cooperatives or from export agencies or processing facilities that assisted the commercial banks in loan recovery. Farmers operating in sub-sectors with weak organizational structures and support services (particularly non-traditional activities) had little access to commercial credit. They depended on family sources, money lenders and localized institutions such as credit unions for their financing needs. The establishment of the DFC, in part, was intended to meet the credit needs of a broader cross-section of borrowers and support a balanced growth of the sector.

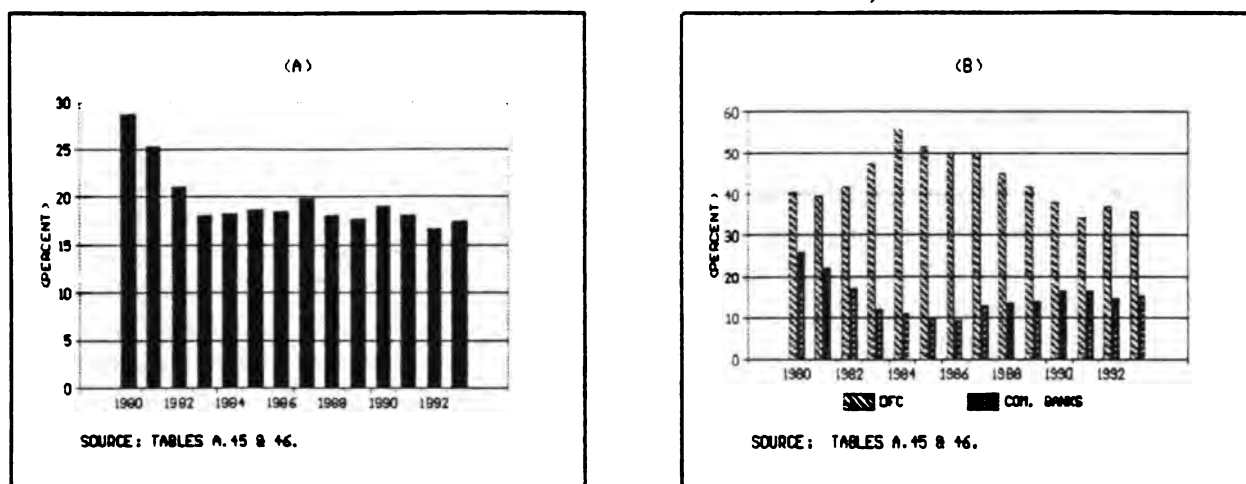
During the 1980-93 period, aggregate lending to the sector by the main institutions (the DFC and commercial banks) was BZ\$632.9 million or 19% of their total lending portfolio. A large proportion of the total amount was loaned by the commercial banks (85%).

The trend in the value of total loans by these institutions to the agricultural sector declined gradually, from 29% to almost 17% in the period (FIGURE VIII.2A). However, the trend in lending by the DFC and commercial banks was cyclical and moved in opposite directions for much of the period. DFC's lending to the sector gradually increased in the first half of the 1980s then declined; commercial bank lending declined, then increased in the corresponding periods (FIGURE VIII.2B). In recent years, (1990-93 period), the proportion of DFC's loans to agriculture declined, averaging 36.2%, while that of commercial banks increased to 16%.

Of the total credit (value) provided by the DFC and commercial banks in the 1980-93 period, 44% and 15% respectively were loaned to the agricultural sector (TABLES A.45 & 46). The sugar sub-sector was the main beneficiary of this credit, accounting for one-third of the total channelled into the sector. In value terms, commercial bank lending increased significantly in recent years, compared with a declining trend for the DFC (except 1994). A large proportion (83%) of commercial bank loans went into the export sub-sectors (sugar, citrus and bananas). The main beneficiaries of DFC's loans were sugar (40%), cattle and dairy (16%) and bananas (14%). Since 1989, the DFC reduced the value of its loans to the sugar sub-sector, while increasing that for banana production.



**FIGURE VIII.2**  
**PERCENT OF TOTAL LOANS TO AGRICULTURE**  
**BY THE DFC & COMMERCIAL BANKS, 1980-93**



Although the DFC's lending has been constrained by the lack of additional equity and loanable funds, it recently contributed about BZ\$1.0 million in a revolving fund, created with USAID support, to help small farmers in Corozal and Orange Walk to diversify their production system. It is implementing a BZ\$1.5 million credit component of the IFAD's TSFDP. Loans ranging from BZ\$500 to BZ\$20,000 have been provided to 1,100 small farmers to develop land and grow corn, rice, beans, citrus and livestock. Besides agriculture, the DFC has allocated a significant proportion of its loans to the industry and housing sub-sectors. This is indicative of the Corporation's efforts to diversify its portfolio and venture into activities with lower risks than agriculture.

In recent years, the lending gap for small farmers has been partly filled by special credit programs, such as the smallholder loan provided by IFAD and administered by the DFC, and by NGOs such as the NDFB and BEST. The Caribbean Development Bank (CDB), a major provider of funds to the DFC, also allocated a loan for on-lending by that institution to NDFB-type organizations, in recognition of the need to reach smaller business enterprises in a cost-effective manner and for poverty alleviation.

In the 1984-94 period, the NDFB loaned almost BZ\$17.0 million to various productive enterprises in Belize (TABLE A.47). Of this amount, 27% was loaned to finance smallfarm production, mainly food processing and small-scale agriculture and related enterprises. Nearly one-half of the number of loans and 40% of the total amount disbursed to smallfarm production was allocated to the Cayo district. Most of its clients (91%) had loans valued between B\$500 and B\$10,000, representing 56% of the total value of loans. For the 1991-95 period, the NDFB plans to allocate BZ\$3.8 million for the development of small- and medium-scale enterprises; BZ\$1.5 million to agriculture and agro-processing; BZ\$0.8 million for women' development; and BZ\$0.5 million for youth training and development.

#### **8.2.4 Institutional Capacity**

The institutional capability to mobilize and channel funds effectively varies between the credit institutions. **TABLE VIII.3** provides a summary of the attributes of the main institutions in the agricultural credit system. Despite the differences, there is potential for the institutions to adequately meet the credit needs of the agricultural sector, through greater collaboration and networking.

Commercial banks have the most potential to mobilize domestic resources, but they lend mainly to the traditional export sector. Although most institutions have the ability to procure foreign resources, both the NDFB and BEST have a stronger capability to access grant funds. These institutions have a low operational cost and they provide smaller-size loans and work in development areas where risks are higher. Both also have additional strengths in providing training and technological support, management support of loans and follow-up activities. The main strengths of cooperatives and credit unions are in their capability to mobilize savings among the lower income groups of the community, as well as providing credit.

Over the last two decades, the DFC's capability improved in all aspects of the project cycle and it can assist the other institutions (particularly the non-bank ones) in the formulation of proposals for the procurement of funds. BEST also has some strengths in this area.

The DFC, NDFB and BEST have all improved their capabilities in the area of project supervision and monitoring. Since their presence in the different geographic locations may vary, there is the possibility that institutional collaboration in areas such as supervision and monitoring could be mutually beneficial, as well as meeting the credit needs of farmers in a more effective manner.

Except credit unions and cooperatives, all the institutions are involved in project identification as part of their lending process. They either actively pursue opportunities to make loans or these are presented to them in the normal course of business. However, not all the projects would be eligible for financing by the institution to which they are first presented. Therefore, a system of networking or referrals could be developed in which credit applications not approved by a particular institution can be referred to a more appropriate one in the agricultural credit system for consideration.

#### **8.2.5 Issues and Constraints**

A major issue of agricultural credit is related to accessibility or the ability of borrowers to secure loans. This in turn is associated with the policies and practices of the lenders regarding collateral or guarantee to assure loan repayment, interest rates, procedures to be followed, the location of the lending facility, and the capacity of the borrower to present a credit proposal and to implement it.

TABLE VIII.3  
ATTRIBUTES OF INSTITUTIONS IN BELIZE'S AGRICULTURAL CREDIT SYSTEM

STRENGTHS/ATTRIBUTE	COMMERCIAL BANKS	DFC	NDFB	COOPS AND CREDIT UNIONS	BEST
REGULATORY FUNCTIONS					
FINANCIAL SUPERVISION					
FINANCIAL MANAGEMENT	X				
BUSINESS MANAGEMENT	X				X
MOBILIZATION OF FOREIGN RESOURCES	X	X	X	X	X
MOBILIZATION OF DOMESTIC RESOURCES	X	X	X	X	X
MOBILIZATION OF GRANT FUNDS		X	X	X	X
DEVELOPMENT FINANCING		X	X	X	
LONG REPAYMENT PERIOD		X			
LENDING RATE LOWER THAN MARKET RATES		X	X	X	X
PROJECT IDENTIFICATION	X	X	X	X	X
PROJECT PREPARATION/APPRaisal		X			X
PROJECT MONITORING		X	X		X
DEVELOPMENT OF WOMEN			X	X	X
COMMUNITY DEVELOPMENT			X	X	X
LOW FINANCIAL COST OF OPERATIONS			X		X

SOURCE: COMPILED BY MISSION.

More often than not, the commercial banks ask for proof of ownership of any given asset being used as collateral for loans. The DFC requires farmers to hold a secure and firm title to their land. It also accepts government leases, under the additional provision that a firm option exists for the lease to be converted into a real title of the landsite where the loan is to be applied. However, a large proportion of small farmers do not own land, or cannot prove their right to use it. As a result many small farmers in Belize lack the capacity to provide an adequate guarantee for securing loans from the banking system.

With regard to accessing loans from other sources, such as cooperatives, producer associations, NGOs and to a lesser extent credit unions, most are willing to use the expected output to be attained through the loan as a guarantee. In the case of NGOs, they rely also on personal credit worthiness or trust which is undoubtedly more favorable to small farmers. However, due to limited financial resources, membership requirements (in the case of credit unions and cooperatives) and inadequate follow-up activities, the scope of lending and its impact on the farming sector by informal credit institutions are limited.

With regard to interest rates, those of the DFC and NGOs are generally lower than those of commercial banks. This puts an additional pressure on the demand for the resources of these institutions. In the case of the DFC, it has been unable to secure additional equity capital or to increase its supply of loanable funds to cope with the high demand for its loans. This has contributed to a limited coverage of farmers. Other organizations such as cooperatives and credit unions, depend on the banking system also to channel resources toward their members. Funding by NGOs have some impact at local levels, but their resources are much more limited and are directed to a very segmented clientele. The cost to borrow from these institutions is not an important constraint affecting accessibility of farmers to their resources.

Most banks ask their clients to follow standard procedures for given operations. Procedures of the DFC are more complicated, as its loans are made on a project basis and it supervises the use of these. This means that borrowers have to comply with additional regulations and be able to provide credit officials with more information. Cooperatives, credit unions and other organizations follow procedures that are simpler than those used by the banking system. However, as these organizations expand, it is likely that more standardized, impersonal procedures will be needed for them to effectively address the additional credit demands. It is possible also that some advantages they offer as effective intermediaries on the small farmer's behalf could be eliminated.

Although the commercial banks have branches in the larger towns, most small farmers have limited access to them. The DFC has offices to meet the needs of borrowers in the various districts, but its personnel resources are limited, particularly with regard to evaluation of credit applications, follow up of outstanding loans and supervision of new ones. These require different schedules, skills and reporting and are based on the type of borrower and project. In general, NGOs, cooperatives and credit unions are constrained by insufficient staff. Moreover, their managers spend a great deal of effort and time in internal administrative matters.

The ability of farmers, particularly small ones, to present viable loan proposals is weak. Moreover, once the loan is approved, they also lack managerial and administrative skills needed for implementing the proposal. Both the DFC and NGOs have follow-up activities to support effective use of their loans but these are inadequate.

Other major constraints of the agricultural credit system include: (i) commercial banks do not lend long-term credit to the sector and their lending is confined to mainly the traditional export crops; (ii) shortage of grant funds and resources from external agencies are likely to affect the sustainability of lending by NGOs and the NDBF to small farmers; (iii) the effectiveness of agricultural credit is reduced by inadequate support services such as marketing, extension and poor infrastructure; (iv) the prevailing land tenure situation and the lack of crop insurance are obstacles to the provision of agricultural credit; (v) absence of a mechanism to coordinate the activities of institutions providing credit to the sector; and (vi) absence of a comprehensive credit policy for the agricultural sector.

## CHAPTER IX

### CONCLUSIONS AND RECOMMENDATIONS

#### 9.1 Development Potential and Strategy

Since 1980, the performance of Belize's economy and its agricultural sector exceeded the average of most Latin America and Caribbean countries. In the 1980-93 period, the key indicators of performance reflected a healthy economy: real economic growth averaged 5.2% per year, per capita income expanded by 2.8%/year, inflation was 4.2%/year, and both capital formation and foreign reserves increased steadily. The agricultural sector grew by 4.3%/year, while the livestock, fishing and forestry subsectors recorded higher real growth rates. At the same time, the sector's contributions to GDP, foreign exchange earnings and employment were relatively stable, averaging approximately 20%, 70% and 24% per year, respectively.

Belize's agricultural sector has much potential for development, not only because of the country's natural resources endowment, but also because of the possibilities for increased diversification of production and exports through the exploitation of new market opportunities, developing linkages with other sectors of the economy, and improving production efficiency. To fully exploit these three important sources of growth, the GOB will need to do the following: (i) continued sound economic management of the country through the pursuit of appropriate macroeconomic, trade and sectoral policies; (ii) formulation of an agricultural development strategy, identifying the principal policy objectives and measures to be adopted for the sector, and priority areas to be targeted; (iii) improving the system of incentives to attract both local and foreign investment; (iv) increased investments in research and development and transfer of new technology to the sector; (v) investments in support services and basic infrastructure; (vi) human resource development; (vii) improved management of the environment and the natural resource base; and (viii) strengthen the MOA's capabilities to plan, execute, coordinate and monitor sector policies and programs, and provide other support services adequately.

A primary area to be addressed is the design of an agricultural development strategy for the country. Among others, the strategy should assess the long-term potential and outline the role of both the traditional and non-traditional subsectors, the role of public and private sector institutions and identify priority areas for investment and development. Elements of the strategy should include: (i) emphasis on a market-led approach; (ii) the need for a more competitive agriculture (in both the domestic and export markets); (iii) sustainability of agricultural production, the environment and natural resource base; and (iv) inter-sectoral linkages.

The strategy should be a market-led approach, focusing on: (i) improving the country's agricultural competitiveness; and (ii) accelerating agricultural diversification. These two major objectives are complementary and should be pursued within a framework that ensures a more sustainable agricultural sector in the long run. Several factors point to the need for this focus.

First, the Belizean economy is heavily dependent on few traditional products which are exported to preferential markets. Both the traditional products and the preferential markets are becoming increasingly less important in a world economy, where competition and globalization are the norms. Global trade liberalization, adoption of the GATT agreement and the emergence of trading blocks are putting pressures on protected markets for reform and free trade. There is uncertainty therefore, of the future of the guaranteed markets. In addition, Belize's major agricultural exports are not competitive in free markets, and the country will have to make much improvements in production efficiency if it is to compete in non-preferential external markets.

Second, the emergence of NAFTA will significantly affect Belize exports to the North American markets over the medium and longer term. The main implication for Belize is the potential loss of the preferential USA market for citrus juice, sugar and garments. Being a member of NAFTA and because of its production advantages (such as lower wages, scale economies, etc.), Mexico is likely to emerge as a successful competitor in the North American market in these and other products. Moreover, there is a strong possibility that other Latin American and Caribbean countries may obtain preferential access to the USA's market under NAFTA. These factors will place much pressure on Belize to compete in that market.

Third, Belize is implementing trade policy measures (the CET and reduced tariffs) which will increase the accessibility of imports to its domestic market. Unless there are significant improvements in production efficiency to compete successfully with imports, these measures are likely to have negative impacts on import-substituting activities. Fourth, the domestic market size is limited; it provides limited opportunities to diversify the production and constrains the achievement of scale economies in production. Therefore, the development strategy should seek to expand market opportunities, both within Belize and abroad. There is need to identify products for which there is a growing demand, and orient the production system to meet the likely needs of the market.

Fourth, the need to accelerate the diversification process is supported by the uncertainty of the preferential trading arrangements and long term viability of the country's traditional exports. While these markets are still open, Belize should seek to produce its traditional exports more efficiently, in order to maximize their contribution to the economy. It also means that the country should explore options in non-traditional areas, where farmers can contribute to increased production, foreign exchange earnings and savings.

Several policy and institutional requirements will be needed if Belize's agricultural sector is to be more competitive and sustainable, and the goals of diversification are to be achieved. These include the design of appropriate macroeconomic and sector specific policies, complemented by adequate support services; rationalization of the roles of the public and private sectors; a quality infrastructure; strengthening public sector institutions supporting agriculture; a facilitative regulatory framework; adequate resources; and the political will. Although macroeconomic management of the country was good in the last decade, the GOB will need to maintain adequate control over some key variables that could affect the country's competitive

position. These include inflation, the fiscal deficit and external imbalances, taxation, exchange rate, wage rates and tariff rates.

So far, the success of agricultural diversification efforts was limited success, in part due to an inadequacy support system (incentive policies and services). Appropriate incentives should be provided to facilitate more private sector involvement in the diversification effort. Considering that Belize has been experiencing negative trade deficits, and given the country's large resource base, aggressive policies are needed to promote export-oriented agricultural production in both traditional and non-traditional areas.

Sustainability requires that production and productivity increases should not be achieved at the expense of degradation of the country's resource base, but rather by improving the current farming systems consistent with environmental and natural resource preservation<sup>174</sup>. Therefore, agricultural policy should be instrumental in developing and promoting the adoption of appropriate technologies among different regions and producers, for increasing output and productivity in the long run, while simultaneously minimizing environmental degradation.

The sector strategy needs to take cognisance of both the positive and negative factors that could facilitate or limit its success. There are several factors which are likely to provide positive support to development of Belize's agriculture and its competitive position in the international market. The combination of these factors enhances the country's attractiveness to foreign investors for both export-oriented and import substitution activities. These include: (i) the long history of political, economic and social stability which together, is an important incentive for both domestic and foreign private investment; (ii) the strategic location of the country to nearby large international markets like the USA and Mexico; (iii) availability of natural resources to support production expansion for exporting and for import substitution; (iv) regulations provide more or less equitable treatment of domestic and foreign investors<sup>175</sup>; (v) exports under preferential market access through bilateral and multilateral trade agreements (CBI, CARICOM, CARIBCAN) provides economic space for the country to concentrate on productive activities for which it has a competitive advantage; (vi) corporate income tax holiday of up to 15 years for investing in agriculture, duty free importation of raw material, machinery and equipment and guaranteed repatriation of capital<sup>176</sup>; (vii) duty exemptions to investors as well as protection of local industries from unfair competition. (viii) accessible foreign ownership of land in Belize<sup>177</sup>.

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<sup>174</sup> This is important. Population pressures and the demand for land induce production activities to move into more fragile areas. This seems to be the case with the expansion of citrus groves in Stann Creek and Toledo. NARMAP (op. cit.).

<sup>175</sup> The legal framework that regulates private business in Belize include the Central Bank Act, the Development Concession Act, the Fiscal Incentives Act and the Aliens Landholding Act.

<sup>176</sup> Incentives given by the Ministry of Economic Development.

<sup>177</sup> Alien Landholding Act of 1973.

On the other hand, there are factors which limit the country's competitiveness in both the domestic and export markets. These include: (i) the small size of the local market; (ii) regulations and bureaucratic procedures result in delays and higher costs for doing business; (iii) high labor and other input costs compared to neighboring countries (Mexico and Central American Countries); (v) low productivity in several agricultural, forestry and livestock activities; (vii) limited research and development programs for the agricultural sector including agro-processing activities; (viii) inadequate infrastructure; and (ix) the high dependency on protected export markets for a long time affected the development of competitive production activities and diversification.

The GOB's move towards the adoption of trade liberalization measures is an area of major concern, particularly in the short to the medium term. On the one hand, trade liberalization will, among other things, facilitate cheaper food imports and place additional pressures on Belize to become more competitive. On the other, it will likely impact various producer groups negatively, in addition to any potential loss of government revenue. Given the general thrust towards free trade in the region (through NAFTA), the options for Belize to protect its domestic producers and market from cheaper imports are limited. In the circumstance, two complementary lines of action will need to be pursued. First, food security should be an important goal of agricultural policy, and measures to support its achievement should be aggressively pursued. Second, a more cautious approach to trade liberalization is needed. Some protection should be provided in the short run to those domestically-produced commodities presently uncompetitive with cheaper imports, while efforts are made to increase their production efficiency in the longer run. Products such as grains, meat, dairy products and several vegetables are unlikely to compete with imports. Therefore, programs should be implemented to increase the production efficiency of those identified as contributing to food security, and those considered as having a competitive (or near competitive) advantage in the short and medium term.

In general, there are five broad areas in the sector with much development potential. These include the traditional export crops, traditional domestic crops, food security or import substitution products, non-traditional exports and forestry.

***Traditional export crops:*** Belize will continue, at least for the foreseeable future, to depend heavily on the exports of sugar, citrus products and bananas for the major portion of its foreign exchange earnings, and for employment of a significant part of its work force. Long-term planning for the traditional sector is required, and policy objectives should be to increase productivity (i.e., yield per unit area), development and commercialization of new end uses for these products, and increased utilization of by-products. Higher productivity of land presently cultivated should maintain current output levels to meet domestic and export market requirements, while simultaneously releasing some resources for producing import substitution/food production and/or non-traditional export crops.



***Traditional domestic crops:*** The most important of these, particularly from a food security standpoint, are rice, corn and beans. Agricultural policy should support achieving and maintaining domestic self-sufficiency in these crops on a competitive basis, with annual increases in output to meet projected local demand. The major emphasis should be on improving productivity and an overall increase in farm income, of particularly small and medium-sized farmers.

Rice production deserves special consideration due to its role in the local diet and its potential for export. In the short to medium term, the development strategy for this subsector should aim to reduce government subsidies for production; be competitive with imports; and achieve domestic self-sufficiency. This should be achieved by higher production efficiency. Priority should be given to improving the incentive scheme for production, improved seeds and other technology, and improved infrastructure, irrigation and other support facilities. Reducing production cost and an improved quality of paddy and milled rice are also important.

In the long-run, Belize would need to seek export markets if output continues to expand and the product can compete in those markets. Major requirements for exporting rice include the development of a comprehensive marketing strategy, including grading standards and quality control for both paddy and milled rice.

***Food security/import substitution commodities:*** Despite Belize's adequate resource endowment, the country has a large food import bill. A food security/import substitution strategy should be a major component of the country's overall agricultural policy. A priority area should be on commodities which are high on the import bill, and which could be produced in Belize on a competitive basis. Animal feed in the form of soybean concentrate, is by far the major crop-based commodity imported annually, followed by imports of oils and fats. Belize has much potential to substantially reduce its import bill for these products and its dependence on external feeds for livestock and shrimp production. This can be achieved by improving the quality and expanding soybean production, and utilizing it as a base for producing a range of outputs for human consumption (soyflour, oils, etc.), as well as for feeds for livestock and shrimp farming. The country is well-endowed with both climatic and topographic conditions suitable for soybean production. The technological package has already been developed and will require minor (if any) modifications to achieve wider applicability. Soybean can be easily rotated with corn and red kidney beans, and farmers should be encouraged through policy and suitable incentives to adopt a rotation package best suited for their individual enterprises. Furthermore, the production cost is almost competitive with imported soybeans (c.i.f) in Belize. With improvements in production, soybean could be produced on a competitive basis.

