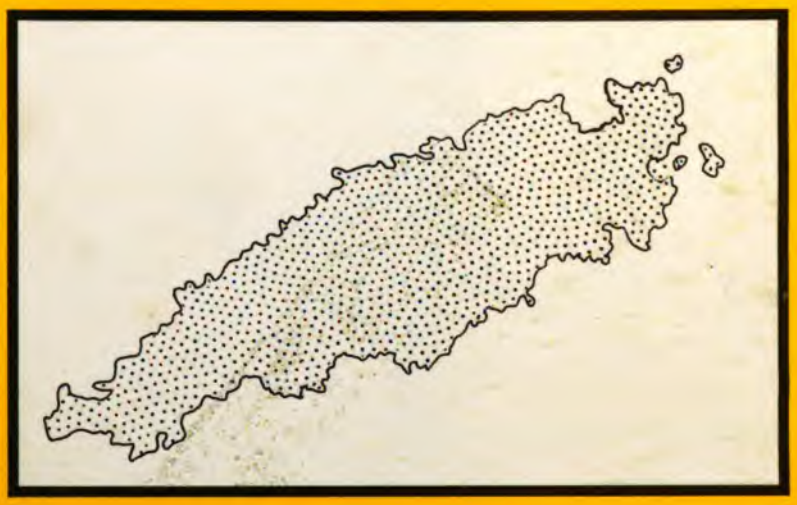
IICA

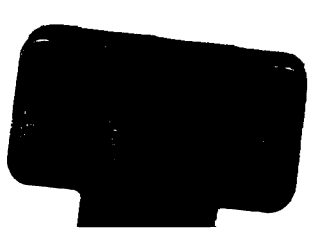
INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE
OAS

TRINIDAD AND TOBAGO



AGRICULTURAL SECTOR STUDY OF TOBAGO

CENTER FOR PROGRAMS AND INVESTMENT PROJECTS (CEPPI)
TOBAGO'S DIVISION OF AGRICULTURE, FORESTRY AND MARINE AFFAIRS



TRINIDAD AND TOBAGO: AN AGRICULTURAL SECTOR STUDY OF TOBAGO

JULY 1994

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.

This study was prepared at the request of the Division of Agriculture, Forestry and Marine Affairs (DAFMA) of the Tobago House of Assembly (THA). It provides a diagnosis of Tobago's agricultural sector and the foundation for designing a future agricultural development strategy for the THA and the Government of Trinidad and Tobago. It was coordinated by CEPPI, with support from the IICA Office in Trinidad and Tobago and the DAFMA.

The report consists of nine chapters. Background information on Tobago is provided in chapter one. An overview of the country's agricultural and natural resource policies, and those of Tobago specifically, are presented in chapter two. Chapter three examines the status of Tobago's natural resource base and its implications for the island's agricultural development. Chapter four discusses the major characteristics and constraints of the agricultural sector, while Chapters five and six analyze the crop, livestock and fisheries sub-sectors. Chapter seven examines the marketing of agricultural products and Chapter eight provides an assessment of the main agricultural institutions. Chapter nine presents both the framework for an agricultural development strategy for Tobago and the agricultural development potential of the island, and makes specific policy and institutional recommendations.

Several institutions in Trinidad and Tobago also contributed to the development of this study by providing various types of information. These include the Tobago House of Assembly, Tobago Agricultural Society, Ministry of Agriculture, University of the West Indies, Central Statistical Office, Town and Country Planning Division, the Central Bank and the Caribbean Agricultural Research and Development Institute.

PREPARATION OF REPORT

This report was prepared by a technical team comprising:

Dowlat Budhram	Coordinator of the Study, CEPPI/IICA
Errol Berkely	Coordinator, Regional Projects Unit, IICA Office in Barbados
Willard Phillips	IICA Office in Trinidad and Tobago
Paul Thomas	Livestock Officer, Division of Agriculture, Forestry and Marine Affairs, Tobago House of Assembly
Pam Collins	Consultant in Crop Production
Ranjit Singh	Consultant in Natural Resource Use and Management
Carlos Santana	Coordinator, Sectorial Studies Area, CEPPI/IICA
Eddy Palma	Computer Specialist, CEPPI/IICA
Mabel Valerin	Secretary, CEPPI/IICA

Thanks is given for the contributions from: Gerald MacFarlane, Secretary of Agriculture, Tobago House of Assembly; Arlington Chesney, IICA Representative in Trinidad and Tobago; Gerard Barbeau, IICA's Fruit Crop Specialist in Trinidad and Tobago; Wayne Lees, IICA's CARAPHIN Coordinator in Trinidad and Tobago; Geraldo Calegar, Coordinator of CEPPI/IICA; the administrative and secretarial staff of the IICA Office in Trinidad and Tobago; and the technical and support staff from the Division of Agriculture, Forestry and Marine Affairs of the Tobago House of Assembly.

ACRONYMS

AA	Agricultural Assistant
ACT	Association for Caribbean Transformation
ADB	Agricultural Development Bank
APME	Annual Programming, Monitoring and Evaluation
CARDI	Caribbean Agricultural Research and Development Institute
CARICOM	Caribbean Community
CARIRI	Caribbean Industrial Research Institute
CDB	Caribbean Development Bank
CEPAT	Continuing Education Programme in Agricultural Technology
CFRAMP	Caribbean Fishery Resource Assessment and Management Program
CFTDI	Caribbean Fisheries Training and Development Institute
CGA	Coconut Growers Association
CIAT	International Center for Tropical Agriculture
CIDA	Canadian International Development Agency
CMA	Central Marketing Agency
CPA	Cocoa Planters Association
CSEs	Consumer Subsidy Equivalents
CSO	Central Statistical Office
CWM	Central Wholesale Market
DAFMA	Division of Agriculture, Forestry and Marine Affairs
DP	Division of Planning
ECIAF	Eastern Caribbean Institute of Agriculture and Forestry
EDF	European Development Fund
EEC	European Economic Community
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EO	Extension Officer
FAC	Food and Agricultural Corporation
FAO	Food and Agricultural Organization
FRP	Forest Resources Plan
GORTT	Government of the Republic of Trinidad and Tobago
IDB	Inter-American Development Bank
IICA	Inter-American Institute for Cooperation on Agriculture
IMA	Institute of Marine Affairs
MALMR	Ministry of Agriculture, Lands and Marine Resources
MD	Marketing Division
MDC	Management Development Centre
MFPME	Ministry of Food Production, Marine Exploitation, Forestry and the Environment
MIET	Ministry of Industry, Enterprise and Tourism
MTPF	Medium-Term Policy Framework
NAMDEVCO	National Agricultural Marketing Development Corporation

NGOs	Non-government Organizations
NIPDEC	National Insurance Property Development Company
NPDP	National Physical Development Plan
NRAC	Natural Resources Advisory Council
NRMU	Natural Resources Management Unit
PCFC	Pembroke Cocoa Fermentary Cooperative
PSEs	Producer Subsidy Equivalents
SBDC	Small Business Development Corporation
TAS	Tobago Agricultural Society
TCPD	Town and Country Planning Department
TDGFA	Tobago Dairy Goat Farmers Association
TFAP	Tropical Forestry Action Plan
TFC	Tobago Fishing Cooperative
THA	Tobago House of Assembly
TO	Technical Officer
TRBA	Tobago Rabbit Breeders Association
TT	Trinidad and Tobago
TTAS	Trinidad and Tobago Agricultural Society
TTBS	Trinidad and Tobago Bureau of Standards
TWIC	Tobago Wood Industry Cooperative
TSH	Trinidad Select Hybrids
UWI	University of the West Indies
UNDP	United Nations Development Program
US	United States
VAT	Value Added Tax
WASA	Water and Sewerage Authority
WRA	Water Resources Agency

WEIGHTS AND MEASURES

British		Metric
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 ($km.^2$)
1 pound (lb.)	=	0.4 kilogram (kg.)
1 cwt	=	50.8 kilograms
1 ton	=	1.016 metric ton (mt.)
2205 lbs.	=	1 metric ton (mt.)

TABLE OF CONTENTS

Page

Page

TABLES IN THE TEXT

FIGURES IN THE TEXT

Page

List of Tables

List of Figures

EXECUTIVE SUMMARY

Background: The island of Tobago is an integral part of the two-island nation of Trinidad and Tobago. The Tobago House of Assembly (THA) was established in 1980 and was given the mandate to administer the affairs of the island, including its social, economic and political development. A ten-year plan (1981-90) was formulated for the economic and social development of the island. Although Tobago has internal self-government (since 1980), it is subject to national economic and social policies, defence and various administrative regulations by the Central Government of the country.

Traditionally, Tobago's economy has been based on agriculture. Among other achievements, the island ten-year development plan resulted in a considerable improvement to the island's infrastructure (roads, the port, water supply, etc.) for supporting tourism development, agriculture and a few light manufacturing activities. Presently, a major proportion of the island's economic activities is service-based, with government and tourism-related services being the most important ones. To a lesser extent, agriculture (including fisheries), retail trade and construction are other main economic activities.

Development Strategy: Consistent with the Medium Term Macro Planning Framework of the country (1989-95), the THA defined five broad objectives for the economic development of the island. These are to: (i) transform the island's economy from a dependent one to one being more productive and self-reliant; (ii) promote economic diversification; (iii) attain greater self-sufficiency in food production; (iv) develop an efficient system of social and economic infrastructure; and (v) create productive employment opportunities. Job creation was identified as the principal focus of development activities and the THA's strategy involved expanding the employment base through increased investment and other activities, private investment, small enterprises and through self-employment. The sectors targeted for development were agriculture, tourism, fishing, agro-industry and light manufacturing.

Tobago's agricultural development strategy complemented the national agricultural strategy. Basically, its strategy aimed at increasing Tobago's self-sufficiency and reducing its dependence on food imports, by expanding food production to meet the needs of both the local population and the tourist sector. Emphasis was placed on: (i) increasing output of food crops and livestock products; (ii) commercializing activities such as vegetables and ruminants for both the tourist sector and for export to Trinidad; and (iii) expanding production of commodities for which there is both a domestic and export market potential.

In support of the strategy, the THA executed programs to: (i) increase access to lands for farming; (ii) develop vegetable, small ruminant and fishing sub-sectors; (iii) expand agro-processing; and (iv) improve basic infrastructure, support services and the agricultural marketing system. In this regard, several specific measures were implemented, the most important of which were: (i) a stateland distribution program whereby some estate lands acquired by the government were distributed to farmers; (ii) provision of subsidized tractor services for land preparation; (iii) production of seedlings and plants for sale to farmers at subsidized prices;

(iv) establishment of demonstration centers (for both crops and livestock) and commercial plots at Louis D'Or, Goldsborough and Studley Park; (v) strengthening institutional support and expansion of services in the areas of extension and training; and (vi) providing direct support to marketing and agro-processing.

Evidence from farm level activities and from the volume of commodities flowing through the marketing system suggest that the impact of the THA's policy measures has been marginal. With few exceptions, farming has remained a part-time activity, and the measures have failed to commercialize production activities and reduce the island's dependency on food imports. The land distribution program has not produced the intended results, since a large number of the beneficiaries have remained as part-time farmers or have abandoned farming.

In addition, Tobago's agricultural sector has been and continues to be adversely affected by the country's macroeconomic and agricultural policies, through, among others: (i) a reduction in the budgetary resources allocated to support the island and its agricultural sector; (ii) a relative strengthening of the institutional framework and support services in Trinidad; and (iii) allowing cheaper food imports into the country.

Population and Labor Force: In 1990, Tobago's population was 46,654 persons (4.1% of the national population), 50% of which was less than 30 years of age. The population was almost equally divided between males and females. Compared to earlier periods, the population growth was higher in the 1980-90 period, averaging an annual average rate of 1.8%. Growth has always been affected by the migration of people to Trinidad, which has been an important employment source. However, the migration trend reversed in recent years, with many persons preferring to remain in Tobago and others returning, due to a contraction of Trinidad's economy since 1985 and declining employment opportunities there, as well as economic development in Tobago.

Within Tobago, the southwest and Scarborough areas recorded higher population growth on a continuous basis, due to the concentration of commercial and employment-generation activities in these places. The northcoast area has consistently experienced negative growth rates because of its resource limitations and scarce economic opportunities.

In 1991, the labor force was estimated at 33,800 or 63% of the population. The services sector (including government, finance and real estate activities) has been the most important and the largest employer of labor in the island's economy. In 1991, it accounted for 42% of total employment, while the construction sector contributed 22%, wholesale and retail trade 8%, restaurant/hotel sector 7% and agriculture (including fishing and forestry) 6%.

Since 1980, the unemployment situation in Tobago has deteriorated. The unemployment rate steadily increased to 22.8% of the total labor force by 1989, due to the country's economic recession and its adverse impact on the fiscal operations of the THA. In 1991, the rate decreased to 19.4%, with a 12.7% unemployment rate among males, compared to 30.8% for females. Due to the concentration of employment generating activities around Scarborough and

its environs, unemployment was lower in the southwestern area and highest in the parishes of St. John (58.5%) and St. Paul (46.1%).

Natural Resource Base: The natural resource base of Tobago includes soils, water, forests, coastal and marine resources, as well as environmental and ecological resources. With the exception of low potassium levels in some areas, soil fertility in most areas is adequate for producing crops. The island's Class I soils are suitable for any kind of crop production. Of the 38 soils classified, 23 could, under proper management, be used for vegetable production, and 31 for food crops. Only 12 were considered suitable for citrus production, 31 were considered suitable for other fruit trees and 33 for coconut. Three soils are not suitable for crop production, one being swamp and the other two severely eroded.

The major factor limiting the suitability of land for productive agriculture in Tobago is "slope," with the associated problem of erosion risk. Approximately 79% of the soils, corresponding mainly to those of Group C (Steepland soils), are limited in use because of this factor. The only other limitation of significance is "excess moisture in the soil." About 20% of the island's soils have this limitation which generally occurs in pockets in various valley bottoms and coastal lowlands.

Tobago's forest resources are limited and are concentrated on the main ridge, consisting of 4,000 ha. of forest located in the North and North East districts. Most of these are in the forest reserve. Additionally, there are 33 ha. of forests in private ownership. The forest areas, particularly the forest reserve, provide a resource base rich in biodiversity, scenic views, clean air and natural wilderness. Excluding the southwest, much of the natural ecology of the island has been preserved due to limited development.

Since 1980, the THA's policy has been to conserve the forest resources, and it has discontinued timber exploitation from the forest reserve. The main ridge contains five watersheds and they provide the major catchment areas for most of the island's water. Unlike Trinidad, this area has not been affected by activities such as deforestation and slash and burn agriculture.

Surface run-off constitutes the major source of water on the island since ground water is not available in any appreciable quantity. All the water produced is based primarily on the yield of the main ridge. Water demand exceeds production, particularly in the south-west, due to the expansion in tourism and other development activities in recent years. Present water utilization is dominated by domestic use, with the tourism sector being the major user.

The island's coastal and marine resources comprise the beaches, the fisheries and other marine resources such as macro-algae and coral which can be found in and around the island's reefs. The coastal resources are utilized mainly for tourism and to facilitate fishing. In the southwest, rapid development of this area and the removal of vegetation, together with infrastructural deficiencies in waste handling and sewage treatment, have led to pollution of coastal waters. In some cases, the levels were above the mandatory recreational quality standards

that have been established internationally. This, together with household and urban water run-off also threaten the island's coral reefs.

Although there is no precise assessment of the fishery stocks, there is evidence that some species are being overexploited, particularly in the inshore fisheries. The DAFMA has given a high priority to coastal resources conservation, and has initiated a set of activities including participation in an Eastern Caribbean network to conduct surveys of flying fish, regularly patrolling the Buccoo Reef and working with NGOs to regenerate and enhance the reef.

Besides the Tobago ridge, the coral reefs, beautiful beaches, scenic landscapes, rustic and unpolluted countryside, forests and wildlife, together provide a rich and valuable tourism resource base, a major factor in the recent growth in tourism in Tobago.

With some exceptions, the natural resource management policies implemented over the years have placed Tobago in a relatively good position with respect to the state of its natural resources and the environment. Declaration of the forest reserve and enforcement of conservation measures have left the island with almost 34% of its area under forest, much in pristine form. The biodiversity, aesthetic value, hydrologic balance, micro-climate stabilization and wildlife associated with one-third of the land area have thus been preserved. Furthermore, the establishment of game sanctuaries on the island of Little Tobago in 1928 and St. Giles Island in 1968 has preserved two important natural heritage areas.

However, while past policies have served well to protect and conserve a large proportion of the island's natural resources, the same cannot be said about other aspects of the natural resource base. The absence of a comprehensive environmental policy and accompanying legislation, together with the limited enforcement capacity of agencies such as the Town and Country Planning Department, have had adverse impacts on the resource base and environment, particularly in the southwest sub-region. The absence of adequate guidelines and proper planning, the lack of enforcement of regulations, and the absence of a comprehensive and effective system of land zoning have contributed to the rapid alienation of agricultural lands in other parts of the island.

Characteristics of the Agricultural Sector: Agricultural production activities comprise mainly small ruminants, small stocks of cattle and milk production, fishing and crop production. There are also limited forest activities which consist of small operations producing timber for household use and for small shelters. The farming system is characterized by small, part-time farming activities, low levels of technology utilization and low production efficiency. There are a limited number of commercial farming activities, the major ones being a few large beef cattle operations.

The last agricultural census (1982) indicated that there were 1,966 agricultural holdings in Tobago, having a total land area of 5,872 hectares. More than one-half of these holdings and the land area were owned, with the balance being accounted for by rentals, leases, squatting and contracts. Small holders (<2 ha.) accounted for 71% of the total holdings, but they occupied

only about 15% of the area. The average size of small holding was 0.6 ha., while the large holdings (>50 ha.) averaged 160.8 ha. each, being primarily state lands and private estates.

Recent information suggests that a large proportion of the land area is still in large holdings, controlled mainly by the state and by private estate owners. Moreover, small farmers occupy a smaller proportion of the total land area and their average farm size has reduced due to: (i) diversion of more land to built development and other non-agricultural uses; and (ii) the stateland distribution program.

In previous years, the state had acquired several private estates; today, it owns twelve estates comprising approximately 4,139 ha. Much land on these estates is underutilized, and constitutes a major source of land available for expanding agricultural development. The THA has tried to facilitate this expansion through a program that distributes state lands to farmers having a land constraint. In addition, squatting has become a major problem on statelands, and large areas of private lands are also underutilized or in an abandoned state.

A large proportion of good agricultural land in the southwest sub-region has been diverted into built development. This area still remains the most important for the development of agriculture, since approximately 40% of the best soils are located there. However, the recent growth in tourism and service-related developments in that sub-region has induced a high demand for land. Moreover, evidence from real estate transactions as well as requests for planning approval for this sub-region suggest that large tracts of land under agriculture, comprising the highest soil capabilities, are in the process of conversion, or are likely to be converted to built-up uses in the future.

Because farming is a part-time activity in Tobago, labor is usually provided by the farmer and/or the farm family. Very few enterprises are large enough to hire full-time labor, which is both scarce and very costly. Women farmers may hire labor more often for activities such as land preparation and clearing bush.

Like most Caribbean countries, Tobago's labor market has several major characteristics which adversely affect agricultural development. These include: (i) an aging farmer population; (ii) a lower average income in agriculture compared to most other occupations; (iii) pull factors such as higher remuneration, job security and other benefits in the government and in other sectors; (iv) farming is a part-time activity; (v) agricultural labor demand is highly seasonal; and (vi) farmers do not aspire to involve their children in agriculture.

Women play an important role in Tobago's agriculture. Although many holdings are owned by males, they are operated by both spouses, with women contributing at least as much as men to crop production. Most women are involved in crop production, as well as in preservation and/or processing. Other aspects of crop production such as nursery care, planting, fertilizing, weeding and harvesting may either be shared between spouses or undertaken by the woman. Furthermore, due to the high cost of inputs and other responsibilities, women farmers are more likely to have a relatively lower input farming system and achieve lower yields.

In general, farm incomes are low in the country and agriculture is considered to be a low income activity which does not attract young people. Estimates of the level of farm incomes vary, ranging from 50% to 75% of the average income level for all occupations in the country. The situation in Tobago is likely to be the same or even more acute due to agriculture being a part-time occupation. Recent observations and interviews with farmers suggest that few households are totally dependent on farming for their income, except for small artisanal fishermen.

With regard to inter-sectoral linkages, Tobago's agriculture has few linkages with other sectors, particularly with processing and tourism. Many factors that affect the sector's development, such as inadequate agricultural marketing, also limit strong linkages between agriculture and these sectors.

The agricultural sector has declined progressively in the last few decades. Some factors that contributed to this are rooted in the island being a part of the nation state of Trinidad and Tobago. These include the impact of structural changes on the country's economy and its agricultural sector, competition for labor, land and financial resources within the island economy and the country, and competition by cheaper products from Trinidad and from abroad. In addition, the land tenure system, underutilization of land, low technology utilization in farming, inadequate markets, a weak institutional support system, lack of commercial farming, predial larceny and a disdain for agricultural work constrain production and contribute to a general lack of competitiveness of the sector.

Crop Production: Although there are about 650 farmers currently involved in commercial crop production, most crops are produced on small plots that average less than 0.5 ha. by part-time farmers engaged in non-intensive agriculture. They cultivate a mixed system comprising some root crops, a few vegetables, fruit trees and other food crops and rear a few animals. In addition, about 80% of the households maintain a backyard garden, cultivating mainly vegetables and fruits.

The main vegetables produced include tomato, sweet pepper, cabbage, cucumber, pumpkin, beetroot and various condiments (seasonings) and these are cultivated in several areas of the island. Smaller quantities of other vegetables such as cauliflower, lettuce, broccoli and many others are also cultivated with the main production areas being the statelands at Shaw Park in the southwest and at Goldsborough in the Windward district. The main constraints affecting vegetable production are: (i) an inadequate marketing system; (ii) competition by cheaper products from Trinidad; (iii) pest and diseases; (iv) low levels of technology utilization; (v) costly inputs; and (vi) the practice of part-time farming and labor scarcity.

The main root crops cultivated are sweet potato, yam, cassava and dasheen grown on small plots in mixed cropping systems throughout the island. Sweet potato is usually grown in pure stand, dasheen is cultivated in wet areas, also in pure stand, while yam and cassava are frequently intercropped. More farmers grow yam in the hilly districts of Charlotteville and Runnemede, while a large proportion produce sweet potato and cassava in Plymouth. The main

constraints of root crop production are: (i) pests and diseases; (ii) lack of good planting material; (iii) high costs to maintain germplasm banks; and (iv) inadequate storage and processing facilities.

The other main food crops are pigeon peas, corn, bananas and plantain, grown throughout the island and in almost every household garden. In recent years, some farmers have expanded cultivation of pure stand corn, which otherwise is traditionally grown as a corn/peas mixed crop. There are also many small, pure stands of pigeon peas throughout the island, while production of bananas and plantain is concentrated in Charlotteville and in the Windward valleys. Pests and diseases are the main constraints of these crops.

Fruit crops and estate crops are also cultivated in Tobago. Fruit trees are usually cultivated in a mixed system, with the main crops being mango, orange and other citrus. There are also smaller cultivations of West Indian cherry, sour cherry, soursop, sapodilla, golden apple, pomerac, breadfruit, paw paw, melons, pineapple and cantaloupe. A large proportions of the fruits produced comes from small orchards, "backyard" trees that are scattered throughout the island and from those interplanted with short-term crops.

The main estate crops are cocoa grown in the northeast and coconut in the southwest. Production of both crops declined significantly since Hurricane Flora struck Tobago in 1963 and most of the trees destroyed were not replanted. In addition, few new plantings of these crops were done in the last three decades and much of the area previously cultivated has been abandoned.

The principal constraints of fruit crop production are: (i) low productivity and high production costs; (ii) marketing problems and competition by retailers from Trinidad; (iii) pests and diseases, particularly bird pests; (iv) lack of processing facilities; and (v) praedial larceny. In the case of cocoa, birds (particularly parrots) have been a serious crop pest.

Livestock production: The livestock sub-sector comprises production of cattle, sheep, goats, pigs, poultry and rabbit. The principal outputs are live animals, fresh and frozen meats, milk, eggs and processed products such as ham, bacon and sausages. Except for a few large commercial operations in the southwest, production is done by a large number of small part-time farmers operating a subsistence system, to meet household needs primarily and sell any surplus in local markets. These farmers have a mixed animal production system in which they rear stocks consisting of a few cattle, sheep, goats and pigs.

There are five main livestock production systems: (i) roadside tethering; (ii) zero grazing (cut and carry); (iii) pasture grazing (extensive system); (iv) a combination of the above; and (v) concentrate-based system. Of these, the first two are the most common among small farmers, while the extensive system is practiced in the southwestern part of the island where beef cattle and sheep are reared under coconuts on a few large estates.

Beef cattle production is done: (i) on large estates using an extensive system; (ii) on the government station at Hope using an extensive production system; and (iii) by small farmers who rear small stock using the tethering system in their backyards or on the road side. The principal cattle breeds are Charolois, Jamaica Red Poll, Zebu and crosses of these. The main production constraints are: (i) difficulties in procuring breeding stock; (ii) high costs of inputs; (iii) inadequate water supply; and (iv) inadequate markets.

Dairy production has traditionally been a small-farm activity on a part-time basis. In general, farmers rear two to five dual-purpose animals having a high percentage of zebu blood, and these are maintained using the roadside tethering system. Production is affected by the same factors that constrain beef production. Additional factors include: (i) the hilly terrain and small farm size; (ii) part-time nature of operations; (iii) inadequate artificial insemination services; (iv) unsatisfactory marketing arrangements for milk; and (v) insufficient number of good quality breeding stock.

Most sheep and goats are raised by small farmers. Sheep are reared in flocks of one to 20 animals as a source of cash or for meat for special occasions. The production system varies, from roadside tethering by landless farmers when lands are available to the cut and carry system.

Pig production has also traditionally been a small farmer activity, but has been declining in recent years. The animal stock per farm is small, usually comprising less than 10 sows; the main production system is an intensive one in which pigs are housed in pens. The Large White Landrace and crosses are the main breeds in Tobago. Between 1982 and 1991, the pig population declined by more than one-half, due to private farmers ceasing operations and disposing of their breeding stock. The unreliability of supply and the high cost of concentrate feeds, together with inadequate marketing arrangements, were the main factors that affected production.

Poultry production is a small-scale activity in Tobago, mostly backyard operations. In the last decade, the sector has declined due to the closure of the commercial operations by many small producers because of: (i) the unreliable supply and high cost of concentrate feeds; (ii) high production costs; and (iii) cheaper imports of chicken and eggs from Trinidad. Presently, there are only two commercial farms in operation and these use the deep litter production system.

Fishing: Fishing has traditionally been an important activity, providing the main economic support to many coastal villages. Furthermore, the island's flying fishery has been one of the most popular in the Caribbean. Fishing is largely an artisanal and seasonal activity. In 1991, there were 32 recorded landing beaches, approximately 840 registered fishermen, 275 fishing boats and nine major fishing sites in Tobago. Most of the boats are located in the Leeward region of the island, operating from beaches such as Bon Accord, Buccoo, Plymouth, Charlotteville, Bloody Bay and Parlatuvier.

Much of the fishing is done in-shore, within the country's territorial waters (12 nautical miles). Most boats are small open-decked vessels called pirogues (<7.6 meters in length)

without modern equipment such as fish finders, communication systems or cold storage facilities. The most common fishing methods include trolling for the pelagic species, banking for the demersal species, fish potting, gill netting, beach seining and "drifting" (using nets and lines).

Although the peak fishing season is from January to June, fishing is done all year by many fishermen. Based on the fish landed on the main fishing beaches in recent years, the dolphin, tuna, albacore, snapper, shark and the flying fish are the most common species harvested. Preliminary data show that Pigeon Point, Lambeau and Buccoo were the most important landing sites for dolphin, while Charlotteville, Pigeon Point and Lambeau were the major landing sites for tuna. The major landing points for flying fish are Pigeon Point, Mt. Irvine and Buccoo.

Except for a few small processing operations, most of the fish landed are sold in fresh form. The catches are usually disposed of at the landing beaches by the fishermen and/or their spouses. Whenever there is surplus fish available, much of it is utilized for smoking, drying or filleting by small processing operations. The albacore, tuna, bonito, dolphin and wahoo are the most popular species smoked, while the dolphin is also dried and the flying fish is filleted and exported.

The fishing sub-sector is relatively underdeveloped in Tobago. Factors that have affected its development include: (i) inefficient technology utilized; (ii) insufficient information on the fish resources; (iii) overexploitation of some species; (iv) insufficient training of fishermen; (v) problems of marketing; and (vi) inadequate infrastructure to facilitate landing, and maintenance of boats and equipment.

Agricultural Institutions: Tobago's agricultural sector is supported by three main groups of institutions: (i) public; (ii) cooperatives and producer groups, and (iii) regional and international organizations. The Division of Agriculture, Forestry and Marine Affairs (DAFMA), the Marketing Division (MD) of the THA and the Agricultural Development Bank (ADB) are the main public institutions.

The DAFMA is the principal public sector institution in agriculture and it operates several support facilities for developing the island's agriculture. Most of the services so provided are highly subsidized by the THA. The facilities include a propagation station located on the Louis D'Or estate, two demonstration centers at Goldsborough and Louis D'Or, a propagation center in the Botanic Gardens, seven fish centers, two livestock stations at Blenheim and Hope, livestock breeding units at Runnemede, Louis D'Or and Charlotteville, the Kendal Farm School and a tractor pool service at Shaw Park for land preparation. In addition, its Marine Affairs section provides extension support to the fishing sub-sector.

The Division is financed mainly from appropriations provided by the THA, and it receives small amounts of funding and technical assistance from regional and international agencies for special projects. It also receives a small amount of revenue, less than TT$ 0.5 million/year from sale of various products and services. Since 1984, the real level of funding

from the THA, especially for development activities have declined significantly. Moreover, wages and salaries have absorbed about 83% of the recurrent expenditures in recent years.

The DAFMA suffers from several deficiencies that affect its developmental and supportive roles in the sector. These include a lack of policy formulation, ineffective planning and weak control and monitoring. These deficiencies are attributable to problems associated with the institutional structure itself and relationships between various units, inadequate technical and financial resources, a weak information base, and the low level of importance which many people attach to agriculture.

The **Marketing Division (MD)** has been involved in purchasing farmers' products, packaging and storage, distribution, transportation, market intelligence and selling farm products and inputs. It also retails other food products such as meat (chicken, beef and goat), macaroni, rice, and a few inputs, particularly animal feed and a limited number of chemicals. In addition, it is involved in processing of fish, pigeon peas, plantain chips, and a few fruits initiated through small pilot projects.

The Division also manages all public markets where private vending is done. This includes two retail markets and four mini-markets established in recent years (at Charlotteville, Speyside, Goldsborough and Plymouth) for farmers and vendors. Furthermore, it operates two distribution stations at Shaw Park and Louis D'Or, two abattoirs in Scarborough and Roxborough, and a small wholesaling facility that was established recently at the Scarborough public market.

The Division has several weaknesses that are typical of state marketing agencies. These include: (i) inefficient operations; (ii) inadequate response to market requirements; (iii) high dependence on THA for funding; (iv) inadequate pricing mechanisms; (v) limited technical and skilled human resources; (vi) late payment to farmers; and (vii) inability to access the revenue generated from its operations. The MD thus has had a limited impact on agricultural marketing and has incurred heavy financial losses.

The Division is currently reviewing its organizational structure and operations with a view to rationalizing its activities and improving its efficiency. It proposes to have a developmental role in marketing and to concentrate its purchasing and distribution operations in a limited number of commodities, based on certain criteria such as marketable potential, processing opportunities, perishability and distributional arrangements.

The **Agricultural Development Bank (ADB)** in Tobago is a branch of the country's ADB and it is the principal institution that provides agricultural credit in the island. Since 1988, the Bank has allocated a large proportion of its lending to the fishing, small ruminant and agro-processing sub-sectors. Its portfolio shows that it has lent TT$ 5.58 million to agriculture (including fishing and agro-processing). It has also financed processing of dried fruit and horticulture development. In the livestock sub-sector, funding has been channelled mainly to ruminant production projects (sheep and goats) and for pig and pig feed purchases.

The Bank's lending policy requires that the value of the security provided should be at least equal to the loan amount. Fixed assets, cash and insurance policies are acceptable forms of security. Leases are acceptable in some cases, but the lease must be valid for at least one year beyond the repayment period.

Tobago has several agricultural cooperatives but their performance has fluctuated due to changing economic conditions. Most are either totally or partially inactive. The more important active ones are the Tobago Fishing Cooperative and the Tobago Cocoa Fermentary Cooperative. The poor performance of most cooperatives is due to the low level of commitment to farming, production and marketing problems, and inadequate organization and management.

There are also several farmers' groups/farm associations throughout Tobago. These groups have been organized for specific activities such as marketing of farm products, purchasing inputs, and accessing training and extension services. Included in these groups are producers of specific products and other interest groups such as the Tobago Horticulture Society (for promoting horticultural activities), the Tobago Rabbit Breeders Association (promoting rabbit farming) and the Tobago Bee Keepers Association (for beekeeping and honey production). However, like cooperatives, the farmers' groups are weak, primarily because most members are small, part-time farmers and agriculture is an economic activity in decline.

CARDI and IICA are the main regional and international institutions supporting Tobago's agriculture. The sector has also received support at various times from other institutions such as the European Development Fund, the Canadian International Development Agency, FAO and UWI.

Agricultural Marketing: The current marketing system is characterized by high state involvement, mainly in purchasing from farmers, selling to consumers and in storage activities. Except for a few organized enterprises, marketing is done mainly through traditional methods and operators. The system comprises several agents, including the Marketing Division of the THA, market vendors, inter-island distributors or traffickers, supermarkets, food shop retailers and input suppliers. These agents operate independently or in some form of collaboration in food distribution.

Another important market characteristic is the profile of product suppliers. In the case of Tobago, they are a number of small part-time farmers who operate small plots, with much variation in the range, quantity and quality of the commodities produced. Risks and uncertainty associated with marketing are high due to part-time operation of these suppliers, inadequate information and the inability to predict production.

Market vendors comprise the largest group of marketing agents. Their main venue is the public retail market, with Friday and Saturday being the main "marketing" days. Much of the retail marketing is dominated by women vendors, while wholesale marketing is often done by men. Transporting products to these markets is by the farmers's own means, hiring transport

or bringing smaller quantities in bags by taxis. A large volume of products are also bought in Trinidad for resale in Tobago.

Most crops are marketed in Scarborough, and to a lesser extent in smaller retail markets located in Plymouth, Roxborough, Speyside and Charlotteville and around the farms. Cattle is sold to local butchers for slaughter, and they retail the meat in surrounding areas and to households for use on special occasions. Most pigs are slaughtered at the Scarborough and Roxborough abattoirs and by private butchers for sale in neighboring areas. Due to the lack of processing facilities, milk and much of the fish landed in Tobago are marketed fresh.

The inability of farmers to market their products is perhaps the most important constraint to production. The State's involvement in agricultural marketing has resulted in a heavy financial burden on the THA and inefficient marketing activities. In addition, marketing has also been affected by lack of comprehensive sectoral planning, insufficient resources and support activities, absence of adequate infrastructure, unreliability of supplies and small market size.

Agricultural Credit: The ADB is the major source of agricultural credit in Tobago. Commercial banks provide only a small portion of the total agricultural credit, and most of this is lent to the large estates. Other public sources of credit include two government-owned entities - the Industrial Development Corporation, which finances secondary and processing activities, and the Development Finance Corporation. Private sources of credit include NGOs (primarily the Association for Caribbean Transformation), cooperatives, credit unions, money lenders and traders of agricultural products, who usually make special credit arrangements with farmers. It is difficult to quantify the contribution made through these arrangements, but it is believed that the amount supplied to the sector is relatively small.

Many farmers have difficulties accessing formal credit because of insufficient security to cover their loan. Land titles, cash and other assets are accepted, but most small farmers are unwilling to risk these types of collateral. The ADB accepts land as security only if it is owned or if it has been leased for a long term. However, most stateland farmers have short-term leases and could only access small loans (TT$ 5,000 - TT$10,000) if additional collateral is provided.

While accessing credit may be a problem for most Tobago farmers, a major issue is their unwillingness to use credit. Small farmers are reluctant to borrow and this attitude is rooted in their cultural behavior. Those that do obtain loans, however, are unable to manage them adequately, due to insufficient farmer training, inadequate support by the extension service, marketing problems, and circumstances beyond the farmer's control or because he has lost his regular job. On the other hand, women farmers have a better reputation than men in servicing their loans.

Infrastructure: The southwest, where approximately one-half of the population resides, has the most developed infrastructure, including the best road system and support services such as electricity, schools, medical services, public transport and communications.

However, much of the infrastructure supporting agriculture in Tobago is inadequate. Access roads to most small farms are poor and irrigation facilities are lacking. In less populated areas of the Windward coast, where agriculture could be further developed, the access roads are inadequate, electricity cannot be accessed easily for agricultural use and the public transport services, particularly between Scarborough and Charlotteville, are unreliable. The north/northeast is the least populated and has the poorest infrastructure. The road between Bloody Bay and Charlotteville is impassable, and there are very few secondary roads and access roads to farms.

Development Potential and Recommendations: Tobago's agricultural sector has declined steadily in the last three decades. The THA needs to arrest this trend and exploit the island's agricultural potential in targeted areas in which the island has unique advantages. The THA should place a high priority on identifying the areas of potential and developing a comprehensive agricultural strategy that involves a multi-institutional and multi-sectoral approach. This strategy should be the Tobago component of the national agricultural development strategy, and it should be designed in collaboration with the MALMR.

The strategy should emphasize that agricultural production be market-led, focusing on developing a correct product mix in which Tobago has a competitive advantage. It should emphasize a targeted farmer approach for the areas with potential to be developed, and reduce the production risks and uncertainty by strengthening and organizing the production and marketing system, improved planning, institutional coordination and networking, providing a suitable institutional framework, developing an informed and innovative marketing strategy, and providing the necessary physical infrastructure and support services. Furthermore, due to resource and other constraints of the THA, institutional support from Trinidad on a continuous basis is critical for success of the strategy.

The strategy should incorporate certain important considerations including: (i) the island's limited and fragile natural resource base; (ii) the prospects for the island's agriculture to compete in both the national and regional markets, given few commercial farming operations, limited scale of production, level of technology and high cost of production; and (iii) current and future developments in the tourism and other sectors which are likely to intensify competition for resources.

Given the resource constraints and other characteristics of Tobago's agriculture, there is potential for development in limited areas. Emphasis should be placed on developing high-valued products from small-scale sustainable production systems. One area of potential is to increase the output efficiency of products that are organically grown. Several factors support the viability of this approach, including: (i) the island's easy access to a relatively large market in Trinidad; (ii) existence of a large client group of middle- to high-income consumers and tourists in both islands that could be targeted for selling "wholesome" and organically produced food; (iii) the rapidly expanding tourism sector, which provides a potential market niche for exotic and quality food; and (iv) the environmental benefits of low-chemical agriculture.

In other areas of production, the development of fruit crops (citrus, mango and pineapple), pigeon peas, root crops, small ruminants, particularly sheep and goats, and the flying fishery have much potential. With regard to agro-processing, a variety of products of excellent quality are currently produced, and there is scope for expansion. These include seasoning, hot pepper, jams and jellies, juices, nectars, wines, confectionery, dried fruits, dried sorrel and farine. Some are also produced in small commercial quantities, such as cherry nectar, hot pepper sauce, seasonings, locally produced wines, coffee and chocolate. There is also potential in the processing of the flying fish.

The production efficiency of the above areas needs to be improved considerably and commercial farming activities expanded if the island's potential in these areas is to be realized. However, due to the limited information available, it is critical that the THA evaluates further the market potential of the above products and their economic feasibility of production under both commercial and part-time farming operations. In this regard, support should be sought from the MALMR and other national, regional and international institutions.

In addition, the THA needs to address several issues if the island's agricultural potential is to be exploited. These include: (i) strengthening the management system for state lands; (ii) a re-evaluation of the state's land distribution program; (iii) underutilization of land; (iv) limiting the divergence of good agricultural land into built development; (v) reducing predial larceny; (vi) improving the agricultural infrastructure; (vii) developing and enforcing environmental guidelines and resource enhancement programs in the southwest.

With regard to land use, agricultural output could be expanded significantly if there are more efficient utilization of both public and private land. The THA should do a land audit of both public and private lands to assess their availability for future agricultural development. To support more effective use, land distribution should be made in conjunction with the provision of support services such as infrastructure, training, extension support and credit facilities. Future distribution and use of both public and private land for agriculture and other uses should also consider zoning regulations, priority activities to be developed, plot size, leasing arrangements, infrastructure costs, and others. The government's policy to acquire and set aside estates for future development offers the THA much flexibility and leverage to protect this resource. The 12 estates account for almost 25% of the land area, and with a large proportion of these lands uncommitted, the government has good opportunities to facilitate the island's agricultural development in the future.

The tourism sector is a niche market for food which Tobago is capable of producing, but its linkage with agriculture remains weak. This market potential needs to be assessed and improved mechanisms put in place to link the sector's demands with production and marketing. Currently, hotels and restaurants offer the best opportunities for establishing such linkages. Besides having an improved production and distribution system, institutional coordination and information sharing should be critical components of the strategy.

The agricultural development strategy should also include programs to support the sustainability of the natural resource base. Due to the strong economic dependence of the island's communities on the natural resource base and the environment, an integrated community-based approach should be used for designing conservation programs, developing economic activities and for managing the resource base.

Although several areas of potential for development have been identified, it should be emphasized that **the deficiency of information on Tobago's agriculture has precluded an adequate diagnosis of the sector, thus limiting the scope and adequacy of the recommendations.** Therefore, additional data need to be generated to facilitate further diagnostic work on several important issues before the recommendations are implemented. Critical information is needed on production, area cultivated, farm budgets, prices, and processing costs to determine the economic feasibility of production. The generation of basic information to support policy decisions and planning should be a high-priority area.

CHAPTER I

BACKGROUND

1.1 Main Physical Characteristics

Trinidad and Tobago is a twin-island state lying between 10^0 and 12^0 north latitude and 60^0 and 62^0 west longitude. Trinidad, the larger island, is situated between 10^0 and 11^0 north latitude and 61^0 and 62^0 west longitude, while Tobago is centered at approximately 11.5^0 north latitude and 60.5^0 west longitude. The islands are the most southerly of the Caribbean islands, with Trinidad being only about 13 kilometers (km.) from Venezuela at the nearest point. The country's total land area is 5,129 $km.^2$, of which Trinidad's area is 4,828 $km.^2$. Tobago is situated approximately 32 km. northeast of Trinidad. It is 51 km. long, 18 km. broad and has an area of approximately of 301 $km.^2$.

Tobago is divided into six sub-regions - the northeast, the windward coast, the north coast, the central region, Scarborough and the southwest (**FIGURE I.1**). Politically, it has seven parish districts: St. John, St. Paul and St. Mary in the northeast, and St. George, St. David, St. Andrew and St. Patrick in the southwest.

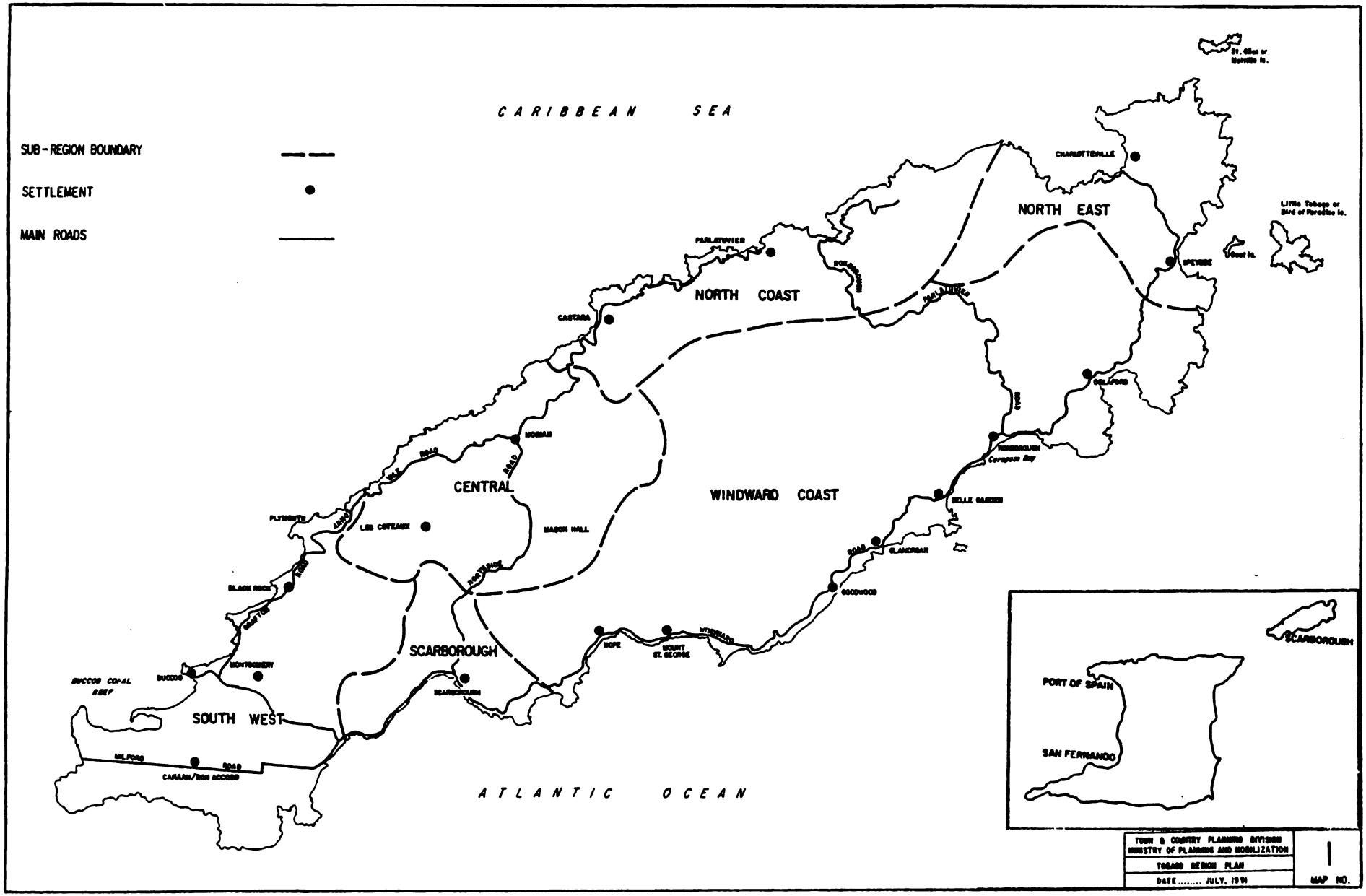
The island has two main physiographic regions, a main ridge and a flat coastal plain (**FIGURE I.2**). The ridge of mountains dominates the island's topography, running northeast to southwest for nearly two-thirds of the length of the island. The ridge rises very steeply from the north coast to a maximum height of approximately 576 meters at Central Point, then slopes gently on the southern side. In the southwest, the terrain falls to a flat coastal plain. On the windward coast, the plain is limited and it is virtually nonexistent on the north coast.

The island consists of about 50% igneous rocks and approximately one-third of it is covered with sedimentary rocks. The ridge of mountains consists mostly of metamorphosed sedimentary and igneous rocks. It separates the Windward Coast and the North Coast; about 60% of the land in these areas has slopes of 20^0 to 30^0 or even steeper. Geological erosion is very active, especially on the higher ridges due to the youthful topography, steep slopes, many deep weathered rocks and occasional torrential rains. The Leeward Coast is traversed by rapid flowing rivers with theirs source in the main ridge, while the Windward Coast has larger, less swift rivers.

In general, the soils of Tobago, including the lowlands tend to impede drainage. The only well-drained soils are in the alluvial valleys. The southwestern plain, however, consists of coral rock and water availability seriously affects agriculture production. The Windward Coast has soils that are mainly clay loam formed over volcanic rock, and it has relatively large areas within the valleys or on the coast that can be mechanized for agricultural production. There are also several large river valleys with highly fertile alluvial soils, currently being exploited for agriculture. The North Coast has clay or clay loams with very few alluvial soils, as well as some limestone and other rock types suitable for construction.

FIGURE I.1

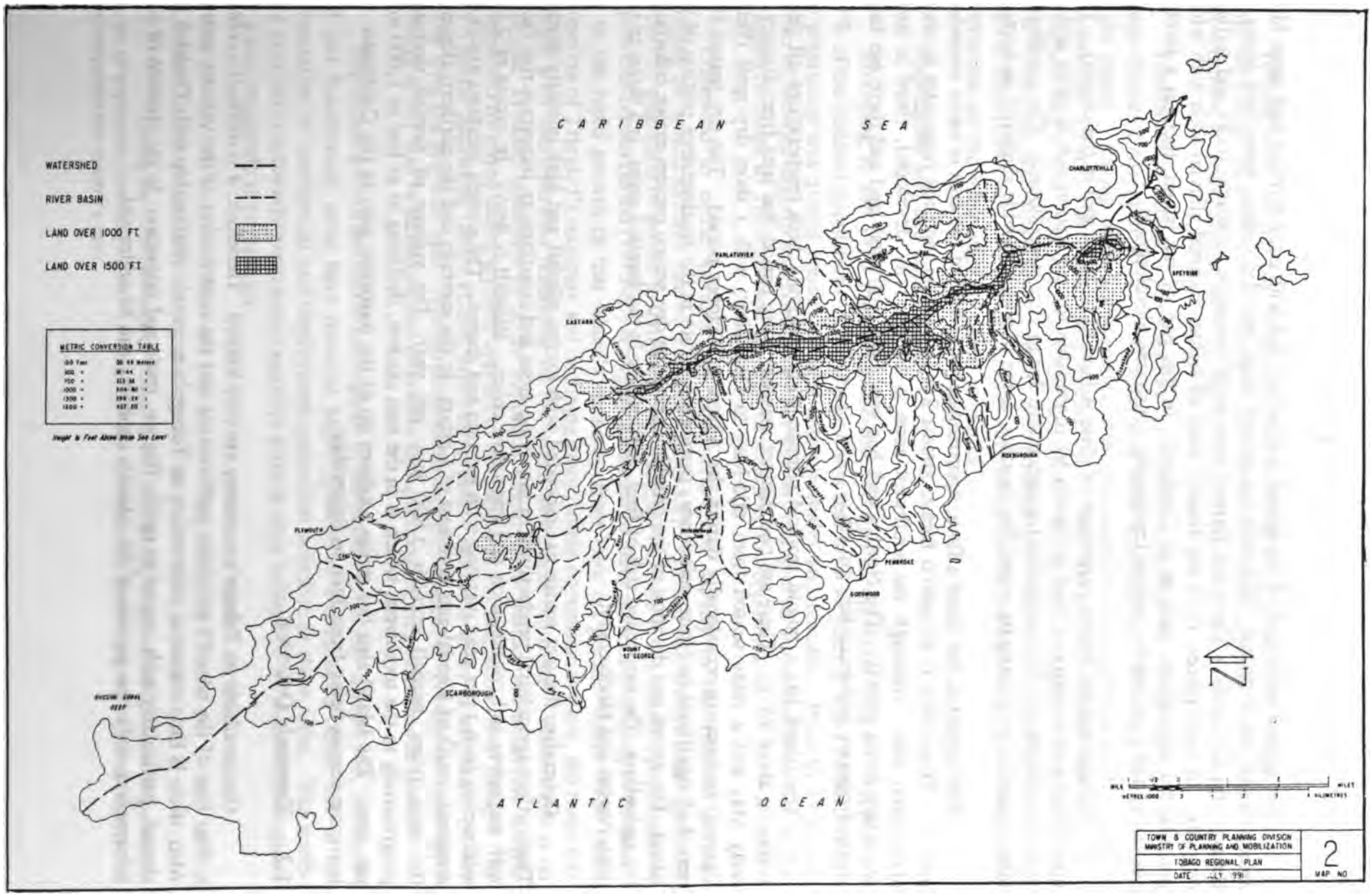
SUB-REGIONS OF TOBAGO



Source: Town and Country Planning Division

FIGURE I.2

TOBAGO: TOPOGRAPHY AND DRAINAGE



Source: Town & Country Planning Division

The southwestern part of the island is relatively flat with coral terraces and some hilly areas towards the northeast. The soils are mostly clays and clay loams, some very heavy at Buccoo and Lowlands. These are formed over coral limestone, volcanic rocks and tertiary deposits. In some places, there are smaller areas of lighter-textured alluvial soils with wider potential for agriculture, such as at Courland. In this part of the island, there is a limited amount of flat land and the rugged topography constrains development.

Tobago has the lowest percentage of class A land (0 to 10^0 slope) in the country. The main ridge area consists of land in classes VI (unsuitable for cultivation due to slope and/or water limitation) and VII (unsuitable for agriculture due to very steep slopes). The coastline is fairly indented with many bays and fine beaches, some of which provide sheltered anchorage.

With regard to the island's flora, approximately one-half of the area is under secondary growth. About 16% is in natural forest, almost 2% is built on, and the remainder is under agricultural use. Although the southwest zone is almost fully developed, there is some secondary forest growth. The North Coast has very little cultivated land and there are large areas of primary and secondary growth.

The island has a humid tropical climate with uniformly high temperatures all year, averaging about 26^0 C. There are two distinct seasons: a dry period that lasts from January to early May and a rainy season from mid-May to December, with a short dry spell (Petite Careme) that occurs occasionally during the August to October period. The dry season is a period of significant moisture deficiency, particularly acute in the southwestern portion of the island. The extent and duration of the drought during the dry season present major constraints for agriculture. The associated risk of fires, particularly in the forested areas, is a threat to soil conservation and biodiversity.

Generally, the wet season is associated with excess rainfall and high-intensity storms. These affect agricultural productivity in low lying areas and constitute an important risk factor with respect to soil conservation and vegetative cover. Rainfall is heavy, in excess of 2,000 millimeters (mm.) per year, varying with location and season. The wettest locations are in the northeast, north of Kendal and northeast of Castara; in the summits and the northern slopes of the main ridge, rainfall exceeds 3,800 mm. per year. The volume of rainfall decreases progressively to the southwest, which is in the rain shadow, declining to as low as 1,000 mm. per year. The island also lies at the southern tip of the hurricane path in the Caribbean, the hurricane season being from June to September.

1.2 Economic Overview

Data available on Tobago's economy are very limited. Therefore, it is difficult to obtain a clear idea of the island's economic performance and the contribution of the various sectors. Also, there is little statistical information on Tobago's economic relationship with Trinidad and abroad, particularly with respect to public finance, trade and migration. In the absence of such information, only few aspects of the island's economy can be addressed.

Tobago is an integral part of the national economy of Trinidad and Tobago, which is petroleum-based. In 1991, the petroleum sector contributed approximately 26% to GDP, 34% to government revenue, almost 65% to total domestic exports and nearly 7% to employment.

Traditionally, Tobago's economy has been based on agriculture. With the passing of the Tobago House of Assembly Act of 1980, a ten-year development plan (1981-90) was formulated for the island. Among other achievements, this plan considerably improved to the island's infrastructure (roads, the port, water supply, etc.,) for supporting tourism development, agriculture and a few light manufacturing activities. Presently, a major proportion of the island's economic activities is service-based, with government and tourism-related services being the most important ones. To a lesser extent, agriculture (including fisheries), retail trade and construction are the other main economic activities.

1.3 Population and the Labor Force

According to the 1990 Population Census, Tobago's population was 46,654 persons (4.1% of the national population), 50% of which was less than 30 years of age (**TABLE A.1**). The population was almost equally divided between males and females. Prior to 1980, the number of females slightly exceeded males but this has changed as a result of a decline in the migration of males to Trinidad (and beyond) in search of job opportunities.