The sector strategy should also target certain vegetables and livestock products which contribute both to food security and import substitution objectives. Besides the local market, the growing tourist sector offers market opportunities for expanding agriculture-tourism linkages. Preliminary information from various studies indicate that products with potential market opportunities include onions, tomatoes, cabbage, carrots, lettuce, milk and various meat products. Presently, there is much scope for increasing the productivity of vegetables and

livestock products, and exporting meat. With adequate support of R & D activities, extension, marketing and improved infrastructure, some of these products (if not all) could compete successfully with imports.

The country has much potential to expand livestock production, but the economic feasibility of the alternative production systems need to be further examined. Presently, beef production is unprofitable due to high input costs, competition by poultry meat and imports, and a limited domestic market. Support should be provided to improve the production systems for beef, particularly among small farmers, using alternative feeds such as sugarcane tops and indigenous legumes. Most farmers can increase their stocking rate by 50%, using existing pastures and improved management. In addition, there are large land areas suitable for pasture in Cayo, Orange Walk and Corozal districts.

Poultry production can expand if a low cost feed source is found and non-Mennonite producers integrate their operations. Small producers and cooperatives need to adopt a more efficient, vertically integrated production system, whereby farmers produce their own feed (particularly corn), and poultry production operations are linked to feed production and processing. However, Belize is self-sufficient in poultry meat; output expansion by non-Mennonites would require additional markets for disposing the product.

Like small poultry producers, pig farmers need to integrate their production operations with feed production. Besides the need to improve productivity, pig production requires better organization of the production system, low cost feed and adequate slaughter facilities. Pig farmers are unable to generate a reasonable profit unless feeds are cheaper and they have a slaughter contract for the animals.

Dairy production is a high cost activity in Belize. The demand for liquid fresh milk is constrained by inadequate refrigeration facilities and high production cost. Dairy farmers need to adopt a low cost production system and cheaper feeds. Preliminary information indicate that the St. Stanislaus dairy production model in Guyana is appropriate for Belize, but this requires testing and validation before it is adopted.

***Non-traditional exports:*** Given the market constraints of the traditional exports, Belize needs to expand its range of exports to compete successfully in free markets in the longer run, if it is to sustain economic growth. Increasing non-traditional exports requires a strong export marketing strategy, product identification and development (including quality control) and commercialization of activities (both primary production and processed). The criteria for product selection should include its potential impact on foreign exchange earnings and export diversification, clearly identified markets, availability of adequate research and development facilities and sustainability (economic, institutional, cultural and environmental).

Belize has successfully produced and exported two non-traditional exports - marine products and papayas. The GOB needs to consolidate production and improve the marketing system for these commodities, and identify new export market opportunities for other commodities in which the country has a competitive advantage.

**Forestry:** Although the forestry subsector has been exploited, there are opportunities for it to continue making a valuable contribution to the economy. Through the support of the Forest Planning and Management Project, improved forest management practices could be adopted to enhance yields. Agro-forestry activities should be explored in areas that have been overexploited, and integrated with other production activities in tribal communities (Maya indians), milpa production systems and ecologically sensitive areas. In general, the true potential of the forest subsector for conservation, recreation, eco-tourism and commercial production should be determined and strategies designed for its development.

**Other considerations:** To develop the above areas in the sector, a three-pronged approach is suggested. These are:

- (a) Promotion of large scale, capital intensive operations involving joint ventures with foreign investors. This strategy is suited to the development of new enterprises or the modernization of existing subsectors, where the foreign investor may be expected to supply equity (in foreign exchange) and technology. This strategy was successful in the area of shrimp farming and could equally be applied to selected ornamentals, fish farming and fruit crop development.
- (b) Development of small-scale operations. These will need to be supported by research and development of tech-packs to make such activities more competitive. The output of these operations would either be used for domestic consumption in fresh or processed form, or to augment exports based mainly on large or centralized producers, as in the case of papayas.
- (c) Engaging in highly focused research involving one or two commodities and supporting these through successive stages from pilot production to full-scale commercialization. This has been accomplished in the case of papaya and the approach could be applied to other commodities.

Although several areas with development potential were identified above, it is critical that further evaluation be done to determine their technical and economic feasibility of production, and their competitiveness in the various markets. In this regard, improving the data base on farm level production, marketing and distribution are critical areas to be addressed. Moreover, the overall information base to support planning and policy decisions in the sector needs to be considerably strengthened.

A market-led approach implies that production should be integrally linked with marketing. For non-traditional products for both the domestic and export markets, the strategy should target groups of farmers in specific localities, provide the necessary support system for improving their production efficiency and expand commercialization of their activities. The strategy should aim to reduce the production risks and uncertainty by organizing and strengthening the production and marketing system, improved planning, institutional coordination

and networking, developing an informed and innovative marketing strategy, supported by the necessary support services and infrastructure.

Success of the agricultural development strategy depends on an appropriate incentive framework and an adequate system of support. Incentives for agriculture are provided by various macroeconomic and sectoral policies. Therefore, the GOB should involve several institutions in designing its sector strategy. While the MOA should have the lead role in this exercise, it should include the MED, MOF, MOT, MOH, Ministry of Natural Resources and the Environment, DFC, BMB, as well as the producer associations.

## 9.2 Smallfarm Agriculture

Theoretically, the GOB's policy objectives for the development of the smallfarm sector are appropriate, but they lack a strategy and adequate means for achieving them. Belize needs to increase food production for enhancing food security and compete successfully with imports<sup>178</sup>. Small farmers produce most of the food that is domestically-consumed, but they experience several constraints which together, contribute to low productivity and farm incomes. Improving the smallfarm sector would contribute to food security, and competitive and equity objectives.

The government's strategy for small farmers should include the following elements: (i) coherency between macroeconomic, sectoral and rural development policies; (ii) a strategic focus that indicates the priority areas to be addressed and the institutional and resource needs for accomplishing this; (iii) considerations of the specific needs of this group, and the socioeconomic, institutional, and the agro-ecological environment in which they operate; (iv) commercialization of production.

Of the various groups of small farmers, those involved in the production of non-traditional commodities for sale in the domestic market should be specifically targeted for development support. Presently, their production efficiency is low. They engage in limited commercial farming and are inhibited from adopting new technologies, due to their lack of capital and limited access to formal credit sources. They operate a complex farming system which is organized to minimize risks, provide the bulk of their household food needs and a constant supply of cash. Any strategy to develop these farmers should include an evaluation of their behavior and the constraints which limit their productive capacity.

Although a policy objective is to improve commercialization of smallfarm production, the strategy should have a balanced approach, incorporating sustainable and equity considerations. It should take into consideration the needs of this farming group and minimize the unintended negative impacts of policy measures. For example, lower tariffs on imported foods are likely to affect domestic food producers negatively, inducing them to seek off-farm

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<sup>178</sup> Trade liberalization would provide additional pressures on domestic food producers to compete with cheaper imports.

employment opportunities to compensate for lower farm incomes. If an objective is to retain such farmers on the land, an alternative is to implement policies that to achieve higher production efficiency, so that these producers can successfully compete with cheaper imports.

Another example is the impact of expanding support services and improved production technologies to develop the milpa production system. If such support results in the traditional system evolving in a more diversified and settled form of agricultural production, additional pressures could be imposed on the environment and on the social structure of these farming communities. As the population grows and more cost efficient farming methods are introduced, farm gate prices could decline and milpa farmers may have to intensify production, cultivate alternative cash crops, and/or seek additional off-farm employment to sustain their income level. This can change current production patterns, resulting in shorter fallow periods with highly negative effects on soil conservation, as observed in the Toledo and Stann Creek areas.

Improving the smallfarm production system requires implementation of appropriate incentives and a strong support services system, so as to induce farmers to either shift into new activities, and/or adopt improved technologies and practices. Both will contribute to reducing risks and uncertainty associated with production and markets. A major challenge therefore, is for the GOB to design appropriate policies, supported by the public sector's capability to deliver essential services such as research and extension, credit, markets and marketing, and plant and animal health services in an integrated manner.

Accessing good agricultural land is a major constraint for most small farmers, and the GOB should give special attention to removing the limitations imposed by the present land tenure system. Policies should accelerate small farmers' access to secured land, through land titling and the implementation of adequate legislation regarding landuse rights. In addition, the land administration system needs to be improved considerably, for solving land disputes, procuring titles of ownership, transferring land and revenue collection.

However, addressing the land tenure and landuse problems require that these be resolved within a larger policy framework. The GOB needs to evaluate its current landuse policy, with the objective of designing one that allocates and promotes the use of this resource in a more efficient manner. Although Belize is fortunate to have abundant land, alternative uses of land should be assessed, taking into account the medium and long-term development objectives of the country. In this regard, high priority should be given to the recommendations provided in the NRI Report<sup>179</sup>.

### **9.3 Institutional Streamlining**

The MOA is the most important institution in the public agricultural sector. As the core agency responsible for planning, designing, executing and monitoring the GOB's agricultural

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<sup>179</sup> King et al. 1993.

policy, several aspects of its functions, organization and management need to be strengthened if these responsibilities are to be discharged effectively.

The ministry should assess its role in the sector, given the new challenges facing Belize's agriculture. Its functions should be clearly defined to include: (i) policy formulation and sectoral planning (designing, implementing and ongoing evaluation of the sector's policies, programs and projects) for the achievement of specific objectives and targets; (ii) collection, organization and dissemination of agricultural statistics; (iii) provision of certain goods and direct support services such as training, infrastructure, research and extension; and (iv) coordination and liaison (of the activities of various institutions and agencies operating in both the public and private agricultural sector, and with other relevant national, regional and international institutions).

First, the MOA's policy formulation and planning process needs strengthening. The areas to be addressed are planning methodologies (such as annual work programs, sector and sub-sectoral planning, statistics, budgeting, project development, etc.,) and operational aspects related to policy implementation and analysis, monitoring and evaluation. It should establish a structured annual policy and planning cycle for preparing its annual sector review, work plan and annual budget. The development of an annual programming, monitoring and evaluation system (APME) would facilitate the annual planning process.

Second, the MOA's current institutional structure provides three sets of major problems: (i) an ineffective planning, execution and control process; (ii) inefficient operations; and (iii) delays or inadequate actions in key areas. The Ministry needs to be restructured, to clearly indicate levels of authority (hierarchy of departments, divisions and other units), unit responsibilities and operations, job specifications of individuals, relationship between its units, and its relationship with other public and private sector institutions.

Third, a review of the ministry's operations is needed and adjustments made to focus on specific areas, targets and clients which are to be identified in the development strategy. It should improve the overall production efficiency of its key services (R & D, extension, training, etc.), and examine possibilities for divesting others to the private sector (NGOs, farmers organizations, etc.). In particular, it should divest itself from commercial production activities, and provide adequate incentives and support for greater private sector participation in the provision of machinery services, planting material, extension and certain livestock production health services.

Fourth, the MOA needs to review its involvement in the large number of committees and task forces, and design strategies for greater involvement of private sector groups in its planning and review process. To efficiently utilize its scarce resources and improve participation of other groups in this process, the MOA could form special committees, having a range of expertise to provide advisory support on specific subsectors or areas. At the district level, the participation of farmers and other rural institutions in the annual planning process should be encouraged.

Fifth, the ministry's effectiveness in the sector will remain limited unless it can retain and attract a core cadre of technicians and professionals, and sufficient financial resources. Several issues need to be addressed fairly quickly including the level of remuneration for personnel, appointments of technical people to key vacant positions, improving the system to facilitate upward mobility of staff, training, and the provision of adequate budgetary resources for investment, operations and for facilities. Given the tight financial situation, the MOA should examine alternative sources of financing some operations, such as user fees for some services.

#### **9.4 Marketing**

The present marketing system is a major constraint to Belize's agricultural development. The country's small market size, lack of information on local and external markets, the inability of farmers to compete with cheaper exports and in free markets abroad, and high post-harvest losses are among the critical constraints of the marketing system. As a consequence, producers are faced with high risks, which contribute to the limited success in agricultural diversification.

The characteristics of Belize's agricultural marketing system indicate the need for several possible remedial interventions. The country needs a marketing reform and development program, having components to address specific constraints. The program should take a comprehensive view of the system, cutting across institutional, regional, product and functional boundaries, and outlining a set of objectives, strategies and courses of action. It should also implement a long-term innovative marketing strategy that to improve the overall system, expand the current market size and identify new market opportunities. This strategy has the advantage of avoiding the usual pitfalls when a "piecemeal" approach is used, and it would permit focusing on a series of historically neglected areas.

In the context of Belize, intervention in the marketing system should focus on reducing post-harvest losses; lower marketing costs and margins in the domestic market; support the expansion of food production and import substitutes; improve accessibility of lower income groups to more nutritious foods; and expand non-traditional exports. The strategic guidelines and components of an agricultural marketing strategy suggested are:

**(a) Comprehensive system development:** Public policy in marketing should be comprehensive, incorporating the principal agents (producers, rural assemblers, wholesalers, and retailers) and functions (information, credit, grading and standardization, transportation, rural assembly and urban distribution, and infrastructure planning). Specifically, attention should be devoted to improving rural-urban linkages in the marketing system, and preventing rural development actions from being confined only to support producer organizations and rural assembly functions. In this regard, an improved information system, supported by adequate infrastructure and transportation are critical. Actions should also be taken to promote efficiency among retailers and wholesalers, through improved support services and organization of these participants, including farmers groups.

**(b) Improved marketing efficiency:** The program should also focus on improvement of the operating efficiency of the system's participants. Such improvement, measured in terms of decreased marketing costs and margins, reduction in post-harvest losses, or expanded volume of sales per wholesale/retail establishment could be accomplished by: promoting integration arrangements among the system's participants, fostering the adoption of modern operating procedures and equipment, and expanding the range of products and services provided. Initial attention could be focused on retailers and wholesalers operating in Belize City.

At the wholesale level, the infrastructure should be improved to: (i) minimize farmers' transaction costs; (ii) support competitive trading and increasing the flow of products from farmers to retailers directly; and (iii) expand wholesaling activities. Wholesale marketing facilities could be improved in Belize City, Belmopan, St. Ignacio and in Corozal town. At the retail level, the program should seek to improve services provided in the principal urban centers and towns, and improve information dissemination.

**(c) Support to private marketing:** The development of private marketing should be supported, specifically at the retailer level in urban areas. A stronger retail sector can exert a critical countervailing force on the system's development, by inducing decentralization of existing wholesale activities and fostering the development of more efficient marketing intermediaries. In Belize city, several retailers were contacted in the course of this study. They expressed interest in exploring the formation of a retailer organization (as in other Latin American countries), to achieve scale economies, improve operating procedures and reduce marketing costs. Similarly, with adequate public support, farmers groups and cooperatives could play an active role in private marketing. Strengthening these organizations in various aspects of planning, budgeting, management and marketing techniques should be a major goal of public support to private marketing.

**(d) Public sector role:** The public sector has two critical roles in agricultural marketing. First, the GOB needs to outline its marketing policy in support of its overall development strategy for the sector. Second, it should provide the necessary support to implement that policy. The GOB should adopt a role as facilitator, encouraging cooperation with private sector organizations and marketing agents, promoting marketing operators to adopt cost-reducing technologies and fostering competition at all stages of the system. Presently, no agency in the country performs this role. In defining the sector strategy and assigning the corresponding institutional responsibilities, the MOA should play a more pro-active role to support agricultural marketing.

Specifically, the MOA should concentrate on providing support services at the production level, market information and forecasting, design a grade and standards system for Belize and strengthen farmers organizations. The export market has specific requirements and challenges; exporters would require significant support from the public sector to overcome these problems. In addition, it should coordinate its activities with other public and private agencies discharging marketing functions, such as market research and information, grading and classification, financing, processing, shipping, non-traditional export promotion and infrastructure development.



It is essential that the GOB assigns the overall coordinating responsibility for system-wide agricultural marketing to one agency.

**(e) Establishment of a commercial extension service:** Although a commercial extension service will promote efficiency and innovation throughout the marketing system, it needs to be developed on a commodity basis. This service would assist marketing operators to achieve scale economies (principally through vertical and horizontal integration arrangements), foster the adoption of more efficient technologies and procedures, facilitate negotiation and encourage functional specialization. In turn, these will contribute to lower marketing costs, increasing incomes and expand food demand. In Belize City, a program could be designed to link some of the more modern and larger supermarkets with producer groups<sup>180</sup>.

Likewise, the formation of chain organizations could be explored. Specifically, two types of organizations could be established: a voluntary chain, owned by a group of four to six wholesalers in complementary product lines which would enlist independent grocers<sup>181</sup>; and, a cooperative retailer chain, grouping independent retailers. Either or both of these organizations could encourage merchant cooperation, achieving scale economies and contributing to lower marketing costs. Moreover, chain organizations can contribute to formalize marketing operations, facilitate access to a wider range of products, and increase the system's capacity to introduce and market new domestically-produced commodities.

**(f) Non-traditional export promotion:** Belize needs to establish a solid non-traditional export promotion organization. Presently, even though it is not possible to identify the precise institutional form of such an organization, nor its relation to the existing institutional apparatus, its main features should be: (i) national in scope and not controlled by any specific interest group; (ii) supported strongly (politically and financially) by both the public and private sectors; and (iii) financially capable to play a meaningful role, possibly with the capacity to take equity positions and/or conduct direct investments, encourage joint ventures between local and foreign investors, as well as providing pre- and post-shipment credit and an export guarantee scheme.

In relation to specific non-traditional exports, several suggestions are provided. Regarding papaya, it is essential to build on the success of BABCO, by supporting the expansion of exports and assisting to make it a major export crop. This requires increasing the area cultivated, the existing packing house, as well as institutional reorganization, since neither BABCO nor the PGA have the capacity presently to launch a significant expansion. To expand the area under cultivation, innovative financing arrangements that go beyond the traditional commercial bank lending practices would be required. New marketing initiatives should be

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<sup>180</sup> Save-U supermarket indicated to the mission that it is interested in exploring a possible agreement with a group of growers. The major objective of such an agreement would be to organize production and supply to meet the specific needs of the supermarket.

<sup>181</sup> This could be launched with the participation of food wholesalers such as Farm-to-U, Grace Kennedy, Running W, and Quality Poultry, all of which are wholesalers in different food product lines. These could then enlist independent retailers.

taken; as production increases, priority should be directed to opening new export markets (i.e., Japan) and developing the domestic market for both the fresh fruit and for processing<sup>182</sup>.

As a member of CARICOM, Belize can export milled rice to any member country tariff-free. In the early 1990's, these countries imported between 65 and 90 million metric tons of rice per year, and experienced a 2-3% annual consumption growth. Although the region's market is relatively large, Belize would need to produce rice competitively with Guyana, and imports from the USA and Thailand. Moreover, the CARICOM rice market is highly diverse in quality requirements and marketing channels. Belize would have to overcome formidable obstacles related to productivity, quality, shipping and financing. In addition, it would need to make considerable investments to improve its rice production and marketing system, if it is to penetrate the CARICOM rice market.

With approximately 15% of the arable land under cultivation, a relatively small population, the absence of serious bovine diseases, and the availability of land for pasture development and feed grain production, Belize has good potential for expanding its livestock industry. If the proper support facilities are provided (slaughter houses, etc..) and the relevant standards met, meat could be exported to the USA and Caribbean countries. However, further evaluations of several aspects of exporting meat will be needed. These include the economic feasibility of exporting meat to various markets, and establishing a modern slaughterhouse versus upgrading existing facilities<sup>183</sup>. Likewise, the status of the residue testing laboratory should be assessed, and a financing plan for its rehabilitation adopted. Until such facilities are in place, measures should be taken to promote exports of live animals and modernize domestic distribution systems, particularly at the wholesale and retail levels.

**(g) Import substitution:** Import substitution/expanding food production is a complementary line of action to non-traditional export promotion. It should be a priority policy objective, given that Belize spends approximately US\$50 million per year for importing various foods. As in the case of non-traditional export promotion, successful import substitution requires a coordinating agency, public and private sector cooperation, financing, technical assistance and support services. The MOA should be the primary public sector institution responsible for executing an import substitution/domestic food production program. The strategy should include the development of farm production models, and a system-wide approach to solve the different bottlenecks and deficiencies along the marketing chain for the products targeted.

**(h) Reorientation of the BMB:** The agricultural sector strategy should clarify the GOB's policy regarding the future of the BMB. The Board should eliminate its marketing activities over time and play a facilitating role in development of the marketing system and supporting non-

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<sup>182</sup> Even though several organizations indicated to the mission that papaya has much potential as a non-traditional export, none had a well-defined program to pursue this.

<sup>183</sup> The document presented to the consultant by the BLPA, to justify funding for the construction of a new slaughterhouse, is not considered a feasibility study.

traditional exports<sup>184</sup>. Appropriate actions should include privatization of the Big Falls Mill and Grain Complex, strengthening the BMB's capability as a marketing intelligence unit and its coordinating role for the GOB's agricultural marketing strategy.

*(i) Market information:* The BMB, in collaboration with the MOA should assume a leading role in the establishment of a domestic marketing information system. Other key participation should include the MTI, the City Council, as well as trade and producer organizations<sup>185</sup>. Careful attention should be given to the system's design, type of information to be collected, the methods of collection and processing and mechanisms for dissemination.

Given the absence of a market information system, an incremental approach should be used for developing it. Initially, it should be simple, focusing on a few activities, such as collecting information regularly on wholesale and retail prices of basic commodities, and on volumes entering Belize City for a narrow range of essential products on heavy trading days (such as Saturdays). A major contribution to its development would be to establish a market news reporting system which broadcasts critical information daily, during the prime time period by Radio Belize<sup>186</sup>. Gradually, the scope and depth of information provided could be expanded, in accordance to the needs expressed by users.

Regarding international market information, the BMB and MOA, together with relevant private sector organizations should develop a standardized trade information center for the country. The proposal by BEIPU/ITC to establish such a center would address this need.

*(j) Complementary support services:* A good marketing system is only a necessary requirement for developing the agricultural sector. Its effectiveness depends on complimentary support activities and services such as credit, research and extension and infrastructure. Currently, these are inadequate in Belize. Credit is a critical and a major input in all aspects of marketing, for financing existing and new ventures in production and exporting, storage, wholesaling and retailing.

Marketing also requires basic infrastructural facilities, including feeder roads, depots, marketing centers, etc. Construction of feeder roads connecting production areas with markets, should continue to be a priority area for supporting agricultural development. However, such actions should be complemented by initiatives to upgrade the entire marketing chain, including collection centers, ports, and providing support to improve the capability of major participants in the system - farmers, rural assemblers, vendors and exporters.

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<sup>184</sup> The BMB has already started to play a more facilitating role and there are plans to reduce its product marketing activities.

<sup>185</sup> A proposal was already formulated by the PAU.

<sup>186</sup> Malhotra 1986.

Although the improvement of buying/collection centers where food crops can be marketed is important, it is not necessary to equip these with cooling and product handling facilities as suggested by some analysts. Farmers and rural assemblers need simple, cost effective facilities to protect their products from natural causes while conducting their business<sup>187</sup>. These could be managed efficiently by the marketing agents (producers and intermediaries).

The expansion of improved drying and storage facilities for grains, for reducing post harvest losses and assisting farmers to obtain higher prices is important. However, as demonstrated in both the TAMP and TSFDP projects, their cost-efficiency and suitability for integration into the farming system should be carefully evaluated, before their adoption by farmers. Recommendations to use alternative technologies should be based on a sound assessment of its appropriateness, given the farming system, economic and cultural characteristics of the beneficiaries.

## 9.5 Credit

The evolution of agricultural credit indicates that the traditional sector has benefitted relatively more than non-traditional agricultural production. This is particularly so in the case of commercial bank lending. Although the DFC and NGOs targets non-traditional production and small farmers, their lending is constrained by the shortage of capital. In addition, absence of a credit policy to support diversification, inadequacy of support services, the land tenure system and insufficient coordination among credit institutions are some constraints of the agricultural credit system.