Compared to earlier periods, the population grew rapidly in the 1980-90 period, averaging an annual average rate of 1.8% (**TABLE I.1**)[1]. Growth has always been generally affected by migration of people to Trinidad. The marginal increase in the island's population in the previous census period (1970-80) is largely attributed to many persons migrating to Trinidad, due to the rapid growth of that island's economy from high oil prices. Since 1985, with contraction of Trinidad's economy and declining employment opportunities there, the trend was reversed with many persons remaining on the island and others returning. While there is no doubt that Trinidad continues to be an important employment source, the economic decline accompanied by rising unemployment appears to have reduced out-migration from Tobago. The 1989 Central Statistical Office (CSO) mid-year estimate indicated a net in-migration of 407 persons over the previous year. The thrust towards the development of Tobago seems to have a positive effect also in stemming out-migration and encouraging migration to the island.

Population growth among the sub-regions of the island has varied. Since 1960, the south-west and Scarborough areas have recorded higher growth on a continuous basis, due to the concentration of commercial and employment-generation activities in these areas. The north-coast area has consistently experienced negative growth rates because of its resource limitations and scarce economic opportunities.

---

[1] During the 1980-1990 period, Tobago ranked third among the administrative areas of the country in terms of population increase (+23.41%). Also, for the first time, the island's population growth rate in this period surpassed the country's rate.

TABLE I.1
POPULATION BY SUB-REGIONS, 1960-1990

SUB-REGIONS	POPULATION				AVERAGE ANNUAL RATE OF GROWTH (%)			
	1960	1970	1980	1990	1960-1970	1970-1980	1980-1990	1960-1990
NORTH COAST	1,425	1,188	1,068	1,177	-1.80	-1.06	0.98	-0.64
NORTH EAST	2,413	2,515	2,212	2,284	0.41	-1.28	0.32	0.18
LEEWARD COAST	8,525	9,525	9,149	10,233	1.12	-0.40	1.13	0.61
CENTRAL	5,477	6,418	6,222	7,316	1.60	-0.31	1.63	0.97
SOUTH WEST	8,383	10,330	12,049	15,741	2.11	1.55	3.05	2.12
SCARBOROUGH	7,110	8,792	8,825	9,903	2.15	0.04	1.16	1.11
TOTAL	33,333	38,768	39,525	46,654	1.52	0.19	1.80	1.13

SOURCE: TOWN AND COUNTRY PLANNING DIVISION, 1991

In 1991, the economically active population or the labor force was estimated at 33,800 or 63% of the population. It comprised 17,100 males (51%) and 16,600 females (49%). Although these figures are quite similar, there was a significant difference in the actual numbers of people employed. The estimated figures were 11,800 males and 7,800 females.

The service sector (including government, finance and real estate activities) has been the most important sector and the largest employer of labor in the island's economy (**TABLE A.2**). In 1991, it accounted for 42% of total employment, while the construction sector contributed 22%, wholesale and retail trade 8%, restaurant/hotel sector 7% and agriculture (including fishing and forestry) 6%. Of the persons employed in the service sector, the government accounted for almost 62%. The parishes of St. Andrew (57%) and St. Patrick (54%) had the highest proportion of their labor force employed by both the state and the private sector.

Since 1980, the unemployment situation in Tobago has deteriorated. The unemployment rate was 11% of the labor force in 1980 and it steadily increased to 22.8% by 1989, due to the country's economic recession and the adverse impact of this on the fiscal operations of the Tobago House of Assembly (THA). In 1991, it was estimated that unemployment had decreased to 19.4% of the total labor force, with the rate among males being 12.7%, compared to 30.8% for females. These figures, however, are not reflective of an upward trend in employment, given that the labor force also expanded as the population increased.

Although the unemployment rate varied among parishes, it was lower in the south-western area compared to other parts of the island. In 1991, the lowest rates were recorded in St. Patrick (7.1%) and St. Andrew (15.9%), while the highest were in St. John (58.5%), St. Paul (46.1%), St. David (24.9%) and St. Mary's (21.6%). These figures also indicate that the employment generating activities are located mainly around Scarborough and its environs and in the St. Patrick area, where the largest number of business establishments are found. The parishes where high unemployment exists are also those in which agriculture is dominant, an indication of the minimal impact of this sector on employment generation.

1.4 Political Background

Prior to 1980, Tobago was administered politically from Trinidad through a Commissioner for Tobago Affairs and later through the Ministry for Tobago Affairs. The efforts of the people of Tobago for internal self-government culminated in the island achieving limited self-government in 1980, through the Tobago House of Assembly Act of 1980. This Act established the THA and provided it with the mandate to administer the affairs of the island, including its economic, social and political development.

The THA is a body of 15 persons, 12 of whom are elected from the 12 political districts that encompass the seven parishes of the island, and three are nominated as councillors. The Chairman of the THA is elected by the ruling political party. The island has two seats in the country's national parliament in Trinidad, one for the northeast region and the other for the southwest region. Elections for the THA are held every four years, while national elections are held every five years.

Although the island has internal self-government, it is still a part of the nation of Trinidad and Tobago. As such, it is subject to national economic and social policies, defence and various administrative regulations by the central government. However, there are special political and administrative arrangements between the THA and the central government in many matters, such as the annual budgetary allocation, responsibilities for tax collections and social services. Despite these arrangements, the responsibilities of the central government for development policies and for financial provisions to the THA impose severe limitations on the island's flexibility to pursue particular policies. Furthermore, almost all the private, public and external institutions are based in Trinidad which places Tobago at a further disadvantage. Together, these factors have important implications for the economic development of Tobago.

1.5 Constraints and Development Strategies

Consistent with the Medium Term Macro Planning Framework of the country (1989-95), the THA has defined five broad objectives for the economic development of the island. These are: (i) to transform the island's economy from a dependent one to one that is more productive and self-reliant; (ii) to promote economic diversification; (iii) to attain greater self-sufficiency in food production; (iv) to develop an efficient system of social and economic infrastructure; and (v) to create productive employment opportunities.

Job creation has been identified as the principal focus of development activities. The strategy involves expanding the employment base already developed by the THA's investment and other activities, by private investment, and that created through self-employment and by small enterprises. The sectors targeted as most important for development and revitalization are agriculture, tourism, fishing, agro-industry and light manufacturing. The THA anticipates that investment in these sectors should expand the demand for labor sufficiently to reduce unemployment to acceptable levels.

The strategy also includes an increased role for Tobago in the country's external trade. Trinidad and Tobago is strategically located to serve regional and international markets, and it has a long history of democratic and racial harmony. These characteristics enhance the investment potential of Tobago, and aggressive export promotion in these markets is a deliberate policy of the state.

CHAPTER II

AGRICULTURAL AND NATURAL RESOURCES POLICIES

2.1 Agricultural Policies

2.1.1 Overview of the National Agricultural Strategy

In the last three decades, Trinidad and Tobago's agricultural policies have been generally consistent, with adjustments made to changing internal and external economic circumstances. The policies aimed at achieving six short and medium-term goals, rather than on a broader long-term development strategy for the sector[2]. The goals were to: (i) increase agricultural production, productivity and incomes; (ii) diversify the production base; (iii) create employment opportunities; (iv) ensure a more efficient use of land; (v) provide adequate supplies to meet food and nutritional needs and to reduce the food import bill; and (vi) expand non-traditional exports.

To attain these goals, the government recognized that it should: (i) provide price support to improve income security and reduce any comparative production disadvantage; (ii) establish an adequate land zoning system and land use regulations (including taxation) to reduce the progressive alienation of arable land for non-agricultural uses; and (iii) provide adequate tenure security and distribute state lands to farmers for establishing economically viable farm units. The state also placed emphasis on strengthening support services and activities in the sector by: (i) expanding agricultural infrastructure and services; (ii) fostering more positive attitudes towards agriculture; (iii) encouraging increased farmer participation in the sector's policy and program formulation; and (iv) providing various incentives, including subsidies, guaranteed prices and price support.

The government also recognized the relatively weak position of the agricultural sector in the economy. Since the oil boom of the 1970s, the sector became increasingly uncompetitive, both within the domestic economy (vis-a-vis other sectors) and in the international economy[3]. Despite this, significant agricultural activities were desirable at the policy-making level, even if they involved a high cost to the government and consumers[4]. Agricultural protection, therefore, became the major policy objective over the last two decades, and the huge oil revenues during this period provided the means to finance public policies in the sector.

---

[2] National Agricultural Development Plan of Trinidad and Tobago, 1988-92.

[3] There is a view that Tobago's agriculture had become uncompetitive within the economy long before the oil boom.

[4] The need for the country to have significant agricultural activities was based in part on pursuing food security.

In the case of Tobago, the national strategy was complemented by an agricultural development strategy that was included in the THA's ten-year development plan. Basically, the sector strategy aimed at increasing the level of self-sufficiency and reducing the island's dependence on food imports, by expanding food production to meet the needs of both the local population and the tourist sector. The THA placed emphasis on: (i) increasing output of food crops and livestock products; (ii) commercializing particular activities such as vegetables and ruminants for both the tourist sector and for export to Trinidad; and (iii) expanding production of commodities for which there is both a domestic and export market potential. To achieve these goals, the THA implemented programs to: (i) increase access to lands for farming; (ii) develop vegetable, small ruminant and fishing sub-sectors; (iii) expand agro-processing; and (iv) improve basic infrastructure, support services and the agricultural marketing system.

2.1.2 National Policy Measures

In the last two decades, the central government implemented a set of policy measures to protect the sector and to achieve the objectives of its development strategy[5]. The most important of these included: (i) acquisition of certain productive agricultural enterprises (Caroni 1975 Ltd., Orange Grove National Company Ltd., National Feed Mills, National Flour Mills); (ii) acquisition of large land holdings in both Trinidad (Non-Pareil Estate, Grand Riviere Estate, St. Johns Estate) and 12 estates in Tobago[6]; (iii) distribution of large areas of state lands for land settlement, but oriented towards encouraging livestock production within a mixed farming system; and (iv) expansion of the incentive programs to increase production, stabilize and increase farm incomes, and provide reasonably cheap food to consumers.

In addition to the above, the government expanded its institutional support to the sector through: (i) creation of the Agricultural Development Bank (ADB), the Central Marketing Agency (CMA), the Food and Agricultural Corporation (FAC) and the Caribbean Fisheries Training and Development Institute (CFTDI); (ii) expansion of the Eastern Caribbean Institute of Agriculture and Forestry (ECIAF); and (iii) restructuring the Ministry of Agriculture, Lands and Food Production.

Regarding the incentive programs, the main policy measures implemented included price support, input subsidies, tariffs, import restrictions, price control and provision of various fiscal incentives (**TABLE A.3**).

Minimum guaranteed prices were provided for certain commodities (mainly short-term crops) up to the mid-1980s through the Ministry of Agriculture. This measure was aimed at stabilizing farm incomes by providing a floor price to farmers in times of excess supply. **Price support** was given for the main export crops (sugarcane, citrus, cocoa, coffee and copra), rice,

---

[5] Some measures to protect agriculture were implemented since the 1960s.

[6] The government had been acquiring estates in Tobago since the 1960s as part of its land distribution program.

milk and pork. Subsidies were granted to a range of activities and farm inputs including credit to reduce production costs and make domestic outputs competitive with imports. Furthermore, the government provided indirect subsidies on intermediate inputs such as bakers' flour, (until January 1984), copra, poultry feed (until 1985) and locally produced hatching eggs. It also granted fiscal incentives in the form of housing for agricultural workers and custom duty exemptions for imported inputs for livestock production.

To protect consumers, three main measures were implemented. First, the retail prices of several basic food items were subsidized so as to reduce the burden of high food expenditures on low-income groups. Until 1973, rice was the only basic food that was subsidized, but the program was expanded afterwards to cover flour, edible oil and poultry meat[7]. Second, price controls in the form of maximum wholesale and retail prices were placed on several basic food items (chicken, milk, flour, edible oil, rice, sugar, onions, potatoes and certain other staple foods) to limit food price increases and provide cheap food[8]. Third, a trade regime of special regulations were implemented to protect both consumers and producers.

The main instruments of protection in the trade regime were quotas, tariffs, licensing and tax exemptions[9]. Quotas were placed on imported agricultural products based on recommendations by the Ministry of Agriculture and the CMA, and the import licenses for these were required from the Ministry of Industry, Enterprise and Tourism (MIET). Tariffs were placed on most agricultural imports and temporary bans were imposed occasionally on certain vegetables[10]. Currently, higher tariff rates are placed on imported processed food products, while duty exemptions and other fiscal incentives are given to local food processing activities for imported semi-processed and unprocessed raw materials. Furthermore, duties and surcharges were added to import tariffs for competing goods, and duty exemptions were given for certain inputs and capital equipment used in processing activities.

In addition to the above, there were several supportive measures to protect agriculture. These included: (i) tax exemption on agricultural income for farms ranging up to 40 hectares; (ii) expansion of the range of support services in extension, training and information by the government; and (iii) creation of the Food and Agriculture Corporation (FAC) to support agricultural development projects.

---

[7] Except for rice, these subsidies were gradually reduced from 1984; however, they have now been totally removed.

[8] Price controls still exist in Trinidad and Tobago for certain basic foods - bread, butter, milk, onions, potatoes, flour, rice, sugar and fish.

[9] A large number of products imported was placed on a "negative list", and an import license was required for their importation.

[10] Goods originating from CARICOM countries have been removed from the negative list of imports.

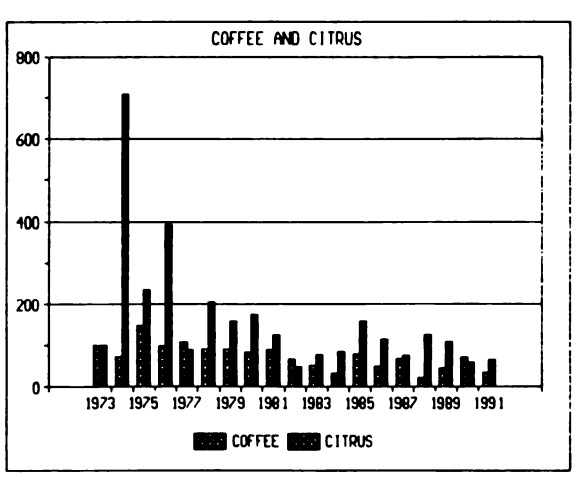
In the case of Tobago, the THA implemented specific measures to support the island's agriculture. The most important of these included: (i) a stateland distribution program whereby some estate lands acquired by the government were distributed to farmers; (ii) provision of subsidized tractor services for land preparation; (iii) production of seedlings and plants for sale to farmers at subsidized prices; (iv) establishment of demonstration centers (for both crops and livestock) and commercial plots at Louis D'Or, Goldsborough and Studley Park; (v) strengthening institutional support and expansion of services in the areas of extension and training; and (vi) providing direct support to marketing and agro-processing.

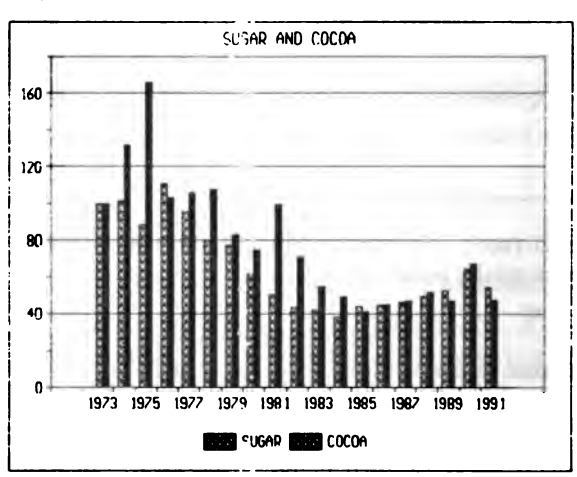
2.1.3 Policy Impacts on the National Economy

The positive impacts of the policy measures on Trinidad and Tobago's agricultural production have not been as high as expected. Except for a few years, the sector's overall response has been poor, a trend observed during the 1960s which continued in the 1970s and 1980s. To a large extent, the low response of output to the incentive measures was due to the concentration of activities in the petroleum and related sectors. The buoyancy of these sectors in the 1970s and part of the 1980s impacted negatively on agriculture by shifting resources out of the sector, and by increasing food imports to meet growing demand due to higher incomes.

To assess the policy impacts on the sector, the performance of individual sub-sectors in the 1973-91 period is done. Output of the principal export products (sugar, coffee, cocoa and citrus) was cyclical but the general trend was downward (**FIGURE II.1**). Of those four products, citrus performed relatively better, particularly in the first half of the period. The sugar sub-sector performed the poorest, but it recovered in the second half of the 1980s, with an upward trend in output in the 1985-90 period.

FIGURE II.1
OUTPUT INDICES OF SUGAR, COCOA, COFFEE & CITRUS FOR TRINIDAD AND TOBAGO, 1973-91 (1973=100)





SOURCE: TABLE A.4

The response of domestic agriculture to the policy measures was relatively better. However, the performance of individual products was mixed, and the output of the important commodities was generally cyclical. In the 1980s, there were significant production increases in poultry, pork, mutton, milk, vegetables and fruits which contributed to higher levels of self-sufficiency. The output trend of poultry and milk was better than those for beef, pork and eggs (**TABLE A.4**). By 1986, the country had achieved complete self-sufficiency in poultry meat, and this sub-sector is considered to be one of major successes of the incentive programs. Except for a few years, the output of beef and eggs was lower than the 1973 level. On the other hand, fruits and vegetable production have increased remarkably, averaging about 8% per year in the last five years.

Except for two products (poultry meat and milk), empirical studies have found that there were other major factors, besides the subsidies, that contributed significantly to improved production of domestic agricultural products[11]. These factors include: (i) an increase in the real prices of domestic agricultural commodities; and (ii) a contraction of the economy since 1982, which resulted in an inflow of resources to the sector, particularly of labor.

There is considerable doubt about the economic benefits to the society provided by the agricultural policy measures implemented in the last two decades[12]. In general, the measures suffered from several weaknesses and generated some negative impacts, including: (i) a high cost to the national Treasury; (ii) distortion in resource allocation; (iii) high bureaucratic and administrative costs for their implementation; and (iv) a non-improvement of the sector's competitiveness vis-a-vis imports.

The subsidies have been a financial burden on the state. Between 1977 and 1985, expenditure on production subsidies increased from about TT$1.5 million to TT$28.7 million while the cost of price support almost doubled. In the 1982-92 period, the government spent a total of TT$1.4 billion on price support and food subsidies alone (**TABLE II.1**). Five commodities (sugar, cocoa, coffee, milk and rice) together accounted for 84% of the total amount allocated for price support. In recent years larger allocations have been made for price support to the rice sub-sector.

In 1990, the cost to support producers and to protect consumers were estimated using producer subsidy equivalents (PSEs) and consumer subsidy equivalents (CSEs) for 10 products[13]. As a percent of the transfers/total value to producers, the PSEs were highest for rice (85%), coffee (74%) and dairy (65%). In value terms, the transfers from the government and from consumers to producers totalled TT$390 million for the 10 products. The total value of CSEs

---

[11] Rankine and Bruce, 1991.

[12] See the National Agricultural Development Plan, 1988-92 and Basic Agricultural Studies (Final Report) by the Tahal Consulting Group, 1992.

[13] Orden, 1992.

TABLE II.1
EXPENDITURE ON PRICE SUPPORT PROGRAMS & FOOD SUBSIDIES IN TRINIDAD AND TOBAGO, 1982-1992 (TT$ MILLION)

COMMODITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	TOTAL
SUGAR CANE	23.50	20.30	30.30	35.10	36.40	41.00	22.70	19.00	13.40	18.80	14.40	274.90
COCOA & COFFEE	19.50	39.30	11.10	12.60	1.10	3.60	8.20	5.40	9.30	4.30	5.00	119.40
MILK	3.00	5.00	7.00	9.10	8.70	9.10	8.30	8.30	9.50	10.20	9.20	87.40
ORANGES	0.10	-	-	-	0.10	-	0.10	0.10	-	-		0.40
GRAPEFRUIT	-	-	-	-	-	-	-	-	-	-	-	0.00
PADDY	-	-	-	-	5.30	10.10	12.90	13.40	13.40	25.00	23.00	103.10
COPRA	9.80	8.00	8.10	2.90	3.20	3.00	2.30	1.90	3.00	2.90	2.60	47.70
SORREL	-	-	-	-	0.10		-	-	-	-	-	0.10
OTHER INPUT SUBS.	6.00	18.10	8.00	7.00	6.40	13.80	0.50	0.40	0.50	1.00	1.20	62.90
SUB-TOTAL	61.90	90.70	64.50	66.70	61.30	80.60	55.00	48.50	49.10	62.20	55.40	695.90
FOOD SUBSIDIES	288.00	231.30	81.40	48.30	7.70	8.80	7.80	-	-	-	-	673.30
TOTAL	349.90	322.00	145.90	115.00	69.00	89.40	62.80	48.50	49.10	62.20	55.40	1,369.20

SOURCE: MALMR.

(transfers to consumers) was estimated to be TT$136 million with poultry (TT$73 million), sugar (TT$27 million) and rice (TT$21 million) being the highest.

The sector's response to the large budgetary transfers and other protective measures has been unsatisfactory. Although the output of livestock products and to some extent, vegetables expanded substantially since the 1970s, the sector has been relatively unresponsive to the policy measures in general. The intended structural changes for self-sustained growth have not been realized. Moreover, primary production activities of most sub-sectors, particularly vegetables and livestock (beef, pork, poultry and milk), as well as the expanding agro-processing operations, have become heavily dependent on imported inputs and raw materials. The growth of these activities resulted in high foreign exchange needs.

In 1983-84, the Ministry of Agriculture evaluated the incentive programs and found that they had an input bias, their design was poor and they contributed very little to production efficiency. Furthermore, their implementation was affected by complicated administrative procedures and payment delays[14].

There were several weaknesses in the design and implementation of the policy measures. Rather than improving production efficiency, the subsidies reduced it in certain activities, particularly in the export crop sub-sector. As indicated above, export crops have lagged in relation to the output response of other commodities. The country's sugar industry is considered to be obsolete, with production costs among the highest in the world (about 10 times the world price and higher than the guaranteed prices received in the US and EEC markets)[15].

At the farm level, deficiency payments were made for individual crops based on the difference between market prices and farm budgets that were determined by the Ministry of Agriculture. The main weakness of the deficiency payment scheme is that most of the farm budgets did not accurately reflect production costs.

Some measures had conflicting objectives. For example, both domestic primary and agro-processing activities were protected through the input subsidy program and from imposition of high tariffs on imported processed foods, while duty-free concessions were granted to local food industries for raw materials and semi-processed products. As a result, the food processing sector was the main beneficiary of the tariff protection, while domestic agriculture was unable to compete with cheaper food imports because of high costs and structural weaknesses in the sector. Also, the objective of improving farm incomes was negated by measures to provide cheap food to consumers through price controls on both imported and domestically produced food.

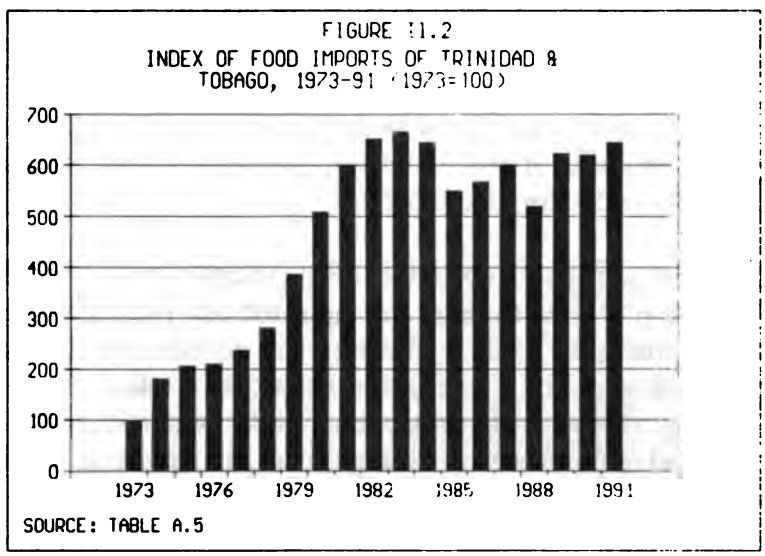
---

[14] This evaluation resulted in the discontinued payment of several production subsidies from 1985.

[15] The costs to maintain the sugar industry are very high. The estimated costs to the country ranged from US$120 million to US$160 million per year (Country Economic Report of Trinidad and Tobago, World Bank 1988).

Besides their weak design, most trade policy measures increased the complexity and burden of protecting the agricultural sector. In particular, tariff rates had to be constantly revised and negotiated given the inflationary trends in world markets and the trading arrangements within the CARICOM framework. In addition, the government has had to resort to other measures such as banning certain commodities temporarily and placing others on a negative list. The adoption of these measures has been costly because of resource misallocation and malpractice in the granting of concessions. Furthermore, the scope and level of tariffs for protecting domestic agriculture have been inadequate. On the one hand, the food processing sector benefited substantially more from the concessions; on the other, many primary production activities have been unable to compete with cheaper imports.

The impact of the policies on food supply and higher self-sufficiency has been minimal. Given that a major objective of the measures was to increase food production and replace imports, the trend in both production and food imports indicates that this overall objective has not been achieved. Although higher levels of self sufficiency were achieved for some products (vegetables, fruits and poultry meat), the production increases for others were marginal. With regard to food imports, this increased steadily up to 1983, reflecting the ineffectiveness of the measures on import replacement (**FIGURE II.2**). Since 1984, food imports have fallen because of the introduction of the negative list in 1985, devaluations in 1985 and 1988 and a decline in consumer income[16]. In recent years, imports have increased again in response to economic policy reforms, the removal of some subsidies and other incentives provided to the sector.



The specific impacts on resource allocation are fairly complex. In addition to the high cost for the national treasury, it is possible that the policy measures have placed a high social and financial cost on the economy, through the undesirable effect of retaining marginal and inefficient producers in the sector and the excessive utilization of subsidized imported inputs in

---

[16] MALMR/Tahal Consulting Engineers, 1992.

production. Moreover, any comparative advantage of resource use in agriculture that may have resulted due to protection is likely to decrease significantly as budgetary support declines and protective measures (macro and sector specific) are gradually reduced[17].

2.1.4 Policy Implications for Tobago

Lack of data does not allow for a comprehensive assessment of the implications of the policy measures for Tobago's agriculture. However, a "second best" analysis is provided based on the impacts of: (i) macroeconomic policies; (ii) sector-specific national policies; and (iii) the measures implemented by the THA.

The impacts of both macroeconomic and national agricultural policies on Tobago's agriculture are likely to be negative. Four main reasons can be advanced for this. First, the economic activities of the country are concentrated in Trinidad; therefore, most of the structural changes are likely to have greater positive impacts (employment opportunities, income growth, budgetary allocations, etc.,) there. Second, Trinidad's agricultural sector is relatively larger and more efficient; thus, any protection to the sector would provide disproportionately more benefits to producers and consumers there than in Tobago. Third, the national institutional system and support services to agriculture are concentrated in Trinidad. Fourth, the semi-autonomous position of Tobago and its geographical separation within the country keeps Tobago from benefiting fully from national policies.

For the above reasons, Tobago's agriculture has declined progressively over time and it is unlikely that it will benefit much from current policies[18]. In recent years, the central government's policies have focused on policy and institutional reform in the economy (due to stabilization and structural adjustment programs) with the objective of improving resource allocation, efficiency and competitiveness. Among the measures adopted, trade liberalization, fiscal reform and institutional adjustment are likely to have adverse impacts on Tobago's agriculture through: (i) a reduction in the budgetary resources allocated to support the island and its agricultural sector; (ii) a greater strengthening of the institutional framework and support services in Trinidad; and (iii) allowing cheaper food imports into the country.

The policy measures implemented by the THA have had minimal impacts on the sector, as shown by evidence from farm-level activities and from the volume of commodities flowing through the marketing system. With few exceptions, farming is a part-time activity, and the measures have failed to commercialize production activities and reduce the island's dependency on food imports. The land distribution program has not produced the intended results, since many of the beneficiaries have remained as part-time farmers or have abandoned farming.

---

[17] The implementation of macro and sectoral reform measures since 1987 are likely to further affect the economic viability of several production activities in the sector.

[18] The view is that Tobago's agriculture has been declining progressively during the last three to four decades.