An important priority is the need to design a comprehensive credit policy in support of the government's agricultural development strategy. Some policy objectives should include: (i) increased financing of agricultural development projects by the private sector; (ii) improving credit delivery to priority areas; (iii) design an alternative regime/program to extend credit to individuals and enterprises with insufficient bankable collateral; (iv) provide longer term credit in support of diversification; and (v) improve coordination of the credit delivery system in the sector.

Alternative options for improving the credit delivery system, accessibility particularly by small farmers and channelling resources into the priority areas for development should be pursued. Credit resources from the DFC could be channeled to the smallfarm subsector, in association with the provision of technical assistance. In fact, the cost of technical assistance could be included as part of the loan, especially in those cases where larger farmers and farmer groups could hire technical help from sources other than the public extension service. Such experiences already exist in several Latin American countries and they should be appraised for implementation in Belize.

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It is possible that such facilities could be provided by private operators if they are economically justified.

Furthermore, the DFC's resources could be channelled into specific projects, under the responsibility of cooperatives, NGOs or producer associations. Credit lines could be established with those organizations for disbursing individual loans for specific ventures among their members. Collateral could be provided through the respective organization, and additional administrative charges could be imposed for creating reserve funds to guarantee the individual loans. The latter could be also applied in those regions where communal forms of land tenure exist.

The above arrangement should provide some savings of administrative costs to the DFC, which could support the training needs of the staff of the participating organizations, in areas such as credit management and loan procurement, and in the procedures and instruments for administering credit lines. However, both the institutional organization and the legislation regarding the DFC's operations would need to be reviewed, before such recommendations can be implemented.

The availability of credit will always be limited, given the demand for such resources. The GOB should pursue collaborative efforts with NGOs and other farmers' groups to mobilize more resources within the farming and rural community, for investment in production activities. One innovative way for mobilizing resources is the creation of community banks among various farming groups.

An area that needs strengthening is training of farmers to develop loan proposals and managing the use of credit. The DFC and NGOs are favorably placed to provide such training. This service should be coordinated by the MOA and the DFC.

Regarding the future demand for agricultural credit, this will be influenced: (i) by the GOB's development policies and strategy for the sector; (ii) the extent to which programs and projects are implemented; (iii) the external environment affecting marketing prospects and the competitiveness of Belize's products; and (iv) the adequacy of other support services.

The traditional agricultural subsectors (sugar, citrus and bananas) have relatively stable export markets; the demand for credit by these in the short- to medium-term is likely to vary little. Major credit needs will result if large investments are required by these sub-sectors, if they are to modernize and become more competitive in non-traditional markets. An example is the restructuring of the banana industry in recent years, which resulted in fewer, but larger farms. Some investments have been made in ratooning regimes and spraying cycles for Sigatoka control in banana production, with a view to cutting costs and increasing the level of competitiveness.

In the citrus industry, apart from the threat of loss of protection due to the removal or reduction of easy entry in the USA and CARICOM markets, the presence of the tristeza virus provides a threat of reduced output and productivity. Investments in replanting of groves using resistant varieties of stock material and installation of improved drainage systems will become necessary.

Expansion in the credit demand in the short- to medium-term is expected for papaya and grains. The papaya industry has come through the pilot stage successfully, and plans for expanding its commercialization are being considered. This will require investments in irrigation systems and other support facilities. Some attention may have to be given also to institutional and management aspects, in order that higher production could be successfully achieved, without undergoing structural changes. BABCO estimates that there is a potential export market that could generate BZ\$20 million, and it is preparing to expand commercial production. It sees the need for investments in: packing sheds, warehousing facilities, carton producing facilities, and pre-cooling and ancillary facilities. At the farm level, investments would be needed in: wells, submersible pumps and filters, drip irrigation facilities and boom sprayers.

Additional credit for grain production in the future is also likely. This includes expansion in the production of rice for exports, and other grains such as corn and soybeans, which can result from higher demand in the livestock subsector, especially by dairy and beef production activities. The GOB is also seeking funding for two projects, the development of a seed production entity (BZ\$200,000) and production of seeds of grains, pulses, grasses and legumes (BZ\$300,000). These two projects could be tied into an overall program for developing the grains subsector.

In the medium to longer term, expansion in shrimp and fish farming may require additional investments. Furthermore, if research and development work can be undertaken successfully for commercializing the production of ginger, soybean and pineapples, then future investments would be necessary in these commodities.

The reactivation of the honey industry is also another possible source of higher credit demand. Production declined steadily, from 340 metric tons in 1987 to 45 metric tons in 1992, and attempts are now being made to reactivate the industry, especially in the southern area of Punta Gorda. A market study commissioned by the Belize Chamber of Commerce suggests that Belize could market up to 0.9 million metric tons annually.

One project that is likely to have a major impact on the future demand for credit is related to the completion of the Southern highway. Its length is estimated to be 100 miles, from Dangriga to Punta Gorda, costing around US\$40 million. With the completion of this highway, large tracts of land could be brought under agriculture, which will generate demand for credit.

## **9.6 Research, Extension and Training**

The research, extension and training system to support agricultural development has declined in both quality and the quantum of its services. The weaknesses of the system are both policy-related and institutional. The absence of a comprehensive policy, together with limited resources have weakened the MOA's capability to provide adequate support to the sector.

*(a) Research:* The GOB's agricultural policy should be directed towards increasing productivity and competitiveness, supported adequately by research and extension, infrastructure

and an information base. Sustained R & D activities are important for expanding production. These should ensure a timely and adequate supply of quality seeds and planting material, and identifying efficient, profitable and environmentally-friendly farming systems (combination of crop and livestock enterprises) best suited to small- and medium-size producers. Other priority areas to be addressed include: (i) providing adequate resources to execute priority research programs; (ii) increased coordination between government and non-government institutions, taking into account research needs and the long time period required to develop and validate new technologies; (iii) increased participation of extension staff and farmers in field trials; and (iv) dispersing research findings widely, in a timely manner and in a form understandable by farmers. However, appropriate mechanisms would need to be developed to minimize the risks undertaken by farmers.

The development strategy should specify the research policy of the GOB, and explicitly indicate the role of science and technology in the sector. Basically, all public sector research should be applied research, aimed at increasing crop and animal production and higher farm income. Applied, on-farm research activities should be emphasized, in which researchers and farmers collaborate to address real problems in the sector. This approach has certain advantages, such as: (i) the use of private farms can provide public savings in infrastructure; (ii) commercial results could be obtained in a short time period; (iii) results can be easily demonstrated to other farmers; and (iv) farmers are integrally involved in problem identification and implementation of alternative solutions.

A well-defined agricultural research policy is an important pre-requisite for a coherent and productive research program. It should be based on an analysis of the technical and economic constraints to agricultural production, and its implementation requires active support from policy-makers, as well as farming groups and support institutions. In addition, it should include all the major areas of research and development, as well as improvements in the information base, management and monitoring of technical improvements and achievements.

Effective implementation of an agricultural research policy should be supported by appropriate institutional mechanisms. Two relevant ones include an **Agricultural Research Committee or Council (ARC)** and other sub-committees. Based on the previous experience of NAREC, full-time staff support will be needed if the ARC is to be functional and effective. The major responsibilities of the ARC could be to: (i) translate agricultural policy into the design of a long-term national research policy; (ii) identify research priorities, given the GOB's thrust in particular areas of agricultural production; (iii) coordinate all agricultural research activities in the country in accordance with the GOB's priorities; (iv) initiate new areas of research if needed; (v) monitor and evaluate the implementation of the national agricultural research policy; and (vi) establish and review annual work programs and the budget to support research.

The ARC could be supported by relevant sub-committees involved in specific commodity areas, to determine the research emphasis to be given to addressing specific problems, as well as those that cut across subsectors of production, such as irrigation techniques, cropping systems, soil fertility management, farming systems.

With regard to the TRDT, it is suggested that: (i) an inter-sectoral group be set up within the ARC, coordinated by the MOA's policy-making structure, to provide the policy and technical bases for designing national programs; (ii) a broad base sub-group be formed comprising representatives of relevant TRDT structures (public and private and farmers' groups), to define the national TRDT plan, under the coordination of MOA; and (iii) redefine the MOA's TRDT structure and functions, consistent with policy objectives.

To improve the management effectiveness and efficiency of TRDT activities, the following are suggested: (i) program TRDT actions through joint participation of agencies involved in R & D; (ii) formulate specific TRDT projects to implement the MOA's crop and livestock development programs, including active participation of farmer groups/organizations; (iii) organize inter-sectoral production and marketing groups to design specific crop or livestock projects; (iv) institutionalize a formal programming, monitoring and evaluation system for TRDT activities; and (v) formalize cooperation mechanisms to strengthen the relevant structures.

**(b) Extension:** As in research, the GOB needs to define a long-term extension policy for the sector, based on priority areas to be developed, the MOA's constraints and the roles of other institutions in providing extension support. Improvements are required in the structure and work responsibilities of the MOA's extension service. Specific targets should be identified, and the service's work program should determine the means for achieving those targets at the central and district levels. The work program should include: (i) definition of achievable targets, in both quantitative and qualitative terms; (ii) identification of target populations; (iii) definition of extension methods; (iv) determining resource needs for implementation; and (v) scheduling activities.

The major role of the extension service is to support farmers through training and demonstration, for increasing their productivity and incomes from current cropping and livestock activities, as well as introducing new, profitable production activities into the farming system. The service should focus on priority areas and commodities, allocating a large proportion of its resources (minimum of 60%) on supporting these. Given the limited resources of the MOA, emphasis should be placed on improved coordination between the various institutions in the sector. A larger number of farmers can be reached with fewer staff, by coordinating efforts between institutions and farmers' groups. At the district level, extension officers can build on the efforts of other institutions that are complementary to those of the MOA. With the Ministry taking a lead role, other institutions should actively support these efforts, through joint program planning and implementation, with emphasis on cost-sharing and cost-saving.

The extension strategy should place increased emphasis on improving the quality of extension-farmer interaction at the farm level, as opposed to the emphasis given to full zonal coverage, or to the numbers of farmers contacted. In this regard, several approaches could be used, such as: (i) the MOA should apply criteria for selecting key farmers to play critical extension roles such as organizers, model farmers (this approach has already been adopted by the Extension Unit of BSI); (ii) the MOA should establish a limited pilot program of on-farm trials and demonstrations for crops and livestock production, using a model-farm approach for



training; (iii) researchers, extensionists and selected farmers should collaborate for developing a well-defined set of procedures to control the quality of on-farm work; (iv) extension officers should schedule visits for on-farm demonstrations and trials at key points in the cropping cycle; and (v) the MOA and other organizations should jointly provide in-country and on-site training for their research and extension staff involved in district programs.

The effectiveness of an extension service is directly related to the quality and capability of its staff. Because of the applied approach used, training should include subject matter that has direct and practical applications. Completing a diploma or degree program should not be considered as being sufficient for producing a professional extension worker. "Hands-on" training is critical, and should be provided before extensionists are assigned to work with farmers. Periodical in-service training for extension workers is important for improving their technical skills. Other priority areas to be addressed are: (i) increasing the size of the extension staff which is presently very insufficient; (ii) improving the working and living facilities for extension staff; and (iii) creating an incentive scheme for extension officers, whereby promotions and training are linked to strict performance measures.

Research and extension are complementary, and the existence of a strong working relationship is essential for the effectiveness of these services. Adequate mechanisms should therefore be developed to strengthen linkages between the activities of both areas. It is suggested that: (i) the PAOs of both research and extension should participate in the formulation of the annual work program of each other's service; (ii) researchers should also participate in the in-service training of extension officers; (iii) the PAOs of research and extension should participate in evaluating the impacts of each other's work program; and (iv) relevant researchers should also participate in the preparation of tech-packs for farmers.

**(c) Training:** Agricultural training programs should be carefully planned to support research and extension activities. These should be based on the perceived present and future needs of the sector. In the MOA: (i) training should be directed to developing and motivating research and extension personnel and improving research capability, while conducting applied research; and (ii) teaching personnel at the BCA should be supported to be actively engaged in agricultural research. Furthermore, efforts should be made to sensitize personnel on training possibilities and provide support for upward mobility in the respective professions.

Given the limited resources of the MOA, it is essential that supplemental funding be sought to upgrade the quality of its education programs. In this regard, it is suggested that collaborative training programs be developed by the MOA, with relevant private sector institutions, to facilitate exchange of experiences and cost-sharing. Efforts should also be made to develop and strengthen farmers organizations, which can be a good medium for training farmers.

## 9.7 Animal and Plant Health

Presently, most aspects of the MOA's animal and plant health service are below the required standards to support a competitive agriculture and meet export market requirements. Belize needs to strengthen these services considerably, if it is to compete successfully with other countries to penetrate new markets, or even maintain existing market shares in the longer run. Moreover, Belize's economic growth largely depends on exports, which provides a sufficient basis for improving its animal and plant health service. Two major areas need to be addressed by the GOB: policy and infrastructure.

The GOB needs to review all aspects of its animal and plant health policies (including legislations), with the objective of strengthening the policy framework, consistent with the standards and requirements of other countries and export markets. The emergence of NAFTA has placed pressures on Mexico (as well as other countries in the region wanting to join the free trade area), to improve their regulatory and product quality standards, for meeting strict U.S. and Canadian requirements. Belize will also need to make the necessary adjustments to meet these new challenges.

At the institutional level, there are several problem areas to be addressed. Ideally, the MOA should have one structural and functional organization to provide animal and plant health services. While the GOB could consider an alternative functional structure, a separate animal or plant quarantine service may not be necessary. A single structure would be cost effective, as it would conserve resources through sharing of office, laboratory space, equipment, common administrative support, etc. The animal and plant health structure should contain five units, having a professional each in-charge of animal and plant health, respectively. The five units would relate to: (i) animal and plant quarantine; (ii) animal and plant diagnosis and surveillance, including the inspection of animals, vegetables and installations; (iii) registration and control of pesticides and veterinary drugs; (iv) implementation of zoosanitary or phytosanitary programs; and (v) epidemiology.

It is suggested that the quarantine unit be managed by a full-time plant or animal health professional with experience in pest-risk analysis. This unit should be responsible for: (i) handling import and export permits; (ii) maintaining a regional and international computerized database related to the geographical distribution of animal diseases and plant pests; (iii) enforcing the quarantine regulations and procedures for the movement of animals and vegetables; and (iv) managing the information data base associated with the importation and exportation of animals/vegetables or their byproducts, and of any disease or pest detected and reported in the country.

Belize should become more involved in the programs and projects of international and regional agricultural health organizations and projects, such as PROPEXAN<sup>188</sup>, the Central

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<sup>188</sup> FAO Hemispheric project.

America PARSA<sup>189</sup> and the International Office of Epizootics (OIE), in order to harmonize and modernize their regulations and quarantine procedures with other countries in Latin American and the Caribbean. The head of the quarantine unit should be responsible for determining and establishing animal and plant health regulations and procedures of Belize, in accordance with GOB's policies and harmonization measures taking place in the region. Moreover, the unit should develop close relationships with both the epidemiological unit (animal and plant health), veterinary doctors and agronomists, to address problems related to the introduction or exportation of animals, vegetables and other farm products.

It is suggested that the GOB design an act similar to the PCA, and create a new public/private entity<sup>190</sup> to handle the registration and control of other products, besides those such as animal concentrates and pesticides for animal use. This entity should operate under the MOA (Animal Health Section), working in close collaboration with the Ministry of Health. Regarding agricultural pesticides, the PCB should also register trade names and active ingredients, and recover its operational costs, by charging adequate fees for its services. The PCB should establish a strong relationship with Central American and Caribbean countries, primarily for harmonizing registration requirements, labelling, quality control, sale, packaging and storage of products, in order to reduce or eliminate illegal imports or smuggling. Belize should apply for a specific FAO and TCP permission for implementing the International Code of Conduct on the distribution and use of pesticides<sup>191</sup>.

To maintain an acceptable level of efficiency of the new animal and plant health system, the MOA should examine alternatives for self-financing or cost recovery for some of its services. Institutions such as IICA, OIRSA, and FAO could be accessed to provide the necessary support for evaluating such alternatives. Similar work has already been done in other Central American countries which can be adopted by Belize<sup>192</sup>.

The GOB should consider having the PCB achieve financial self-sufficiency in the longer run, through cost recovery for its services, such as for quarantine and veterinary drugs registration. The additional revenue could finance additional staff, improvement of services, support more expensive ones such as laboratory diagnosis and surveillance, and educational programs<sup>193</sup>. Except in special cases, such as an outbreak at the national level or immediately after the introduction of an exotic animal and plant disease, the MOA should explore alternative

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<sup>189</sup> European Community and OIRSA project.

<sup>190</sup> Veterinary Drug Control Board.

<sup>191</sup> FAO 1990.

<sup>192</sup> Venezuela, Colombia, Costa Rica and El Salvador are directly handling the income collected and making much progress in offering quality services and keeping their clientele satisfied.

<sup>193</sup> Contreras 1992.

cost-sharing options for eradication campaigns with farmers groups (such as the BLPA, Mennonites, CGA.), since these are expensive to be supported only by the government.

The MOA should be empowered through adequate legislation to implement animal and plant health protection practices. Strengthening these services should include establishing an efficient epidemiology unit, where data can be quickly processed. In addition, there is a need to improve public monitoring of the quality of livestock and vegetable products offered for both human and animal consumption.

It is important that the MOA develops a networking mechanism involving relevant Ministries, private institutions, farmers groups and NGOs for its animal and plant health services. Such collaboration could facilitate improving the information base on pests and diseases, and operating as a national network for disease/pest surveillance and detection.

Additional actions which can contribute to strengthening the service include: (i) prohibit the importation and use of substances disallowed under USA and EC regulations; (ii) introduce new substances on the basis of strict licensing regulations, following testing and approval by the Ministry of Health; (iii) strengthen the role of the extension service in plant protection; and (iv) disseminate information widely on the use of pesticides and herbicides.

## **9.8 Natural Resource Management**

The development of Belize's agriculture is closely linked to the exploitation of its natural resource base. Therefore, the GOB's agricultural development strategy should include measures to use and manage natural resources more efficiently, for enhancing the environment and contributing to sustainable agricultural production.

*(a) Policy aspects:* As indicated in Chapter III, Belize has begun to experience serious problems in several areas related to the misuse of natural resources and environmental degradation. These are several priority areas to be addressed, if further deterioration of the environment is to be arrested, and the long term sustainable development of the country is to be assured. Furthermore, the government needs to influence changes in the attitude toward natural resources use - land, forest, water, coastal and marine - by the different sectors. A holistic resource management approach is recommended, which integrates plant, animal and bio-type protection.

An appropriate policy is needed to create an agriculture that is sustainable, conserves resources and is economically attractive. This could be achieved with measures that combine the tasks of ensuring food security, income generation as well as resource conservation. The policy should be coherent, focusing on incomes, prices, structures and institutions with a number of priorities, including: (i) increasing productivity at farm level, which are environmentally compatible, (e.g., higher efficiency is achieved with the same level of use of energy and other natural resource inputs); (ii) implementing programs to sustain higher productivity; (iii) providing incentives that encourage a farming system that preserves the soil and improve its

fertility, through intercropping and adapting local crop varieties; and (iv) providing disincentives to agricultural activities that contributes to environmental degradation.

Regarding land resources, it is suggested that the GOB formulates an overall land-use policy and a plan, using existing land capability information. This should take into account the need for environmental conservation, definition of land-use zones and protection of sensitive land areas. Presently, there is a sound legal framework for allocating land to its most appropriate use. However, in practice, land allocation is done on an ad hoc basis. The enforcement of existing laws is recommended and an effective monitoring mechanism is needed. Moreover, land titling and land-use rights have to be adjusted to promote sustained yields, and support the orientation of the production system toward long-term gains. Land taxes and fees should also be adjusted upwards, to reflect inflation rates and the costs for certain transactions.

The NRI study has made adequate recommendations on land use which should be implemented and enforced<sup>194</sup>. Inter-departmental cooperation would be required for comprehensive land-use planning and implementation. This could be accomplished through an existing institution, such as the Ministry of the Environment or the Lands and Surveys department. A land allocation committee comprising various relevant institutions, should be set up to coordinate and supervise implementation of policy measures.

Although the country has adequate environmental legislation, enforcement is a major issue due to financial and human resource limitations. The GOB will need to allocate more resources to strengthen its regulatory framework, including improving the institutional capability to enforce regulations.

Improved public awareness of the country's current and potential environmental problems is critical. While there are environmental education programs in schools, little is done to sensitize and mobilize people that could influence the decision-making process. Besides the inadequate resources of government departments that deal with natural resources and the environment, a comprehensive approach to environmental planning (linking economic, agricultural and environmental policies) and coordination is needed, supported by the necessary legislation.

The is limited knowledge of Belize's groundwater resources. However, its potential as a source of potable and irrigation water appears to be considerable. The development of irrigation and drainage systems is needed, to contribute to diversification, increased output and lower agricultural production cost. Enforcement of guidelines and regulations for water supply, as well as governmental coordination of the agencies responsible for well-drilling and water supply are also needed.

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<sup>194</sup> King et al. 1993.

**(b) Institutional aspects:** A critical area to be addressed is the administration and management of the natural resource base and the environment. Although several institutions have various responsibilities in this area, a coordinated approach is lacking, and aspects related to planning, management, monitoring and evaluation are inadequate. The institutional capabilities for strategic planning, setting priorities and designing programs need to be strengthened. Moreover, planning and program execution need to be closely integrated with program management, so that goals remain realistic and feasible. It is essential that an institutional framework and a clear-cut management structure be set up to deal with natural resources and environmental management. Hopefully, the execution of the NARMAP project will provide sufficient experiences for designing such a framework. Furthermore, implementation of public policy should be supported by a critical mass of financial and human resources if it is to be effective.

At the community level, active participation of target groups and beneficiaries should be encouraged. Women as a target group, having the responsibility for resource management at the family level, should be specially addressed and integrated in environmental programs. Development support should also be provided to NGOs and community groups, to participate both in the consultative process and execution of activities. Due to the work of NGOs with small farmers and refugees, there is need to strengthen their institutional capacity to work on environmental and natural resource issues.

A cross-sectoral approach embracing public and private institutions is also recommended. In this regard, the strategy of the Department of the Environment to seek cooperation with governmental and non-governmental agencies, for inter-institutional coordination should be supported.

**(c) Ecological issues:** The Belize Tropical Forestry Action Plan (1989) offers possibilities for forestry development and management, through a participatory approach that integrates governmental institutions and NGOs. A management plan and an up-dated inventory of timber, water, soil, wildlife and recreation resources is suggested.

As population increases, fallow periods are shortened and new areas are converted from forest to agriculture. These practices have adverse implications for the natural resource base and the environment. Therefore, modifications to traditional cultivation practices is recommended, including: (i) giving preference to the promotion of land use systems that already make a relatively significant contribution to improvement of soil fertility because of their system-integrating capability (e.g., perennial crops, mixed farming, environmentally compatible irrigation, fallow, agro-forestry and silvi-pastoral systems and conservation farming); and (ii) encouraging cultivation of crops contributing to increased soil fertility, (e.g., legumes, mixed crops, environmentally compatible local varieties, perennial crops and multi-purpose grasses).

Because of a decline in marine resources and over-exploitation of certain species, the GOB will need to strengthen enforcement of its regulations and monitoring activities, in order to achieve a sustainable level of production. Support should be sought from international

agencies to assist in designing appropriate system(s) for the management of the resource system. To meet increasing human demands, institutional and legal mechanisms will need to be further developed, so that the needs for conservation and those for development can converge. An integrated coastal zone management plan for Belize and its implementation are necessary to help preserve the coastal zone.