2.2 Natural Resource Policies

2.2.1 National Policies and Their Impacts

Policies regarding the use and conservation of natural resources in the country have generally lacked comprehensiveness and coherence. Examples exist where management responsibility is entrusted to several agencies without clear guidelines for coordination and enforcement mechanisms are usually weak. In the area of the environment, policies and supporting legislation are only now being proposed. Together, these factors have contributed to the rapid environmental degradation which the country has experienced in recent years.

Land: Approximately one-half of the land in Trinidad and Tobago is state-owned (including large areas of arable land) and most of this is under natural vegetation or forest cover. In spite of direct control by the state, the natural resources of the country have not been developed to their full potential.

Within the country's development framework, a broad proposal for land to be allocated among various competing uses has been suggested in the National Physical Development Plan (NPDP) of 1989. The Plan recognizes the rapid alienation of good arable lands from agriculture, and the problems of degradation of watersheds, forests, coastal and marine resources. The NPDP has suggested land use allocations based on land capability, development potential and the need to protect critical areas. Within the Plan's broad policy framework, several Government Agencies and Ministries have jurisdiction over public or state lands. The main ones are the State Lands Division and Forestry Division of the Ministry of Agriculture, Lands and Marine Resources (MALMR), and the Lands and Surveys Division.

Because the government controls a significant proportion of the total land resources, including large areas of arable land, it has used the stateland distribution program as a critical agricultural development strategy since the 1960s. The procedure to transfer public lands to private individuals requires recommendations from the MALMR and the Lands and Surveys Division, with final approval from Cabinet. In the case of private lands, their use for sub-division and built development requires authorization from the Town and Country Planning Division (TCPD), the Drainage Division of the Ministry of Works and by the Local Health Authority. With regard to forest lands, the Forestry Division is responsible for all lands under the government's forest reserves and protected areas. The Division has the responsibility for policy formulation, regulation, exploitation, and development and conservation programs.

However, the existing institutional and legal framework has not been effective for regulating the use of state lands, and the enforcement mechanism to protect the resource base is weak. In the last decade, Trinidad experienced widespread squatting on state lands, accompanied by slash and burn activities and destruction of the resource base. Moreover, the alienation of good agricultural lands to built-uses continues unabated on both private and state lands. Although the TCPD and other agencies must give building permission, there appears to be much defiance of the law requiring land use permission for these purposes.

Additionally, the widespread practice of dumping of garbage and waste in rivers, on state lands and in vacant private lands has polluted land areas, watercourses, coastal areas as well as the atmosphere. Fortunately most of these problems have been confined to Trinidad.

Forestry: Although the administration of forest resources in the country commenced in 1901 (1765 in the case of Tobago), the first formal forest policy was articulated in 1942. The principal elements of that policy included[19]: (i) creating a permanent forest reserve; (ii) sustaining the yield and management of forestry resources; (iii) achieving timber self-sufficiency; (iv) optimal utilization of forest products; (v) research in various aspects of tropical forestry; (vi) sound land use and its allocation; (vii) expanding private forestry; and (viii) education and training in forest use and management.

Over time, there has been a rapid alienation, destruction and degradation of forestry resources caused by population growth and the rapid expansion of settlements and other built developments. In response to this situation, the Forestry Division reformulated a Forest Resources Plan (FRP) in 1991. The FRP aims at promoting sustainable development of the country's forestry, wildlife and environmental resources. To deal effectively with the trends in forestry resource degradation, the FRP places emphasis on[20]: (i) allocating an adequate area of land in strategic places for forestry and ecological purposes; and (ii) managing the forest resources for optimum combinations of their productive, protective, recreational, aesthetic, scientific and educational capacities. Though the Plan has not been formally adopted, it has informed the development of the National Agricultural Development Plan (1989-95) and the National Forest Resources Plan (1990-99)[21].

Watershed Management: Legislation for protection of the country's watersheds is embodied in several acts including the Forest Act, the Water and Sewerage Authority (WASA) Act, the Town and Country Planning Act and the Agricultural Fire Act.

The principal watershed conservation objectives include: (i) identification and protection of major watersheds, particularly upstream catchment areas; and (ii) establishment of rehabilitation programs for critical watersheds. Notwithstanding these objectives, the evidence suggests that watershed degradation is proceeding at an alarming rate. The absence of an integrated, holistic approach to watershed management and conservation, including clearly defined and unambiguous responsibilities of various institutions, constitutes the most serious impediment. As an example, the Forestry Division focuses on upper watershed management, while institutions such as WASA and Water Resources Agency (WRA) concentrate more on downstream utilization.

---

[19] TFAP, 1992.

[20] Ibid, p. 36.

[21] One goal of the National Forest Resources Plan is to maintain one-third of the land area in Trinidad and Tobago under forest cover.

Discussions on the need for integrated resource management and the establishment of a "Watershed Management Authority" have not yet materialized. Accordingly, the major effort in watershed conservation and development has been made by the Forestry Division. Through its mandate for watershed management, the Division has embodied the protection and conservation of wildlife and biodiversity, including mangroves, wetlands, watercourses, national parks and other protected areas in its draft policy document. The legislation for protection of wildlife and preservation of bio-diversity is contained in numerous acts such as the Forests Act (1915), regulation for oyster removal from the Ortoire River (1916), conservation of Wildlife Act (1958) and regulation for the protection of turtles[22].

National Parks/Game Sanctuaries: Several game sanctuaries were established over the years with the objective of protecting critical wildlife species and habitats . In Tobago, the Little Tobago Game Sanctuary of 101 hectares (ha.) was created in 1928 and St. Giles Island Sanctuary with 28 ha. was established in 1968. However, the system of game sanctuaries in the country did not provide effective protection to wildlife species. Consequently, in 1980 the Forestry Division proposed the establishment of a system of National Parks. The proposal identified 61 areas and 6 categories of protected areas, including several areas proposed for Tobago.

2.2.2 Recent Policy Developments

The rapid rate of environmental and resource degradation in the country during the last two decades, the increased demand for the natural resource stock among competing uses, and a greater reliance on the contribution of the agricultural and tourism sectors to the economy, have together, highlighted the deficiencies, omissions and ineffectiveness of most of the existing natural resource policies and plans[23]. Similar concerns are being articulated in the country by NGOs, community and professional groups. Despite their limited resources, these groups are taking various initiatives to assist in addressing this problem.

In response to the above situation, several public institutions have formulated a comprehensive policy agenda (through various proposals and plans) in recent years, to provide greater coherence for improved natural resource use and management and place the country on a sustainable development path (TABLE II.2)[24]. Unfortunately, the government has not taken the necessary steps to adopt the proposals and enact the corresponding legislation.

---

22 The Wildlife Act was amended in 1991.

23 The high priority placed on environmental conservation and sustainability of the natural resource base by the international community has stimulated increased awareness in this area in Trinidad and Tobago.

24 Some of the most important policies which emanate from the proposals are discussed in APPENDIX B.

TABLE II.2
SUMMARY OF RECENT PROPOSALS AND PLANS FOR
NATURAL RESOURCE USE AND MANAGEMENT

FOREST RESOURCE PLAN	1989
AMENDED ALIENS LAND HOLDING ACT	
PROPOSED 'NATIONAL CONSERVATION STRATEGY':	1989
(I) AN ENVIRONMENTAL PROTECTION POLICY ACT	
(II) PROHIBITION AND CONTROL OF POLLUTION ACT	
THE TROPICAL ACTION FORESTRY PROGRAM	1992
THE MEDIUM-TERM POLICY FRAMEWORK	1993-95
DRAFT FOREST RESOURCES AND NATIONAL PARKS CONSERVATION ACT	1990
DRAFT AGRICULTURAL POLICY	1993
CIVILIAN CONSERVATION CORPS	
ADDITIONAL PROPOSALS FOR TOBAGO:	
DRAFT, TOBAGO REGION PHYSICAL DEVELOPMENT PLAN (BY THE TOWN AND COUNTRY PLANNING DIVISION)	1991
DRAFT 'STRATEGIC PLAN' (DAFMA)	1993

SOURCE: TFAP, 1992.

2.2.3 Natural Resource Policies of Tobago

Through the THA Act of 1980, the Assembly was mandated also to implement the central government's policies in Tobago regarding the use and management of natural resources[25]. Although this responsibility was transferred to the THA, implicit within this arrangement was that specific policies adopted by the Assembly would be harmonized with national policies. Within the THA, the responsibility for natural resources has been placed with the Division of Agriculture, Forestry and Marine Affairs (DAFMA). A summary of the major natural resource policies implemented by the Division is provided below.

Land Resources: By 1980, when the THA was established, the state had acquired a number of private estates. Today, the state owns 12 estates comprising a total of approximately 4,139 ha. (TABLE II.3). Much of the land on these estates has been unutilized, and it constitutes a major source of land available for expanding agricultural development. In view of the above, the DAFMA's policy has been to facilitate this expansion through the distribution of state lands to farmers who have a land constraint. In spite of the efforts made, the Division has experienced persistent delays to full implement its stateland distribution program. In 1992, a Land Management Unit for state lands was established to support the program, with specific responsibilities for land surveying and sub-division of state lands, distribution of plots to farmers, and for monitoring and reporting on farmers' activities.

Forestry: In 1902, the Colonial Government declared the Tobago Ridge a forest reserve. Since 1980, the THA's policy has placed much emphasis on conservation of forest resources and it has discontinued timber exploitation from the forest reserve. It implemented a reforestation

---

[25] Within the framework of sectoral policies for Trinidad and Tobago, the responsibilities include (i) economic planning, programming and development of the resources of Tobago with special emphasis on agriculture, fisheries, forestry, industrial development and tourism; and (ii) the conservation and improvement of the environment.

TABLE II.3
GOVERNMENT-OWNED ESTATES IN TOBAGO, 1993

ESTATE	HECTARES
BLENHEIM	48.2
BLOODY BAY	195.1
CALDER HALL	30.8
CASTARA	166.8
ROXBOROUGH "FOREST PARK"	243.4
GOLDSBOROUGH	951.4
LURE	675.3
HOPE	416.2
KENDAL	519.0
RICHMOND	531.2
STUDLEY PARK	251.0
BELLE GARDEN	70.4
TOTAL	4,138.9

SOURCE: DAFMA.

program, focusing mainly on steep slopes outside of the forest reserve using major species such as cedar, mahogany, blue mahoe, cypre and acasio. Furthermore, efforts have been made to include the establishment of fruit trees on the outskirts of the reserve, with the intention of attracting the birds away from farmers' holdings to reduce the incidence of crop damage.

In addition to conservation, the THA has focused on the development of the natural resource base by establishing visitation facilities on Little Tobago, hiking trails, bird watching huts and rest houses. It has also collaborated with the FAO/UNDP and the Central Government in an upper watershed management project involving the Castara watershed, with the objective of improving its capability in watershed management.

Coastal Resources: A high priority has been given to coastal resource conservation in Tobago. The DAFMA has initiated a set of activities including participation in an Eastern Caribbean network to conduct surveys of flying fish, regularly patrolling of the Buccoo Reef by its Marine Section and with the Institute of Marine Affairs, and working with NGOs such as the Crusoe Reef Society to regenerate and enhance the reef.

Emphasis has also been placed on the development and improvement of local fishery activities through: (i) constructing modern fishing centers with facilities for cold storage, cleaning, packaging and equipment storage; (ii) encouraging the use of larger boats which accommodate chill facilities; and (iii) researching new and appropriate technology for fishery exploitation.

***National Parks*:** In the system of National Parks (established in 1980) for the country by the Forestry Division of the MALMR, approximately 10,566 ha. were set aside as protected areas for use as national parks and conservation reserves in Tobago (**TABLE II.4**). This area corresponds to almost 25% of the island's land area. If the system is implemented and effectively managed, it promises fairly comprehensive protection for the island's natural environment.

TABLE II.4
PROTECTED AREAS PROPOSED FOR TOBAGO

AREA	SIZE (HA.)
NATIONAL PARK:	
EASTERN TOBAGO:	5,700
	1,700 FOR FOREST RESERVE
	100 FOR WILDLIFE SANCTUARY
BUCCOO REEF:	300
NATIONAL LANDMARK:	
GOLDSBOROUGH:	1,500
	600 FOR FOREST RESERVE
SCIENTIFIC RESERVE:	
KILGWYN	100
NATIONAL CONSERVATION RESERVE:	
GRAFTON	200
RECREATION:	
CASTARA:	2
LITTLE ROCKLY BAY:	2
MT. IRVINE:	2
SCIENTIFIC LANDSCAPE:	
PARLATUVIER/ROXBOROUGH:	240
	120 FOR FOREST RESERVE

SOURCE, TFAP, 1992.

2.2.4 Policy Impacts in Tobago

With some exceptions, the natural resource management policies implemented over the years have placed Tobago in a relatively good position with respect to the state of its natural resources and the environment. Declaration of the forest reserve and enforcement of conservation measures have left the island with almost 34% of its area under forest, much of this being in pristine form. The biodiversity, aesthetic value, hydrologic balance, micro-climate stabilization and wildlife associated with one-third of the land area have thus been preserved. Furthermore, the natural and environmental resources of the main ridge offer opportunities which could make a significant contribution to the sustainable development of Tobago.

The government's policy to acquire and set aside estates for future development offers the THA much flexibility and leverage to protect land resources. In addition, the 12 estates account for almost 25% of the land area, and with a large proportion of these lands uncommitted, the government has good opportunities to facilitate the island's agricultural development in the future.

The establishment of game sanctuaries on Little Tobago in 1928 and St. Giles Island in 1968 has preserved two important natural heritage areas. Little Tobago was once well known for the greater bird of Paradise, but these almost disappeared after a hurricane[28]. It is believed

[28] Attempts are now being made to re-stock the birds.

that the sanctuaries also provide a home for about 58 species of birds, as well as a breeding ground for large colonies of sea birds[27].

However, while past policies have served well to protect and conserve a large proportion of the island's natural resources, the same cannot be said about other aspects of the natural resource base. The absence of a comprehensive environmental policy and accompanying legislation, together with the limited enforcement capacity of agencies such as the TCPD, have had adverse impacts on the resource base and environment, particularly in the southwest sub-region.

Given that the southwest has the largest tracts of the most arable soils, the rapid conversion of private lands to built development has compromised the capacity for agricultural production and productivity. Clearing of coconut trees over large areas and the relatively unplanned development of the sub-region have reduced the aesthetic value of the area. Furthermore, development expansion without effective environmental policies and guidelines has led to serious degradation of the coastal resources. Some beaches and coastal waters are polluted with bacterial counts above threshold levels, and portions of the Buccoo Reef have been destroyed. The conversion of agricultural lands to irreversible uses and environmental degradation can be traced to: (i) absence of an overall physical plan for the southwest including environmental assessments; (ii) limited effectiveness of the TCPD in enforcing physical development plans; (iii) absence of guidelines, regulations and enforcement mechanisms for the environment; and (iv) absence of a tourism policy. These factors, together with the absence of a comprehensive and effective system of land zoning, have contributed to the rapid alienation of agricultural lands in other parts of the island[28].

---

[27] Tropical Forestry Action Plan (TFAP), 1992.

[28] The weakness of the TCPD largely results from the ultimate decision on physical development being made at the political level, either by the Minister of Planning and Development or the THA.

CHAPTER III

NATURAL RESOURCE USE AND MANAGEMENT

3.1 Natural Resource Characteristics

The natural resources of Tobago are soils, water, forests, and coastal and marine resources. Additionally, environmental and ecological resources are of particular importance. The large areas under forest, particularly the forest reserve on the main ridge, provides a resource base rich in biodiversity, scenic views, clean air and natural wilderness. The limited scale of built development in the various communities, excluding the southwest, preserves much of the natural ecology of the island. This, together with the cultural traditions of the local communities, provide a rich blend of "naturalness".

3.1.1 Soils

Tobago has four major soil groups - Groups A, B, C and D (**TABLE A.6**). Of these steepland soils are the dominant group. Fifty-six percent (approximately 16,721 ha.) of the soils in Tobago are considered arable, that is, soils which belong to capability classes I to IV (**TABLE III.1**). Even though these soils are suited for commercial agriculture, they have varying degrees of physical limitation. Accordingly, appropriate management systems must be employed in order to avoid degradation and to ensure sustainability of acceptable levels of production.

TABLE III.1
SOIL CAPABILITY FOR AGRICULTURE IN TOBAGO

CAPABILITY CLASS	AREA (HA.)	% OF TOTAL LAND AREA
I	276	0.92
II	3,381	11.34
III	6,638	22.29
IV	6,426	21.58
V	8,513	28.59
VI	4,268	14.33
VII	270	0.90
TOTAL	29,772	100

SOURCE: BROWN ET AL

Less than 1% (276 ha.) of the soils belong to capability class I. These soils are characterized as having good fertility and drainage, and are fairly level. They are located mainly in areas near Scarborough in the southwest of the island, in smaller areas between Plymouth and Montgomery, near Mt. St. George and Goodwood in the northwest and central southern regions, respectively.

Like class I soils, those belonging to class II are also suitable for agricultural production. Approximately 11% of the island's soils have class II capability (**TABLE A.7**). These soils are fertile with flat to gentle slopes. Although they have some limitations, the necessary protective measures to ensure sustainability are not onerous and could be easily provided. These soils are

scattered throughout the island, but are found mainly in the northwest and southern coastal regions, and a few areas in the north-east and north-central regions. Approximately 60% of these soils belong to Group A (soils of the alluvial plains and valleys) and the remainder to Group C (steepland soils). As a consequence, 85% have excess moisture limitations and 11% have a slope limitation. The limitations of class II soils are not severe and they are capable of supporting intensive farming.

Soils of class III comprise a relatively large area (6,638 ha. or 22.3%) of the island. The degree of limitation of these soils requires moderate to extensive protective measures before they can be used intensively. Most of these soils are steepland soils, thus the major factor constraining productive use is slope with the risk of erosion. Approximately 70% of the land in this class has this limitation. Excess soil moisture is an important factor that affects about 26% of the lands in this group.

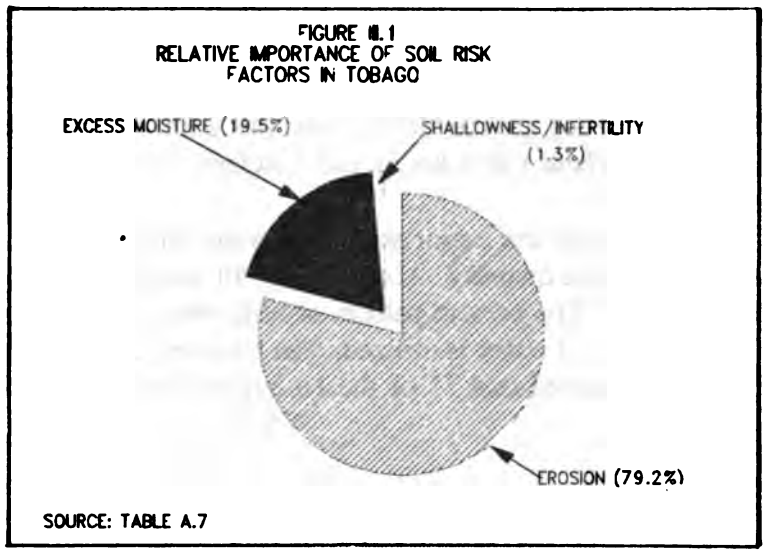
In general, class IV soils have a higher degree of slope than those of class III. Approximately 22% (6,426 ha.) of the island's soils belong to class IV, with 85% of this having the limitation of "slope with erosion risk".

Soil classes III and IV are located mainly in the western end and south-central regions of the island. Their use requires careful selection of enterprises and soil/land management systems, in order to obtain maximum gains from agriculture and to ensure sustainable production.

Soils of capability class V to VII have fairly steep slopes; therefore, their vegetation and soil cover should not be removed or disturbed. Soils of capability class V are located mainly in the mid-western, southeastern and scattered areas in the north of the island, while those of capability classes VI and VII are principally confined to the main ridge and vicinity.

Approximately one-half (5,746 ha.) of the best agricultural land is located in the south-western and Scarborough sub-regions. In the former sub-region about 75% of the soils belong to classes I to III. Unfortunately, almost one-half of these lands is no longer available for agriculture, as it is under built-up uses. The windward sub-region is next in importance in terms of agriculture, since about one-third (32%) of the soils in capability classes I to III are located here. Most of the remaining lands considered most suitable for agriculture are located in the central sub-region, comprising 1,642 ha. or 14.5% of total area.

The major factor limiting the suitability of land for productive agriculture in Tobago is "slope" and the associated problem of erosion risk. Approximately 79% of the soils, corresponding mainly to those of Group C (Steepland soils) are limited in use because of this factor (**FIGURE III.1**). The only other limitation of significance with respect to agricultural capability is "excess moisture in the soil." About 20% of the island's soils have this limitation; these generally occur in pockets in the various valley bottoms and coastal lowlands. Soil "shallowness or infertility" is not significant for agricultural activities, as only 1.3% of the soils are affected.



3.1.2 Forests

At the time of the Land Capability Study in 1973, Tobago had almost two-thirds of its vegetative cover in natural forest, secondary forest and lastro. Over the last two decades, removal of trees has taken place in several areas, particularly in the southwest. According to the Tropical Forestry Action Plan (TFAP), the island's forest cover encompasses 13,907 ha. or 46.4% of the total land area[26]. Based on a forest inventory conducted in 1980, the forest reserve in the northwest along the main ridge comprises 3,958 ha., whilst another 9,949 ha. of forests are located on state lands. The forest reserve includes a wildlife sanctuary with an area of 133 ha. In addition to forests on state lands, there are forests on private lands, the extent of which is unknown. With the ban on sales of timber from state lands, all lumber currently produced in Tobago is derived from private holdings.

The amount of timber on state lands which could be commercially exploited is limited due to access difficulties and steep terrain. This constraint, together with the THA's policy emphasis on conservation and protection, have resulted in commercial forests being largely unexploited[27]. In an effort to expand the area under forests, the Forestry Division has been engaged in reforestation activities at the rate of 12 ha. per year. Up to 1992, it is estimated that 646 ha. of plantation forest (Honduras Pine) was established.

---

[26] TFAP, 1992.

[27] The THA has now banned sales of all timber from its lands due to the damage to the environment caused by machinery operations.

3.1.3 Water Resources

Five watersheds have been identified in Tobago, all of which includes a portion of the main ridge (**FIGURE III.2**). They are the North Coast (49.2 km.^{2}), the East Coast (48.7 km.^{2}), Windward (113.9 km.^{2}), Courland (38.6 km.^{2}) and Lowland (49.8 km.^{2}).

Surface run-off constitutes the major source of water on the island since ground water is not available in any appreciable quantity. Accordingly, all water production is based primarily on the yield of the main ridge. The present pattern of utilization is dominated by domestic use; only a limited amount of irrigated water is utilized. The tourism sector has become a major user of water. In 1990, it was estimated that 11 of the 16 largest water consumers in Tobago were hotels[28].

Water production in Tobago by the WASA is well below current demand. The deficit is becoming increasingly acute in the southwest, due to the expansion in tourism and other development activities in recent years. WASA has four plants (at Hillsborough, Courland, Craighill and Greenhill) which serve the southwest, Scarborough and central Tobago. In 1990, the production shortfall was approximately 12% of demand, and this is expected to increase to about 22% in 1995, assuming a demand of 19,930 cubic meters (m.^{3}) per day.

The Windward communities also experience a deficit in pipe-borne water. They obtain their supplies from the Richmond, Kings Bay and Charlotteville plants. In 1990, the shortfall in these communities was 20% of demand, and this deficit is expected to increase to 26% by 1995.

Turbidity of the water from the catchment areas is a major factor affecting production of pipe-borne water supply, particularly during the rainy season. As a result, some installations cease production altogether at this time of the year whereas others operate at reduced capacity. Additionally, effective supply is further affected by transmission problems, which contributed to an estimated 50% water loss in 1990[29].

Given the seasonality of rainfall in Tobago, it is difficult to have efficient agricultural production in the absence of irrigation. The problem is most acute in the southwest where the most suitable soils for agriculture are located. The inability of pipe-borne water supply to meet current needs and those in the near future, virtually rules out this source as having a significant potential for irrigation.

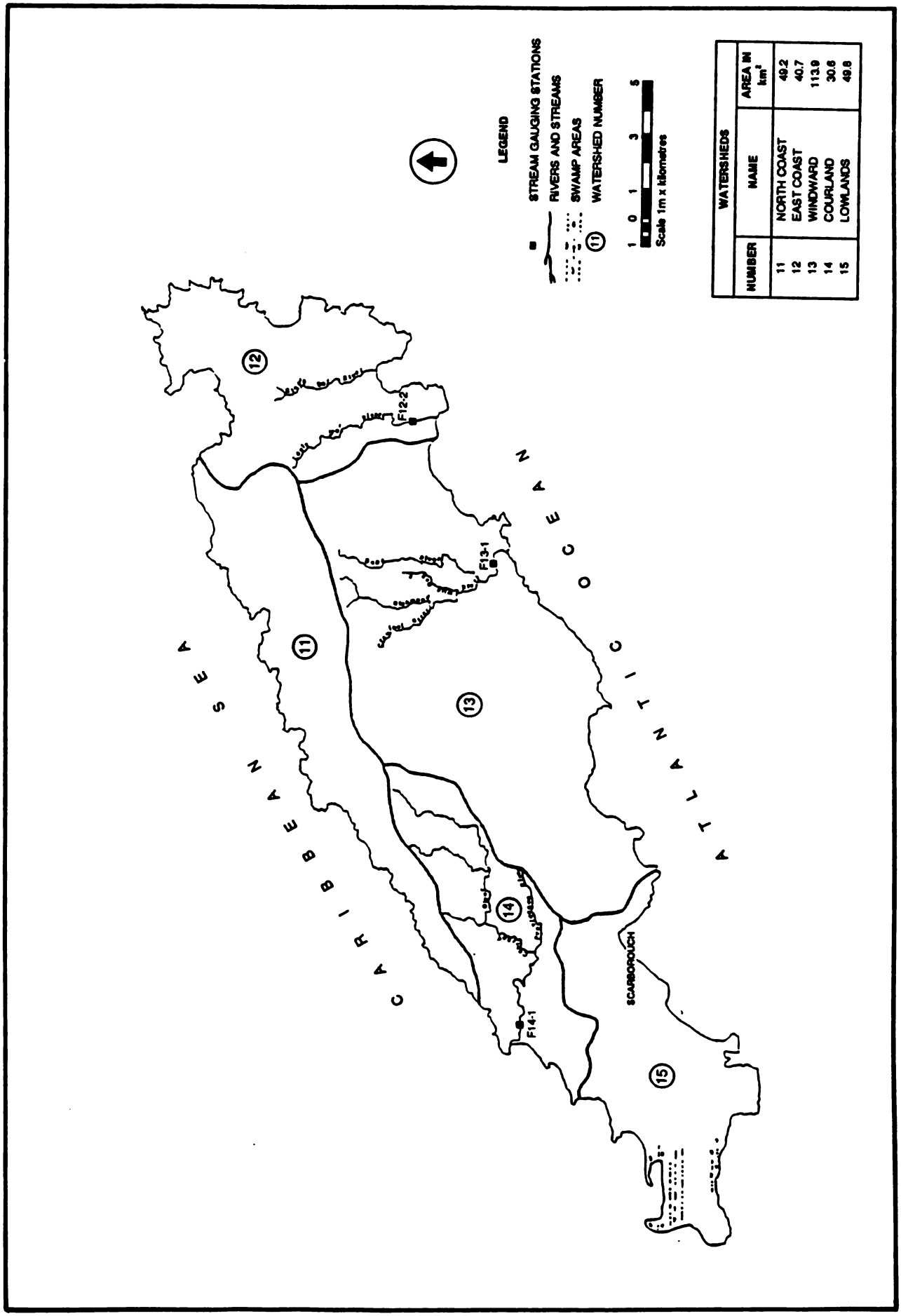
Agriculture along the Windward coastal lowlands is less constrained during the dry season since some of the rivers maintain a year-round flow. Some level of irrigation in the

---

[28] Town and Country Planning Division, 1991.

[29] WASA estimate.

FIGURE III.2
WATERSHEDS OF TOBAGO



WATERSHEDS		
NUMBER	NAME	AREA IN km²
11	NORTH COAST	49.2
12	EAST COAST	40.7
13	WINDWARD	113.9
14	COURLAND	30.6
15	LOWLANDS	49.8

Goldborough, Louis D'or and Studley Park estates does exist, but they have limited capacity and may not support a significant expansion in the area under cultivation.