**(d) Sustainable production:** Since agricultural production systems are complex systems involving the interaction of biological, socio-economic and cultural factors, it is critical that special attention be given to understanding the constraints of small farmers, and their reaction to policies and to changing situations.

A long term policy goal for the sector is to achieve a sustained level of production, with minimal costs on the natural resource base and the environment. Techniques for achieving this include: (i) agro-forestry; (ii) multi-cropping (sequential cropping and intercropping); (iii) green manuring; (iv) biological nitrogen fixation (cultivation of legumes, blue algae, azolla); (v) manure and compost application; (vi) mulching; (vii) integrating animal husbandry and crop husbandry into the farming system; (viii) biological and integrated plant protection; (ix) improved residue and stubble management and conservation tillage.

A target-group based approach should be used for developing methods and techniques for sustainable production, with emphasis placed on experimental work at the farm- and village-levels. This could start at the farm-level with farmers selected in the priority areas to be developed. The work should be relevant and beneficial for the development of appropriate farming systems. It is also important to analyze the weaknesses of sustainable, improved farming practices and develop an "integrated participatory approach", so as to understand farmers' decision-making process before promoting technological interventions. Recommended areas in which research could focus include:

- (i) Enhancement of water/irrigation management and long-term soil productivity. Alternative land-use management options are suggested, and there is a need to monitor changes in the ecosystems, and have integrated nutrient management systems that include consideration of pollution of the natural resource base. Increased research on mixed farming and agro-forestry systems are recommended. Research is also needed to develop inter-cropping and sequential multiple cropping systems that enhance crop productivity while maintaining soil fertility.
- (ii) Integrated pest management for sustainable systems. This can contribute to increasing the resilience and stability of the crop and livestock production systems in relation to pest problems. Concerns for efficacy and safety of current pesticides being used warrant research into alternatives, including beneficial organisms that control pests and diseases in the Belize environment.
- (iii) Improvement of resource management policy. More attention should be given to policy research, so as to improve policy-makers' understanding of the influence of policies on

sustainable land-use systems. Research should focus on evaluating the farming system rather than individual components, as well as comparisons of alternative farming systems. Attention should be paid to identifying ecologically sound, high-value products capable of achieving economic and physical sustainability of these ecosystems.

- (iv) In the case of the Mayan indians in the Toledo district, site specific solutions based on their traditional methods should be the basis for technology development. Presently, both crop and livestock activities are directed toward a commodity rather than a systems approach. Greater emphasis should be given to promoting farming as an integration of enterprises at the farm level, rather than comprising a group of separate activities.

Some additional suggestions for promoting sustainable development at the regional and local levels are: (i) development policy should promote self-help instruments and methods, in order that target groups are able to identify their own development priorities and resolve problems through their own efforts; (ii) a systematic assessment of environmental impacts and prevention of environmental damage must play a key role in all development activities; (iii) the technology applied should be appropriate to the ecological, socio-cultural and site-specific conditions prevailing in the area; (iv) sustainability should be a key criterion for choosing development projects (i.e., activities should be sustainable in the long-run with minimal external assistance); and (v) the integration of poor and uneducated refugees of different social and cultural backgrounds requires special attention, and specific programs and measures should be designed for these groups.



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**APPENDIX A**  
**TABLES**



TABLE A.1  
GROSS DOMESTIC PRODUCT AND SECTOR SHARES, 1980-93  
(AT CONSTANT 1984 PRICES)

SECTOR	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
TOTAL GDP (MILLIONS OF BZ\$ DOLLARS)	365.7	373.8	370.9	365.1	371.5	373.0	384.1	431.1	457.4	517.6	570.4	590.6	648.6	673.4
SECTOR SHARE %														
GDP:	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PRIMARY ACTIVITIES:	20.7	20.6	21.8	21.1	21.1	21.1	19.6	21.1	20.0	19.0	19.7	20.0	21.0	20.4
AGRICULTURE	15.3	15.1	16.3	15.7	15.7	15.6	14.9	15.2	13.6	13.2	14.0	13.3	14.2	13.0
FORESTRY & LOGGING	2.4	1.6	2.3	1.8	2.0	1.8	1.6	2.9	3.1	2.4	2.2	2.9	2.9	2.5
FISHING	2.6	3.4	2.9	3.2	3.0	3.3	2.7	2.5	2.7	2.6	2.7	2.9	2.9	3.6
MINING	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.8	0.8	1.3
SECONDARY ACTIVITIES:	28.3	28.7	28.1	27.9	26.7	26.7	26.7	26.8	25.9	26.2	25.6	25.7	25.1	27.0
MANUFACTURING	21.4	21.9	21.7	21.8	19.6	19.7	19.6	18.9	17.7	17.3	16.6	15.9	15.4	15.9
ELECTRICITY & WATER	1.3	1.3	1.5	1.6	1.6	1.7	1.8	1.7	1.8	1.7	1.7	2.0	2.2	2.2
CONSTRUCTION	5.5	5.5	4.8	4.4	5.3	5.1	5.2	6.1	6.2	7.1	7.1	7.7	7.4	6.9
SERVICES:	54.6	54.4	53.4	54.3	55.5	55.6	57.1	55.7	58.0	56.3	58.1	57.6	57.3	55.9
TRADE, RESTS, HOTELS	20.3	19.4	16.1	14.7	15.4	14.5	15.5	15.8	17.1	18.6	19.3	18.2	17.7	16.9
TRANSPORT & COMMUNICATIONS	6.0	6.5	7.5	8.3	8.6	8.9	9.6	9.4	11.1	12.3	12.5	13.3	13.8	14.4
FINANCE & INSURANCE	5.3	5.3	4.8	4.7	4.6	4.9	5.0	5.1	5.5	5.1	4.9	4.8	4.8	4.5
REAL ESTATE & BUS. SERVICES	5.8	5.8	5.7	5.8	5.7	5.8	5.7	5.4	5.4	5.0	4.9	4.9	5.0	4.9
PUBLIC ADMINISTRATION	6.2	6.3	9.9	10.9	11.1	11.4	11.2	10.5	9.9	9.2	8.8	8.8	8.6	8.3
COMM. & OTHER SERVICES	6.9	6.9	9.2	9.6	9.7	10.0	9.9	9.1	8.8	8.0	7.5	7.4	7.2	6.9
IMPUTED BANK SERVICE CHARGES (LESS)	3.7	3.8	3.4	3.4	3.3	3.5	3.5	3.7	3.9	3.6	3.4	3.4	3.4	3.3
PER CAPITA GDP (BZ\$)	2,516	2,505	2,420	2,321	2,300	2,249	2,256	2,466	2,548	2,808	3,014	3,040	3,251	3,285

SOURCE: CSO 1994.

TABLE A.2  
POPULATION AND EMPLOYMENT STRUCTURE, 1960-92

	1960	1970	1980	1993*
TOTAL POPULATION	91,328	119,645	145,353	200,057
FEMALES	46,166	59,553	71,736	100,093
MALES	45,162	60,092	73,617	99,964
TOTAL POPULATION AT WORKING AGE	46,335	55,624	71,510	119,110
FEMALES	23,739	27,845	35,096	61,157
MALES	22,596	27,779	36,414	57,953
TOTAL ECONOMICALLY ACTIVE POPULATION	27,006	33,360	46,457	66,487
FEMALES	4,883	6,012	10,627	20,354
MALES	22,123	27,348	35,830	46,133
TOTAL EMPLOYMENT	24,477	31,465	39,806	60,119
FEMALES	4,498	5,981	8,024	17,227
MALES	19,979	25,484	31,782	42,892
LABOR FORCE PARTICIPATION (%)	58.3	60.0	65.0	55.8
FEMALES	20.6	21.6	30.3	33.3
MALES	97.9	98.4	98.4	79.6
UNEMPLOYMENT (%)	9.4	5.7	14.3	9.6
FEMALES	7.9	0.5	24.5	15.4
MALES	9.7	6.8	11.3	7.0

\* 1993 DATA IS BASED ON INFORMATION GENERATED IN OCTOBER OF THAT YEAR.  
SOURCE: 1960, 1970, 1980 AND 1993 LABOR FORCE SURVEY, CSO.

TABLE A.3  
KEY INDICATORS OF ECONOMIC PERFORMANCE, 1980-93

YEAR	REAL GDP GROWTH RATE (%)*	PER CAPITA INCOME GROWTH RATE (%)	INFLATION (%)	REAL EFFECTIVE EXCHANGE RATE (INDEX)	GROSS CAPITAL FORMATION (INDEX)	FOREIGN RESERVES (BZS'000)
1980	4.3	0.4	7.1	74.3	100.0	11,780
1981	2.2	-0.4	6.7	81.3	100.9	3,918
1982	-0.8	-3.4	6.7	86.2	70.3	(7,062)
1983	-1.5	-4.1	6.7	91.0	70.2	(10,724)
1984	1.7	-0.9	6.7	94.8	90.6	(27,111)
1985	0.4	-2.2	3.4	100.0	82.6	(6,745)
1986	3.0	0.3	0.8	89.6	85.2	26,559
1987	12.2	9.3	2.0	83.5	109.5	49,879
1988	6.1	3.3	3.2	78.6	140.8	86,966
1989	13.2	10.2	2.1	80.4	184.7	124,286
1990	10.2	7.3	3.1	77.2	185.1	154,580
1991	3.6	0.9	5.5	77.2	198.6	115,755
1992	9.8	6.9	2.8	76.3	216.0	93,158
1993	3.8	1.0	1.6	78.0	247.0	41,034

\* AT FACTOR COST  
SOURCES: CSO, 1994; CBB, 1993 & IMF FINANCIAL STATISTICS.



**TABLE A.4  
PRODUCTS WHICH REQUIRE AN IMPORT LICENSE PRIOR TO IMPORTATION**

- |     |  |
|-----|--|
| 1.  | BEANS (EXCLUDING CANNED)   |
| 2.  | BLEACHING AGENTS   |
| 3.  | EGGS IN SHELL AS CLASSIFIED UNDER H.S. TARIFF HEADING 04.07 AND 0408.00  |
| 4.  | FLOUR (EXCLUDING CORNFLOUR USED AS CEREAL)   |
| 5.  | FRESH FRUITS AND VEGETABLES (EXCLUDING ONIONS AND GARLIC)  |
| 6.  | FURNITURE (EXCLUDING LCEBOXES)   |
| 7.  | LUMBER AND ARTICLES MADE OF WOOD (EXCLUDING MUSICAL INSTRUMENTS, PLYWOOD AND DECORATED PANELLING)                      |
| 8.  | HEATS (ALL TYPES) AND MEAT PREPARATIONS EXCLUDING CANNED SOUPS   |
| 9.  | MOLASSES AND SUGAR (EXCLUDING LCING SUGAR)   |
| 10. | WEARING APPAREL: - T-SHIRTS (ALL TYPES) FOR COMMERCIAL PURPOSES  |
| 11. | BEER AND BEVERAGES AS CLASSIFIED UNDER H.S. TARIFF HEADING 22.03 AND 22.02 RESPECTIVELY (EXCLUDING DIETETIC BEVERAGES) |
| 12. | MAIZE (EXCLUDING POPCORN)  |
| 13. | FUEL (ALL PETROLEUM PRODUCTS)  |
| 14. | MILK (EXCLUDING POWDERED MILK IN CANS AND CONDENSED MILK)  |
| 15. | GASES (BUTANE, OXYGEN AND ACETYLENE)   |
| 16. | POULTRY: LIVE, FRESH, CHILLED OR FROZEN (EXCLUDING BABY CHICKS)  |
| 17. | CITRUS AND BEVERAGES CONTAINING CITRUS PRODUCTS  |
| 18. | JAMS, JELLIES AND PEPPER SAUCE   |
| 19. | MACARONI, SPAGHETTI, VERMICELLI, MACARONI AND CHEESE DINNER AND OTHER SIMILAR DRY PASTA PRODUCTS                       |
| 20. | MATCHES  |
| 21. | ANIMAL FEED CLASSIFIED UNDER H.S. TARIFF HEADING 23.09   |
| 22. | TOILET PAPER AND PAPER BAGS  |
| 23. | PEANUTS AND PEANUT BUTTER  |
| 24. | BOATS, SKIFFS AND CANOES MADE OF WOOD AND FIBERGLASS   |
| 25. | BROOMS   |

SOURCE: MINISTRY OF TRADE.

TABLE A.5  
COMPARATIVE FOOD PRICE INDICES, 1980-91 (1980=100)

YEARS	BELIZE	BARBADOS	JAMAICA	TRINIDAD & TOBAGO	UNITED STATES
1980	100.0	100.0	100.0	100.0	100.0
1981	106.2	114.9	107.8	116.6	107.8
1982	112.8	123.3	115.2	132.5	112.2
1983	119.8	126.6	130.4	163.3	114.7
1984	127.2	131.6	168.8	179.5	119.0
1985	129.0	138.4	212.2	194.7	121.8
1986	129.1	141.7	245.4	215.3	125.8
1987	133.5	148.3	264.9	256.9	130.9
1988	135.1	157.9	288.5	289.7	136.3
1989	139.3	172.3	346.1	354.9	144.1
1990	144.8	179.2	423.2	415.7	152.4
1991	151.4	187.8	673.7	441.2	157.8
1992	158.3	197.3	757.2	473.4	162.5

SOURCE: CSO, 1993; T&T, 1992.

TABLE A.6  
TOTAL REVENUE LOSS FROM DEVELOPMENT CONCESSIONS IN AGRICULTURE, 1990-92 (BZ\$)

SUBSECTOR	1990				1991				1992			
	IMPORT DUTY	STAMP DUTY	REVENUE DUTY	TOTAL	IMPORT DUTY	STAMP DUTY	REVENUE DUTY	TOTAL	IMPORT DUTY	STAMP DUTY	REVENUE DUTY	TOTAL
BANANA	379,103	289,709	14,653	683,465	430,479	362,125	14,050	806,654	367,928	548,221	104,910	1,021,059
CATTLE	9,025	3,782	7,371	20,178	7,482	4,561	6,439	18,482	5,601	16,852	9,581	32,034
CITRUS	507,544	443,082	83,356	1,033,982	542,770	388,316	65,506	996,592	417,438	337,618	179,670	934,726
COCOA	192,358	176,842	7,631	376,831	17,561	19,333	0	36,894	23,949	18,349	0	42,298
COTTON	12,696	10,882	0	23,578	14,340	458	0	14,798	0	0	0	0
FOLIAGE PLANT	984	381	0	1,365	33,516	33,343	0	66,859	31,333	39,411	13,230	83,974
FRUITS	2,077	2,423	0	4,500	-	-	-	0	20,636	12,282	22,612	55,530
MIXED FARMING	-	-	-	-	-	-	-	-	39,013	46,885	677	86,575
OTHER	37,790	50,525	0	88,315	51,224	49,037	2,458	102,719	905,898	1,019,618	330,680	2,256,196
TOTAL	1,141,577	977,628	113,011	2,232,214	3,322,851	5,668,076	11,223,141	2,042,998	905,898	1,019,618	330,680	2,256,196

SOURCE: MINISTRY OF ECONOMIC DEVELOPMENT 1993.

**TABLE A.7**  
**BELIZE'S SUGAR QUOTA IN THE U.S. MARKET,**  
**1984-93 (SHORT TONS)**

YEAR	QUOTA ALLOCATION
1984/85	27,940
1985/86	18,876
1987*	10,010
1988*	16,692
1989/90	29,372
1990/91	24,665
1991/92	16,022
1992/93	14,139

\* QUOTA PERIOD FOR THESE YEARS IS  
 FROM JANUARY 1 TO DECEMBER 31.  
 SOURCE: USDA.

**TABLE A.8**  
**EFFECTS ON AN EIGHT-YEAR PHASING OUT OF PREFERENTIAL AGREEMENTS**

SCENARIOS OF COMMODITIES LOSING PREFERENTIAL STATUS	PRICE EFFECT a/	OUTPUT EFFECT b/	FOREIGN EXCHANGE EFFECT c/
I. ALL COMMODITIES	-4.0%	-2.0%	-4.7(-6.1)
II. SUGAR ONLY	-3.0%	-1.5%	-3.5(-4.6)
III. CITRUS ONLY	-0.5%	-0.15%	-0.6(-0.75)
IV. BANANAS ONLY	-0.44%	-0.20%	-0.5(-0.67)

a/ ANNUAL PERCENTAGE FALL OF THE AVERAGE PRICE OF ALL AGRICULTURAL EXPORTABLES.

b/ ANNUAL PERCENTAGE FALL OF THE AGGREGATE LEVEL OF OUTPUT OF THE THREE AGRICULTURAL EXPORT COMMODITIES.

c/ IN US\$ MILLION. FIGURES IN BRACKET CORRESPOND TO THE PERCENTAGE FALL IN FOREIGN EXCHANGE EARNINGS OF AGRICULTURAL EXPORTS.

SOURCE: WORLD BANK 1992.

TABLE A.9  
LAND ALLOCATION IN BELIZE, 1990

ALLOCATION	AREA (HA)	SHARE (%)
PRIVATE LAND	774,000	34.0
PUBLIC LAND	711,000	31.0
FOREST RESERVES	567,000	25.0
NATIONAL PARKS	164,000	7.0
OTHER	80,000	3.0
<b>TOTAL</b>	<b>2,296,000</b>	<b>100.0</b>

SOURCE: UNDP-FAO PROJECT.

TABLE A.10  
LOSS OF VEGETATION TO AGRICULTURAL/URBAN DEVELOPMENT

VEGETATION CLASS	ORIGINAL AREA (KM2)	PRESENT AREA (KM2)	AREA LOSS	
			(KM 2)	(%)
BROADLEAF COVER	15,771	13,725	2,046	13
OPEN BROADLEAF COVER	493	469	24	5
MIXED BROADLEAF & PINE	393	378	15	4
PINE WOODLAND	361	360	1	0
PINE WOODLAND SAVANNA	705	637	68	10
PINE TREE SAVANNA	1,302	1,227	75	6
MARSH/SWAMP FOREST	587	553	34	6
MANGROVE	539	523	16	3
NON-FOREST COVER	1,580	1,536	44	3
AGRICULTURAL/URBAN LAND	0	2,323		
<b>TOTAL</b>	<b>21,731</b>	<b>21,731</b>	<b>2,323</b>	

SOURCE: BELIZE FOREST DEPARTMENT, 1993.

TABLE A.11  
CURRENT OFFICIAL AND ACTUAL EXTENT OF FOREST RESERVES

FOREST RESERVE	OFFICIAL AREA (KM2)	ACTUAL AREA (KM2)	NOTES
COLUMBIA RIVER	417	?	MINOR ENCROACHMENT, INCLUDING FROM GUATEMALA
COMMERCE BIGHT	32	?	POSSIBLE GRANTING OF LEASES
DEEP RIVER	491	?	4 KM2 BEEN LEASED OUT AND OTHER SETTLEMENT TAKING PLACE
FRESHWATER CREEK	296	?	POSSIBLE GRANTING OF LEASES
GRANT'S WORK A	31	?	20 HA. LEASE LET IN 1990/91
GRANT'S WORK B	14	0	UNOFFICIALLY DERESERVED IN 1990
MACHACA CREEK	24	?	FORESTRY DEPARTMENT ESTIMATES 23 KM2 REMAINED IN 1989. OTHER LEASES THOUGHT TO HAVE BEEN GIVEN OUT SINCE
MANATEE	458	?	ABOUT TO BE DERESERVED IN PART IN LATE 1991/2, WITH ENCROACHMENT ALREADY UNDER WAY
MANGO CREEK	232	?	A FORESTRY DEPARTMENT ESTIMATE FOR 1989 PUTS THE RE- MAINING FOREST AREA AT 144 KM2 AFTER UNOFFICIAL EXCISION FOR AGRICULTURE. ADDITIONAL LEASES ARE UNCERTAIN
MAYA MOUNTAINS	933	933	PROBABLY NO CHANGE
MOUNTAIN PINE RIDE	515	511	SMALL EXCISION FOR AGRICULTURE, PLUS FIRE DAMAGE STARTED BY MILITARY IN 1991 AND PREVIOUSLY
SIBUN	430	430	MINOR ENCROACHMENT ALONG HUMMINGBIRD HIGHWAY
SILK GRASS	26	?	SOME UNOFFICIAL LEASING SUSPECTED, TO THE EXTENT THAT THE MAJORITY OF THE RESERVE HAS GONE
SITTEE	379	379	THOUGHT TO BE INTACT

SOURCE: NRI, 1993.

TABLE A.12  
RECOMMENDED LIMITS TO CULTIVATION

ROCK TYPE	ANGLE OF SLOPE							
	0°	4°	6°	8°	10°	12°	13°	20°
TOLEDO BEDS	MECHANIZED AGRICULTURE							
	PASTURE							
	CITRUS							
	MILPA							
	CACAO							
LIMESTONE	MECH. AGRICULTURE							
	CITRUS							
	CACAO							
	PASTURE							
	MILPA							
METASEDIMENTS	MECH. AGRICULTURE							
	TREE CROPS							
	PASTURE							
	MILPA							
GRANITE	MECH. AGRICULTURE							
	PASTURE							
	TREE CROPS							
	MILPA							

SOURCE: KING ET AL., 1994.

TABLE A.13  
DISTRIBUTION OF PRIVATE LANDS BY PLOT SIZE AND AREA, 1984

PLOT SIZE		NOS. OF PLOTS	%	AREA		%
HECTARES	ACRES			HECTARES	ACRES	
< 0.81	< 2	,464	29.1	N/A	N/A	N/A
0.81 - 4.05	2 - 10	2,237	26.4	607.8	15,007	0.7
4.46 - 14.18	11 - 35	2,479	29.3	22,070.1	54,491	2.6
14.58 - 40.50	36 - 100	640	7.6	17,140.1	42,319	2.0
40.91 - 202.51	101 - 500	368	4.3	31,930.3	78,836	3.8
202.92 - 607.53	501 - 1500	116	1.4	40,199.7	99,253	4.7
> 607.53	> 1500	158	1.9	733,057.9	1,809,920	86.2
TOTAL		8,462	100.0	845,005.9	2,099,826	100.0

SOURCE: MINISTRY OF NATURAL RESOURCES, 1984.

TABLE A.14  
REVENUE FROM LAND TAXES AND OTHER CHARGES, 1983-92 (BZ\$'000)

TYPE	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
LAND TAXES	465.8	465.3	649.5	1,042.0	825.1	984.4	876.0	929.2	813.2	815.5
OTHER*	527.6	612.4	304.8	379.1	547.4	2,121.9	2,525.2	3,109.5	2,991.2	3,491.2
TOTAL	993.4	1077.7	954.3	1412.1	1372.5	3,106.3	3,401.2	4,038.7	3,804.4	4,306.7

\* BASED ON PURCHASE OF GOVERNMENT LAND; REGISTRATION FEES; STAMP DUTY; MAPS; ETC.  
SOURCE: LAND DEPARTMENT, 1993.