Deforestation, slash and burn agriculture, squatting, unauthorized and ill-planned housing, road construction and quarrying have all contributed to serious degradation of the watersheds in Trinidad. The hydrological and ecological balance of forested watersheds have also been greatly altered. Fortunately, in the case of Tobago, the watershed areas have not been affected to the same extent, and the main ridge which is the catchment area for most of the water supply has been conserved.

WASA is responsible for the overall management and exploitation of the water resources of Trinidad and Tobago. It discharges its functions of water production and distribution through six districts, of which Tobago is one. Within the organizational structure of the Authority, the Water Resources Agency (WRA) has specific responsibilities for water resources research, planning, exploitation and monitoring the total resource situation.

Although WASA has the responsibility to conserve and protect water resources, its efforts have been limited. The Authority has not conducted a comprehensive research on the factors impacting on water quality and quantity in the major catchment areas, nor has it implemented comprehensive measures to ensure the integrity of the water resource base. In this regard, the THA should not only insist that the Authority discharges this responsibility in the case of Tobago, but it should also request that WASA continue to develop a program for conservation and management of the main ridge and its water resources.

In the case of irrigated water, WASA has largely ignored this aspect of water resource development. Given the importance of irrigation for agriculture, the THA should develop an action program in consultation with the Authority and the WRA.

3.1.4 Coastal and Environmental Resources

The coral reefs, beautiful beaches, scenic landscapes, rustic and unpolluted countryside, forests and wildlife provide a rich and valuable tourism resource base, which has been a major factor in the recent growth in tourism in Tobago. Although there are plans to expand tourism through the exploitation of eco-tourism and the island's cultural heritage, the traditional resources (sun, sea and sand) will continue to be an important source of attraction to the island.

The tourism resource also includes the aesthetic qualities of the land area in the south-west. Rapid development of this area, the removal of vegetation, together with the infrastructural deficiencies in waste handling and sewerage treatment, have led to pollution of coastal waters. During the 1989-90 period, the IMA conducted water quality assessment of the coastal waters in the southwest and found faecal coliform bacteria at unusually high levels in many of the bays. In some cases, the levels were above the mandatory recreational quality standards that have been established internationally. This, together with household and urban

water run-off also threaten the coral reefs. In the not too distant future, these problems as well as congestion, noise and air pollution are likely to become major environmental issues.

3.2 Natural Resource Implications for Agricultural Development

As indicated, the most important factor limiting land availability for productive agriculture in Tobago is "slope with erosion risk". Although one-third (about 11,000 ha.) of the island's land resource is considered to have "good suitability" for agriculture, they are concentrated in the southwest, the windward and the central sub-regions. Almost 10% of this area (located in a belt that stretches from Scarborough to Canaan/Bon Accord) has been lost to rapid built-up development over the past two decades. According to a survey of the land use distribution of four major built-up areas in 1990, a major portion of the total area was under non-agricultural uses and only about 5% (111.3 ha.) under agriculture (**TABLE III.2**).

TABLE III.2
LAND USE DISTRIBUTION FOR MAJOR BUILT AREAS IN TOBAGO, 1990 (HECTARES)

LAND USE	MAJOR AREAS				
	PLYMOUTH	ROXBOROUGH	CANAAN/ BON ACCORD	SCARBOROUGH	TOTAL
TRADE	1.63	2.07	39.25	29.63	72.58
OFFICE	0.52	2.75	1.16	14.26	18.69
MIXED USE	12.42	5.79	64.91	59.90	143.02
INDUSTRIAL	0.03	0.28	1.13	4.20	5.64
RESIDENTIAL	83.14	48.30	289.03	224.86	645.33
INSTITUTIONAL	11.50	12.85	7.37	56.65	88.37
PROTECTIVE\HEALTH	0.27	2.71	7.98	21.60	32.56
TRANSPORTATION/ COMMUNICATION	0.00	0.00	138.28	8.70	146.98
UTILITIES	0.00	0.09	11.12	14.47	25.68
AGRICULTURE	9.46	32.02	45.53	24.37	111.28
RECREATION	4.54	4.32	6.41	40.90	56.17
VACANT	108.79	95.49	489.30	384.85	1,078.43
TOTAL	232.30	206.67	1,101.47	884.39	2,424.73

SOURCE: TCPD, 1990.

Despite the diversion of land into built development in the southwest sub-region, this area is still the most important for the development of agriculture, since approximately 40% of the best soils are located there. The recent growth in tourism and service-related developments in that sub-region has resulted in tremendous pressure for land for built-up uses. Evidence from real estate transactions as well as requests for planning approval for this sub-region suggest that large tracts of land under agriculture, with the highest soil capabilities, are in the process of conversion, or are likely to be converted to built-up uses in the future. If this trend continues unchecked, it is likely to compromise the long-run development potential of Tobago, with the following major implications:

(a) The alienation of good agricultural lands to built-up uses seriously limits the scope for expanding agricultural production to meet domestic food requirements, as well as for exploiting potential benefits from the tourism sector in terms of food demand.

(b) The development of agriculture in Tobago in the future is likely to be significantly affected by lower cost imports because of economic reform policies[30]. In the case of Tobago, the southwest has the soils and land resources to support efficient and competitive agricultural activities. The loss of these lands to non-agricultural uses would seriously compromise the island's potential in agriculture, as well as its food security needs.

(c) Furthermore, the current rate of built-up expansion in the south-west would not only affect agriculture, but would also eventually also erode the quality of the resource base on which the tourism industry survives. Land-based activities, if uncontrolled on a small island such as Tobago, could adversely affect the quality of the coastal and marine resources. This has been the experience in recent years, where mangroves, coastal areas, water quality of the beaches and the coral reefs have been degraded. For Tobago, achieving sustained growth and development is very much related to the quality of the island's environmental resources. In this regard, further loss of good agricultural lands in the southwest and unchecked expansion of built development are urgent issues to be addressed.

Approximately 5,000 ha. of good agricultural lands (capability classes I to III) are located outside the southwest sub-region. These lands are generally fragmented, occurring in pockets in the windward and central sub-regions. Accordingly, the development of agriculture in such areas appears more appropriate for small- and medium-scale operations.

With regard to soil capability class IV (21.6% of lands), slope is likely to impose a serious constraint. A significant proportion of these lands require less intensive use and the activities selected should ensure soil conservation practices. However, such requirements for sustained use of the land could provide lower returns in the longer run. Additionally, the inability to mechanize as well as the difficulty to access steeper areas would increase the production cost on these soils. The more steeply sloping lands in this class are unlikely to support competitive agricultural activities, due to lower yields, higher investments (e.g., in erosion control measures) and production and transportation costs. Using these areas more efficiently may therefore require the production of high-value specialized commodities, or unconventional enterprises such as agro-forestry, agro-tourism and nature retreats.

Given the high erosion risk associated with the soils in capability classes V, VI and VII, policies should be put in place to keep such areas under permanent forest cover. This appears

---

[30] It is possible that the price of imports could be higher with liberalization, tariff reductions and reductions in the levels of support in the more developed countries.

practical and feasible, given that the good agricultural lands are grossly underutilized at this time.

3.3 Constraints for Natural Resource Development

The major constraints to natural resource development in Tobago include:

(a) ***Absence of appropriate policies, enabling legislation and enforcement mechanism:*** Prior to 1980, policies and supporting legislation intended for improved use of the natural resource stock and for conservation/protection were concerned mainly with forests, wildlife and water resources. The existing policies did not comprehensively address all aspects of natural resources (e.g., development of national parks, protection of bio-diversity). The fragmented nature of policies, inadequate legislation, lack of enforcement and the numerous agencies that have overlapping responsibilities, have together contributed to ineffective resource conservation. With regard to environmental resources, the absence of policies and regulations has been a major factor affecting rapid degradation.

Given these deficiencies, the relevant ministries and agencies (particularly for forestry) enunciated more comprehensive proposals to address the problems of natural resources and the environment (**APPENDIX B**). Some of these proposals still have to be adopted/enacted, such as environmental legislation, land administration reform, land zoning, a system of national parks and establishment of an environmental protection agency. These are comprehensive in scope and appear to provide the appropriate policy and legal framework for natural resources management, development and conservation. Some proposals have been in draft form for over a decade (e.g., the revised Forest Resources Policy of 1981). While the government has delayed implementation of appropriate public policies, degradation of the resource base continues at an alarming rate.

(b) ***Inadequate irrigation facilities and alienation of arable land:*** While the southwest is endowed with the best and largest stock of arable lands, future development of these resources for agricultural production are constrained by two major factors. First, there is a rapid alienation of arable agricultural lands to built development, thereby compromising the future potential of this area. Second, the productivity of the arable lands depends to a large extent on irrigated water. The current water resources constraint in this part of the island requires the development of an irrigation system (including the sourcing of water), as an integral part of an overall agricultural development strategy.

(c) ***Limited lands amenable to mechanization:*** Outside of the southwest area, lands which are amenable to mechanized operations are limited and fragmented. This imposes constraints on productivity and the capacity to develop a competitive agricultural base.

(d) ***Inadequately trained staff, funding and research and development:*** The DAFMA has responsibilities to execute a range of functions that are normally undertaken by several public institutions. Limited human resources, both in terms of the level of expertise and the range of discipline, is currently a major constraint to the Division in discharging its mandate. This limitation is likely to continue in the near future.

A similar situation exists with respect to funding for both development projects and for research and development activities. In the case of the latter, linkages with national, regional and international agencies via the central government provide a cost-effective approach to scientific and technological support.

(e) ***Other constraints*** include: (i) the inadequacy of waste and sewerage handling and treatment facilities in the southwest; (ii) a major risk of erosion for most soils if utilized for agriculture; (iii) underdevelopment of irrigation facilities for the productive areas of the windward coast; and (iv) potential for financial gains from land speculation.

CHAPTER IV

THE AGRICULTURAL SECTOR: MAJOR CHARACTERISTICS AND CONSTRAINTS

Prior to the development of petroleum exports, agriculture was a major sector in Trinidad and Tobago. It was the principal foreign exchange earner, a large employer of labor and the main source of food. In Tobago, the sector was also important, as the island was considered as the "bread basket" of the country, i.e., the main food source. However, the expansion in the production and exports of petroleum and related activities in the last four decades contributed to a progressive decline of the agricultural sector in both Trinidad and Tobago. All the traditional export crops (sugar, coffee, cocoa and citrus) experienced declining outputs and exports. In Tobago, the main products (sugar, bananas, citrus and copra) and food crops (mainly root crops) declined significantly also, with little or no production taking place for a few products.

The sector is relatively small in the country, contributing about 5% to GDP, 4.5% to export earnings and 10% to total employment in 1991. Sugar has remained as the country's only significant agricultural export, contributing nearly 1.5% to total export earnings, due to massive domestic and export market subsidies. The sector in Tobago is also very small, with production activities comprising mainly those of small farmers and artisanal fishermen. Both production and productivity levels are very low due to the low levels of use of modern inputs in the farming system.

4.1 Resource Base

4.1.1 Land

Tobago has a land area of 30,044 ha. (almost 5.7% of the land area of the country), with about two-thirds of this being unsuitable for cultivation due to topography and poor soil conditions. It is estimated that approximately 40% of the land area has slopes of more than 20 degrees and 22% has moderate slopes (10-20 degrees), but conditions such as erosion risk, poor accessibility and other difficulties restrict their use for agriculture. Of the remaining one-third of the land area, a significant proportion is in small, fragmented pockets located on the coastal plain and in the valleys. Only in the south-west where the land is flatter is there potential for intensive agriculture.

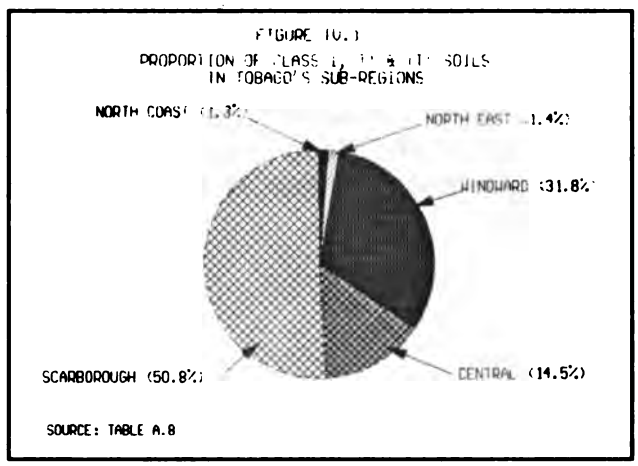
Based on soil fertility, erosion, slope and drainage capabilities, seven classes of soils were identified (**TABLE A.6**)[31]. Most of these soils are limited for agricultural use by factors such as slope, excess soil moisture and limited fertility due to shallowness. Of the soils in the various capability classes, those in classes I-IV are limited mainly by slope and moisture factors and the remainder by slope only (**TABLE A.7**). Those with capability classes I to IV are considered suitable for agriculture, with capability I having the highest potential (about 1%

---

[31] Brown et al., 1973.

only). Almost 56% of the soils in Tobago (16,721 ha.) are considered arable, that is, soils belonging to capability classes I to IV.

According to the TCPD, a large proportion of the soils in Tobago has good capability for agriculture (**FIGURE A.1**). Class I,II and III soils (11,289 ha.) are the most suitable for agriculture and these are distributed throughout the island, but are more concentrated in the south-west/Scarborough and in the windward sub-regions (**FIGURE IV.1**). Almost 51% is in the south-west and Scarborough and 32% in the windward region. The latter area comprise the Bloody Bay/Mt. Dillon Clay Loams, Belle Garden/Roxborough brown soils with good drainage and Goldsborough/Goodwood clay soils with poorer drainage. The area is characterized by steep topography which limits land for cultivation. However, there are approximately 3,500 ha. that are relatively extensive pockets of cultivatable lands, and most of these are located on state-owned estates.



The soils of the Leeward district are alluvial soils ranging from sandy clay loams to clay loams, the former being freer draining than the latter and are found at Bon Accord and Shirvan/Friendship respectively. The other major types are the volcanic soils covered by Brown soils and ranging from the Signal Hill sandy loams to the Montgomery clay loams and the Hope clays. The drainage potential ranges from very good on the sandy loam to restricted on the Hope clays. As in the case of the Windward district, the terrain in the Leeward area is hilly, and in addition it is more heavily populated so that housing development has reduced the availability of agricultural lands.

A comparison of 1973 and 1982 data shows that a significant amount of land has been diverted out of agriculture and forestry (**TABLE A.9**). In 1973, more than two-thirds of the total land area of Tobago was under crops and forests compared to only about 11% in 1982. In addition, areas under crops and grassland declined by almost 50% in this period. Recent information on land use shows that a major proportion of the land area is under forests, savannah conditions and pasture (**FIGURE A.2**). Furthermore, observations of the present

situation indicate that much land has been diverted to non-agricultural uses and a large proportion is still in an abandoned state, particularly public lands.

A large part of fairly good agricultural lands is located on the estates owned by the state. Some of these lands have been distributed through lease arrangements to farmers under the stateland distribution program. However, despite much efforts by the government to expand production activities, there is intensive agriculture on a few estates only (such as Roxborough, Goldsborough and Belle Garden), and much of the remaining land is either under part-time farming, being squatted on or semi-abandoned. In addition to state lands, there are 15 private estates comprising a total area of more than 2,400 ha. (**TABLE A.10**). Some lands in these estates are still under agriculture (primarily coconuts and cattle) and some are in a semi-abandoned state, but most are being converted rapidly to built development, particularly in the south west. The Courland estate (230 ha.) and the Lowlands estate (283 ha.), two relatively large private estates are the most recent to be taken over for built development.

4.1.2 Labor

Because farming is mainly a part-time activity in Tobago, labor is usually provided by the farmer and/or the farm family. Very few enterprises are large enough to hire full-time labor; those that do so often complain that reliable labor is both scarce and very costly, especially for only a few hours' work per day. Currently, the accepted wage rate in the private sector averages about TT$40/day although higher rates are sometimes requested. The practice of "lend hand" still exists whereby farmers may help each other as required or accept payment in kind such as exchanging a lamb for labor services. Women farmers may hire labor more often for certain activities such as land preparation and clearing bush.

As in most Caribbean countries, Trinidad and Tobago's labor market has several major characteristics which adversely affects agricultural development in the country, including Tobago[32]. These include: (i) the average age of the agricultural labor force (42 years) is higher than the average age of the total labor force (36 years)[33]; (ii) the average monthly income from agriculture is slightly more than 50% of the average income from all occupations in the country[34]; (iii) pull factors such as higher remuneration, job security and other benefits in the government and in other sectors attract labor from agriculture; (iv) most farm households are engaged in part-time farming; (v) labor demand is highly seasonal; and (vi) farmers do not aspire that their children become involved in agriculture.

Available data for 1976 and 1982 show that more than two-thirds of Tobago's farmers were above the age of 44 years and less than 15% were under 35 years (**FIGURE IV.2**). Over

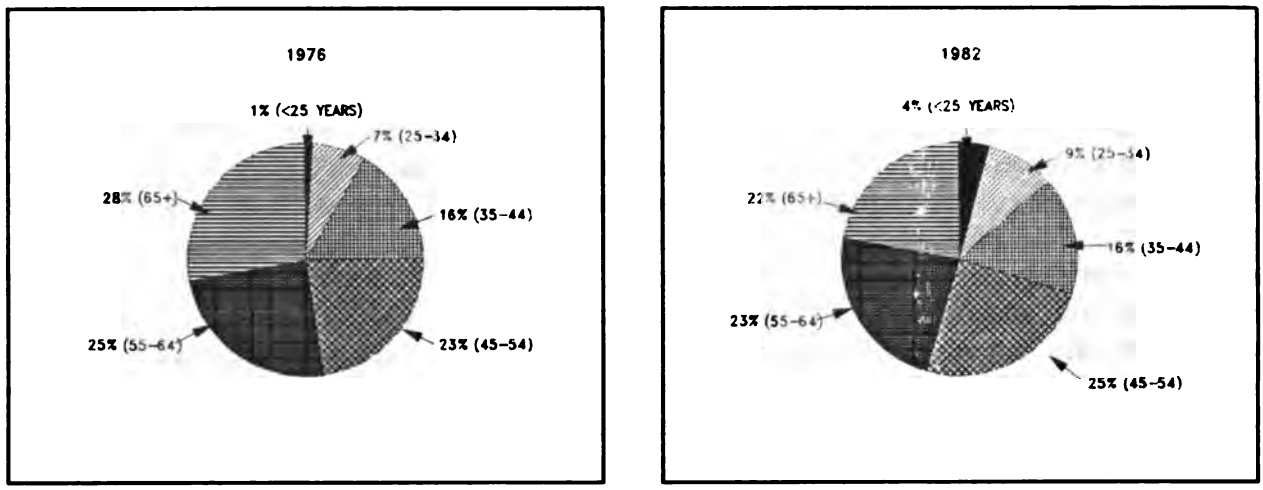
---

32 FAO/MFPME, 1989.

33 Estimated from the CSO's Labor Force Report, 1991.

34 Ibid.

FIGURE IV.2
AGE DISTRIBUTION OF FARMERS, 1976 AND 1982



SOURCE: TABLE A.11

the years, the sector has been unable to attract new entrants primarily because farming is basically not a competitive activity. Problems of access to land and insecure tenure, low technology use, the hard physical labor required in farming and the social stigma towards the sector contribute to low returns in agriculture, and discourage younger people from going into farming. As a result, the current situation reflects an aging farmer population, and the sector being looked at as a place of employment of last resort.

4.1.3 Rainfall and Water Supply

The island has a dry period from January to early May, and a wet period from mid-May to December, with the months of October and November usually having higher rainfall (**TABLE A.12**) The average annual rainfall has ranged from 1,610 mm. to 2,125 mm. during the ten year period 1982-91.

Farmers generally rely on rainfed irrigation for crop production. However, the rainfall is low in relation to the average evapotranspiration rate during the dry periods, and irrigation systems based on stored water supplies are therefore necessary for crops to be cultivated on an economic basis, especially vegetables. Approximately 75% of the estimated 2,000 private holdings are supplied with water, mainly piped. This is mainly potable water and it is costly, especially if used for irrigation purposes. Some farmers use limited amounts of this water for irrigation while others access water from nearby streams and private catchments.

While the south-west has good infrastructure and the best land for agriculture, its main problem is that of a water deficit. The area is much drier than the rest of the island with an average annual rainfall of 127-150 cm. There are few rivers or natural sources of water in this

area and irrigation is required in every dry season and for short periods at other times of the year. With current supplies unable to meet the demands of domestic users and the tourism sector it is unlikely that the needs of agriculture could be met.

In the windward area, the mean annual rainfall is higher (150-220 cm./year) but irrigation may still be required for at least part of the dry season in most years. Public water supplies are still insufficient to meet demand and one long part of the windward road has no public water supply. There are many rivers in this area, and the better soils are in the valleys where river water could be accessed.

Rainfall in the north-east is higher than elsewhere, but irrigation is usually required at least for short periods in the dry season. Despite this advantage, this area has a very steep topography and fragile soils which together limit the development of crop production.

4.1.4 Marine Resources

Although there is no precise assessment of the fisheries resources around the island, indications based on fishing practices by fishermen from Tobago, Trinidad and Barbados suggest that the stock is high, particularly in the deep sea areas. The resources are supported by the island being on the continental shelf of the north-eastern part of South America and by several reef formations that surround it.

In examining the marine resources of Tobago, it is important for this to be done within the context of Trinidad and Tobago, since Tobago shares the country's Exclusive Economic Zone (EEZ)[35]. The main fish species of commercial importance to Tobago that are located within the country's EEZ include demersals (such as croakers, sea trout, herrings, etc.) and seasonal migratory pelagics (such as king fish, flying fish and tuna) which are located off the East and West Coasts of Tobago[36]. While there is limited information on the stocks of these groups, investigations on individual species indicate that some are nearly fully exploited, particularly the demersals located in inshore areas which are intensely exploited by artisanal fishermen (more discussion on the fishery sub-sector is provided in Chapter VI). Of the sedentary marine resources, macro-algae and coral can also be found in and around the island's reefs.

4.1.5 Forest Resources

The forest resources of Tobago are relatively small. Most of these are in the Tobago forest reserve, consisting of 4,000 ha. of forest located in the North and North East districts. Additionally, there are 33 ha. of forests in private ownership. Forest activities consist of small

---

[35] The EEZ of Trinidad and Tobago is less than the 200 nautical mile limit because the country's neighbors are located within this distance.

[36] National Agricultural Development Plan of Trinidad and Tobago, 1988-92.

operations to produce timber for household use and for small shelters. There is only one small licensed saw-mill in Tobago which utilizes timber supplied by private enterprises.

Presently, the State has discontinued timber harvesting on state lands because of the use of inappropriate equipment which damages the land. However, timber extraction continues on private lands and this is difficult to control, because individuals legally require a permit only to transport logs on the highway. Land degradation has occurred in some areas of the island, due to squatting and felling of trees.

The Forestry Section of the DAFMA has responsibilities for the island's forestry. Its broad mission is to protect the environment and this is accomplished through: (i) an ongoing reforestation program that targets 12 ha. per year with Mahogany and Cedar species; (ii) protecting the flora and fauna on the main ridge which are an attraction to both visitors and Tobagonians; (iii) protecting "Little Tobago" as a sanctuary for the Bird of Paradise and about 30 species of sea birds; and (iv) maintaining trees along the highways and coastal areas.

4.2 Farm Structure and Income

Current information on the farming situation in Tobago is very limited. In 1992, the DAFMA estimated that there were 2,727 registered farmers in Tobago (**TABLE A.13**). The largest number was in the Mt. St. George district (18.3%), followed by an almost equal number located in the Roxborough and Goldsborough districts.

According to the 1982 Agricultural Census, there were 1,966 agricultural holdings in Tobago having a total land area of 5,872 ha. (**TABLE IV.1**). Small holders (<2 ha.) accounted for 71% of the total holdings, but they occupied only about 15% of the area. The average size of small holders was very small (0.6 ha.), about 22% of the average plot size of the island. Large holdings (>50 ha.) averaged 160.8 ha. each and these comprised primarily state lands and private estates.

TABLE IV.1
NUMBER OF HOLDINGS & AREA BY SIZE CATEGORY, 1982

SIZE (HA)	NUMBER	% OF HOLDINGS	HECTARES	% OF AREA	AVERAGE SIZE PER HOLDING
< 1	1,022	52.0	389.8	6.6	0.38
1 < 2	373	19.0	509.6	8.7	1.37
2 < 5	444	22.5	1,288.0	21.9	2.90
5 < 10	77	3.9	532.0	9.1	6.91
10 < 50	34	1.7	580.5	9.9	17.07
50 < 100	7	--	495.7	8.4	70.82
OVER 100	9	--	2,076.4	35.4	230.71
	1,966	100.0	5,872.0	100.0	2.99

SOURCE: 1982 AG. CENSUS.

The trend over the last 30 years indicates that there has been a significant reduction in land under agriculture and in farm structure. Both the number of holdings and the land area in 1982 were only about one-third the corresponding figures for 1963. Moreover, there was a reduction in the average size per holding (by 50%), as well as a decline in the average size of holdings for all the size categories during the period.

Recent information on Tobago's land situation indicates that a large proportion of the land area is still under relatively large holdings, controlled mainly by the state and by private estate owners (**FIGURE A.3**). It is possible therefore, that compared to a decade ago, small farmers occupy a smaller proportion of the total land area and their average farm size has been further reduced. In addition, the declining trend in total area under agriculture and in the average farm size seem to have continued in the last decade due to: (i) diversion of more land to built development and other non-agricultural uses; and (ii) the stateland distribution program.

In general, farm incomes are low in the country. Estimates vary about the level of farm incomes, ranging from 50% to 75% of the average income level for all occupations in the country[37]. Not only is farm income low, but a higher proportion of the lowest income group in the country is located in the sector, compared to other sectors of the economy[38]. The situation in Tobago is likely to be the same or even more acute than for the entire country due to agriculture being a part-time occupation. According to the 1982 Agricultural Census, about 70% of all households obtain less than 50% of their incomes from agriculture (**TABLE A.14**). Recent observations and interviews with farmers suggest that very few households are totally dependent on farming for their income, except for small artisanal fishermen. This confirms the view that agriculture is considered to be a low income activity, which reinforces the perception of families that their children should seek employment in other sectors.

4.3 Land Ownership and Tenure

The state is by far the single largest land owner in Tobago. In 1989, state ownership of land was estimated to be approximately 10,770 ha., just over one-third of the island's land area.

Data from the 1963 and 1982 agricultural censuses shows that more than one-half of the agricultural holdings and land area was owned, with the balance being accounted for by rentals, leases, squatting and contracts (**TABLE IV.2**). The tenure situation is likely to have changed in the last decade due to the government acquiring private estates and redistributing part of these under its stateland distribution program. Furthermore, both the number of holdings (almost 50%) and the area of owned agricultural land (about 80%) were significantly reduced during the period, confirming the trend of land alienation and land diversion out of agriculture, probably

---

[37] The FAO/MFPME study of 1989 estimates it to be about 75% of the national income average. The CSO Labor Force Report of 1991 estimates it to be a little more than 50% of the average income of all occupations in the country.

[38] FAO/MFPME, 1989.

TABLE IV.2
LAND TENURE IN TOBAGO, 1963 & 1982

TENURE TYPE	1963				1982			
	NUMBER OF HOLDINGS	%	HECTARES	%	NUMBER OF HOLDINGS	%	HECTARES	%
OWNED	2,710	66.3	15,526.3	83.7	1,414	49.1	3,022.0	51.5
RENTED/LEASED	840	20.6	1,923.1	10.3	684	23.7	822.9	14.0
CONTRACT	50	1.2	60.7	0.3	--	--	--	--
SQUATTING	--	--	--	--	265	9.2	263.4	4.5
OTHER	490	12.0	1,072.9	5.7	520	18.0	1,763.7	30.0
TOTAL	4,090	100.0	18,542.5	100.0	2,883	100.0	5,872.0	100.0

SOURCE: 1963 AND 1982 AG. CENSUS

due to its higher opportunity cost in other economic activities. Of significance also is that even though private ownership is the most common form of tenure, agricultural production has been on the decline. The above suggests that: (i) farming is not attractive because its economic viability is low compared to other land-use activities; and (ii) the constraints affecting agriculture will have to be addressed if the sector's performance is to be enhanced.