TABLE A.15  
EMPLOYED LABOR FORCE BY SECTOR AND DISTRICT, OCTOBER 1993

SECTOR	EMPLOYMENT BY DISTRICT						
	TOTAL EMPLOYED	BELIZE	CAYO	COROZAL	ORANGE WALK	STANN CREEK	TOLEDO
TOTAL EMPLOYED	60,119	21,035	10,885	9,079	9,556	4,861	4,703
TOTAL EMPLOYED (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
AGRIC. & FORESTRY	25.1	2.4	24.6	50.8	32.1	29.6	58.9
FISHING	1.2	1.8	0.0	0.9	0.3	3.4	0.7
MINING/QUARRING	0.5	0.6	0.7	0.0	0.6	0.6	0.0
MANUFACTURING	11.8	13.2	9.6	8.6	15.9	13.1	7.5
ELEC., GAS, WATER	2.0	3.2	2.6	0.5	0.6	2.1	0.7
CONSTRUCTION	5.8	6.9	5.7	5.1	7.4	4.9	0.7
WHOLE & RETAIL TRADE	16.1	19.5	15.0	13.1	17.7	12.8	8.8
HOTEL & RESTAURANTS	4.9	6.3	5.9	2.8	2.6	7.9	2.6
TRANSP./STORAGE/COMMUN.	5.4	9.8	3.5	2.2	3.5	3.4	2.6
FINANCE	1.5	2.6	1.2	0.9	0.7	1.5	0.3
REAL ESTATE/BUS.SVC.	1.4	3.0	1.5	0.3	0.3	0.3	0.0
PUBLIC ADMINISTRATION	9.1	11.6	13.5	3.1	6.0	6.7	7.8
EDUCATION	6.0	6.7	4.3	6.3	5.4	8.5	5.2
HEALTH/SOCIAL WORK	1.7	3.0	1.3	1.0	0.7	1.5	0.0
COMMUNITY/SOCIAL	3.7	5.5	5.3	1.2	2.2	1.2	2.9
PRIVATE HOUSEHOLD SERV.	3.3	3.4	4.1	3.0	3.8	2.4	1.3

SOURCE: CSO, 1994.  
TABLE A.16



TABLE A.16  
WAGES BY SECTOR, 1980-91 (BZ\$ PER HOUR)

OCCUPATION	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
<b>AGRICULTURE:</b>												
Tractor Operator	1.7	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.8	2.8	2.8	2.8
Caterpillar Operator	2.0	2.3	2.3	2.6	2.6	2.6	2.6	2.6	3.0	3.0	3.0	3.0
<b>CANE FIELD WORKERS:</b>												
(Cultivation)												
Weeding (1)	8.0	10.0	5.0/task	5.1	5.1	5.1	20 /mecate	20/mecate	20/mecate	20/mecate	20/mecate	30/mecate
Planting (1)	84.0	84.0	30.4/task	30.4	30.4	30.4	20/mecate	20/mecate	20/mecate	20/mecate	20/mecate	30/mecate
Applying of Fertilizer (1)	8.0	8.0	5.9/task	2.3/hr.	2.3/hr.	2.3/hr.	3/bag	3/bag	3/bag	3/bag	30/bag	3/bag
Replanting (1)	24.0	24.0	30.4/task	2.3/hr.	2.3/hr.	2.3/hr.	2.3/hr.	2.3/hr.	2.3/hr.	2.3/hr.	2.3/hr.	2.3/hr.
Fire Pass (1)	20.0	25.0	5.0/task	2.3/hr.	2.3/hr.	2.3/hr.	2.5/25yds.	2.5/25yds.	2.5/25yds.	2.5/25yds.	2.5/25yds.	2.5/25yds.
<b>CANE CUTTER:</b>												
Cutting (1)	140.0	150.0	6.7/ton	8.0/ton	8.0/ton	8.0/ton	4.0/ton	9/ton	9.0/ton	9.0/ton	9.0/ton	9.0/ton
<b>CITRUS ORCHARD WORKERS:</b>												
Male (2)	14.2	14.2	2.0/hr.	2.0/hr.	2.0/hr.	2.0/hr.	61c/box	.66c/bag box	.70c/bag box	.70c/bag/box	.70/bag/box	.70/bag/box
Female (2)	13.0	13.0	1.6/hr.	1.6/hr.	1.6/hr.	1.6/hr.	51c/box	.55c/bag/box	.55c/bag/box	.55c/bag/box	.75/bag/box	.75/bag/box
<b>BANANA:</b>												
Worker (2)	2.5	1.9/hr.	1.9	1.6	1.6	1.6	1.8/hr.	1.8/hr.	1.8/hr.	1.8/hr.	1.8/hr.	1.8/hr.
<b>CATTLE, PIGS AND POULTRY: (3)</b>	75.0	55.0	54.2	79.2	79.2	79.2	79.2	79.2	79.0	79/w	79/w	79.2
<b>FORESTRY &amp; LOGGING:</b>												
Truck Driver	2.0	2.5	125.0/w.	2.0	2.0	2.0	150 weekly	150+ bonus	150+ bonus	150+ bonus	150+ bonus	150+bonus
Worker	1.2	1.5	1.6	1.2	1.2	1.2	100 weekly	150.0	100 weekly	100 weekly	100 weekly	100 weekly
<b>BUILDING CONSTRUCTION:</b>												
Worker	45.5	1.4	1.4	1.4	1.5	1.5	1.73	1.7	1.9	1.9	1.9	1.9

NOTES: (1) PER ACRE; (2) PER DAY; (3) PER WEEK.

SOURCE: LABOR DEPARTMENT

TABLE A.17  
BELIZE ROAD NETWORK, 1985 AND 1993  
(MILES)

DISTRICT	MAIN		SECONDARY		FEEDER		TOTAL	
	1985	1993	1985	1993	1985	1993	1985	1993
BELIZE	119.1	119.1	128.7	128.7	106.5	136.0	354.3	383.7
CAYO	124.7	124.7	51.5	51.5	224.5	315.8	400.6	492.0
COROZAL	39.4	39.4	160.4	160.4	162.0	220.6	361.9	420.4
ORANGE WALK	35.4	35.4	101.4	101.4	289.6	339.5	426.4	476.3
STANN CREEK	106.2	106.2	75.6	75.6	141.6	240.1	323.4	421.9
TOLEDO	102.2	102.2	92.5	92.5	60.5	159.1	255.2	353.8
TOTAL	526.9	526.9	610.1	610.1	984.7	1,411.1	2,121.8	2,548.2

SOURCE: DEPARTMENT OF ROADS.

TABLE A.18  
GROSS VALUE ADDED BY AGRICULTURE, 1980-93 (BZ\$ '000)  
(CONSTANT 1984 PRICE)

YEAR	CROPS	IVESTOCK	FISHING	FORESTRY	TOTAL AGRICULTURE
1980	49,147	7,064	10,234	8,325	74,770
1981	48,898	7,570	12,785	6,845	76,098
1982	52,873	7,762	10,992	8,209	79,836
1983	47,702	9,721	11,819	6,632	75,874
1984	48,416	10,144	11,433	7,419	77,412
1985	48,293	9,899	12,407	6,946	77,545
1986	47,783	9,636	10,365	6,285	74,069
1987	54,180	11,312	11,174	12,756	89,422
1988	50,880	11,739	12,817	14,206	89,642
1989	59,131	9,335	13,328	12,803	94,597
1990	65,362	14,437	13,946	12,864	106,609
1991	63,901	14,439	15,487	16,965	110,792
1992	71,912	16,477	19,977	18,642	127,008
1993	71,877	15,866	24,191	17,102	129,036

SOURCE: CSO, 1994.



**TABLE A.20**  
**CATTLE LIVESTOCK CENSUS BY DISTRICT, 1978-91**

DISTRICT	1978	1988	1991	1992
COROZAL	1,050	1,578	1,530	1,721
ORANGE WALK	14,713	20,269	24,116	28,863
BELIZE	6,514	6,311	7,423	9,165
CAYO	22,060	17,329	20,174	23,434
STANN CREEK	1,526	778	599	712
TOLEDO	1,523	1,645	1,532	1,946
<b>TOTAL</b>	<b>47,386</b>	<b>47,910</b>	<b>55,374</b>	<b>65,841</b>

SOURCES: MOAS, 1989 & BELIZE SCREWORM ERADICATION PROJECT, 1992.

**TABLE A.21**  
**OVINE, PORCINE AND EQUINE LIVESTOCK POPULATION, 1991-92**

DISTRICT	OVINE		PORCINE		EQUINE	
	1991	1992	1991	1992	1991	1992
COROZAL	326	313	333	978	311	347
ORANGE WALK	205	237	2,912	3,212	1,554	2,052
BELIZE	493	666	930	1,412	--	166
CAYO	990	1,492	959	2,212	719	1,101
STANN CREEK	32	65	200	587	28	100
TOLEDO	18	41	7,465	7,629	--	156
<b>TOTAL</b>	<b>2,064</b>	<b>2,814</b>	<b>12,799</b>	<b>16,030</b>	<b>2,612</b>	<b>3,922</b>

SOURCE: BELIZE SCREWORM ERADICATION PROJECT, 1992.

TABLE A.22  
LOG PRODUCTION AND EXPORTS BY SPECIES, 1980-93 ('000 BOARD FEET)

SPECIES	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
PINE	76	103	207	316	361	395	450	624	541	472	908	784	863	902
MAHOGANY AND CEDA	535	505	608	284	323	331	225	598	477	518	466	867	953	773
ROSEWOOD *	90	13	16	13	21	14	16	1	3	3	6	.	.	.
ZERICOTE *	1	1	2	1	1	2	3	3	2	3	1	.	.	.
OTHER	846	567	666	567	652	693	440	948	965	1,354	1,181	1,551	1,706	1,784
TOTAL	1,548	1,189	1,499	1,181	1,358	1,435	1,134	2,174	1,988	2,350	2,562	3,202	3,522	3,459
TOTAL EXPORTS	.	.	.	.	1,268	868	2,958	6,065	7,567	3,749	2,396	4,250	4,424	3,238
MOHOGANY & CEDAR	.	.	.	.	1,044	645	277	2,385	3,321	2,029	1,983	3,454	4,065	2,883
OTHER	.	.	.	.	224	223	2,681	3,680	4,246	1,720	413	796	359	355
CICLE	.	.	.	.	246	41	.	.	111	175	96	206	.	.

\* SMALL AMOUNTS HAVE BEEN PRODUCED IN THE 1991-93 PERIOD.

SOURCE: FOREST DEPARTMENT.

TABLE A.23  
AMOUNT OF LAND WITH POTENTIAL FOR TIMBER EXTRACTION, 1991

VEGETATION CLASS	AREA INSIDE FOREST RESERVES		AREA OUTSIDE FOREST RESERVES		TOTAL AREA	
	(KM2)	(%)	(KM2)	(%)	(KM2)	(%)
BROADLEAF COVER	990	11	7,864	89	8,854	100
OPEN BROADLEAF COVER	10	2	460	98	470	100
MIXED BROADLEAF & PINE	31	22	107	78	138	100
PINE WOODLAND	254	72	98	28	352	100
PINE WOODLAND SAVANNA	105	18	485	82	590	100
PINE TREE SAVANNA	269	25	828	75	1,097	100
MARSH/SWAMP FOREST	0	0	0	0	0	100
MANGROVE	0	0	0	0	0	100
NON-FOREST COVER	0	0	0	0	0	100
<b>TOTAL</b>	<b>1,659</b>	<b>14</b>	<b>9,842</b>	<b>86</b>	<b>11,501</b>	<b>100</b>

SOURCE: SMITH, 1991.

TABLE A.24  
DISTRIBUTION OF EMPLOYMENT IN AGROINDUSTRIAL ACTIVITIES, 1990

EXPORT-ORIENTED ACTIVITIES	GRICULTURAL-BASED (INCLUDING FORESTRY)	No. OF EMPLOYEES
	SUGAR	652
	CITRUS JUICES	469
	SUB-TOTAL (AS A % OF TOTAL)*	1,121 (17.6%)
IMPORT-SUBSTITUTION	BASED ON LOCAL INPUTS	
	MEAT PROCESSING	396
	DAIRY PRODUCTS & ICE CREAM	132
	MISC. FOODS	78
	TANNERIES	42
	SAWMILLS	428
	FURNITURE & OTHER WOOD	239
	SUB-TOTAL	1,315
	BASED ON IMPORTED INPUTS	
	MILLING	40
	BAKERY PRODUCTS	385
	SPIRITS & BEER	287
	CARBONATED BAV.	214
	TOBACCO	67
	SUB-TOTAL	993
	SUB-TOTAL (AS A % OF TOTAL)*	2,308 (36.1%)
<b>TOTAL</b>		<b>3,429</b> <b>(53.7%)</b>

\* THE PERCENTAGE IS COMPUTED BASED ON A TOTAL OF 6,385 EMPLOYEES IN THE MANUFACTURING SECTOR  
SOURCE: WORLD BANK, 1992.

TABLE A.25  
MAJOR DOMESTIC EXPORTS, 1980-93

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
<b>MAJOR AGRIC. EXPORTS</b>														
SUGAR														
VALUE (1)	95,403	75,112	66,673	70,927	65,072	40,853	62,908	62,622	70,027	68,128	85,529	83,407	75,257	82,914
QUANTITY (2)	98,901	96,009	99,918	111,081	95,567	90,755	100,253	80,403	81,135	80,166	94,118	93,568	91,653	92,015
CITRUS CONCENTRATES														
VALUE	12,738	12,077	13,964	12,600	19,545	24,240	22,221	32,008	34,583	38,846	43,168	21,651	54,766	27,894
QUANTITY (3)	815	1,284	1,379	872	1,066	1,251	1,588	1,930	1,525	1,880	1,957	1,229	2,670	N/A
MARINE PRODUCTS														
VALUE	6,551	6,035	13,347	15,073	13,439	15,037	14,820	16,870	16,164	17,186	18,172	20,102	23,112	26,394
QUANTITY (4)	531	N/A*	655	472	669	656	618	727	753	762	780	925	1,020	1,089
BANANAS														
VALUE	6,987	4,063	4,265	4,975	6,286	6,605	9,199	14,311	17,232	18,072	19,737	14,674	20,497	24,180
QUANTITY (5)	785	551	523	531	555	542	671	1,184	1,457	1,551	1,723	1,157	1,545	1,945
PRICE/UNIT	6.9	7.37	6.15	9.37	11.33	12.19	13.71	12.09	11.82	11.65	11.45	12.68	13.92	12
FORESTRY PRODUCTS														
VALUE	3,703	2,808	3,773	2,841	2,131	1,198	1,469	4,850	6,437	5,239	4,042	5,564	6,137	4,570
QUANTITY (6)	2,579	1,881	3,023	2,034	1,261	859	2,716	5,861	7,323	3,903	2,428	4,757	4,424	3,238
OTHER AGRIC. EXPORTS														
VALUE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2,184	1,991	2,729	7,909	8,755	6,708	13,634
<b>TOTAL MAJOR AGRIC. EXPORTS (A)</b>														
VALUE	127,382	100,095	102,022	108,416	106,473	87,933	110,617	132,825	146,434	150,200	178,557	154,153	188,477	179,586
OTHER EXPORTS (B)														
VALUE	36,738	49,377	19,433	23,869	39,246	40,919	38,340	41,024	43,912	37,775	38,354	42,923	42,617	49,649
<b>TOTAL EXPORTS (C) = (A + B)</b>														
VALUE	184,120	149,472	121,455	130,285	145,719	128,852	148,957	173,849	190,346	187,975	216,911	197,076	231,094	229,235

NOTES: (1) '000 BZ\$; (2) MT.; (3) '000 KGS. (5) '000 GAL.; (4) '000 BOXES OF 42 LBS.; (6) '000 BF FT.; (7) NA = NOT AVAILABLE.

SOURCE: CSO.

TABLE A.26  
OTHER AGRICULTURAL EXPORTS, 1987-93

PRODUCT	1987	1988	1989	1990	1991	1992	1993
CHICLE							
QUANTITY (KGS.)	0	50,259	79,555	43,639	94,901	132,597	143,415
VALUE (BZ\$'000)	0	378	716	356	729	1,146	1,195
MOLASSES							
QUANTITY (GALS.)	3,655,304	3,268,417	5,404,664	7,115,515	9,677,000	7,707,756	8,063,629
VALUE (BZ\$'000)	1,068	956	1,258	6,535	7,481	6,369	9,623
HONEY							
QUANTITY (GALS.)	89,166	37,344	18,689	11,051	7,110	9,874	3,172
VALUE (BZ\$'000)	493	377	157	104	84	123	29
PAPAYAS							
QUANTITY (KGS.)	141,722	25,909	145,000	528,228	64,545	482,964	2,173,070
VALUE (BZ\$'000)	291	22	148	466	107	624	2,451
COCOA BEANS							
QUANTITY (KGS.)	66,691	56,818	89,091	955	78,636	140,620	71,068
VALUE (BZ\$'000)	312	258	398	30	245	293	142
PEPPER SAUCE							
QUANTITY (KGS.)	0	0	11,813	15,027	31,076	29,855	33,210
VALUE (BZ\$'000)	0	0	52	418	109	189	194
<b>TOTAL VALUE (BZ\$'000)</b>	<b>2,164</b>	<b>1,991</b>	<b>2,729</b>	<b>7,909</b>	<b>8,755</b>	<b>8,744</b>	<b>13,634</b>

SOURCE: CSO, 1993.



TABLE A.27  
SUGAR EXPORTS BY COUNTRY, 1980-93

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
<b>UNITED KINGDOM</b>														
QUANTITY (TON)	35,248	41,530	34,904	42,427	30,200	41,977	41,259	41,511	42,273	43,351	41,726	35,825	36,098	42,234
VALUE (\$'000 BZE)	31,729	30,721	26,420	31,266	20,685	27,404	37,680	46,139	48,527	44,761	48,686	41,198	41,287	56,405
AVERAGE PRICE/TON	900	740	757	737	685	653	913	1,111	1,148	1,033	1,167	1,150	1,144	1,336
<b>UNITED STATES OF AMERICA</b>														
QUANTITY (TON)	61,904	54,746	38,194	26,979	34,481	17,623	51,971	15,820	19,317	21,865	33,406	30,460	23,246	12,136
VALUE (\$'000 BZE)	63,674	44,391	29,040	24,935	29,632	7,156	23,425	9,653	14,914	16,425	25,796	31,038	21,529	10,751
AVERAGE PRICE/TON	1,029	811	760	924	859	406	451	610	772	751	772	1,019	926	886
<b>CANADA</b>														
QUANTITY (TON)	0	0	18,950	39,711	11,650	17,750	0	21,650	18,110	13,533	17,322	16,731	16,811	35,978
VALUE (\$'000 BZE)	0	0	6,452	14,726	3,754	4,369	0	6,830	6,596	6,942	11,047	7,544	6,369	15,736
AVERAGE PRICE/TON	0	0	340	371	322	246	0	315	364	513	638	451	379	437
<b>OTHER COUNTRIES</b>														
QUANTITY (TON)	0	0	6,103	0	17,546	11,800	5,250	0	0	0	0	8,898	13,877	40
VALUE (\$'000 BZE)	0	0	4,761	0	11,001	1,924	1,793	0	0	0	0	3,627	6,073	22
AVERAGE PRICE/TON	0	0	780	0	627	163	342	0	0	0	0	408	438	550
<b>TOTAL</b>														
QUANTITY (TON)	97,152	96,276	98,151	109,117	93,877	89,150	98,480	78,981	79,700	78,749	92,454	91,914	90,032	90,388
VALUE (\$'000 BZE)	95,403	75,112	66,673	70,927	65,072	40,853	62,908	62,622	70,027	68,128	85,529	83,407	75,258	82,914
AVERAGE PRICE/TON	982	780	679	650	693	458	639	793	879	865	925	907	836	917
WORLD MARKET PRICES*	1,300	750	378	380	232	182	272	300	456	573	562	405	407	449

\* F.O.B. CARIBBEAN PORT, USA; TON = LONG TONS.

SOURCE: CSO AND USDA.

TABLE A.28  
VALUE OF MAIN AGRICULTURAL IMPORTS, 1984-93 (BZ\$'000)

IMPORTS	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
MEAT: #	6,442	6,473	6,413	6,417	8,815	9,552	10,625	11,038	9,589	7,425
BEEF	230	94	65	167	69	128	156	274	319	172
PORK	1,286	1,156	1,127	996	1,065	1,370	1,517	1,674	1,258	1,365
POULTRY	134	201	267	173	183	50	282	75	56	47
OTHER	4,792	5,022	4,954	5,081	7,498	8,004	8,670	9,015	7,956	5,841
DAIRY	16,267	22,180	15,522	18,946	21,671	31,428	24,152	22,375	28,635	24,447
EGGS	408	370	623	702	873	628	705	667	636	391
RICE	110	648	143	1,067	1,547	251	2,140	2,576	2,327	1,290
FLOUR	2,570	3,706	841	402	474	168	235	205	181	157
OTHER CEREALS *	5,063	4,544	6,610	6,983	8,470	11,918	11,579	13,254	10,886	10,714
FRUITS AND VEGET.	6,280	6,112	6,744	6,883	7,391	8,130	7,951	8,337	8,420	8,161
R.K. BEANS	377	568	885	687	274	617	2,422	1,612	1,822	544
OTHER PEAS	165	150	213	178	234	399	299	241	3,460	263
OTHER FOOD:*	18,385	16,346	20,154	20,879	25,066	27,961	26,998	32,448	31,997	28,718
TOTAL FOOD	56,047	61,097	58,148	63,144	74,815	91,052	87,106	92,753	97,953	82,110
INPUTS:										
SEEDS	32	155	250	330	205	555	772	583	4,307	344
FERTILIZERS (7)	2,759	2,298	1,752	5,922	3,798	4,074	4,841	5,917	7,057	5,517
HERBICIDES	644	780	556	970	1,531	1,723	1,900	2,249	2,037	2,344
INSECTICIDES	2,233	1,269	1,200	1,561	2,189	1,909	2,637	2,957	3,268	3,252
FUNGICIDES	662	836	810	1,079	1,104	1,808	1,712	2,012	2,015	3,044
ANIMAL FEED	5,034	3,853	4,045	5,496	5,928	8,552	7,434	6,774	10,188	8,481
TOTAL INPUTS	11,364	9,191	8,613	15,358	14,755	18,621	19,296	20,492	28,872	22,982
TOTAL AG. IMPORTS	67,411	70,286	66,761	78,502	89,570	109,673	106,402	113,245	126,825	105,092
OTHERS IMPORTS	192,982	186,045	177,246	207,500	272,467	321,849	316,184	399,240	421,232	456,733
TOTAL IMPORTS	260,373	256,333	244,007	286,002	362,037	431,522	422,586	512,485	548,057	561,825

# INCLUDES FRESH, CHILLED, PRESERVED, PROCESSED & PRODUCTS.

\* INCLUDES PROCESSED AND UNPROCESSED PRODUCTS.

TABLE A.29  
PROPOSED AGRICULTURAL DEVELOPMENT PROJECTS IN THE PUBLIC SECTOR TO SUPPORT SMALL FARMERS\*

CATEGORY AND PROJECT NAME	PROJECT		LOCATION	PRELIMINARY INVEST. COST (BZ\$)	POSSIBLE SOURCE OF FUNDING
	STATUS	PRIORITY			
<b>PRODUCTION:</b>					
. SEED PRODUCTION (GRAINS, PULSES, GRASSES, LEGUMES)	IDEA	3	CAYO, TOLEDO	300,000	U.K. CDB, MEXICO EEC
. BEEF CATTLE CREDIT LINE	PROFILE	1	COUNTRY	10,000,000	
. AFRICANIZED BEE MANAGEMENT	PROFILE	1	COUNTRY	2,400,000	
. ERADICATION OF TUBERCULOSIS IN CATTLE	PROFILE		COUNTRY	215,000	
. EVALUATION OF MINERALS IN LIVESTOCK PRODUCTION	IDEA		COUNTRY	155,000	
. HOG CHOLERA ERADICATION	IDEA		COUNTRY	418,000	
<b>AGRICULTURE AND LIVESTOCK PRODUCTION SERVICES:</b>					
. ANIMAL HEALTH SERVICES	IDEA	2	COUNTRY	150,000	CIDA
. STRENGTHENING OF PLANT PROTECTION SERVICES	PROFILE	3	COUNTRY		ODA
. IMPROVING FARMER EXTENSION SERVICES	PROFILE	3	COUNTRY	3,000,000	TAIWAN
. STRENGTHENING THE BELIZE COLLEGE OF AGRICULTURE	PROFILE	1	CAYO	1,000,000	CIDA
<b>INSTITUTIONAL BUILDING:</b>					
. STRENGTHEN. OF AGRICULT. STATISTICS AND MKRTG. INTELLIGENCE UNIT	DESIGN	1	CAYO	1,100,000	USAID
. IMPROVED AGRICULTURAL INFORMATION SERVICES	PROFILE	2	CAYO	200,000	U.K.
. SEED AUTHORITY	IDEA	3	CAYO	200,000	U.K.
<b>RURAL DEVELOPMENT:</b>					
. BELIZE RIVER VALLEY DEVELOPMENT	PROFILE	3	CAYO	500,000	U.K. CDB/EEC
. SMALL FARMER DEVELOPMENT	PROFILE	1	COUNTRY	1,530,000	
<b>COOPERATIVE DEVELOPMENT:</b>					
. ORGANIC FOOD PRODUCTION	DESIGN	1	BELIZE	250,000	
. GRAIN FEEDMILL AND BROILER PRODUCTION	IDEA	1	TOLEDO	75,000	
. VEGETABLE PRODUCTION	FEASIBILITY	1	O.W., COROZAL	200,000	
<b>LAND AND ENVIRONMENT:</b>					
. LAND USE PLANNING	IDEA	1	COUNTRY U.K.		
. LAND REGISTRATION	IDEA	1	COUNTRY U.K.		
. NATIONAL ENVIRONMENT INVENTORY AND DATABASE	IDEA	1	COUNTRY	300,000	

\* THESE PROJECTS ARE PART OF THE PUBLIC SECTOR INVESTMENT PROGRAMME FOR FISCAL YEARS 1991-96.  
SOURCE: MINISTRY OF FINANCE.

**TABLE A.30**  
**SMALLHOLDER FARM LAND CHARACTERISTICS**

DISTRICT	NUMBER OF FARMS	AVERAGE UNIT SIZE	AVERAGED AREA IRRIGATED	AVERAGED AREA OWNED	AVERAGE AREA RENTED
BELIZE	33	7.4	0.7	9.0	1.8
CAYO	23	7.9	2.1	9.5	0.7
COROZAL	22	9.9	1.5	9.9	3.5
ORANGE WALK	26	8.7	0.7	9.0	2.5
STANN CREEK	22	7.0	1.6	6.7	2.1
TOLEDO	15	3.6	0.4	3.6	2.8
ALL DISTRICTS	141	7.7	1.1	8.4	2.1

SOURCE: USAID 1989.

**TABLE A.31**  
**PROPORTION OF FARMS OPERATED BY OWNERS**  
**BY DISTRICT, 1985 (%)**

DISTRICT	AREA	HOLDINGS
BELIZE	72	49
CAYO	56	19
COROZAL	43	31
ORANGE WALK	69	31
STANN CREEK	68	38
TOLEDO	64	11
COUNTRY	62	28

SOURCE: 1984-85 AGRICULTURAL CENSUS.

**TABLE A.32**  
**APPROVED BUDGETARY ALLOCATIONS TO THE MOA, 1980/81 - 1994/95**

YEAR	MOA'S BUDGET AS PROPORTION OF THE TOTAL GOB BUDGET (%)		REAL BUDGETARY ALLOCATIONS (BZ\$ MILLION)			
	RECURRENT ESTIMATES	CAPITAL ESTIMATES	REAL RECURRENT EXPENDITURES	REAL CAPITAL EXPENDITURES	NOMINAL EXPENDITURES	
					RECURRENT EXPENDITURES	EXPENDITURES ON PERSONNEL
1980/81	10.4	26.0	7.2	4.1	7.7	3.9
1981/82	10.6	19.7	8.6	3.5	9.2	4.4
1982/83	11.0	21.5	10.1	3.7	10.7	6.1
1983/84	10.7	21.7	9.7	3.1	10.5	6.1
1984/85	10.6	19.6	8.6	0.6	9.7	5.5
1985/86	9.6	14.4	8.4	2.7	9.6	5.6
1986/87	7.8	17.8	7.7	3.8	9.0	5.4
1987/88	8.2	17.7	9.3	2.4	11.1	6.4
1988/89	7.5	14.3	8.0	1.9	9.8	6.5
1989/90	7.1	9.0	8.4	2.6	10.6	7.4
1990/91	7.5	7.7	8.9	2.3	11.7	8.2
1991/92	7.6	7.1	9.7	3.0	13.2	9.3
1992/93	7.4	9.6	9.8	3.9	13.8	7.6
1993/94	6.4	6.2	10.0	2.8	14.6	10.5
1994/95	5.4	5.6	N/A	N/A	14.6	11.2

SOURCE: BUDGET ESTIMATES, MINISTRY OF FINANCE.

**TABLE A.33**  
**SELECTED STATISTICS ON THE MENNONITE COMMUNITY**  
**AT SPANISH LOOKOUT (DECEMBER 1993)**

TOTAL CATTLE	6,508
BROILERS (PER BATCH)*	386,550
TRACTORS	188
HECTARES OF PLOWED LAND	1,742
HECTARES OF COW PASTURE	4,638
HECTARES UNDER JUNGLE	8,252
OTHER HECTARES	1,029
TOTAL HECTARES OWNED	15,535
INCOME FOR CUSTOM WORK	3,520,049
BUSINESS HAVING A TURNOVER OF BZ\$5,000.00	88
NATIVE FAMILIES ON LAND	23
OTHER FAMILIES LIVING ON LAND	26
NOS. OF CATTLE FARMERS	214
NOS. OF HEN FARMERS	100
NOS. OF BROILER FARMERS	99
NOS. OF BROILER & HEN FARMERS	38
NOS. OF CORN FARMERS	134
NOS. OF BEAN FARMERS	84

\* THERE ARE SIX BATCHES PER YEAR.

SOURCE: MOA.

TABLE A.34  
EXPORTS OF MARINE PRODUCTS BY MAJOR FISHING COOPERATIVES, 1988-93

COOPERATIVE	VALUE (BZ\$'000)					VOLUME ('000 KGS.)						
	1988	1989	1990	1991	1992	1993	1988	1989	1990	1991	1992	1993
NATIONAL FISHING COOP.	6,356.2	7,070.9	6,875.1	7,209.2	8,602.8	7,597.2	277.4	283.3	281.8	287.2	298.2	288.8
NORTHERN FISHERMEN COOP.	7,155.4	7,350.0	7,850.7	10,671.4	7,681.5	6,515.4	241.9	233.5	239.7	351.8	268.7	0.3
PLACENCIA PROD. COOP.	1,408.9	1,311.9	464.8	145.3	9.0	0.9	141.3	121.2	68.6	32.8	2.1	210.1
CARIBENA PROD. COOP.	1,209.0	1,129.2	1,318.9	657.1	304.8	303.0	68.5	71.5	95.0	31.0	51.6	23.0
INDEPENDENCE FISHING COOP.	35.7	12.5	30.1	140.9	148.9	132.8	1.8	14.8	3.7	23.6	28.4	8.0
TOTAL	16,163.2	16,874.5	16,539.6	18,823.9	16,747.0	14,549.3	730.9	724.3	688.9	726.4	649.0	530.1
COUNTRY TOTAL	16,511.3	17,620.7	18,085.1	20,177.0	23,101.2	24,630.0	763.8	763.9	776.4	826.1	1,019.6	1,088.6
EXPORTS AS A % OF COUNTRY TOTAL	97.9	95.8	91.5	93.3	72.5	59.1	95.7	94.8	88.7	87.9	63.6	48.7

SOURCE: FISHERIES DEPARTMENT, MOA.

**TABLE A.35**  
**CARDI'S PROFESSIONAL STAFF (1988-1993) 1/**

BUDGET YEAR (SEPT.-AUGUST)	STAFF BY ACADEMIC LEVEL				
	PHD	MSC	BSC	DIP 2/	TOTAL
1988-89	1	1	-	5	7
1988-89	1	1	-	5	7
1989-90	-	1	-	4	5
1990-91	-	2	-	3	5
1991-92	-	2	-	2	4

1 INCLUDING REPRESENTATIVE IN BELIZE.

2 INCLUDING ONE DOA EXTENSION OFFICER TRAINEE PER YEAR

SOURCE: CARDI.

**TABLE A.36**  
**CENTRAL FARM**

MISSION	CURRENT PROGRAMS/ACTIVITIES	CURRENT TECHNICAL STAFF (ACADEMIC LEVEL)	CURRENT ANNUAL BUDGET, 1993/94 (BZ\$'000)
TO CONDUCT CROP RESEARCH AND DEVELOPMENT ACTIVITIES	1. SCREENING VARIETIES OF RED KIDNEY BEANS.	DIPLOMA - 3 B.SC. - 2*	PERSONNEL 377 SALARY 161 WAGES 183 OTHERS 33
	2. SCREENING OF BREEDING LINES OF CORN SUPPLIED BY CIMMYT, MEXICO.	M. S. - 2 PH.D. - 1* TOTAL - 8	OPERATIONS 110
	3. MULTIPLICATION OF COCONUT CROSS FOR RESISTANCE TO LETHAL YELLOWING.		TOTAL 487
	4. PEST AND DISEASE MANAGEMENT OF VARIOUS CROPS.		
	5. SEED MULTIPLICATION- CORN		
	6. SOIL AND TISSUE ANALYSIS		

\* 1 B.SC. AND 1 PH.D. RESEARCHERS ARE PROVIDED BY ODA IN PLANT PROTECTION.  
 SOURCE: CENTRAL FARM, MOA.



TABLE A.37  
REAL EXPENDITURES ON RESEARCH, EXTENSION, QUARANTINE SERVICES AND  
THE BCA BY THE MOA, 1981/82 - 1992/93, (BZ\$'000)

YEAR	EXPENDITURE ON RESEARCH*	EXTENSION		EXPENDITURE ON QUARANTINE SERVICES #	BCA	
		APPROVED BUDGET	ACTUAL EXPENDITURE		APPROVED BUDGET	ACTUAL EXPENDITURE
1980/81	373.1	305.6	321.0	97.9	58.1	56.8
1981/82	442.1	375.9	382.7	112.5	88.0	85.1
1982/83	369.6	383.3	346.4	88.3	127.5	118.9
1983/84	427.3	377.9	329.5	91.5	126.2	121.6
1984/85	364.1	622.4	570.1	87.9	137.8	134.4
1985/86	356.6	585.3	558.3	86.1	147.6	131.6
1986/87	373.9	558.0	452.8	100.3	145.7	137.0
1987/88	447.2	607.3	549.7	108.7	184.6	174.1
1988/89	425.1	583.3	575.2	121.6	182.2	203.5
1989/90	358.1	669.6	593.8	125.5	245.0	217.9
1990/91	343.9	719.9	660.0	125.6	237.8	204.9
1991/92	315.8	770.7	783.4	135.4	284.5	246.6
1992/93	277.8	797.4	772.1	91.0	316.1	227.7

\* EXPENDITURES ON RESEARCH REFER TO SUB-HEADS RESEARCH & DEVELOPMENT, RESEARCH STATION ADMINISTRATION AND RESEARCH DIVISION.

# DATA FOR 1980/81 AND 1981/82 INDICATE APPROVED ALLOCATIONS.

SOURCE: BUDGET ESTIMATES, MOF.

TABLE A.38  
RESEARCH AND EXTENSION ACTIVITIES OF THE BELIZE SUGAR INDUSTRY

MISSION	CURRENT PROGRAMS/ACTIVITIES	CURRENT TECHNICAL STAFF (ACADEMIC LEVEL)	CURRENT ANNUAL BUDGET, 1993/94 (BZ\$'000)
TO CONTRIBUTE TO THE SUGAR INDUSTRY DEVELOPMENT THROUGH THE DEVELOPMENT AND DISSEMINATION OF APPROPRIATE SUGARCANE TECHNOLOGY TO CANE GROWERS	1.SUGARCANE VARIETY SELECTION PROGRAM	DIPLOMA - 5 B.SC. - 1	PERSONNEL 224
	2.INPUT MANAGEMENT PROGRAM	M.SC. - 2	OPERATIONS 544
	3.PRODUCTION OF FOUNDATION CANE SEED	TOTAL - 8	TOTAL 768
	4.SUGARCANE EXTENSION AND TECHNICAL SUPPORT SERVICE FOR CONTACT FARMERS		
	5.COORDINATION OF LAND PREPARATION SCHEME		

SOURCE: BSI.

TABLE A.39  
RESEARCH AND EXTENSION ACTIVITIES OF THE CITRUS GROWERS ASSOCIATION

MISSION	CURRENT PROGRAMS/ACTIVITIES	CURRENT TECHNICAL STAFF (ACADEMIC LEVEL)	CURRENT ANNUAL BUDGET, 1993/94 (BZ\$'000)
TO CONDUCT RESEARCH IN THE AREAS OF CITRUS PRODUCTION AND PROTECTION, AND EDUCATE CITRUS FARMERS IN NEW TECHNOLOGY	1. INTRODUCTION OF NEW CITRUS VARIETIES.	PH.D. - 1 DIPLOMA - 3	PERSONNEL 89 SALARIES 77 WAGES 12
	2. CONDUCTING SURVEY FOR DETECTION OF CITRUS DISEASES INCLUDING CITRUS TRISTEZA VIRUS.	TOTAL - 4	OPERATIONS 157
	3. REGISTRATION OF CITRUS NURSERIES.		TOTAL 246
	4. EDUCATION PROGRAMMES FOR CITRUS FARMERS.		

SOURCE: CGA.

TABLE A.40  
RESEARCH ACTIVITIES OF THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE (CARDI)

MISSION	CURRENT PROGRAMS/ACTIVITIES	CURRENT TECHNICAL STAFF (ACADEMIC LEVEL)
TO CONTRIBUTE TO AGRICULTURAL DEVELOPMENT THROUGH THE GENERATION AND DISSEMINATION OF APPROPRIATE TECHNOLOGY THAT WILL BENEFIT THE CARIBBEAN PEOPLE.	1. EVALUATION OF IMPROVED VARIETIES OF SOYBEAN.	DIPLOMA - 1 M.S. - 2
	2. EVALUATION OF IMPROVED VARIETIES OF PEANUT.	TOTAL - 3
	3. EVALUATION OF IMPROVED VARIETIES OF PIGEONPEA	
	4. DEVELOPMENT OF TECHNOLOGICAL PACKAGE OF GINGER.	
	5. TESTING OF SOYBEAN PRODUCTION SYSTEM.	
	6. IMPROVEMENT/DEVELOPMENT OF POST-HARVEST SYSTEM FOR PEANUT.	
	7. MULTIPLICATION OF FOUNDATION SEEDS OF SOYBEAN, PEANUT, RICE, PIGEONPEA.	
	8. WEED MANAGEMENT IN COWPEA.	
	9. TECHNICAL ASSISTANCE TO FARMERS AND OTHER ORGANIZATIONS.	
	10. PROMOTING THE UTILIZATION OF SOYBEAN IN FEED FORMULATION AND TESTING.	

SOURCE: CARDI.

TABLE A-41  
SELECTED REGIONAL AND EXTRA-REGIONAL INSTITUTIONS TO  
COOPERATE WITH BELIZE'S ROTs

NAME	LOCATION	MAIN ACTION AREA
1. REGIONAL		
- CARICOM/MOA NETWORKS	- OECs COUNTRIES - CARICOM COUNTRIES AND SURINAME	- VEGETABLE AND STAPLE FOOD CROPS R & D - IICA'S MULTINATIONAL FRUIT (TREE) CROP R & D
- UWI	- JAMAICA AND TRINIDAD & TOBAGO	- BIOTECHNOLOGY R & D, TRAINING IN EXTENSION
- UNIVERSITY OF GUYANA	- GUYANA	- TRAINING IN AGRICULTURE, FORESTRY
- REPAMA	- GUYANA	- TRAINING IN LIVESTOCK HEALTH AND MANAGEMENT
- ECIATF	- TRINIDAD AND TOBAGO	- TRAINING
- MARI	- GUYANA	- CROP AND LIVESTOCK R & D
- INRA	- GUADALOUPE	- FOOD CROPS R & D
- CIRAD/FLHOR	- MARTINIQUE	- FRUIT CROPS, VEGETABLES AND FLORICULTURE R & D
- WINBAN	- ST. LUCIA	- BANANA R & D
- CFCS	- SITE OF EXECUTIVE SECRETARIAT 1/	- EXCHANGE OF INFORMATION ON CROPS R & D
2. EXTRA-REGIONAL		
- CIP	- PERU	- WHITE (IRISH) AND SWEET POTATO R & D
- CATIE	- COSTA RICA	- TRAINING AND R & D IN CROPS, LIVESTOCK, AGROFORESTRY AND BIOTECHNOLOGY
- INTIFAP	- MEXICO	- R & D AND TRAINING IN CROPS AND LIVESTOCK
- FHIA	- HONDURAS	- BANANA AND FRUIT TREE CROPS R & D
- ICTA	- GUATEMALA	- FARMING SYSTEMS R & D AND TRAINING IN TECHNOLOGY TRANSFER

1/ CURRENTLY UNIVERSITY OF THE U.S. VIRGIN ISLANDS IN ST. CROIX.  
SOURCE: COMPILED BY MISSION.

TABLE A.42  
THE AGRICULTURAL EXTENSION DIVISION OF THE MOA

MISSION	CURRENT PROGRAMS/ACTIVITIES	CURRENT TECHNICAL STAFF (ACADEMIC LEVEL)	CURRENT ANNUAL BUDGET, 1993/94 (BZ\$'000)
TO DISSEMINATE INFORMATION ON NEW AND IMPROVED TECHNOLOGY THROUGH FIELD TRIALS, DEMONSTRATIONS, PAMPHLETS, FARM VISITS, RADIO AND TELEVISION PROGRAMMES	1. FARMER TRAINING IN CROPS AND LIVESTOCK	DIPLOMA - 34 B.SC. - 4	PERSONNEL 951 SALARIES 713 WAGES 188 OTHER 50
	2. COLLECTION OF CROP LIVESTOCK STATISTICAL INFORMATION	M.SC. - 2 TOTAL - 40	OPERATIONS 187
	3. ASSESSMENT OF CROP/LIVESTOCK DAMAGES DUE TO NATURAL CAUSES		TOTAL 1,138
	4. PROMOTION AND PARTICIPATING IN AGRICULTURAL SHOWS.		
	5. SUPPLYING SUCH MATERIALS AS THE PUBLIC MAY NEED ON AGRICULTURAL MATTERS		
	6. PROMOTING MEASURES THE INCREASE PRODUCTIVITY AND DECREASE POST-HARVEST LOSSES		

SOURCE: MOA.

TABLE A.43  
ESTIMATED VALUE OF CROP LOSS DUE TO THE TWENTY-FIVE MAJOR PESTS IN BELIZE,  
RANKED BY TOTAL ECONOMIC LOSS TO EACH PEST

PEST (SCIENTIFIC NAME)	COMMON NAME	CROPS ATTACKED	TOTAL VALUE OF LOSS (BZ\$'000)
CITRUS TRISTEZA VIRUS	TRISTEZA	CITRUS	12,825.8
MYCOSPHAERELLA FIJIENSIS	BLACK SIGATOKA	BANANA	7,401.9
AENEOLAMIA POSTICA JUGATA	FROGHOPPER	SUGARCANE, RICE	3,578.2
TRIPONA CORVINA	DRUNKEN BAYMEN	CITRUS, BANANA	2,544.7
ANASTREPHA SPP.	FRUIT FLIES	CITRUS, MANGO	2,543.5
ATTA CEPHALOTES/MEXICANA	LEAF CUTTING ANTS	CITRUS	2,543.5
POST HARVEST PESTS	(MOSTLY WEEVILS)	CORN	2,349.2
DIABROTICA BALTEATA	CUCUMBER BEETLE	TOMATO, RKB *, CORN	1,993.5
USTILAGO SCITAMINEA	SMUT	SUGARCANE	1,666.4
POST HARVEST FRUIT ROT	ANTHRACNOSE **	BANANA, PAPAYA	1,494.3
THANATEPHORUS CUCUMERIS	WEB BLIGHT	BEANS	1,466.9
SPOOPTERA FRUGIPERDA	FALL ARMYWORM	CORN, RICE	1,439.9
GEMINI CURLS	GEMINI VIRUS	TOMATO, PEPPER	827.6
APION GODMANI	BEAN WEEVIL	RKB	764.2
RADOPHOLUS SIMILIS	BURROWING NEMATODE	BANANA	733.7
COSMOPOLITES SORDIDUS	BANANA BORER	BANANA	733.7
POST HARVEST PESTS	WEEVILS/BRUCHIDS	RKB	702.7
CERATOMA RUFICORNIS	R-H LEAF BEETLE ***	RKB, PEPPERS	566.7
BEMISIA TABACI	WHITEFLY	RKB	412.8
EMPOASCA KRAEMERI	LEAFHOPPER	RKB	412.8
ANTHONOMUS EUGENII	PEPPER WEEVIL	SWEET PEPPER	382.1
OEALUS POECILLUS	RICE STINKBUG	RICE	353.8
MITES	MITES	PAPAYA	327.0
UROMYCES PHASEOLI	RUST	RKB	202.0
SCLEROTIUM ROLFII	COLLAR ROT	RKB	202.0

## NOTES:

\*RED KIDNEY BEANS.

\*\*MOSTLY ANTHRACNOSE, PLUS SOME OTHER ROT.

\*\*\*RED-HORNED LEAF BEETLE.

NOTE THAT WEEDS DO NOT APPEAR IN THIS TABLE. THERE IS VERY LITTLE DATA ON WEED PROBLEMS AND THE COSTS OF THEIR CONTROL, EVEN WITHIN MAJOR PRODUCTION SYSTEMS.

SOURCE: EDEN-GREEN ET. AL., 1992.

TABLE A.44  
AVERAGE WEEKLY PURCHASES OF VEGETABLES BY TWO SUPERMARKETS  
IN BELIZE CITY

PRODUCT	UNIT	BRODIES	SAVE-U	TOTAL
LETTUCE	KGS.	136.3	352.7	489.0
CELERY	KGS.	22.7	98.6	121.3
CAULIFLOWER	KGS.	31.8	43.6	75.4
BRUSSELS SPROUTS	KGS.		5.4	5.4
PARSLEY	KGS.	3.1	3.1	6.2
BROCCOLI	KGS.	36.3	62.7	99.0
POTATOES	KGS.	681.8	454.5	1,136.3
ONIONS	KGS.	454.5	220.0	674.5
TOMATOES	KGS.	56.8	221.8	278.6
WATERMELON	KGS.	90.9	65.9	156.8
SWEET PEPPERS	KGS.	56.8	101.8	158.6
CILANTRO	KGS.	4.5	7.2	11.7
HOT PEPPERS	KGS.	1.3	5.9	7.2
CABBAGE	KGS.		189.0	189.0
CARROTS	KGS.		126.3	126.3
CUCUMBERS	KGS.		110.4	110.4

SOURCE: BRODIES &amp; SAVE-U, BELIZE CITY.