There are several problems related to the land tenure situation and land management that affect agricultural production in Tobago. These pertain to weak management by the state, a poor record system by the Lands and Surveys Division, delays in processing applications and distributing statelands, underutilization of statelands, the existence of a poor revenue collection system and squatting.

Besides being the largest land owner, the state has a major responsibility to manage the island's land resource efficiently. However, its management system is weak with respect to selecting farmers, enforcing the terms of leases and collecting rents. The stateland distribution program has progressed very slowly because there is a limited capacity to survey lands and an even more limited capacity to enforce the leases.

Although there is limited data, there are indications that the THA has been collecting only a small portion of the land rent while a larger amount has accumulated as arrears over the years. Moreover, the actual rent charged by the state is very low compared to market rates, and it has not been adjusted over time to reflect changes in inflation.

Squatting has become a major problem on statelands. Because of the state's poor records system, there is a lack of information on occupiers who have, as well as those who don't have valid documentation. In addition, it is quite difficult to easily access the Registrar's General Department (which is located in Trinidad) for conducting certain transactions such as title searches, transfers, filing, etc. Together, these factors discourage people from pursuing the legal channels to obtain land.

The Government's policy regarding the lease of state lands to farmers has been criticized, particularly the leasing arrangements used. However, even if more appropriate lease

arrangements are put in place, the expected impact on agricultural production may not materialize unless other constraints are removed. In this regard, a Government commissioned report in 1992 made several recommendations to improve the situation and they include[39]: (i) establishment of a land administration facility within the Agricultural Division of the THA; and (ii) centralization of land registration into a central office in Port-of-Spain and regional offices in San Fernando and Scarborough.

4.4 Infrastructure and Support Services

4.4.1 Infrastructure

Although the infrastructure required to support agriculture varies between the island's sub-regions, access roads to most small farms are inadequate. The south-west, where approximately one-half of Tobago's population resides has the most developed infrastructure. This area has the best road system and support services such as electricity, schools, medical services, public transport and communications.

The windward coast has one principal road (except in the Mt. St. George area), and it is complemented by secondary roads, of lesser standards that serve the populated areas located off the main road. In less populated areas, where agriculture could be further developed, the access roads are poor. Electricity lines run in the populated areas of the windward coast but these cannot be accessed easily for agricultural use. There are public transport services on the windward road between Scarborough and Charlotteville but these are unreliable. Regarding communications, there have been recent improvements in telephone services in this area.

The north/north east is the least populated and the most poorly serviced area in Tobago. Services such as public transport, telephones and other utilities are very poor. Between Scarborough and the north coast there is a network of small roads which are in poor condition. There is one road along the north coast and a part of it (from Bloody Bay to Roxborough) has been recently improved. The road between Bloody Bay and Charlotteville is still impassable and both secondary roads and agricultural access roads are very few in this area.

According to the 1982 Agricultural Census, approximately 50% of the 2,000 private holdings in Tobago were accessible by public and private roads and tracks. Only about 33% of these holdings were accessible by surfaced roads and 60% by vehicles (**TABLE IV.3**).

The census also shows that more than 50% of private holdings were without electricity, including for the most part those without dwellings. At the same time, more than one-half of the private holdings without electricity were located more than one mile from the nearest electricity pole. If this situation is unchanged, it will add to the cost of on-farm investments that are required for certain types of value-added activities.

---

[39] Land Tenure Center, 1992. The report also outlines the costs of implementing these recommendations and the training requirements.

TABLE IV.3
ROAD ACCESS TO PRIVATE HOLDINGS, 1982

INFRASTRUCTURE	NUMBER OF HOLDINGS
ROADS	977
TRACKS	880
FULLY SURFACED ROADS	513
PARTLY SURFACED ROADS	136
GRAVELLED ROADS	166
MOTORABLE ROADS	1,205
UNMOTORABLE ROADS	747

SOURCE: 1982 AG. CENSUS.

4.4.2 Agricultural Credit

The Agricultural Development Bank (ADB), is the major source of agricultural credit in Tobago. Commercial banks provide only a small portion of the total agricultural credit and most of this is lent to the large estates. Other public sources of credit include two government-owned entities - the Industrial Development Corporation which finances secondary and processing activities and the Development Finance Corporation. Private sources of credit include NGOs (primarily the Association for Caribbean Transformation), cooperatives, credit unions, money lenders and traders of agricultural products, who usually make special credit arrangements with farmers. It is difficult to quantify the contribution made through these latter arrangements, but it is believed that the amount supplied to the sector is relatively small.

Most major developmental aspects in agriculture are catered for by the ADB. In the last five years the Bank's portfolio shows that it has lent TT$5.58 million to agriculture (including fishing and agro-processing). The proportion of the total loans approved by the Bank as well as the absolute amount peaked in 1990 then declined by more than one-half thereafter (**TABLE IV.4**). The data further indicates that the Bank is supportive of the thrust of the THA, and as such, it has channelled significant amounts of funds for investment in small ruminant, fishing and agro-processing activities.

Often, farmers have difficulties in providing security to cover their loan. Land titles, cash and other assets are accepted but most small farmers are unwilling to risk these types of collateral. The ADB accepts land as security only if it is owned or if it has been leased for a long term. However, only a few stateland farmers have long term leases (25 years). Most have shorter term leases, ranging from 1-3 years, and these could only access small loans (TT$5,000 - TT$10,000) if additional collateral is provided.

While accessing credit may be a problem for most Tobago farmers, a major issue is their unwillingness to use credit. In general, small farmers are reluctant to borrow and this attitude is rooted in their cultural behavior. Most of those that do obtain loans however, are unable to manage these adequately. This is due to insufficient farmer training, inadequate support by the extension service, circumstances beyond the farmer's control or because the farmer has lost his regular job. Of importance also is the perception by some farmers that a loan should be repaid by earnings from their regular off-farm employment rather than from farm production.

TABLE IV.4
LOANS APPROVED BY THE ADB TO TOBAGO 1988-92 (TT$'000)

TYPE OF LOANS	1988	1989	1990	1991	1992	TOTAL
CROPS:						
FOOD CROPS	58.7	215.3	286.6	108.0	118.4	787.0
MIXED CULTIVATIONS	9.0	-	-	-	-	9.0
TREE CROPS	3.0	13.1	2.8	1.3	1.0	21.2
OTHER	-	2.2	1.3	1.3	-	4.8
ORNAMENTALS	138.5	214.5	-	-	15.0	368.0
LIVESTOCK:						
POULTRY	352.7	24.0	163.3	51.1	40.0	631.1
BEEF	-	46.6	53.6	34.5	117.0	251.7
DAIRY	3.0	30.0	-	-	-	33.0
SHEEP AND GOATS	10.0	283.9	415.1	443.2	293.1	1,445.3
PIGS	41.6	74.7	319.6	180.9	117.8	734.6
OTHER	10.6	-	48.2	6.9	-	65.7
BEES	-	11.3	21.5	12.0	10.6	55.4
FISHING	885.2	188.7	1,268.3	1,043.5	997.1	4,382.6
AGRO INDUSTRY	-	718.3	1,834.8	52.7	1,203.3	3,809.1
PLANT PROPAGATION	-	3.0	50.0	-	-	53.0
MARKETING	-	45.0	27.8	35.0	197.8	305.6
MECHANICAL SERVICES	-	-		6.0	-	6.0
TOTAL	1,512.3	3,570.6	5,511.1	1,976.4	3.007,8	5,578.2
% OF TOTAL LOANS APPROVED	5.1	9.7	12.1	4.0	5.0	-

SOURCE: ADB

Obviously, this would have implications for the government's efforts to transform part-time farming into commercial operations. Furthermore, another implication of the above is the need for farmers to improve production efficiency in order to repay loans.

4.4.3 Other Services

Other support services to agriculture are provided by the DAFMA and the Marketing Division of the THA, and to a lesser extent, various public institutions. The DAFMA is the principal institution that supports the sector in the areas of planning, policy guidance, provision of technical and extension services (see CHAPTER VIII). The Marketing Division supports marketing activities in the sector based on a mandate from the THA (see CHAPTER VIII). Although its role is largely developmental it is actively engaged in wholesaling and retailing operations. Other public institutions providing support include the Institute of Marine Affairs (in the area of fishing), the TCPD (land use planning), the Lands and Surveys Department (land surveying), WASA (water) and the Division of Works (roads).

4.5 Women in Agriculture

According to the 1982 CSO census, women accounted for 21 % of all farmers in Tobago. Assuming that this figure is unchanged, observations indicate that it greatly underestimates the

contribution of women to the sector. Although marketing has remained an important traditional area for their involvement, women are also actively engaged in production activities.

Many holdings that are recorded as being owned by a man are, in fact, operated by both spouses, with the woman contributing at least as much as men to crop production. Unless the farms are sited very far from the home, as it is the case with many stateland plots and hillside farms, women are almost always involved with crop production, as far as their other responsibilities allow. Men would often prepare the land and spray the crop. Women, being the link between production and nutrition, usually prepare, preserve or process the crops produced. Other aspects of crop production such as nursery care, planting, fertilizing, weeding and harvesting would often either be shared or undertaken by the woman. In the case of mixed production enterprises, the wife may be responsible for vegetable cultivation while her spouse is responsible for livestock.

Although there are more male farmers involved in livestock production, women play a significant role. The 1988 CARDI census identified 16.1% female livestock farmers in Tobago. There are gender specific duties associated with livestock farming. The more laborious tasks such as land preparation for planting forage, grass cutting and construction of fens are done by men, while women are more involved in activities such as record keeping, feeding of animals, cleaning of fens, care of sick and young animals. There are four well-recognised women sheep farmers in Tobago who have been very successful. In addition, one of the largest beef farms is owned and operated by a woman. This farmer also rears over 100 heads of sheep and 70 buffaloes.

Women applicants have equal access to statelands, but presently there are only 12 (approximately 14%) female stateland farmers. Because of other household responsibilities, they often find it more difficult to leave the home for long periods of time to work on isolated stateland farms.

In general, women farmers are more likely not to have salaried employment. Even if a female farmer is employed, her income may be lower that of the average male part-time farmer. Also, it has frequently been reported that a higher proportion of women's income is used for household expenditures compared to that of men. A woman farmer, then, is likely to have less disposable income to pay for agricultural inputs, which are expensive in Tobago. Therefore, it is likely that she would have a relatively lower input farming system and achieve lower yields.

Women farmers do experience similar farming problems as their male counterparts but with some differences. Regarding agricultural credit, only 31 of the current 377 loans by the ADB in Tobago were made to women. This may be explained by the sector having few female farmers and their unwillingness to take the risk of borrowing money, or because they have inadequate security. However, according to the ADB, if a loan request is made by a woman,

it is likely that her project is well planned. Moreover, females have a better reputation than men for servicing their loans.

There are more women than men involved in marketing. Presently, of the 144 retail vendors in Scarborough, 112 are females and about 75% of these are farmers themselves. Men may assist to transport products to market but women prefer to do the marketing. A high proportion of women are also traffickers, i,e., those involved in trading activities in Trinidad. In livestock marketing, this is the exclusive responsibility of men.

The staff of the DAFMA includes a relatively large number of females. Those that are working on the Agricultural stations in certain categories, are paid a lower wage than their male counterparts. According to the Division, its extension services are unbiased in the treatment of men and women. It has 6 female extension staff members, but it makes no special effort to reach women farmers to learn of their particular problems, or to provide specific training to them. In general, gender sensitivity training could benefit both the extension service and farmers.

Even though women participate in agricultural production activities, they are increasingly being involved in areas that were previously considered a male domain. This is largely due to their access to higher education and training. An increasing number of females are being trained in technical areas and in the arts and crafts. An evidence of this is that in the 1980-90 period, female graduates of the country outnumbered male graduates for six years in the Faculty of Agriculture, University of the West Indies[40].

4.6 Linkages with other Sectors

Besides small operations that involve processing of fish, pork and a few products, agriculture has limited linkages with other sectors. The THA's strategy is to link the development of agriculture with that of other sectors. It has several proposals to improve such linkages, the main ones involving tourism and industry.

Basically, the THA's strategy for agri-tourism linkages involves supplying food and fruits to hotels and restaurants, promoting conservation and enhancing the natural resource base for tourists. This strategy is based on: (i) the potential market in Tobago for food which could be easily met if agricultural production is improved; and (ii) the scenic environment which the island possesses. The DAFMA is in close contact with major hotels, and it is monitoring their demand for various tropical fruits and is organizing farmers to meet the specific requirements. The Division is also targeting other major local outlets such as the School Nutrition Program and the restaurant sector to link their food needs with farm production.

---

[40] Overall, female graduates have outnumbered males since 1988.

A major consideration to the development of the fruit sector is its linkage with forestry. Fruit plants are cultivated as fruit forests in support of wild life programs. Plants are also utilized in agro-forestry projects on the rugged terrain in keeping with approved upper watershed management practices.

There are also proposals in a Government-commissioned report which, if implemented, could result in strong links between the forestry and tourism sector. The proposals include: (i) establishing a Biosphere zone in N.E. Tobago for eco-tourism and complementary activities; (ii) strengthening the national parks section of the THA to direct the management of protected areas; and (iii) providing technical assistance to the Forestry Division and the THA in park planning, economic analysis of eco-tourism and small business projects.

Regarding linkages with agro-processing, the THA's strategy focuses on increasing market opportunities to dispose of surplus products and reducing the market constraint that limits production and commercial farming. Agro-industrial activities are being promoted by the THA for processing fruits, vegetables, fish and pork products.

4.7 Constraints

The agricultural sector in Tobago has declined progressively in the last few decades. Some factors that contributed to this decline are deeply rooted in the island being a part of the nation state of Trinidad and Tobago. These include those factors that have affected the country such as structural changes in the country's economy and its agricultural sector, competition for labor, land and financial resources within the island economy and the country and competition by cheaper products from Trinidad and from abroad. In Tobago, the land tenure system, inadequate markets, a weak institutional support system, lack of commercial farming and a disdain for agricultural work are also constraints to production. Together, these factors contributed to a general lack of competitiveness of the sector.

(a) Structural changes: Since the oil crises of the 1970s, Trinidad and Tobago's economy has experienced tremendous structural changes which have affected the competitiveness of its agricultural sector. The major change was the rapid shift to a petroleum-based economy with implications on the direction and pace of the country's development, resource allocation, policy orientation and institutional adjustments. A higher priority was given to the petroleum sector and a lower emphasis was placed on agriculture. At the same time, national agricultural policies and strategies were not sufficiently adequate to foster the development of the sector. The cumulative impacts of these factors on Tobago's agriculture were negative and they contributed to its decline.

(b) Marketing: The domestic market is very small and Tobago farmers have a competitive disadvantage in Trinidad, due to the existing farming system and high production costs. Tobago has a low input agriculture, plots are small, most farmers are part-time operators, input costs

are high (as these have to be shipped from Trinidad), and the marketable surplus is small because production is targeted to meet home needs rather than by economic considerations of the market place. Additionally, there are transport costs to ship the outputs to Trinidad. Since farmers in Trinidad produce almost the same commodities more efficiently than Tobago, there is a net flow of farm products to the latter island. Furthermore, trade liberalization and tariff reductions facilitate cheaper imports into the country that depress the production potential of Tobago farmers. The Marketing Division has been unable to address the marketing problems of farmers. Its operations are inefficient and these have imposed a costly financial burden on the THA. The weak marketing system results in gluts occurring easily in the peak production period, and this discourages both higher production and commercial farming

(c) Land tenure: Many farmers operate under leasehold arrangements of 3 to 25 years. Those with shorter term leases do not have adequate incentives to invest in farming, and they tend to use low levels of technology and achieve low yields.

(d) Weak institutional support: Because of the farming system characteristics and the THA's thrust to improve agriculture, farmers have become dependent on public service support in most areas. This support is necessary because there are many small part-time producers and this makes it economical to centralize certain services such as supply of planting material. However, the DAFMA lacks the necessary wherewithal (finance, technical support, etc.) to provide effective support to the sector. In addition to this problem, the existing legislation to protect the resource base is inadequate, as in the case of forestry, resource conservation and management.

(e) Inadequate infrastructure: This includes the inadequacy of access roads, water and irrigation facilities, electricity and transportation. Farms are not easily accessible is many areas; where access roads exist, most are in a poor condition. Irrigation facilities and water are lacking to support agricultural production in several places, while in others, they are not readily available at affordable prices. Post-harvest losses, product quality and productivity are affected by the poor infrastructure, which further reduces the sector's competitiveness.

(f) Disdain for agricultural work: The disdain for agricultural work is linked to the plantation agricultural system of the colonial period. Following this period, the expansion in public sector employment, job opportunities and work conditions in other non-agricultural areas in both Tobago and Trinidad contributed to discouraging employment in agriculture. Furthermore, farming is not an attractive employment alternative, especially for young people. It is a labor intensive and difficult occupation due to low wages, inadequate technology and job insecurity.

(g) Other: Other constraints to Tobago's agriculture include: (i) availability of a limited land area suitable for intensive agricultural activities; (ii) slope characteristics and topography can easily induce active erosion and land degradation; (iii) the climate is suitable for production of a variety of crops but the seasonality of rainfall and water deficits in some areas limit the crop potential; (iv) the existence of ecologically sensitive areas on both the island and in surrounding

coastal areas require careful planning; (v) the physical separation of Tobago from Trinidad presents unique problems, which generally contribute to higher agricultural production costs in Tobago; (vi) praedial larceny of products which is a disincentive to production; and (vii) numerous pests and diseases, particularly bird pests which are capable of destroying an entire crop.

CHAPTER V

CROPS SUB-SECTOR

Most of the crop production in Tobago is done by part-time farmers who are dependent on other sources of income for their economic support. These farmers are usually engaged in non-intensive agriculture, cultivating small plots that average less than 0.5 ha. The cropping system on these plots are usually of the mixed type - cultivation of some root crops, a few vegetables, fruit trees and other food crops, and rearing a few animals. The DAFMA estimates that there are about 650 farmers currently involved in commercial crop production. In addition to the commercial farms, an estimated 80% of households maintain a backyard garden, cultivating mainly vegetables. Although data are unavailable to confirm this, the contribution of these backyard gardens to the island's food self sufficiency and to the overall nutrition of the population is fairly significant.

Most of the island's land area is considered to have a good capability for crop cultivation (**TABLE A.8**). With the exception of low potassium levels in some areas, soil fertility in most parts is adequate for producing crops. The Land Capability Survey of Trinidad and Tobago cites only one soil as Class I (Bacolet clay loam) that is suited for all kinds of crop production. However, of the 38 soils classified, 23 could, under proper management, be used for vegetable production and 31 for food crops[41]. Only 12 were considered suitable for citrus production, 31 were considered suitable for other fruit trees and 33 for coconut. The limitations of most of these soils include impeded drainage, requiring adequate water management and, in some cases, erodibility. Of the three soils not considered suitable for crop production, one is swamp and the other two are already severely eroded.

Between 1963 and 1982, there was an 18% decline in the area under crop production (**TABLE V.1**). Cultivation of tree crops declined significantly (by about 75%) due to: (i) closure of some private estates; (ii) replacement by non-traditional tree crops on state lands that have been distributed to farmers; and (iii) large areas being totally or semi-abandoned.

There is very little information presently on production, area cultivated, yields, cost of production or crop production systems in Tobago[42]. Some national data exist (in the CSO, MALMR and in the ADB), but much of this is in an aggregated form (for Trinidad and Tobago), or applies to Trinidad only (e.g., Monthly Crop Production Bulletin), or is incomplete. Although the DAFMA provided all its information, it was insufficient for a comprehensive analysis of crop production.

---

[41] Brown et al., 1965.

[42] The 1982 Agricultural Census contains the latest assessment of crop production in Tobago. The socio-economic conditions have changed much since then but it is difficult to define accurately those changes and the evolution of agricultural production.

TABLE V.1
CROP CULTIVATION IN TOBAGO,
1963 AND 1982 (HECTARES)

CROP	1963	1982
TREE CROPS:		
COCOA	3,766	972
CITRUS	51	43
COFFEE	4	1
COCONUTS	3,719	593
BANANAS	176	133
PLANTAINS	100	144
OTHER	45	44
TOTAL TREE CROPS:	7,861	1,930
NON-TREE CROPS:		
PIGEON PEAS	868	93
GROUND PROVISIONS	491	256
OTHER	435	303
TOTAL NON-TREE CROPS	1,794	652
TOTAL (ALL CROPS)	9,655	7,920

SOURCE: 1963 & 1982 AG. CENSUSES.

However, observations of the cropping system indicate that the island produces a variety of both food and fruit crops, most of which are grown in small mixed-farm systems (except coconut). In general, more vegetable crops are grown in the southwest and Windward areas, while root and other food crops are farmed in the north and northeast. Coconuts are established in the south and cocoa in the wetter northeast region.

5.1 Vegetables

Main Characteristics: According to the 1982 Agricultural Census, vegetables were cultivated on 819 holdings totalling 102.6 ha., equivalent to less than 0.02% of total cultivated cropland in Tobago (**TABLE A.15**). The total number of producers cannot be estimated from the data since some farmers may have had more than one plot and most would have had more than one vegetable crop per plot. The main crops grown (by area cultivated) were tomato, sweet pepper, cucumber and cabbage. At the time of the census, vegetable cultivation was increasing with many farmers beginning to include vegetables in their production systems. That interest continued to grow, with some farmers experimenting with a wider variety of vegetables such as broccoli, butternut squash, carrots and onions.

Most vegetables commonly used are grown in several areas of the island. The main ones being produced include tomato, sweet pepper, cabbage, cucumber, pumpkin, beetroot and various condiments (seasonings). Smaller quantities of other vegetables such as cauliflower, lettuce, broccoli and many others are also produced. The main production areas are on statelands at Shaw Park in the southwest and at Goldsborough in the Windward district[43]. Many farmers on statelands on the Goldsborough/Lure estate, which was intended primarily for dairy and pig farming, also produce vegetables.

---

[43] These statelands were distributed specifically for vegetable production.

Preproduction practices: Land for vegetable production is usually brush cut, ploughed and rotovated, then banked or formed into beds. Many farmers rely on DAFMA's tractor pool services for land preparation, but these are not always provided on a timely basis. The rates charged by the Division for these services are highly subsidized and are often less than 50% of the market rates (**TABLE V.2**).

TABLE V.2
COSTS OF LAND PREPARATION, 1993 (TT$)

OPERATION	BY THE DAFMA	BY PRIVATE OPERATORS
BY WHEEL TRACTOR (PER HA.):		
BRUSHCUTTING	86	400
PLOUGH & HARROW	200	600
BANKING	100	450
BY BUILLDOZERS:		
LAND CLEARING (PER HA.)	740	6,000
ROAD CUTTING (PER 30 METER)	200	800
SITE CUTTING (PER HOUR)*	-	200

* NOT PROVIDED BY THE DAFMA
SOURCE: DAFMA.

Where seedlings are required, they are provided from the farmer's own production or purchased from the DAFMA's agricultural stations. Farmers producing their own seedlings usually do so from a nursery bed outside the cultivated area. These beds are often seeded too heavily, resulting in weak plants being produced. Many farmers also purchase seedlings from the government stations at Louis D'or or the Botanic Station at a subsidized price of TT$3.00/box[44]. The seedlings sold by the stations include tomato, sweet pepper, cabbage, lettuce, patchoi, celery and parsley. Total sales by the two stations for the 1990-92 period are shown in **TABLE V.3**.

TABLE V.3
SALES OF VEGETABLE SEEDLINGS (NOS. OF BOXES)

GOVERNMENT STATIONS	1990	1991	1992
BOTANIC STATION	7,253	6,004	6,219
LOUIS D'OR	8,625	9,635	10,362

SOURCE: DAFMA.

The quality of seedlings produced by the government stations is excellent, but farmers have little choice of variety. An additional problem is that some farmers do not know the varieties or if particular management requirements are needed (e.g., whether tomatoes need staking or not). Efforts are being made by the stations to select varieties that are reasonably tolerant to dry and wet season conditions. Some of the varieties provided to farmers include:

---

[44] It is estimated that the price of seedlings at the government stations is between 50% and 60% of the actual cost of production.

Green Boy and KK Cross Cabbage for both seasons; Tropic Boy tomato for the wet season; Tropic, Floradade and Calypso tomato for the dry season; and California Wonder and Keystone Resistant Giant sweet pepper. Sometimes other newer varieties are also produced, but regular evaluations of them are not done since CARDI/DAFMA evaluation trials ceased in 1986.

For seeds, most farmers depend on a few small supply agencies in Tobago for selecting varieties and advice on cultural practices. Very often, this usually means using older seed varieties. A small amount of newer hybrid varieties are also available, and information on their performance are usually derived from farmers who have already tried them.

Production: The average size of a vegetable plot is 0.5 to 1.0 ha. and it is usually operated with family labor. Women are frequently involved in production and most plots are often sited near the home to fit in with women's diverse responsibilities.

The production practices for the most popular vegetables grown in Tobago are summarized in **TABLE V.4.** Although the use of chemicals (including fertilizers) by farmers is low, their use is, of necessity, relatively higher in vegetable production than in the husbandry of other crops. Use includes the control of both pests and diseases, low levels of fertilizer, as well as pen manure.

Weed control in small plots is done manually. Gramoxone may be used between beds and in pathways, but pre-emergent herbicides are seldom used because of their unavailability. Selective herbicides such as Fusilade are applied occasionally in production, but farmers have not been satisfied with the results. Pest and disease treatments are usually given when problems occur. Routine preventative sprays are made for cabbage and tomato to minimize damage.

Irrigation is used more in vegetable production than in other crops. Farmers that irrigate their plots take advantage of dry season production, while those without this facility are limited to wet season production when yields may be low due to disease problems.

Harvest: Vegetables are harvested frequently, usually on a Thursday for sale on Fridays and Saturdays. Except for the most perishable vegetables (e.g.,tomato) little attention is given to good post-harvest practices.

Constraints: The main constraints affecting vegetable production in Tobago are: (i) much of the production is done under backyard conditions; (ii) marketing is considered to be most important, given the small market size and competition by cheaper products from Trinidad; (iii) pest and disease problems are numerous and difficult to identify because of the lack of laboratory facilities and specialist staff for diagnosis; (iv) few producers have irrigation facilities and this limits production throughout the year; (v) vegetable production often requires more inputs than other crops, but these are expensive in Tobago, costing about 15 to 50% more than in Trinidad; and (vi) part-time farming and labor scarcity reduce production efficiency, because vegetable cultivation is a labor-intensive activity that requires more day-to-day attention than other crops.

TABLE V.4
PRODUCTION PRACTICES FOR SELECTED VEGETABLES

VEGETABLE	COMMON VARIETIES	PLANTING	SPACING	FERTILIZER* USE	MAJOR PEST	MAJOR DISEASES	HARVEST	APPROXIMATE YIELD**
TOMATO	TROPIC BOY EARLY CASCADE CALYPSO	TRANSPLANT (100 CM. TALL)	1 X 1.5 M.	12.12.17.2	NEMATODES LEAF MINER PIN WORM	DAMPING OFF ALTERNERIA GREY LEAF SPOT BACTERIAL WILT BLOSSOM END ROT (CA DEF)	2-3 MTHS. AFTER TRANSPLANT	7 MT./HA.
SWEET PEPPER	CALIFORNIA KEYSTONE RESISTANT GIANT	TRANSPLANT (100 CM. TALL)	60 X 60 CM.	12.12.17.2	MITES THRIPS	LEAF SPOT VIRUS (UNIDENTIFIED)	2-3 MTHS. AFTER TRANSPLANT	5 MT./HA.
CUCUMBER	CALYPSO POINTSETT	2-3 SEEDS/HOLE	60-90X 120-180 CM.	PENMANURE AND 12.12.17.2	CUTWORMS FRUITBORER	POWDERY MILDEW DOWNY MILDEW	6 WEEKS	8-10,000 KG./HA.
PUMPKIN	LOCAL SELECTION	3-4 SEEDS/HOLE	2-3 M. X 3M.	PEN MANURE	FEW PROBLEMS	FEW PROBLEMS	3-3.5 MTHS.	UP TO 15 MT. PER HA.
CABBAGE	KK CROSS GREEN BOY	TRANSPLANT AT 4 WEEKS	60 X 30 CM.	12.12.17.2 + UREA	DIAMOND BACK MOTH BUDWORM	BLACK ROT		20 MT./HA.
LETTUCE	BRONZE MIGNONETTE MINETTO	TRANSPLANT (5-7 CM. TALL)	25 X 25 CM.	UREA OR SULPHATE OF AMONIA	FEW PROBLEMS	FEW PROBLEMS	6-8 WEEKS AFTER PLANTING	2 MT./HA.
BEETROOT	DETROIT DARK RED	SEED IN FURROW	25 X 25 CM.	OFTEN NONE	FEW PROBLEMS	FEW PROBLEMS	8-10 MONTHS (2" DIAMETER)	10 KG./HA.