TABLE A.45  
DISTRIBUTION OF LOANS TO THE AGRICULTURAL SECTOR BY COMMERCIAL BANKS, 1980-93 (BZ\$'000)

PERIOD	SUGAR	CITRUS	RICE	BANANAS	CATTLE & DIARY	POULTRY & EGGS	HONEY PRODUCTION	LAND CLEARING PREPARATION	GENERAL & MISCELLANEOUS	TOTAL LENDING TO AGRICULTURE	GRAND TOTAL	AGRICULTURAL LENDING AS % OF TOTAL
1980	12,553	2,514	2,751	3,585	757	162	85	365	1,287	24,059	91,892	26.2
1981	13,293	2,128	3,025	3,011	855	133	104	177	1,360	24,086	108,909	22.1
1982	10,874	3,198	1,088	4,245	1,369	242	56	209	1,621	22,702	132,344	17.2
1983	8,014	4,422	921	1,411	690	313	61	568	789	17,189	141,431	12.2
1984	6,552	5,229	393	1,749	873	436	51	188	1,198	16,969	153,041	10.9
1985	3,944	7,138	25	210	1,045	379	29	29	1,524	14,323	141,398	10.1
1986	4,030	4,920	-	881	1,152	173	97	10	1,538	12,901	134,950	9.5
1987	4,554	4,932	2	5,143	922	332	69	2,001	3,552	21,507	165,129	13.0
1988	7,410	7,295	87	8,275	855	321	85	1,975	2,539	28,942	211,878	13.6
1989	11,023	8,124	-	9,736	444	247	63	1,563	2,680	33,880	241,055	14.1
1990	15,260	9,965	95	15,400	176	217	63	215	5,394	48,785	280,968	16.7
1991	11,949	21,490	203	16,835	274	458	71	672	3,550	55,502	335,977	16.5
1992	12,030	22,481	168	14,152	501	782	111	681	4,144	55,050	373,180	14.8
1993	11,641	25,451	631	17,018	490	679	80	780	3,290	60,260	387,215	15.6
TOTAL	132,927	129,267	9,369	101,651	10,403	5,074	1,025	9,433	34,466	433,855	2,899,367	15.0

SOURCE: CENTRAL BANK OF BELIZE.

TABLE A.46  
DISTRIBUTION OF LOANS TO THE AGRICULTURAL SECTOR BY THE DFC, 1980-93 (BZ\$'000)

YEAR	SUGAR	CITRUS	RICE	BANANAS	CATTLE AND DIARY	POULTRY AND EGGS	HONEY PRODUCTION	COCOA	OTHER	TOTAL	GRAND TOTAL	AGRICULTURAL LENDING AS % OF TOTAL
1980	3,058	233	133	1,502	1,719	61	62		1,243	8,011	19,808	40.4
1981	3,585	428	241	1,390	1,925	97	65		1,734	9,465	24,065	39.3
1982	4,109	644	284	1,412	2,182	83	58		1,958	10,730	25,824	41.6
1983	6,976	873	330	1,105	2,409	86	259		1,600	13,638	28,805	47.3
1984	8,087	1,356	1,095	1,367	2,544	87	252		2,272	17,060	30,584	55.8
1985	8,941	2,562	516	1,702	2,776	143	271		2,330	19,245	37,468	51.4
1986	7,685	3,179	435	1,790	3,542	134	248		2,298	19,311	38,369	50.3
1987	7,362	2,546	489	1,735	3,244	53	215		2,800	18,444	36,898	50.3
1988	6,193	2,308	909	1,551	2,623	67	259		1,855	15,855	35,191	45.1
1989	5,701	1,967	1,010	1,923	2,499	61	254		1,998	15,113	36,054	41.9
1990	4,971	1,342	322	2,505	1,860	68	128		1,798	12,994	34,229	38.0
1991	4,716	1,482	346	1,618	1,444	62	47	38	1,516	11,271	33,037	34.1
1992	4,610	1,601	186	3,691	1,771	23	26	31	1,484	13,603	36,761	37.0
1993	4,656	2,216	273	4,525	1,474	52	13	21	1,313	14,543	40,845	35.6
TOTAL	60,650	22,937	6,683	27,816	32,014	1,077	2,157	90	25,879	199,283	457,738	43.5

SOURCE: CENTRAL BANK OF BELIZE.

TABLE A.47  
 MDFB'S TOTAL LOAN DISTRIBUTION BY ECONOMIC SUB-SECTORS AND BY DISTRICT,  
 APRIL 1984 TO JUNE 1994

LOAN CATEGORY	MOS.	BELIZE DISTRICT		ORANGE WALK & COROZAL DISTRICTS		STANN CREEK & TOLEDO DISTRICTS		CAYO DISTRICT		TOTAL	
		VALUE#	NOS.	VALUE#	NOS.	VALUE#	NOS.	VALUE#	NOS.	VALUE#	NOS.
MANUFACTURING & INDUSTRY	378	2,572.6	97	645.6	73	505.0	90	485	638	4,208.3	
SMALL FARM AGRIC.	364	971.1	359	1,614.0	44	171.6	668	1,811.7	1,435	4,568.3	
- FOOD PROCESSING	245	722.3	63	249.9	25	117.4	42	199.6	375	1,289.3	
- AGRIC-BUSINESS	119	248.7	296	1,364.1	19	54.2	626	1,612.0	1,060	3,279.0	
SERVICES & TRADE	1,035	5,045.8	280	1,451.9	95	802.9	176	894.3	1,586	8,195.0	
TOTAL	1,777	8,589.5	736	3,711.5	212	1,479.6	934	3,191.0	3,659	16,971.6	
% OF TOTAL	48.6	50.6	20.1	21.9	5.8	8.7	25.5	18.8	100.0	100.0	

# VALUE IS IN THOUSANDS OF BELIZE DOLLARS.  
 SOURCE: MDFB.



**APPENDIX B**

**CHARACTERISTICS OF THE MAJOR AGRICULTURAL  
PRODUCTION SYSTEMS IN BELIZE<sup>1</sup>**

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<sup>1</sup>

Information was obtained from interviews with the Principal Agricultural Officer for Extension.



**1. Rice/corn milpa system by small farmers****(a) Main locations (refer to extension centers):**

- Toledo (Pueblo Viejo, Aguacate, Dump, Rice Station, Crique Sarco and San Juan), with 90% of all producers;
- Stann Creek (Savannah, Melinda);
- Belize (Bermudian Landing, Crooked Tree).

**(b) Technology and production:**

- land clearing by slash and burn method and all cultural practices by hand;
- rice cultivation in pure stand (1.2 ha); corn is intercropped with other food crops (1.2 ha to 2 ha for the individual family; 3.2 ha for the extended family; 10.1 ha for communal village production based on kinship); backyard small animal production;
- mechanized rice is planted outside communal lands;
- no improved inputs used in rain-fed conditions;
- corn cultivation is usually followed by planting of red kidney beans;
- yields: corn 1,010-1,235 kg/ha; rice, 1,010-1,346 kg/ha;
- several years required to replenish soil fertility after 2 to 3 years of cultivating the same plot.

**(c) Other:**

- post-harvest losses are high (due to pests and diseases, rotting, etc.);
- rice output: 80% is sold and 20% used for home consumption;
- corn is primarily used for home consumption, with occasional surpluses sold, mostly at the farm gate;
- farmers, mostly Kekchy and Mopan Mayans live in villages;
- highly cooperative system;
- enterprises are usually located in forest, where rainfall is high;
- difficult access to farms.

**2. Cassava-fishing system by small farmers.****(a) Main locations:**

- Toledo (Punta Gorda, Barranco);
- Stan Creek (Dangriga, Savannah, Melinda, Silk Grass).

**(b) Technology and production:**

- most work is done manually by men (clearing when needed and land preparation) and women; in exceptional cases, small plots may be mechanically tilled (through hiring);
- cassava cultivation is done on 3-4 mecatas or 0.2 ha) as a main crop, with plantain (as a second crop) and yams;
- no use of improved or modern inputs;
- fish is the main protein source and is harvested by men.

**(c) Other:**

- typical production system of Garifuna settlements;
- crops are mainly for home consumption;
- cassava processing is done by women.

**3. Mechanized rice farming by small (up to 4.05 ha.) and large farmers.****(a) Main locations:**

- Toledo (Dump);
- Stann Creek (Melinda, 1 large producer);
- Orange Walk (Mennonite community, 20.2 to 121.5 ha plots).
- Belize (Big Falls).

**(b) Technology and production:**

- land clearing, land preparation, planting (occasionally) and harvesting done mechanically;
- improved inputs used (mostly by medium and large farmers);
- 2.02 to 121.5 ha are often rain-fed plots;
- in Toledo, cultivation is done on the same plot for 3 to 4 years, before moving to another plot, due to weed infestation (mechanized milpa).

**(c) Other:**

- commercial production is also often done by part-time farmers;
- machinery services are subsidized, mostly for use by small farmers in Toledo;
- yields are 1,683 to 2,805 kgs/ha.

**4. Banana production by large farmers****(a) Main location: Stann Creek (Savannah).**

**(b) Technology and production:**

- land clearing, drainage system, land preparation, spraying, in-farm transportation are mechanically done;
- all other activities are done manually.
- farms are developed and handed over to "tenant farmers";
- tenants have no personal investment in farm, but are responsible for managing the operations;

**5. Citrus farming: small (up to 4.05 ha) and large farmers****(a) Main locations:**

- Stann Creek (Melinda, Silk Grass, Alta Vista), with 65% of all producers;
- Cayo and Toledo (25%).

**(b) Technology and production:**

- land clearing in small farms done manually (managing more than 4.05 ha using mostly manual labor is extremely difficult in Toledo, due to weed infestation); medium and large farmers use machinery services;
- agrochemicals are widely used (varies with prices received in the case of small producers);
- output (yield of 3 to 4, 36.4 kg boxes per tree, 246 trees per hectare in alluvial soils; 1 box per tree in pine ridge; and 1 to 2 boxes per tree in calcarius soils); entirely sold to two outlets for processing and export.

**(c) Other:**

- 75% of Stann Creek's output comes from small growers;
- small farmers also grow peanuts, red kidney beans and honey (in Cayo); and cocoa, red kidney beans and pineapples (in Toledo);
- 90% of all producers sold 50 or less boxes in 1991.
- most citrus production comes from monocropping.

**6. Corn milpa system: small farmers****(a) Main locations:**

- Stann Creek (Alta Vista);
- Cayo (San Ignacio, Bullet Tree, San Antonio, Roaring Creek, Hummingbird Sibun, Benque Viejo, Unitedville);
- Belize (Lucky Strike);

- Orange Walk (San Jose, Yo Creek, Guinea Grass, San Felipe, Chunox).
- Corozal (Chunox)

(b) Technology and production:

- mostly slash and burn corn interplanted with root crops and black beans, in 4 to 4.05 ha plots; red kidney beans may follow;
- all work done manually with no use of improved inputs;
- acreage, limited by manpower (family plus interchangeable labor);
- combines with backyard small livestock production.
- subsistence production; surpluses sold in market by women;
- mostly inland, in relatively inaccessible areas.

7. Beef cattle: small to large farmers.

(a) Main locations:

- Cayo (Bullet Tree, Roaring Creek, Unitedville;
- Benque Viejo and Spanish Outlook: the last two include large cattle operations, particularly among the Mennonites at Spanish Outlook);
- Belize (Freetown Sibun, Crooked Tree, Bermudian Landing) holds the largest proportion of small producers (less than 20 heads);
- Orange Walk (Yo Creek, Guinea Grass, Shipyard, Blue Creek, San Felipe): cattle ranching done mostly by a few large farmers.

(b) Technology and production:

- mostly natural pastures; improved pastures may reach 1/3 of total acreage in Cayo, but less than 10% in other districts;
- total acreage is fenced; no individual plots are established within the confines of the fenced area;
- all field operations and management of animals are done manually by adult male family labor and (occasionally) some hired labor;
- animals roam free, to graze at will, within fenced area;
- few or almost no use of improved inputs or veterinary products;
- minimal use of professional health care services;
- size of herd more important than quality of animals;
- typical medium size exploitation: 20-80 heads (mostly 3 heads/ha) allows for the sale on the farm of 2 to 8, 4 year old, 363.6 kgs animal/year.

## (c) Other:

- most established farmers also grow vegetables (cabbage, melon), raise pigs and do off-farm seasonal work; others are part-time farmers, using hired labor to take care of the animals.
- include both crops and cattle, and only cattle;
- milking, milk processing (mostly cheese) and sales, after home consumption, done by women;
- dairy products sold regularly by more advanced larger farmers;
- practiced mostly on private property, or on land leased from the government (and good guarantee of tenureship), it is now becoming the next step after the milpa.

## 8. Dairy Production: small and medium farmers.

## (a) Main locations:

- Cayo (Spanish lookout, San Ignacio, Bengue)
- Orange Walk (Shipyard, Blue Creek)

## (b) Technology and production:

- dairy ranching done by non-Mennonites;
- mennonites keep dairy herds at farm where they live, do twice a day milking;
- small (1-5 heads) medium (6-20 heads);
- yields: 4-12 kg milk/cow/day.

## 9. Vegetable production: small and medium farmers.

## (a) Main locations:

- Belize (Freetown Sibun);
- Cayo (Armenia, Valley of Peace, San Antonio);
- Orange Walk; Corozal.

## (b) Technology and production:

- 0.2 to 2.02 ha plots are usually mechanocally tilled; all other practices are manually done, mostly by family labor;
- local popular varieties are grown to supply local markets;
- seasonally grown in the dry season;
- plots are close to rivers or lakes which serve as a source for irrigation water (done by hand);
- use of improved inputs (seeds and agrochemicals) is widespread to a greater or lesser degree; amounts or dosages used follow supplier recommendations.

- it is a purely commercial venture: 80% of all income comes from cabbage, tomatoes and sweet pepper; the larger farmers also grow peanuts, corn (to be sold as green corn on the cob); most raise backyard pigs on discarded vegetables and corn stalks);
  - requires much technical support than other farmers;
- (c) Other:
- Central American immigrants, working on small 4 to 8 mecate plots (0.2 to 0.4 ha) are becoming important growers;
  - cultivation is on rented land (mostly from the government);
  - men usually prepare the land (if manually), transport inputs, irrigate and transport output to the market; other practices and activities are shared by all family members; women usually are in charge of sales at the local market;
  - cabbage: 1500 to 1800 units/mecate, at 0.9 to 1.1 kg/unit; tomatoes: 0.9 to 1.3 kg/plant with 1500 to 1800 plants/mecate;
  - raise a few backyard pigs and chicken (the latter for home consumption).

#### 10. Permanent fruit trees by small farmers

- (a) Main locations:
- Corozal (Patchakan, San Roman);
  - Orange Walk (Yo Creek, Guinea Grass, San Felipe);
  - Belize (Lucky Strike, Crooked Tree).
- (b) Technology and production:
- 0.4 to 2.02 ha plots planted with fruits and nuts which are locally sold (exclude export crops) such as avocado, mango, sour sop, annona, guava, etc.;
  - improved or modern inputs are not used;
  - weed control are performed manually by men, once a year, at bearing or main harvest seasons of the dominant fruit tree; manual harvest and sale of output are done by women;
  - husbandry practices for the trees are almost non existent.
- (c) Other:
- farmers are part or fulltime off-farm employees; or grow sugar cane and in some cases some food crops;
  - output (according to species planted) is staggered as to provide a small but steady income stream;
  - usually located along roads, for easy of transportation of the final product.



11. **Poultry farming: by small farmers and Mennonite enterprises.**

(a) **Main locations:**

- Cayo (Mennonites at Spanish Outlook);
- Belize (Freetown Sibun).
- Orange Walk (mennonites in Blue Creek, Shipyard)

(b) **Technology and production:**

- Mennonite production is integrated with other farm operations;
- scale of enterprise by the Mennonite is large and production is done on an intensive basis (broiler or layer);
- modern technology is used by Mennonites;
- production by non-Mennonites is done on a small scale, using less intensive production techniques;
- most farmers buy concentrated feed from the Mennonite feed mill and chicks from the Mennonite hatchery;

(c) **Other:**

- food crops may be grown for sale, but are of lesser economic importance;
- Mennonites dominate all segments of the production-marketing system.

12. **Transitional mixed farming: small and medium farmers.**

(a) **Main locations:**

- Cayo (San Ignacio, Bullet Tree, San Antonio);
- Orange Walk (San Jose, Yo Creek, Guinea Grass, San Felipe, Orange Walk);
- Corozal (Calcutta, Patchakan, San Roman).

(b) **Technology and production:**

- a transition between milpa and mechanized agriculture or cattle ranching;
- cash crops cultivated are corn, beans, rice, sugar cane, and peanuts; in some cases, plantains are cultivated following the milpa;
- it may include a small amount of cattle heads in the fallow period.
- due to its transitional nature, it may contain various levels of milpa production and mechanized agriculture;
- most work is done by family labor, plus hired workers on a seasonal basis.

13. **Mechanized mixed farming: small to large farmers.**

(a) **Main locations:**

- Cayo (Mennonite community at Spanish Outlook);
- Orange Walk (Yo Creek, Orange Walk and the Mennonite communities at Shipyard Grass and Blue Creek);
- Corozal (Calcutta, Patchakan, San Roman, Corozal).

(b) **Technology and production:**

- most practices are mechanized; some Mennonite communities use animal traction in a very effective way;
- improved and modern inputs are widely used;
- plant corn, beans, rice, fruits or combinations thereof.
- use mostly family labor; may hire labor on a seasonal basis.
- farmers cultivate as little as 8.1 ha fairly efficiently, combining food crop production for household use and cash crops.

14. **Sugarcane as a monocrop: medium to large farmers**

(a) **Main locations:**

- Orange Walk (Yo Creek, Guinea Grass, San Felipe, Orange Walk);
- Corozal (Calcutta, San Roman, Corozal).

(b) **Technology and production:**

- commercial sugar cane production, mostly on large farms;
- mechanized practices for initial establishment of the root stock and during initial stages of regrowth;
- modern inputs are used;
- field work is done by hired labor;
- much labor is used on a seasonal basis and harvesting is manual;
- yields are below other countries using similar technology;
- most farmers are urban dwellers.

The sugarcane production system also includes production under the milpa system (comprising between 38 and 59% of the acreage reported in the 1984-85 Agricultural Census for Corozal and Orange Walk, respectively). This subsystem seems to evolve from small and medium-size farmers clearing (mostly with the use of hired machinery services) old milpa plots that were left as fallow land, in order to fulfill their production quotas.

**APPENDIX C**

**MOA'S PARTICIPATION ON BOARDS, COMMITTEES  
AND TASK FORCES**



A.	BOARDS AND COMMITTEES:	STATUS
1.	Pesticide Control Board	Functional
2.	Meat and Livestock Commission	Functional
3.	Belize Marketing Board	Functional
4.	Belize Land Development Authority	Non-Functional
5.	Land Utilization and Sub-Division Committee	Functional
6.	Belize College of Agriculture Board	Functional
7.	Belize Meats Limited	No longer Exist
8.	Sugarcane Control Board	Functional
9.	Banana Control Board	Non-Functional
10.	Citrus Control Board	Functional
11.	Belize Livestock Producers Association	Functional
12.	Grain Growers Association	Non-Functional
13.	Cocoa Growers Association	Functional (Only in Toledo)
14.	Fisheries Advisory Board	Functional
15.	Beekeeping Council	Functional
16.	Caricom Farms Limited	Non-Functional
17.	Development Finance Corporation	Functional

**B. TASK FORCES:**

- |    |  |                |
|----|--|----------------|
| 1. | Development Finance Corporation                    | Functional     |
| 2. | National Social and Economic Council (NASEC)       | Functional     |
| 3. | Belize Agribusiness Company                        | Functional     |
| 4. | Belize Export and Investment Promotion Unit (EIPU) | Non-Functional |
| 5. | Steering Committee of Podere Project               | Functional     |
| 6. | Small Sector Development Council                   | Functional     |

**MINISTERIES**

- MOA - Ministry of Agriculture
- MTI - Ministry of Trade and Industry
- MNR - Ministry of Natural Resources
- NON - Ministry of Foreign Affairs

**APPENDIX D**  
**SUMMARY OF MAIN PROBLEMS/CONSTRAINTS,**  
**RECOMMENDATIONS AND ACTIONS**





AREA	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Agricultural development strategy	Belize lacks a comprehensive strategy to develop its agricultural sector.	<ul style="list-style-type: none"> <li>- The GOB should draft an agricultural development plan for the country outlining policies, objectives and strategies for the sector and for the respective sub-sectors;</li> <li>- the sector strategy should emphasize a market-led approach, focusing on achieving greater competitiveness, accelerating diversification, strengthening sectoral linkages, long-term food security and sustainability in the sector;</li> <li>- there should be policy consistency at both the macroeconomic and sectoral levels.</li> </ul>	The MOA should coordinate a multi-institutional effort to develop the plan, involving the MED, commodity associations, the DFC, BMB and other relevant institutions in the sector.
Agricultural policy formulation Implementation, monitoring and coordination	The MOA's capability to formulate, implement, monitor and coordinate agricultural policy is weak.	<ul style="list-style-type: none"> <li>- Design an appropriate mechanism for improved collaboration between the MOA, MED and other institutions for policy formulation, implementation, monitoring &amp; coordination;</li> </ul>	<ul style="list-style-type: none"> <li>- Establish a national agricultural policy coordinating committee to advise on agricultural policies in general;</li> <li>- design an appropriate mechanism within the MOA to formulate, implement, monitor and coordinate policies;</li> <li>- strengthen the PAJ to provide adequate support in this area.</li> </ul>
General sectoral issues	<p>Dependence on preferential export markets and a narrow range of products.</p> <p>Low competitiveness of both traditional and non-traditional products in free markets.</p>	<ul style="list-style-type: none"> <li>- Assess alternative markets and uses for the traditional products;</li> <li>- evaluate the technical and economic feasibility for producing and exporting a wider range of non-traditional products;</li> <li>- diversify the production base;</li> </ul> <p>Increase the production efficiency of both traditional and non-traditional products.</p>	<ul style="list-style-type: none"> <li>- Design an export marketing strategy to diversify export market base;</li> <li>- support research for new end uses of traditional products.</li> <li>- identify regional and extra-regional market potential for non-traditional products;</li> <li>- Improve the support system and incentives to for a more efficient production and marketing system in the sector;</li> <li>- adopt a cautious approach to trade liberalization;</li> <li>- allocate resources to support a more competitive and sustainable agricultural sector;</li> <li>- evaluate the range of production activities that could contribute to the country's long-term food security.</li> </ul>

AREA	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
General sectoral issues (Cont'd)	Institutional weaknesses of the MOA to support the sector.	All aspects of the MOA needs to be strengthened to provide adequate support services.	<ul style="list-style-type: none"> <li>- Review the Ministry's operations,</li> <li>- make the necessary institutional adjustments,</li> <li>- allocate more resources,</li> </ul>
Smallfarm agriculture	<p>Land insecurity and access to land.</p> <p>Production activities affect the natural resource base.</p> <p>Limited access to support services.</p>	<p>Improve the tenure system.</p> <ul style="list-style-type: none"> <li>- Improve the farming system to have more sustainable agricultural practices;</li> <li>- design training programs for small farmers;</li> <li>- provide incentives for these farmers to use the natural resources more efficiently</li> <li>- Increase support services to small farmers;</li> <li>- design rural development program(s) to their production activities;</li> <li>- support the organization of small farmers groups;</li> </ul>	<ul style="list-style-type: none"> <li>- Enact legislation to improve the land tenure system;</li> <li>- strengthen land administration capabilities to manage and monitor land use;</li> <li>- Collaborate with small farming groups, NGOs, etc., to improve farming system;</li> <li>- collaborate with NGOs and other groups to execute activities within a rural development framework.</li> </ul>
Crop production	<ul style="list-style-type: none"> <li>- long term policy for the traditional crops and development of non-traditional crops is lacking.</li> <li>- Future uncertainty of preferential markets for traditional crops;</li> </ul>	<ul style="list-style-type: none"> <li>- Long term planning to determine the potential and role of both traditional and non-traditional crops in the economy is required;</li> <li>- improve production efficiency of domestic crops (rice, corn and beans) to contribute to long term food security.</li> <li>- improve productivity of these crops;</li> <li>- assess the potential to increase the value-added for traditional crops;</li> <li>- diversify the production base by evaluating the technical and economic feasibility of producing and exporting a wider range of non-traditional products;</li> </ul>	<ul style="list-style-type: none"> <li>- Allocate resources and provide incentives to increase productivity of traditional and non-traditional products, and investment in the non-traditional area;</li> <li>- increase research and development efforts and support services (marketing, credit, etc.) for potential non-traditional crops;</li> <li>- improve the infrastructure to support the diversification process</li> </ul>

AREA	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Crop production (Cont'd)	Development of non-traditional products for exports has been limited.	<ul style="list-style-type: none"> <li>- Design a market-led strategy for the development of non-traditional products;</li> <li>- expand the domestic market for non-traditional products through greater linkages to processing activities and the tourist sector, and educating the population to use more local products</li> </ul>	<p>Provide incentives for increasing linkages between the tourism sector and domestic food production.</p> <ul style="list-style-type: none"> <li>- provide training and sensitize target groups and institutions to expand the use of local foods;</li> <li>- provide incentives to expand agro processing activities.</li> </ul>
Livestock production	<p>Absence of livestock production policy identifying priority areas for development.</p> <p>Low productivity and high production costs</p> <p>Lack of markets</p> <p>Lack of slaughter houses and processing facilities.</p>	<p>Design a comprehensive policy to develop the livestock sector, outlining strategies and policy objectives.</p> <ul style="list-style-type: none"> <li>- Improve management and organization of livestock production to improve productivity;</li> <li>- develop alternative low cost sources of feed;</li> <li>- review the tariff structure for inputs and import policy for livestock and dairy products;</li> <li>- define a long term research and extension program.</li> <li>- design a marketing strategy for the subsector's outputs;</li> <li>- provide incentives and support to expand processing activities;</li> <li>- implement a grades and standards system for livestock products.</li> </ul> <p>Construct new slaughter houses and/or upgrade existing ones and processing facilities.</p>	<p>Involve the BLPA and relevant groups in the policy design.</p> <ul style="list-style-type: none"> <li>- Strengthen livestock and health division of the MOA,</li> <li>- allocate more resources to increase support services by the MOA,</li> <li>- strengthen coordination and monitoring activities with other public and private sector institutions,</li> <li>- MOA should implement a cost recovery plan for providing certain support services.</li> <li>- strengthen the MOA's livestock research capabilities and provide incentives for farmers to use low cost feed inputs.</li> </ul> <p>The MOA and the BLPA should develop a plan and seek the necessary financing for the facilities</p>

AREA	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Fishery	<p>Insufficient information on fish stocks.</p> <p>Overexploitation of certain species beyond the maximum sustainable yield.</p>	<p>Assess the fish stocks.</p> <p>Limit exploitation of higher-value resources;</p> <ul style="list-style-type: none"> <li>- provide incentives to exploit lower-value and underexploited species;</li> <li>- regulate development activities that contribute to the destruction of fishing habitats and spawning grounds.</li> </ul>	<p>Seek support from international institutions for this activity.</p> <ul style="list-style-type: none"> <li>- Design a long-term program for more efficient management of the resources,</li> <li>- enforce regulations governing exploitation of the fisheries;</li> <li>- design a cost recovery program to replace overexploited species and maintain a sustainable stock level;</li> <li>- define a plan to exploit the resources beyond the reefs,</li> <li>- strengthen Fisheries Department's capability to manage the fishery resources.</li> </ul> <p>- Coastal development planning should have adequate environmental components to protect the environment;</p> <ul style="list-style-type: none"> <li>- enact and enforce regulations governing coastal development</li> </ul>
Forestry	<p>Lack of information on current status of the country's forest resources.</p> <p>Overexploitation of certain wood species</p> <p>Environmental implications of removing forest cover.</p>	<p>Execute an assessment of the national forest resources.</p> <p>Design a conservation program and a plan to replace and maintain endangered species</p> <ul style="list-style-type: none"> <li>- Promote agro-forestry as a sustainable production system;</li> </ul>	<ul style="list-style-type: none"> <li>- Strengthen the forest department's capability to manage the country's forestry resources more effectively;</li> <li>- enforce regulations to protect forestry resource</li> </ul> <p>MOA should collaborate with the forestry department to design an agro-forestry program</p>
Agroindustry	<ul style="list-style-type: none"> <li>- Dependent on preferential export markets and measures to protect the sector;</li> <li>- high production costs</li> </ul>	<ul style="list-style-type: none"> <li>- Improve the competitiveness of agro-industrial activities;</li> <li>- diversify the agro-industrial base.</li> </ul>	<ul style="list-style-type: none"> <li>- Provide incentives to improve productivity</li> <li>- develop the marketing system</li> <li>- adjust the tariff structure for imported inputs to reduce their costs</li> </ul>

AREA	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Land tenure system	<p>Absence of effective regulations governing land use.</p> <p>Complex land tenure system limits access to ownership.</p>	<p>Review land use policies and implement legislation to use land more efficiently</p> <p>Unify system for gaining access to land resources.</p>	<ul style="list-style-type: none"> <li>- Pass legislation for a simple unified system to access land.</li> <li>- update legislation governing land tenure,</li> <li>- increase funding for land titling and registration;</li> <li>- give priority to surveying and to titling in areas where extension services are available;</li> <li>- strengthen the land information system;</li> <li>- strengthen the land revenue collection system and adjust land taxes to more realistic levels</li> </ul>
Agricultural planning and statistics	<p>Inadequate planning mechanisms.</p> <p>MOA lacks an adequate system for programming its activities, budgeting, monitoring and evaluating these on an annual basis.</p> <p>Weak information system to support policy making and planning.</p>	<p>Strengthen the capability of the land administration to manage the country's land resources more effectively</p>	<p>execute an annual planning cycle in the MOA.</p> <p>The PAU, in collaboration with the CAO, PAOs and other heads of units should design the APME system.</p> <p>The PAU should collaborate with the CSO to design an information system,</p> <p>design mechanisms to collect, process and disseminate agricultural statistics systematically.</p>
Agricultural research	<p>Absence of a clearly defined long-term agricultural research policy and strategy for the sector</p>	<p>Strengthen planning capabilities in the MOA;</p> <ul style="list-style-type: none"> <li>- adopt a systematic approach to annual planning, monitoring and evaluation at each level (division, district, etc.);</li> <li>- strengthen MOA's capabilities in the project cycle.</li> <li>- design an annual programming, monitoring and evaluation system (APME) in the MOA to support systematic planning.</li> </ul> <p>Strengthen the agricultural information system in the MOA.</p>	<p>Design a research policy to provide the long-term needs of traditional and non-traditional production activities;</p> <p>Involve relevant public and private sector institutions, producer organizations, etc. in this activity</p>

AREA	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Agricultural research (Cont'd)	<p>Inadequate public research system to support agricultural production</p> <p>Weak organizational structure and overlapping functions in the MOA's research system.</p> <p>Inadequate coordination and monitoring of research activities in the country.</p>	<ul style="list-style-type: none"> <li>- establish a research committee to advise the government on research priorities and policy</li> <li>- Allocate more resources to strengthen the public research system;</li> <li>- provide incentives to retain and attract qualified staff.</li> <li>- execute training programs to upgrade skills of the MOA's research staff;</li> <li>- strengthen linkages between research and extension;</li> <li>- reorganize the research structure in the MOA;</li> <li>- institutionalize a formal supervision, monitoring and evaluation system;</li> <li>- establish stronger linkages and cooperation mechanisms through networking with research systems within Belize and abroad.</li> </ul>	<ul style="list-style-type: none"> <li>- Prepare specific projects to access external funding for strengthening the MOA's research system</li> <li>- identify possibilities for cost recovery for the provision of certain public research services.</li> <li>- Organize structures along decreasing hierarchy levels (eg. department, division unit, etc.)</li> <li>- define roles and responsibilities of the units and staff engaged in research</li> </ul>
Agricultural extension	<p>Absence of a long-term extension policy</p> <p>Weaknesses in the organization and management of the public extension system.</p>	<p>Design a long-term extension policy consistent with the research policy.</p> <p>MOA's extension structure should be strengthened to provide adequate quality and increased coverage of the service.</p>	<ul style="list-style-type: none"> <li>- Specify institutional responsibilities and roles;</li> <li>- consolidate extension activities to focus on priority areas of production;</li> <li>- evaluate possibilities for divesting certain functions/activities to the private sector;</li> <li>- allocate more resources to extension activities</li> <li>- provide adequate complimentary support services (research, marketing, credit, etc.)</li> </ul>
Plant and Animal Health	<p>Absence of an overall plant and animal health policy</p>	<p>The MOA should design a comprehensive policy, specifying priorities and strategies for its implementation;</p>	

AREA	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Plant and Animal Health (Cont'd)	<ul style="list-style-type: none"> <li>- Weak institutional capabilities in the MOA to execute all aspects of the government's plant and animal health policy;</li> <li>- Inadequate support services.</li> </ul>	<ul style="list-style-type: none"> <li>- the government should enact the necessary legislation to support its plant and animal health policy.</li> <li>Strengthen the MOA's capabilities and increase the support facilities in plant and animal health.</li> </ul>	<ul style="list-style-type: none"> <li>- allocate more resources to improve the service;</li> <li>- modify the structure to provide a more service;</li> <li>- provide training to update staffing skills;</li> <li>- implement a cost recovery plan for certain services;</li> <li>- privatize certain aspects of the service.</li> </ul>
Training	<ul style="list-style-type: none"> <li>Lack of an agency to register veterinary drugs.</li> <li>Inadequate information system.</li> </ul>	<ul style="list-style-type: none"> <li>Design an appropriate institutional mechanism for registration of veterinary drugs.</li> <li>- The MOA should move towards having a computerized information system for the service</li> <li>- strengthen linkages with other institutions in Belize and abroad for sharing information.</li> </ul>	<ul style="list-style-type: none"> <li>Provide training in various methodologies to MOA's staff;</li> <li>- execute a program to train farmers on a continuous basis</li> </ul>
Marketing	<ul style="list-style-type: none"> <li>Absence of a marketing policy, particularly for developing non-traditional products.</li> <li>Inadequate development of private marketing in the non-traditional area.</li> </ul>	<ul style="list-style-type: none"> <li>Strengthen the institutional capability of the BCA and other institutions to meet the training needs of the sector</li> <li>Improve training support facilities in the BCA.</li> <li>Design a marketing policy for the sector.</li> <li>- Support the development of private marketing initiatives;</li> </ul>	<ul style="list-style-type: none"> <li>- Execute a comprehensive assessment of the agricultural marketing system.</li> <li>- formulate an action program for marketing reform, including the development of wholesaling and retailing activities;</li> <li>- provide incentives for the private sector to improve the marketing system;</li> <li>- expand the public sector's role to facilitate agricultural marketing;</li> <li>- provide adequate infrastructure to support private marketing activities.</li> <li>- restructure the BMB to engage less in marketing activities and play a more facilitate role</li> </ul>

AREA	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Marketing (Cont'd)	<p>Poor or non-existing marketing facilities.</p> <p>Prevalence of a centralized and atomized system fostering collusion at the wholesale level and low efficiency at the retail level.</p> <p>Lack of vertical and horizontal integration among marketing operators.</p> <p>Inadequate support services for marketing.</p>	<p>Promote the development of private marketing facilities (drying, storage, processing, packing facilities, etc.).</p> <p>Pursue decentralization of marketing activities.</p> <ul style="list-style-type: none"> <li>- Strengthen integration among components of the marketing system;</li> <li>- improve coordination and monitoring among participants in the system.</li> <li>- Strengthen marketing support services (planning, information, credit, etc.);</li> </ul>	<ul style="list-style-type: none"> <li>- implement training programs for marketing operators at all levels</li> <li>- assign one entity to coordinate actions throughout the marketing system.</li> <li>- Establish a commercial extension center,</li> <li>- improve the information system to improve marketing</li> </ul>
Credit	<p>Commercial banks do not provide long-term funding for agriculture.</p> <p>Limited access of small farmers to credit.</p>	<p>Develop alternative funding mechanisms to provide long-term financing to the sector, particularly non-traditional production.</p> <ul style="list-style-type: none"> <li>- design financing mechanisms for the smallfarm sector;</li> <li>- remove the land tenure constraint of small-farmers;</li> <li>- MOA and DFC should improve coordination of lending to small farmers.</li> <li>- provide increased support to smallfarmers for designing viable projects;</li> <li>- design training programs to improve small-farmers capability to manage credit;</li> <li>- increase savings mobilization among small-farmers.</li> </ul>	<p>These activities should include collaboration among the MOA, DFC and NGOs and the commercial banks</p>



AREA	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Infrastructure	Inadequate infrastructure induces high production, costs, transportation and distribution bottlenecks.	<ul style="list-style-type: none"> <li>- Improve the quality of and expand the roads network;</li> <li>- improve the port in Belize City to accommodate larger vessels;</li> </ul>	Cost recovery initiatives should be developed for contributing to maintenance of the infrastructure.
Natural resource use and management	<p>Inadequate policies</p> <p>Limited institutional capability to effectively manage the country's natural resources.</p> <p>Resource degradation, pollution, over-exploitation and environmental problems are increasing.</p>	<ul style="list-style-type: none"> <li>- Improve policy design;</li> <li>- the government should enact the necessary legislation to support policy implementation.</li> <li>- The government should strengthen the relevant public institutions operating in this area;</li> <li>- improve coordination and monitoring by the institutions.</li> </ul> <p>A comprehensive approach to natural resource planning is required taking into account physical aspects and long term economic and social needs.</p>	<ul style="list-style-type: none"> <li>- Design an inter-institutional mechanism for comprehensive natural resource use planning, design sustainable agricultural production systems</li> </ul>



**APPENDIX E**

**LIST OF INDIVIDUALS AND ORGANIZATIONS INTERVIEWED OR  
CONSULTED BY THE MISSION**



**Ministry of Agriculture (MOA):**

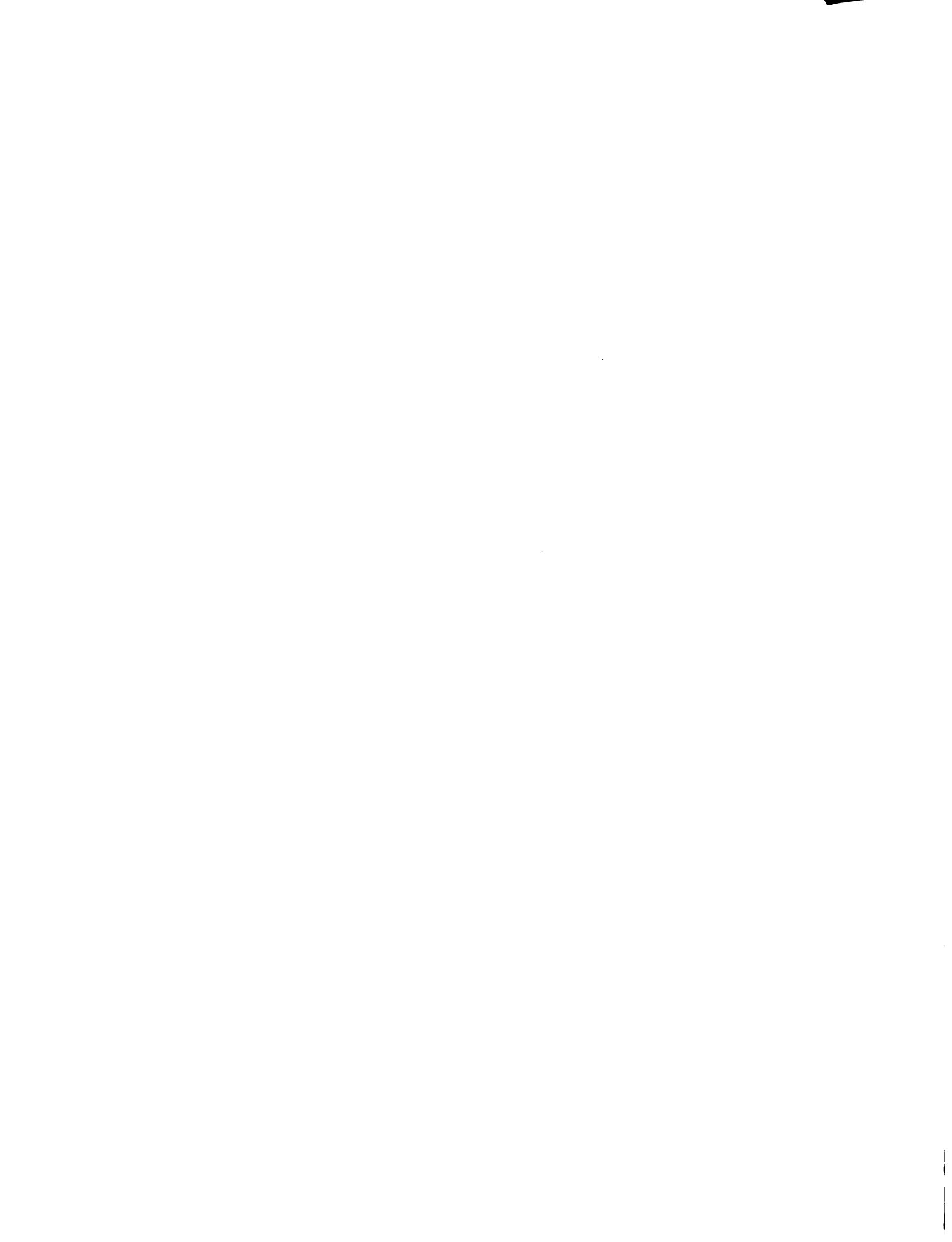
Efrain Aldana	Chief Agricultural Officer
Alphonso Bautista	Statistical Assistant II
Ivor Burns	Principal Veterinary Officer
Jose Castellanos	Agricultural Economics
Derrick Clare	Animal Health Assistant
Michael DeShield	Veterinary Officer
Fred Garcia	Executive Officer
Sergio Garcia	District Agricultural Officer, Cayo
Rosalie Gentle	Accountant
Victor Gongora	Livestock Officer
Orlando Habet	Livestock Officer
Roberto Harrison	Ag. Economist
Peter Hunt	ODA/NRI, Central Farm.
Fred Hunter	Medfly Services (trapping operations and papaya export inspection)
John Link	Plant Pathologist, Central Farm
Roberto Manzanero	Quarantine Inspector
Rene Montero	Principal Agricultural Officer, Special Projects
George Myvett	Senior Fisheries Officer, Fisheries Department
Patricio Mena	District Agricultural Office
Rodney H. Neal	Permanent Secretary, Ministry of Agriculture
Harry Parham	Principal Agricultural Officer, Extension
Wendel Parham	Policy Analyst
Herman Pastor	Head, Toledo Small Farmers Development Project (TSFDP).
Allison Patten	Officer in Charge, Central Farm
Jacqueline Simpson	Statistical Clerk, Central Farm
Phillip Tate	Statistical Assistant I
Haycynth Wagner	Assistant Secretary
Ruth Willians	Finance Officer
Rosalie Zaldivar	Former Assistant Secretary, Personnel
Eddie Zuniga	Former Finance Officer

**Others:**

Yvette Alvarez	Senior Manager Researcher, Central Bank of Belize
Sylvern Arthurs	Principal Public Health Inspector (Deputy). Ministry of Health
Rick August	HELP for Progress, Belmopan
Glenn Avilez	Chief Statistician, Ministry of Finance
Elias Awe	HELP for Progress, Belmopan
Hipolito Bautista	Director, Export Processing Zone, Ministry of Trade and Industry

Edney Bennet	Deputy Labour Commissioner, Ministry of Labour
Luis Betancourt	HELP for Progress, Belmopan
Anselmo Castañeda	BEST.
Geraldine Davis	Income Tax Department
Bertie M. Chimilio	Veterinary Officer, Belize City
Bridget Cullerton	Managing Director, BEST
Juan Elias	Belize Livestock Producers Association
Cynthia Ellis	Belize Rural Woman Association (BRWA), Belmopan
Beltrand Enrique Sr.	General Manager, Belize Federation of Agriculture Cooperative Society Limited
Bertram Enriquez, Sr.	General Manager, Belize Federation of Agricultural Cooperatives (BFAC), Cayo
Colwin Flowers	Commissioner of Transport, Department of Transport
Erasmus Franklin	Manager of the Chemical/Agricultural Division of James Brodie & Co. Ltd.
Carlos C. Fuller	Chief Meteorologist, National Meteorological Center, Ministry of Natural Resources
Linda Gamero	Help for Progress
Owner Gentle	Land Revenue Administration
Kenneth A. Gillett	Commissioner of Land and Surveys, Ministry of Natural Resources
Santiago Gómez	Manager, Belize Export and Investment Promotion
Wilfredo Guerrero	Senior Executive Engineer, Ministry of Works
Justin Hulse	Deputy Chief Meteorologist, Ministry of Natural Resources
Dennis Jones	Chairman, ANDA
Juan Landero	Farmer, San Jose, Cayo
Marvin Lembeya	Senior Social Development Officer, Ministry of Social Development
George Like	USAID Officer, USAID Mission
Gilbert Linares	Public Health Inspector. Ministry of Health
N. MacAndrew	Agronomist, CARDI
Lynn MacDonald	Statistician, Ministry of Finance
Jerome McKessey	Director of Lincoln E. McKessey & Sons
José L. Méndez	Economist, Ministry of Economic Development
Arturo Mesh	Farmer, Cayo
Jennette Myvette	Project Accountant, BEST
P. Noreen	Information Officer, Ministry of Natural Resources
Humberto Paredes	Director, Public Sector Investment Programme, Ministry of Economic Development
Attam Parkash	Trade Policy and Facilitation Adviser, Commonwealth Secretariat, London
Linda A. Price	Administrative Officer, Department of Transportation
José O. Puga	Permanent Secretary, Ministry of Economic Development
Edward Pulver	Natural Resources Management and Protection Project (NARMAP)

<b>Benjamin Reimer</b>	<b>Mennonite Community, Spanish Outlook, Cayo</b>
<b>Vladimir Rathouser</b>	<b>PAHO Representative</b>
<b>P. S. Reddy</b>	<b>Research Manager, Belize Citrus Growers Association</b>
<b>Richard E. Reid</b>	<b>Trade Economist, Ministry of Trade and Industry</b>
<b>Ben K. Reimer</b>	<b>Mennonite Farmer</b>
<b>Oswaldo Sabido</b>	<b>Acting Principal Forest Officer, Forest Department</b>
<b>Ana Salazar</b>	<b>Coordinator of SPEAR</b>
<b>John Salvidar</b>	<b>Senior Economist, Ministry of Economic Development</b>
<b>Carlos Santos</b>	<b>Consultant</b>
<b>Bernardo Samayoa</b>	<b>Farmer, Armenia, Cayo</b>
<b>Miriam A. Serrut</b>	<b>Administrative Assistant, PCB, Central Farm.</b>
<b>Tomás Serrut</b>	<b>Belize Representative Agricultural Products of James Brodie &amp; Co. Ltd.</b>
<b>Anil K. Sinha</b>	<b>CARDI Representative</b>
<b>Michael Tewes</b>	<b>Former Manager, BMB</b>
<b>Albert Williams</b>	<b>Manager, BMB</b>
<b>Godfrey Young</b>	<b>Labour Officer, Ministry of Labour</b>
<b>Anita Zetina</b>	<b>Head, Womens Department, Ministry of Social Development</b>





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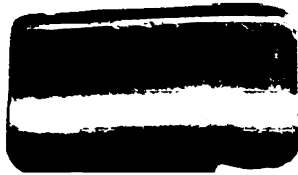
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