* FERTILIZER NOT ALWAYS USED
** YIELD ESTIMATES BASED ON CARDI/THA EXPERIMENTS
SOURCE: BASED ON FIELD OBSERVATIONS AND CARDI'S DATA

5.2 Root Crops

***Main characteristics*:** Root crops (often referred to as ground provisions) are the traditional crops of Tobago farmers. The island's reputation in previous years as the "bread basket" of the country was based on the quality and quantity of these products. Compared to several years ago, only a small amount of root crops are presently shipped to Trinidad. Nevertheless, these commodities have remained an important part of the cropping system because: (i) they can be grown on hillsides (which may be the only sites available to many farmers); (ii) once planted, they require little attention and this is suitable to farmers with inaccessible plots or who are part-time farmers; and (iii) they constitute an important part of the Tobago diet.

The main root crops cultivated are sweet potato, yam, cassava and dasheen[45]. These crops are grown on small plots in mixed cropping systems throughout the island. Sweet potato is usually grown in pure stand, dasheen is cultivated in wet areas and also in pure stand while yam and cassava are frequently intercropped. Since yam requires relatively little attention once planted, it is frequently grown as a hillside crop. Extension Officers report a higher proportion of their farmers growing yam in the hilly districts of Charlotteville and Runnemede than in Plymouth, which has more gentle terrain, and where more farmers can produce sweet potato and cassava.

Information from the 1982 agricultural census shows that root crops were cultivated on 1,412 holdings comprising 256 ha. or about 0.1% of the total cultivated cropland in Tobago (**TABLE V.5**). Production was done on small scattered plots throughout the island. The average cultivated area per holding for sweet potato, yam and cassava was only about 0.17 ha. The number of farmers cultivating these crops cannot be estimated from this data, as some may have cultivated more than one plot. Nevertheless, based on observations, the number of root crop farmers has probably not increased significantly since that census and their average plot size and farming system has changed very little.

TABLE V.5
ROOT CROP CULTIVATION IN TOBAGO, 1982

CROP	NUMBER OF HOLDINGS	HA.
Sweet Potato	362	72.4
Cassava	300	48.3
Dasheen	253	44.2
Yam	249	37.7
Tannia	92	10.8
Eddoe	18	2.3
Ginger	4	0.2
Topi Tambo	1	0.1
Mixed Crops	133	39.5
TOTAL	1,412	255.5

SOURCE: AG. CENSUS, 1982

---

[46] Eddoe, tannia and the wild tannia (Wareke) are grown also in some areas.

Preproduction practices: Planting material is usually obtained from previous crops. In general, farmers prefer certain varieties (e.g., Lisbon or Cush Cush yam, Butterstick cassava and 049 sweet potato), but planting material of specific types is often difficult to obtain, resulting in the use of whatever material is available. The planting material is not usually treated before use, though some healthy materials, such as Magastes-free sweet potato slips may be selected. Land preparation varies both with the type of root crop (banks are preferred for sweet potato, mounds for yams) and with the slope and accessibility to plots. All root crops are planted in hand-prepared holes where land preparation using machinery is not possible.

Production: The production practices for the main root crops grown in Tobago are summarized in **TABLE V.6.** Besides labor (usually male and family labor), especially for planting and harvesting, a very low level of material inputs is used in root crop production. Fertilizer, herbicides and pest and disease control measures are rarely adopted.

Harvest: Harvesting is always done manually using hand tools.

Post harvest: Post-harvest practices comprise immediate use of root crops at home or sale as soon as possible after harvesting. Storage is not a common practice in Tobago, and wherever possible, the crops are left in the ground until they are needed in order to minimize post harvest problems.

Constraints: The main constraints of root crop production are:

(a) Pests and diseases: The following pests and diseases constrain production[46]:

Sweet Potato	-	Stem Borer (Magastes grandilis)
Yam	-	Anthracnose (Colletotrichum spp.)
Cassava	-	Mites (Mononychellus tanajoa)
		Superelongation(Sphaceloma manihoticola)
Dasheen	-	occasional root rots

(b) Lack of good planting material: Efforts to increase the supply of planting material for yam have been made using the minisett technology introduced by CARDI. This technology produces up to 20 plants per kg. of tuber compared to 4-8 from the traditional technology. The Louis D'or Station has been producing minisetts for the past three years for distribution to farmers and or use on the station.

(c) Maintenance of root crop gern plasm banks and multiplication of planting material is costly and labor intensive. This situation is likely to remain unless tissue culture facilities are available.

---

[46] The devastating Cassava Bacterial Blight (CBB) is present in Trinidad, but has not been positively identified in Tobago.

TABLE V.6
SUMMARY OF PRODUCTION PRACTICES FOR SELECTED ROOT CROPS

ROOT CROP	COMMON VARIETIES	PLANTING	SPACING	MAJOR PESTS	MAJOR DISEASES	HARVEST	ESTIMATED YIELD*
SWEET POTATO	049 CERTAIN BOUND TO BEAR CHICKEN FOOT	25-30CM CUTTINGS INSERTED TO HALF THEIR LENGTH ON BANKS.	0.3 M. X 1 M.	MAGASTES GRANDALIS	FEW PROBLEMS	8 MONTHS	20 MT./HA.
CASSAVA	BUTTERSTICK MARACAS BLACKSTICK WHITESTICK	WOODY STEM CUTTINGS 20-25 CM. LONG. PLANTED AT 45 ANGLE ON BANKS OR CAMBERED BEDS.	1 X 1-2 M.	CASSAVA MITES SHOOTFLY	BROWN LEAF SPOT WHITE LEAF SPOT	8-12 MTHS.	10-20 MT./HA.
YAMS	GUINEA LISBON	APPROX. 200G PIECES ARE PLANTED IN MOUNDS (STAKED)	90-180 CM. APART		ANTHRAENOSE VARIOUS VIRUSES	8-10 MTHS.	15-20 MT./HA.
DASHEEN/ EDDOES	LOCAL SELECTION	TUBERS OR SECTIONS OF TUBERS PLANTED IN WET AREAS.	75 X 75 CM.	FEW PROBLEMS	FEW PROBLEMS	24-32 WKS. AFTER PLANTING	2-4 MT./HA.

* YIELD ESTIMATES BASED ON CARDI/THA EXPERIMENTS.
SOURCE: BASED ON FIELD OBSERVATIONS AND CARDI'S DATA.

(d) Lack of adequate storage and processing facilities. If root crops are to be developed further, simple techniques of storage and preservation should be evaluated, such as wax treatments or polythene bag packaging of cassava developed by CIAT.

5.3 Other Food Crops

Main characteristics: The other main food crops in Tobago are pigeon peas, corn, bananas and plantain[47]. These crops are grown throughout the island and in almost every backyard. In recent years, some farmers have expanded cultivation of pure stand corn, which otherwise is traditionally grown as a corn/peas mixed crop. There are also many, small, pure stands of pigeon peas throughout the island, while production of bananas and plantain is concentrated in Charlotteville and in the windward valleys.

According to the 1982 agricultural census, 78.1 ha. of corn, 93 ha. of pigeon peas, 133.4 ha. of banana and 143.4 ha. of plantain were cultivated in Tobago[48]. The area cultivated with peas and corn has not changed much over the years, except for a short period in recent years when there was a large pea output that was sold to a Trinidad processor. Much of the peas and corn is likely to be cultivated in a mixed cropping system, still the most common practice. Likewise, bananas and plantains are inter-cropped.

Preproduction practices: Planting material for peas are usually from seeds saved from previous crops or purchased from the Botanic Station, which is supplied from the MALMR's seed production center in Trinidad. Regarding plant varieties, there are many types of pigeon pea in Tobago[49]. Economically the most important type is the "Tobago" pea. This is a large indeterminate plant-bearing pod with 6-8 large uniform peas. There has been interest in the dwarf photo-insensitive varieties for out-of-season production but very little has been grown commercially. The Chag Pearl variety from Trinidad has been distributed to farmers, but it is not photo-insensitive or truly determinate.

Unlike the pea, corn seeds are rarely saved from previous harvests. They are supplied mainly by the Botanic Station or from commercial sources. The seeds may be of a local variety or a hybrid one, the latter maturing faster.

The commercial varieties of banana include Lacatan and Gros Michel, while both Horn and French plantain types are grown. As elsewhere, the planting material used is usually sword suckers. Unlike the Eastern Caribbean, few inputs are used in the cultivation of these crops in

---

[47] Both bananas and plantains are considered as food rather than fruit crops.

[48] Actual cultivation in the census year may have been higher, because the census is dated May 1982 and the traditional time to plant peas and corn is around Corpus Christi (June 10th).

[49] Some of these were collected in 1985 to be included in the ICRISAT germplasm collection and some were kept in the UWI collection.

Tobago. Chemical inputs are low, though nematacides are sometimes used. The use of labor is mainly for weed control, as deflowering, bunch protection, etc., are not regarded as necessary.

Production: In mixed cropping, corn and peas are cultivated by hoeing one hole, then planting 2-3 seeds of corn at one end of it and 3-4 seeds of peas at the other, leaving a distance of about 20 cm. between the two. In pure stand 3-4 seeds of peas are also used; for corn, the crop is often row-planted in holes spaced about 30 cm. at 2 seeds per hole. In both systems there is a distance of about 15 cm. between holes. Normally no fertilizer, pest and disease control measures are used, though some farmers with pure stand corn use some fertilizer and ensure that the crop is irrigated, if necessary.

Harvest: Corn is harvested in about 2.5 to 3 months depending on the variety planted. The Tobago pea is harvested later (in January/February) than the Chag Pearl variety, which can be harvested in December. The indeterminate nature of these peas is preferred for domestic use, as it gives a steady supply over a long period. Although harvesting is done manually, it is a tedious operation, resulting in a high proportion of the crop not being reaped (perhaps as much as 40%). Regarding bananas and plantains, both are harvested manually upon maturity.

Constraints: The main constraints affecting these crops are pests and diseases. Birds, notably the national bird, the Cocrico (Ortalis ruficauda), is a frequent pest of peas. Pigeon pea pod borers (Fundella pellucens and Heliothis spp.) are also a problem, especially late in the harvesting season, and corn is affected occasionally by the army worm (Spodoptera spp). Gros Michel banana is susceptible to Panama disease (Fusarium oxysporum), and a wilt caused by Erwinia is occasionally seen in plantain.

5.4 Fruit Crops

5.4.1 Tree Crops

Main characteristics: Fruit orchards usually comprise mixed cultivation of several fruit crops, among which mango, orange and other citrus are the most important ones. Other tree crops that are cultivated in smaller numbers include various types of citrus, West Indian cherry, sour cherry, soursop, sapodilla, golden apple, pomerac, breadfruit and paw paw. Much of Tobago's fruit production comes from small orchards, "backyard" trees that are scattered throughout the island, and from those interplanted with short-term crops.

Available data on the total fruit trees cultivated indicate that mango (25%), orange (20%) and avocado (17%) are the major fruit crops[50]. This information suggests that very little change

[50] Berthold, 1992. Because of scattering and intercropping of fruit trees it is difficult to assess the area cultivated, and farmers prefer to report the number of trees in existence rather than the area cultivated.

has occurred in fruit crop cultivation during the last decade[51]. Recent information on the main fruit crops cultivated shows that citrus is concentrated mainly in the Roxborough and St. George districts, mango in the Bethel district and avocado in the Belle Garden district (**TABLE A.16**). Most orchards are relatively small. However, there are a few large estates that cultivate fruit trees, including Roxborough (by the government) and Cameron (private), with more than 1,000 trees each.

Preproduction practices: The DAFMA's nursery at the Louis D'Or station is the main supplier of nursery stock, complemented by some plants brought from the nurseries in Trinidad. In response to an increasing interest in fruit crop production in recent years, the station has expanded its cultivation of young citrus, mango and avocado plants in 1991 and 1992. Although plant sales have increased, there is a lack of adequate fruit tree management.

A fairly wide selection of fruit plant varieties for citrus, mango and avocado are available (**TABLE V.7**), but production is constrained by a lack of rootstock materials. In view of this, the Loius D'Or station is making efforts to expand its plant supply to meet the increased demand by farmers. The DAFMA, with assistance from the Inter-American Institute for Agricultural Cooperation (IICA), is also introducing new types of scion, with emphasis placed on the Tristeza-resistant type.

TABLE V.7
MAIN TYPES AND VARIETIES OF FRUIT PLANTS PRODUCED AT THE LOUIS D'OR NURSERY, 1993

CITRUS	MANGO	AVOCADO
LIME	JULIE	POLLOCK
PORTUGAL	GRAHAM	LULA
MANDERIN	ICE CREAM	ST CLAIR
KING ORANGE	DELAFORD TABLE	COLLINSON
CITRON	BROWN SPICE	
SICILIAN LEMON	DOUX DOUX	
CITRUS HYSTRIX	ZABRICO	
GRAPEFRUIT VARIETY:	DIVINE	
WHITE MARSH	LONG	
PINK MARSH	CALABASH(NEW)	
ORANGE VARIETY:	BOMBAY (NEW)	
PARSON BROWN		
ST MICHAEL		
VALENCIA		
NAVEL		
COCOA ORANGE		
JAFFA		

SOURCE: DAFMA.

[51] Information from the 1982 agricultural census indicates that citrus (43.2 ha.), mango (25.8 ha.) and avocado (12.9 ha.) were the most important crops. Together, these three crops account for almost 95% of the total area cultivated with fruits.

Production: When fruit trees are requested from the government's agricultural station, an Extension Officer visits the farm to certify that it has been prepared properly for cultivation of fruit trees so as to ensure that the plants are not wasted. At that stage, most farmers are already aware of planting techniques. However, after planting, most farmers, either by choice or due to a lack of technical information, tend to neglect the fruit trees, except for a few large farmers (who have access to technical information).

There are frequent complaints about fruit trees being uneconomical and concerns about disease problems such as Psorosis, or the possibility of Tristeza being found in Tobago. Technical assistance to address these problems has been provided by the MALMR and more recently by IICA, but more support is required to improve production.

Harvest: Harvesting is always done manually. Citrus is harvested ripe, mango and avocado when the fruits are mature, but not quite fully ripe.

Constraints: The principal constraints of fruit crop production are:

(a) Productivity is low and the production costs are high because trees are scattered and management practices are inadequate.

(b) The small market size limits sales of fresh fruit. There is competition by retailers from Trinidad, particularly for citrus and portugals who sell by the roadside in Tobago. These fruits are sold at lower prices, although their quality is lower than that of Tobago fruit.

(c) Various pests and diseases affect fruit production[52]. Evaluation of bird damage by IICA indicate that an estimated 26% of the fruit crops in Tobago are badly damaged by birds, with more than 50% of the fruits lost. Aphids damage young shoots, and bachacs destroy seedlings and damage adult trees. Fruit borers also affect some species, particularly guava and soursop. Disease problems include gummosis (Phytophthera spp.) and various deficiency symptoms due to low fertilizer inputs.

Mistletoe (Phthirusa adunca), known as birdvine in Trinidad, is ubiquitous and extremely hard to control. In Trinidad, a treatment of spraying with urea solution has produced some positive results, but this is being evaluated further[53].

(d) Praedial larceny is a problem for all farmers in Tobago but fruits are the most common crops stolen. The lack of policing activities and scattered fruit trees are factors that aid larceny.

---

[52] A fruit fly survey was done a few years ago to assess populations of fruit fly and the plant quarantine implications for export, particularly to the U.S. Problems which would preclude export have not been identified, but the U.S. is requesting a more detailed study.

[53] Ramkhelewan & Baksh, 1993.

5.4.2 Short-Term Crops

Main characteristics: Short-term fruits are generally grown in small plots throughout Tobago. They are often grown by vegetable producers, because they require similar management methods. The main short-term fruit crops are melons (particularly watermelon), cantaloupe and pineapple. Paw paw (papaya) is also produced in very small quantities due to the prevalence of Bunchy Top disease. Attempts have been made to promote passion fruit, but farmers are reluctant to cultivate this crop for lack of an assured market.

The 1982 Agricultural Census recorded 2.5 ha. under pineapple cultivation. This area seems to have changed very little, but the cultivation of paw paw is probably higher today than the 0.7 ha. estimated in the 1982 census. Watermelon cultivation was not identified in that census, although production had started by then in Tobago. Interest in cantaloupe cultivation started with the CARDI/DAFMA evaluation trials in 1983, but commercial production is still small.

Preproduction practices: Land preparation (ploughing/rotovating) for melon and cantaloupe is usually done prior to planting, and raised beds are used. The main varieties planted include Top Net, Top Mark and Magnum 45 for cantaloupe, and Charleston Grey, Crimson Sweet, Jubilee for watermelon. Spacing for cantaloupe is usually 90 cm. x 90 cm. and for water melon 150-200 cm. x 150-200 cm.

Land preparation for pineapple is the same as for most crops, except on hillsides where holes are prepared by hand. Shoots/suckers or slips (from the base of the pineapple fruit) from previous crops are usually collected and used as planting material. These would be trimmed at the base before planting. Pineapple is cultivated at 45-60 cm. spacing in straight or staggered rows. They are usually planted on raised banks or beds which would be of a maximum 1.5 m. width to allow access to the plants. This crop is grown in pure stand or sometimes interplanted with paw paw or other crops.

For the cultivation of paw paw, either seeds are collected from previous crops and set in plastic bags, or plants are sourced from the Louis D'or Station. These would be mainly local selections of unknown variety. Hybrid variety seeds are available in Trinidad and are just beginning to be produced in Tobago. Planting is done either through cultivation of the soil or by holes that are hand-prepared. Plants are placed at 20-25 cm. spacing or as a border around other crops. Although farmers have information on the theory of planting more trees than are required and thinning (after males and females are identified), most cultivate the plants individually and hope that the male/female/hermaphrodite ratio would be satisfactory.

Production: During the growing stage, watermelon may be attacked by leaf-sucking insects (e.g., thrips) but these are relatively easily treated. Cantaloupe production is frequently damaged or even devastated by a fruit borer (Diaphania spp.) which is difficult to control without a regular preventative spray program. Cantaloupes are also more susceptible to soft rots, especially in the wet season.

Plots for pineapple are often small and manual weed control is frequently used. Larger farmers may use Hyvar X or Karmex for weed control, and at least one grower uses black plastic mulch. Production is often delayed due to inadequate or incorrect fertilizer use, as farmers are often unaware of how nutrient-demanding the pineapple crop is. At least 100 kg./ha. of urea at planting and 200 kg./ha. of "12.12.17.2", plus 25 kg./ha. of urea is recommended every month up to flowering. Few pest and disease problems have been observed other than occasional nematode infestations and rots, sometimes due to careless planting techniques.

For paw paw, weeds are usually controlled by hand and fertilizer use is often limited. Pest and diseases are not frequently controlled. The main pest of paw paw, the leaf hopper (Empoasca spp.) which carries the Bunchy Top disease, is very difficult to control. Once infected, the paw paw plant cannot be treated. Anthracnose blemishes are seen after harvest, but this does not receive pre-harvest treatment. Perhaps because the postharvest time between production and consumption is normally very short, this is not seen as a problem by the producer. In addition, Erwinia decline has been identified at least once in Tobago.

Harvest: Harvesting of shortterm crops is done by hand. Unlike parts of Trinidad, where the entire field of melon and cantaloupe are reaped at the same time, ripe fruits are carefully selected and plots repeatedly harvested in Tobago. Because of production practices and pest and disease problems, the maximum yield for cantaloupe is only about 15,000 kg./ha. (much less in local trials), and that of watermelon is approximately 20,000 kg./ha.

Harvesting of pineapple is done 20 to 24 months after planting, when the fruit is nearly ripe and the soil fertility is adequate. Flower initiation is rarely practiced, so repeated harvesting from the plot is necessary. With adequate fertilizer use, yields of up to 40 mt./ha. in the first crop and up to 20 mt./ha. in the ratoon crop can be achieved.

Paw paw is harvested about nine months after planting. The Bunchy Top disease frequently curtails harvesting and farmers are advised to replant frequently, so that, as infected plants die, a new crop emerges for production.

Constraints: The main constraints of short-term fruit crops include:

(a) Pests and diseases including the fruit borer (Diaphania spp.) and fruit rot for cantaloupe; leaf sucking insects and fruit rot for watermelon; and Bunchy Top for paw paw.

(b) The market size is small and there is strong competition by fruits from Trinidad, particularly for citrus and watermelon.

(c) The lack of fruit processing facilities and the perishability of fresh fruit provide higher risks to producers compared to other products.

5.5 Estate Crops

***Main Characteristics*:** Cocoa in the northeast and coconut in the south-west are the principal estate crops grown in Tobago, and there are no commercial plantings of coffee, sugarcane or other estate crops. Production of both cocoa and coconut have declined since Hurricane Flora struck Tobago in 1963. Trees that were destroyed were not replaced and, in the case of cocoa, birds (particularly parrots) have been a serious crop pest. The 1982 agricultural census indicate that areas with cocoa (972 ha.) and coconuts (593 ha.) were about one-half and 31%, respectively, of the total area cultivated with permanent crops. Since the census, there has been little new planting of these crops, and the production area of both has significantly declined because much of it has been abandoned.

The current holdings under cocoa production are almost equally divided between the Moriah area (mostly private farmers) and in the windward sub-region (private, stateland and other leased-land farmers). Productive coconut holdings are few and only four estates are harvesting and processing coconuts.

Cocoa production is mainly a smallholder operation. Although a large proportion of the area cultivated is on large estates, much of the production (about 80%) is from farms ranging from 1-4 ha. This crop has been neglected on most private estates and only three in the windward area are still in production. On the government estates of Goldsborough, Lure and Roxborough, the crop has also been neglected, but it may have been rehabilitated by farmers who are recipients of state land.

***Cocoa*:** The Cocoa Research Unit at the University of the West Indies (UWI) has been supplying high-yielding Trinidad Select Hybrids (TSH) to both Trinidad and Tobago and to other countries for over 50 years. Tobago's production is based on clones of these selections and from some seedlings, and little replanting has been done. The Louis D'or station sold only 504 plants during 1991 and 1992, but expected to double this in 1993.

Production is based on maintenance of existing trees, which are sometimes over fifty years old. Besides pruning, weed control and care of shade trees, few inputs are given during production. Due to the decline in the cultivated area and neglect of existing areas, Tobago's production of cocoa has declined from about 200 mt. in the 1950s to less than 50,000 mt. in recent years. Presently, the average yield is about 500 kg./ha., although higher yields could be achieved. The island has few cocoa diseases (e.g., Witches Broom), but there are problems with bird pests which are capable of destroying an entire crop.

The quality of the cocoa produced has been declining, and it depends largely on the drying and fermenting processes. Quality control is lacking in Tobago and the product that is shipped to Trinidad is literally a "mixed bag" from many producers.

The main constraints of cocoa production are: (i) pest problems, particularly parrots, which damage green cocoa and severely limit productivity[54]; (ii) quality has been declining due to inadequate crop management and poor drying; (iii) low productivity partly because much of the output is from old trees that need to be replaced and/or rehabilitated; (iv) low level of inputs, fertilizer or pest and disease control measures are used; and (v) competition in external markets by a higher-quality product.

Coconut: There have not been significant new plantings of coconuts in the last decade, partly because of market uncertainty and partly because of the risk of Red Ring infection. Production is from old established trees, some of which are 70 years old, and they receive little management and no inputs other than weed control (brush cutting or grazing in a cattle/coconut system).

Dried coconuts which fall from the trees are collected. Information on yields is not available but it is estimated that the production per tree could be about 50 nuts per month. One estate collects about 1,500 nuts daily, but this is not related to the area cultivated nor the number of trees in production. Copra is produced from coconuts by four estates, having a yield of approximately 90 kg. of copra per 1000 nuts. Most of the dried nuts are otherwise used for food preparation at home, while green nuts are used to provide "coconut water".

The main constraints affecting the coconut crop are: (i) pest and disease problems, such as the Red Ring disease which has destroyed many trees, and coconut mites which destroy or severely affect the nut quality; (ii) a significant decline in productivity due to the old age of trees, little replanting, poor management and low input use; and (iii) market uncertainty for copra and competition from lower-priced imported edible oils by the country.

---

[54] Fruit trees are being included in the re-afforestation program in Tobago to encourage these birds back into the forest.

CHAPTER VI

LIVESTOCK AND FISHERIES SUB-SECTORS

6.1 Characteristics of the Livestock Sub-Sector

The livestock sub-sector in Tobago comprises the production of cattle, sheep, goats, pigs, poultry and rabbit. The principal outputs are live animals, fresh and frozen meats, milk, eggs and processed products such as ham, bacon and sausages. Except for a few large estates, production is done by a large number of small part-time farmers operating a mixed system on less than 4 ha. of land. Their production has traditionally been a subsistent one, to meet household needs primarily, and sell any surplus in local markets. The large estates occupy the flatter lands located in the southwestern part of the island and are mainly involved in commercial beef cattle production.

Except for pigs, recent data on the livestock sub-sector (including pasture area) are not available. The information available is based largely on the 1963 and 1982 agricultural censuses, and CARDI's 1988 census of sheep, goats and cattle in Tobago. According to these censuses, the livestock population is very small, peaking in 1982 before declining (**TABLE VI.1**). Since 1982, there has been a 33% reduction in the number of cattle, 26% in sheep and almost 16% in goats[55]. Most of the cattle and goats and a high proportion of sheep were found in the Bethel district (**TABLE VI.2**). There are also livestock on government stations, with poultry and sheep being the largest stocks (**TABLE A.17**). Furthermore, the CARDI census identified 722 farmers involved in livestock activities, of which 543 (76%) were part-time and 169 full-time. The information available on grassland shows that there were 967 ha. of cultivated grasslands in 1982, with 780 ha. being privately owned[56].

TABLE VI.1
LIVESTOCK POPULATION, 1963, 1982 & 1988

TYPES	AG. CENSUS		CARDI CENSUS
	1963	1982	1988
CATTLE	2,918	3,330	2,058
WATER BUFFALOES	*	49	*
GOATS	1,565	1,628	1,371
SHEEP	3,648	4,753	3,506
PIGS	2,074	5,633	*
POULTRY	*	55,963	*

* NOT AVAILABLE
SOURCE: AG. CENSUSES (1963 & 1982) & 1988 CARDI CENSUS.

---

[55] Based on observations, the current livestock numbers are either about the same as 1988 or have declined.

[56] Agricultural Census, 1982.

The CARDI Livestock Census of 1988 identified five main production systems in Tobago. These were: (i) roadside tethering; (ii) zero grazing (cut and carry); (iii) pasture grazing (extensive system); (iv) a combination of the above; and (v) concentrate-based system. Of these, the first two were and continue to be the most common among small farmers. In most cases, these farmers have a mixed animal production system whereby the stock consists of a few cattle, sheep, goats and even pigs. The extensive system is found mainly in the southwestern part of the island (Bethel District), where beef cattle and sheep are reared under coconuts on a few large estates.

TABLE VI.2
ANIMAL POPULATION BY EXTENSION DISTRICT, 1988

DISTRICT	SHEEP	GOATS	CATTLE	NO. OF FARMERS
BETHEL	742	295	997	162
PLYMOUTH	277	221	86	101
RUNNEMEDE	148	66	80	59
MT ST GEORGE	1243	272	331	98
ROXBOROUGH	491	223	217	106
GOLDSBOROUGH	255	78	92	64
BELLE GARDEN	285	116	138	70
CHARLOTTEVILLE	65	100	117	62
TOTAL	3506	1371	2053	722

SOURCE: CARDI CENSUS, 1988.

In general, the quality of Tobago's livestock products (beef, mutton, goat, milk and eggs) compares favorably with that of Trinidad. Trinidad pork has less fat than that of Tobago, largely due to some pig farmers in Trinidad producing it for processing (which requires a leaner product). On the other hand, Tobago farmers have traditionally sold their product in the fresh market. Moreover, there has been no price differential in the Tobago market to reflect variation in fat content.

Livestock products are marketed mainly in local outlets and a small amount is sold in Trinidad. Credit is provided by the Tobago branch of the ADB, and by commercial banks, primarily to large farmers. Of the total amount loaned by the ADB to the livestock sub-sector in the last five years, poultry, pigs and small ruminant (sheep and goats) activities were the main beneficiaries (TABLE VI.3).

TABLE VI.3
LOANS APPROVED BY THE ADB FOR LIVESTOCK PRODUCTION
IN TOBAGO, 1988-92 (TT$)

ACTIVITY	1988	1989	1990	1991	1992
POULTRY	352,700	24,000	163,300	51,133	40,000
DAIRY	3,000	30,000	-	-	-
BEEF	-	46,600	53,600	34,500	11,700
PIGS	41,613	74,700	319,600	180,891	117,832
SHEEP & GOATS	10,000	283,900	415,100	443,170	293,103
OTHER LIVESTOCK	-	-	48,200	6,914	-

SOURCE: ADB, TOBAGO.

Tobago is not affected by any major livestock diseases. The most important disease is endoparasites that affect bovine species, and the most common parasites are trichostrongylus and coccidia **(TABLE A.18)**. However, livestock production is constrained by several factors, the major ones being: (i) inadequate supply of quality breeding stock; (ii) shortage of land; (iii) high cost of inputs (barbed wire, mesh wire, farm equipment and feeds); (iv) unorganized marketing system, grades and standards; (v) difficulties in accessing funding; (vi) seasonality of forages; (vii) inadequate training of support staff of the DAFMA and of farmers; (viii) inadequate organization of farmers; and (ix) competition from cheaper imported livestock products.

6.1.1 Beef

Beef cattle production is carried out on large estates and by small farmers who rear small stock[57]. The main cattle operations are based on six large estates **(TABLE VI.4)**. Four estates, ranging between 200 and 300 ha., have the largest operations, and they are located in the southwestern part of the island. These estates have an extensive production system whereby animals are grazed on improved and unimproved pangola pastures under coconuts. This is usually supplemented with concentrate feed and by-products during the dry season.

TABLE VI.4
MAIN BEEF CATTLE FARMS, 1988

ESTATE	HECTARES	NO. OF ANIMALS
DIAMOND ESTATE	203	300
TOBAGO PLANTATIONS LTD.	284	250
FRIENDSHIP ESTATE	203	100
BON ACCORD ESTATE	243	250
GOLDEN GROVE ESTATE	284	400
BACOLET ESTATE	243	300

SOURCE: DAFMA.

One estate also employs an intensive production system in which the breeding herd and calves are grazed under coconuts. The animals are then transferred to a feedlot at 8 to 9 months of age, where they are fed cut forage until they are marketed (about 3 to 4 years old). Previously the animals on this farm were fed concentrate feed in a feedlot, but this practice was stopped recently, due to the high cost of feed. The estate has also utilized sorghum sudan and pangola grasses which have been cultivated and fed to the animals. The pasture for this forage is irrigated for five months of the year during the dry season.

Beef cattle operations are also maintained by the government and by small farmers. The state has a beef herd of about 60 animals at its livestock station at Hope, to supply quality breeding stock to farmers. These animals are managed under an extensive system of production and are grazed on improved and unimproved pangola pastures under coconuts. A small stock

---

[57] The number of cattle has declined since 1982 due to closure of two estates and a reduction in small farm stock.

(ranging from 1 to 10 animals) is reared by small farmers using the tethering system in their backyards or on the road side. The principal breeds are Charolois, Jamaica Red Poll, Zebu and crosses of these breeds.

Beef production is affected by several factors, including: (i) difficulties in procuring breeding stock; (ii) high costs of inputs; (iii) inadequate water supply; and (iv) lack of adequate markets.

6.1.2 Dairy

Dairy production has traditionally been a small farmer activity on a part-time basis. In general, farmers rear two to five dual-purpose animals having a high percentage of zebu blood, and these are maintained using the roadside tethering system. Calves are tied overnight and the cows are milked manually early the next morning. The milk is used at home and the surplus sold in neighboring areas.

The dairy sub-sector began to be organized in 1968 with the establishment of approximately 20 dairy farms at the Hope and Goldsborough Estates under the Stateland Development Project. These farms, ranging from 6.1 ha. to 8.1 ha. each, were given to selected farmers and they were stocked with 20 imported Canadian Holstein cattle to be managed under a semi-intensive system. The animals were grazed on improved pangola pastures and their diet was supplemented with concentrate feed. A milk collection system organized by the government was introduced, with the milk being tested, graded and collected at the farm gate, then transported to a central cooling system at Hope Farm before being retailed to consumers.

Of the 20 dairy farms, only three are currently in operation; the remaining ones are either totally abandoned or have minimal operations[58]. Presently, the three operating farms together with two state controlled farms at Hope and Kendal are the main sources of milk production. Added to these are numerous small farmers, each having under five animals of which only one or two may be producing milk at any given time.

Dairy production is affected by the same factors that constrain beef production. In addition to those factors, the sub-sector is affected by: (i) the hilly terrain and small farm size; (ii) part-time nature of operations; (iii) high cost of mechanization; (iv) unavailability of spare parts and unreliable servicing of dairy equipment; (v) unreliable artificial insemination program; (vi) unsatisfactory marketing arrangements for milk; (vii) insufficient good quality breeding stock; and (viii) lack of a milk processing plant in Tobago.

---

[58] Of the farms with minimal operations, 10 have no dairy cattle and nine carry small stocks of ruminants ranging from 12 to 50 heads. The project was not successful due to poor farmer selection, inadequate management of and lack of adaptability of animals, hilly terrain, lack of a systematic pasture improvement program and inadequate training of farmers.

6.1.3 Sheep and Goats

The majority of sheep and goats are raised by small farmers. Sheep are reared in flocks of 1 to 20 animals as a source of cash or for meat for special occasions. The production system varies, from roadside tethering by landless farmers when lands are available, to the cut and carry system.

There are no indigenous sheep in Tobago. The present stocks are descendants of imported breeds, the main ones being the Barbados Blackbelly, West African, Persian Blackhead, Virgin Island White and various crosses of these breeds. A few of the large estates carry flocks of 50 to 150 ewes which are reared under an extensive system.

Data on the sheep population show that it increased from 3,648 heads in 1963 to 4,753 in 1982, and then declined to 3,506 in 1988 (**TABLE VI.1**). The CARDI report attributed this reduction to sales to Trinidad and to losses due to attacks by stray dogs. In recent years, the DAFMA has attempted to improve sheep production by establishing the Blenheim Sheep Multiplication and Research Project. The project is financed by the Government of Trinidad and Tobago and it is executed by the THA with assistance from the MALMR, CARDI and the UWI. The project has introduced and distributed new and improved breeding stock to farmers throughout the island. Farmers have also benefited from the introduction of improved management techniques in the areas of health, nutrition and housing. The project currently has about 450 ewes.

Through the Blenheim Sheep Project, the DAFMA has recently developed a system to improve backyard rearing of sheep using a cut and carry system. Animals are housed on slatted wooden floors and fed a diet of chopped elephant grass (Pennisetum purpureum) together with commercial dairy ration. The laths used for the flooring are 5 cm. wide and they are spaced 1.5 cm. apart, providing sufficient room for droppings to fall through the floor while preventing the feet of animals from becoming stuck. This housing system has several advantages for sheep production, including: (i) increased security from dog attacks and larceny of animals; (ii) more efficient utilization of grass fields; (iii) higher survival rates in post weaned lambs; (iv) increased growth rate due to restricted energy usage; and (v) reduced internal parasite burdens resulting in savings on deworming. This production system is being actively extended to farmers through the Extension Section of the DAFMA and several have adopted the new technology.

Goat production is a minor activity in Tobago. Like sheep, there are no indigenous breeds of goat. Animals are reared (with other animals) in stocks of 1 to 15 heads and are managed under various systems, ranging from roadside tethering to the cut and carry system. In recent years, the goat population has declined, also due to animal exports to Trinidad.

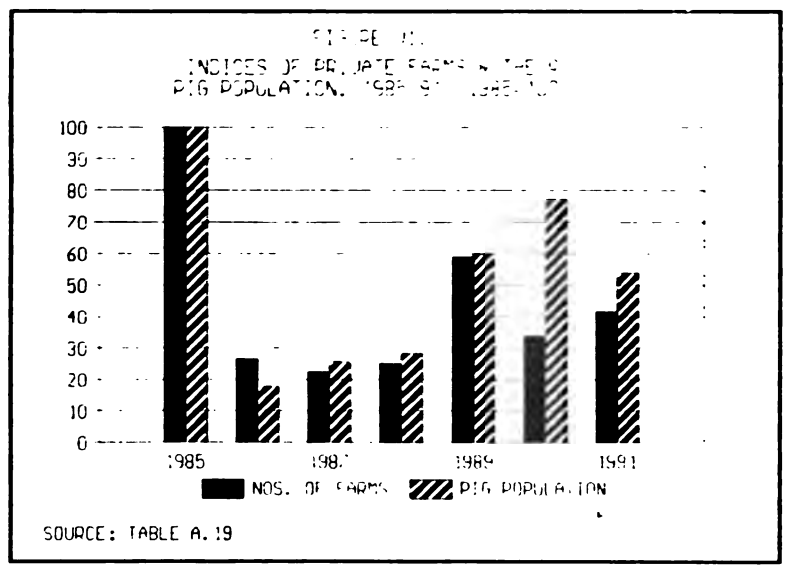
The DAFMA has recently embarked on a goat multiplication program at Hope Farm. The main objectives of this program are to provide farmers with dairy and meat goats, and with improved management techniques for increasing meat and milk production from these animals. The Division currently has a goat herd of about 220 heads.

One member of the Tobago Dairy Goat Farmers Association (TDGFA) recently imported some dairy breeds from the United Kingdom to upgrade his stock. In addition, a farmer from the United Kingdom is in the process of establishing a large dairy goat herd at the Roxborough Estate with plans to process cheese from goats' milk The TDGFA also plans to increase milk production and to process cheese.

6.1.4 Pigs

Pig production has also traditionally been a smallfarmer activity. In general, the animal stock per farm is small, usually comprising less than 10 sows. The main production system is intensive, in which pigs are housed in pens built with concrete floors and galvanized roofs, and fed pig rations with increasing amounts given during pregnancy and lactation. The Large White Landrace and their crosses are the main breeds in Tobago. The Duroc and Hampshire breeds were introduced also, but these presently account for less than 5% of the total pig population.

Pig farming has been a declining activity in recent years. Between 1982 and 1991, the pig population declined by more than one-half, from 5,633 to 2,199 animals, due to private farmers ceasing operations and disposing of their breeding stock. In the 1985-91 period, both the number of pig farms and the animal population on these have declined significantly (FIGURE VI.1). While this reduction occurred, the average farm size (number of animals per farm) increased during the period. The main factors contributing to fewer private farms were: (i) the unreliability of supply and the high cost of concentrate feeds; and (ii) inadequate marketing arrangements with the Marketing Division.



Presently, most farmers in production are engaged in breeding and fattening operations. In 1991, there were 141 pig farms, of which 67% had between 1-10 animals (TABLE VI.5). Approximately 48 of these farms had fattening operations and the remainder had both breeding and fattening activities.

TABLE VI.5
OPERATING PIG FARMS BY FARM SIZE, 1991

FARM SIZE BY NOS. OF PIGS	NOS OF FARMS	NOS. OF PIGS
1 - 10	95	964
11 - 20	32	627
21 - 30	10	308
31 - 50	1	53
51 - 75	1	50
76 - 100	1	54
101 - 200	1	143
201 - 500	-	-
500 & OVER	-	-
TOTAL	141	2,199

SOURCE: CSO PIG SURVEY, 1991.

6.1.5 Poultry

Poultry production is a smallscale activity in Tobago, and most operations are done under backyard conditions. In the last decade, output declined due to the closure of the commercial operations by many small producers because of: (i) the unreliable supply and high cost of concentrate feeds; (ii) high production costs; and (iii) cheaper imports of chicken and eggs from Trinidad.

Presently there are two farms with commercial operations using the deep litter production system - a broiler farm with about 600 birds and a layer farm with 7,500 birds. The latter produces an average of 300 dozen eggs per day, and it reduces its flock size periodically to prevent a glut of eggs on the market. Due to the reduction in the number of producers, the market situation and the economic viability of both operations have improved.

6.1.6 Rabbit

Rabbits are produced by approximately 100 small farmers on a part-time basis under backyard conditions. Most animals are reared in flocks of 1 to 10 does. The main breeds are the New Zealand White, California and Flemish Giant and various cross breeds. The animals are kept under an intensive system, fed cut forages and concentrate feed and the weaners are usually reared in community pens. There are no data available on the rabbit population but indications are that it is increasing, as is the demand for its meat. Presently, the demand for rabbit meat exceeds the supply.

The DAFMA has included increased rabbit production as one of its priority areas of supporting production of low-cost meat. In recent years, the Division has promoted rabbit farming both as a backyard enterprise and as a commercial activity. The Tobago Rabbit Breeders Association (TRBA) is also supporting both production and consumption of rabbit meat, and has imported stock recently from the United Kingdom to upgrade the local stock. The TRBA is promoting the meat as a substitute for chicken due to its low fat and high protein content. In

addition, the 4-H section has been promoting this activity through its 4-H clubs in schools and Young Farmers' Clubs throughout the island.

6.2 Livestock Support Programs

The government has adopted several measures to address the constraints faced by the livestock sector and to improve production. The most important of these are discussed below.

(a) Supply of breeding stock: Five main strategies are being implemented to increase the supply of breeding stock. First, subsidized breeding stock and services are being provided by the state's six livestock stations, particularly by the main one located at Hope[59]. This farm: (i) supplies improved breeding stock to farmers; (ii) provides stud, artificial insemination and veterinary services; (iii) demonstrates improved livestock husbandry methods; (iv) supplies planting material of different forage types to farmers; and (v) provides general assistance for livestock development. Most of these services are offered also by the other five livestock stations, but on a reduced scale. With the exception of (i) and (ii) above, all the other services are free. Where fees are charged they are subsidized, comprising only about 40% of the market rate.

Second, farmers are provided with improved dairy and meat goats and management techniques, through the recently established goat multiplication program at Hope Farm. The national government has also imported about 200 goats of different breeds from the United Kingdom, which are being multiplied at the Centeno Livestock Station in Trinidad. The DAFMA hopes to acquire some offspring of these animals for multiplication and distribution to farmers.

Third, the DAFMA has recently placed a ban on the sale of female sheep and goats so as to increase the breeding stock on government stations. Fourth, the Division is encouraging the more established farmers to develop satellite farms as sources of breeding stock for other farmers[60].

Fifth, the Hope Farm is purchasing pure-bred pigs from Trinidad and selling high quality piglets to farmers. The current policy is to sell piglets to genuine breeders who in turn could sell to other farmers.

(b) Land: The Stateland program is aimed at addressing the land constraint by leasing lands on the large neglected estates to small farmers for livestock production. Under this Program, farmers are encouraged to practice intensive livestock farming so as to increase the efficiency of their limited land and improve production. Furthermore, leases are issued to stateland farmers to assist them in accessing loans from the ADB.

---

[59] Brathwaite, 1991.

[60] An additional artificial inseminator with training in AI in sheep and goats has joined the Division, and is conducting some initial trials on insemination of these classes of livestock at the Kendal Farm School.

(c) Inputs: To reduce production costs, the Division is promoting the use of cheaper production alternatives such as low cost housing for livestock and available local forages. A germplasm bank of improved forage species was established at Hope Farm and planting material from it is being distributed to farmers. Field cultivation of these forages is done on several government stations as well as on some private farms. As an incentive, the state has excluded the value-added tax on essential agricultural inputs such as livestock feeds and fertilizers.

(d) Marketing: Support to livestock development is also provided by the Marketing Division. The Division sells some farm inputs such as livestock feeds and drugs at subsidized prices, so as to reduce input costs and assure reliability of supplies. The state also provides a guaranteed market and price for milk produced on the stateland dairy farms. The milk is purchased through the Government Livestock Farm at Hope and it is sold fresh to the hospital in Tobago and to other consumers. Furthermore, new additional cold storage space (251 square meters) for meat has been provided at Shaw Park by the National Insurance Property Development Corporation (NIPDEC), and a new abattoir with modern equipment for slaughtering and handling of meat has been constructed by the state.

(e) Training: Training and extension support to livestock farmers is provided by the Information and Training Section of the DAFMA through the Kendal Farm School, the extension service and CARDI. The Training Section prepares and releases extension information on a periodic basis to farmers through different communications media. However, training activities have been reduced considerably in recent years due to inadequate resources. The Farm School offers a formal residential program that provides both theoretical and practical training of young people in various aspects of agriculture. It also offers short courses, seminars and demonstrations to farmers.

Training is also provided by the field extension service located in each of the eight extension districts of the DAFMA. Each district has a trained extension officer who works closely with farmers and is available for consultation, technical advice and general guidance. These activities are complemented by courses organized by CARDI which target mainly sheep and goat farmers.

6.3 Fisheries Sub-Sector

An assessment of the fisheries sub-sector of Tobago needs to be done within the national context, because the island's fisheries are subject to national policies. Exploitation and conservation of the fish resources are done under the country's Fisheries Act which regulates fishing in the waters (inclusive of rivers and seas) of Trinidad and Tobago. The Act regulates various aspects of fishing such as mesh size and form, dimension of nets or other fishing equipment, as well as the use of such nets and equipment for catching particular fish species. It prohibits the use of poisons and explosives in fishing and outlines penalties for its contravention. In addition, there are government regulations that pertain to the country's flying fishery.

The Government of Trinidad and Tobago continues to implement several policy measures to develop and conserve the country's fisheries. The most important of these measures include: (i) freezing the number of trawlers engaged in shrimping by Trinidadian and Venezuelan fishermen; (ii) reducing the waste of discarded undersize fish caught in shrimping activities; (iii) identifying the inshore spawning and nursery grounds with a view to prohibit fishing in those areas; (iv) licensing of boats and fishermen to regulate exploitation; (v) reducing concessions, rebates and subsidies given to fishermen; (vi) encouraging the exploitation of under-utilized and unutilized fish resources; and (vii) surveillance of both the inshore and offshore fisheries to prevent unauthorized fishing and to ensure sustainable exploitation.

6.3.1 Profile of the Sub-Sector

Fishing has traditionally been an important activity in Tobago and it has provided the main economic support to many coastal villages. It is largely an artisanal as well as a seasonal activity. The island's flying fishery has been one of the most popular fisheries in the Caribbean (see below).

Based on information available from the early 1980's on fish landed at the five "major" ports in Tobago (Castara, Charlotteville, Milford, Plymouth and Speyside), the island's fishery comprised about 31 different species of fish, most of which were migratory pelagics and a few demersals[61]. In addition to the five major fish ports, there were at least 10 other sites around the island where fish were landed.

In 1991, there were 32 recorded landing beaches in Tobago, 10 of which had fishing facilities that consisted of storage for nets and equipment and changing rooms[62]. In the same year, there were approximately 840 registered fishermen, 275 fishing boats and nine major fishing sites in Tobago (**TABLE VI.6**). Approximately 75% of all the boats are located in the leeward region of the island. More than one-half of the boats operated in the southwest area off the island (Bon Accord, Buccoo, Plymouth, Store Bay, etc.), while an estimated one-quarter operated from the northwest area (Charlotteville, Bloody Bay, Parlatuvier, Englishman's Bay, etc.). The remainder of the boats operated from villages located mainly in the south and southeast of the island. About 75 boats were engaged seasonally in catching the flying fish.

Due to the artisanal nature of fishing in Tobago, most boats operate inshore, within the country's territorial waters (12 nautical miles). They do not utilize modern equipment such as fish finders, communication systems or cold storage facilities. Furthermore, most of the boats are small open-decked vessels called pirogues, powered by outboard engines although some use in-board diesel engines. In 1991, about 86% of the boats were relatively small in size (<7.6 meters) and only 1 boat was in excess of 13 meters. Most of the boats registered with the

---

61 Carlisle M. Jordan, 1984.

62 MALMR, 1994. Charlotteville has the only fuelling facility for fishermen. It is operated by the Tobago Fishing Cooperative.

TABLE VI.6
NUMBER OF FISHERMEN AND FISH SPECIES CAUGHT BY MAJOR FISHING SITE, 1993

DISTRICT	FISHING SITE	NO. OF FISHERMEN	SPECIES CAUGHT
WINDWARD	CHARLOTTEVILLE	120	WAHOO, BONITO, DOLPHIN, ALBACORE, KING, SNAPPER
	ROXBOROUGH	40	DOLPHIN, WAHOO, ALBACORE, BONITO, TUNA, SHARK
	SPEYSIDE	30	SHARK, DOLPHIN, WAHOO, ALBACORE
	PARLATUVIER	40	TUNA, SHARK, FLYING FISH, OCEANGUARD WAHOO, BONITO, DOLPHIN, ALBACORE, KING, SNAPPER
LEEWARD	PIGEON POINT	150	TUNA, SHARK, FLYING FISH, OCEANGUARD, WAHOO, BONITO, DOLPHIN, ALBACORE, KING, SNAPPER
	SWALLOW	150	TUNA, SHARK, FLYING FISH, OCEANGUARD, DOLPHIN, WAHOO, SNAPPER, PLUME
	BUCCOO	100	KING, DOLPHIN, BONITO, WAHOO, JACKS, ROUND ROBIN, CAVALI, SALMON, ANCHOVY
	PLYMOUTH	50	TUNA, WAHOO, ALBACORE, DOLPHIN, JACKS CAVALI, ROUND ROBIN, SNAPPER, ANCHOVY
	CASTARA	50	TUNA, WAHOO, ALBACORE, DOLPHIN, JACKS CAVALI, ROUND ROBIN, SNAPPER, ANCHOVY

SOURCE: DAFMA, 1993

DAFMA since 1987 also were relatively small, ranging between six and nine meters (TABLE A.20).

The peak fishing season is from January to June, but fishing is done all year by many fishermen. In the last twenty years, the fishing methods have shifted from banking to trolling, although the former is still popular. In addition, the use of fish pots and pelagic nets have increased, while beach seiners are still used in some areas such as Lambeau, Castara, Charlotteville, Grafton and Parlatuvier. Currently, the most common harvesting methods include trolling for pelagic fish species, banking for demersal species, fish potting, gill netting, beach seining and "drifting" (using nets and lines)[63]. Spear fishing, longlining and the use of turtle nets are also used by some fishermen.

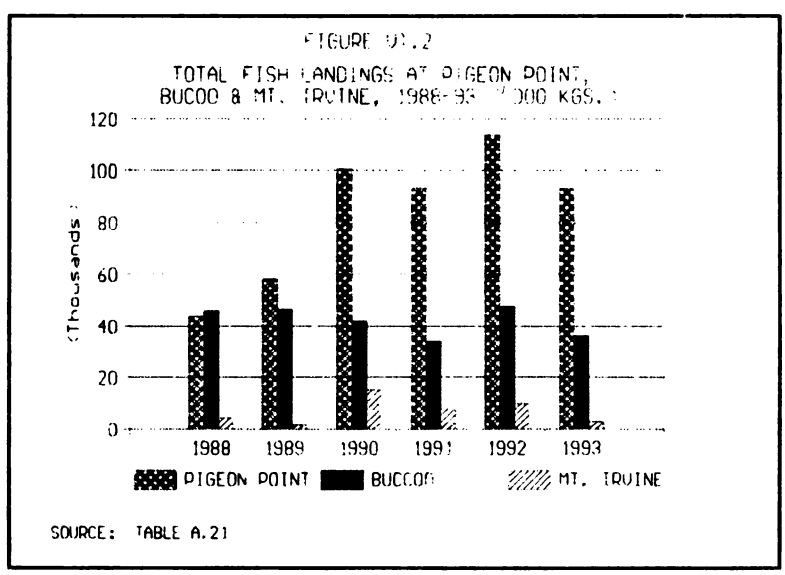
In the southwestern area (such as Buccoo, Pigeon Point and Mount Irvine), the drifting method is mainly used from November to July. Pelagic gillnets are used to catch flying fish and trolling is used to harvest the larger pelagics such as dolphin, tuna and kingfish. In addition, trolling and fish potting are practiced in the flying fish off-season, from July to November. At Pigeon Point, fish potting is done all year by some fishermen and snappers and groupers are the main catches.

---

[63] The latter method is very productive during the peak season (January to June).

Based on the fish landed on the main fishing beaches in Tobago in recent years, the dolphin, tuna, albacore, snapper and shark are the more common fish species harvested (**TABLE VI.6**). Three of the major pelagics (dolphin, tuna and wahoo/kingfish) are caught throughout the year, but there may be variation in the amount landed at certain periods. Preliminary census data on total landings in 1991 show that Pigeon Point, Lambeau and Buccoo were the most important for dolphin, while Charlotteville, Pigeon Point and Lambeau were the major landing sites for tuna[64].

In the 1988-93 period, information on fish landings at Pigeon Point, Buccoo and Mt. Irvine shows that the total amount has been steadily increasing (**TABLE A.21**). Pigeon Point and Buccoo accounted for about 95% of the total catch of the three sites (**FIGURE VI.2**)[65], and the major species caught were dolphin and flying fish.



In general, a substantial portion of Tobago's fish requirements are met from fishing activities around the island. With the exception of small processing operations, most of the fish landed are sold in fresh form. The catches are usually disposed of at the landing beaches by the fishermen and/or their spouses. Considering that fishing is a seasonal activity, there are often excess supplies which cannot be absorbed by the fresh fish market. Whenever there is surplus available, much of it is utilized in small processing operations by the Marketing Division (for smoking and drying), Jacob Enterprise (smoking, drying and filleting) and by the Charlotteville Fishing Cooperative (smoking). The albacore, tuna, bonito, dolphin and wahoo are the most popular species that are smoked. The dolphin is also dried and the flying fish is filleted and exported.

---

[64] MALMR, 1994.

[65] Data for 1993 are for a part of the year.

Support to fishing activities is provided by the Marine Affairs section of the DAFMA, mainly through extension activities such as: (i) conducting demonstrations on fishing methods and safety at sea; (ii) providing various types of assistance to fishermen; and (iii) support to organizing two annual fishing competitions. In addition, the DAFMA does registration of boats and engines and processes fishermen applications for Value Added Tax (VAT) and duty free concessions on fishing equipment and accessories.

The fishing sub-sector is relatively underdeveloped in Tobago and there are several constraints that affect its development. Due to the nature of the industry, production is affected by three major factors: (i) technology utilization; (ii) availability of information on fish resources; and (iii) the total effort by fishermen to exploit the fishery.

Fishing has remained an artisanal activity and modern technology utilization is low. Compared to the fishermen from Trinidad and Barbados that also fish in the waters around Tobago, the technology used by the island's fishermen has improved very little in recent years. Furthermore, knowledge of the fishery resources is very limited and this constrains adequate planning and regulating the rate of exploitation and the species to be harvested. There is need for a comprehensive stock assessment to support management of the fishery resources for ensuring replenishment and sustainable yields.

Most Tobago fishermen exploit the inshore fishery resources, and although there is no firm evidence of overexploitation of this area, evidence based on landings and lower catch rates indicate that the stocks of some species are decreasing[66]. Some fishermen incur higher costs by fishing farther out and/or for longer periods in order to maintain their income level. However, better equipped vessels are needed to exploit the fish resources farther out, but capital and maintenance are too costly for most artisanal fishermen.

In addition, development of the sub-sector is affected by problems of marketing, insufficient training of fishermen, inadequate infrastructure to facilitate landing, maintenance of boats and equipment and insufficient funding from the state. Although flying fish are available on the windward side of the island, they are not exploited as on the leeward side due to inadequate transport, storage and marketing arrangements and rough sea conditions.

6.3.2 Flying Fish Resource

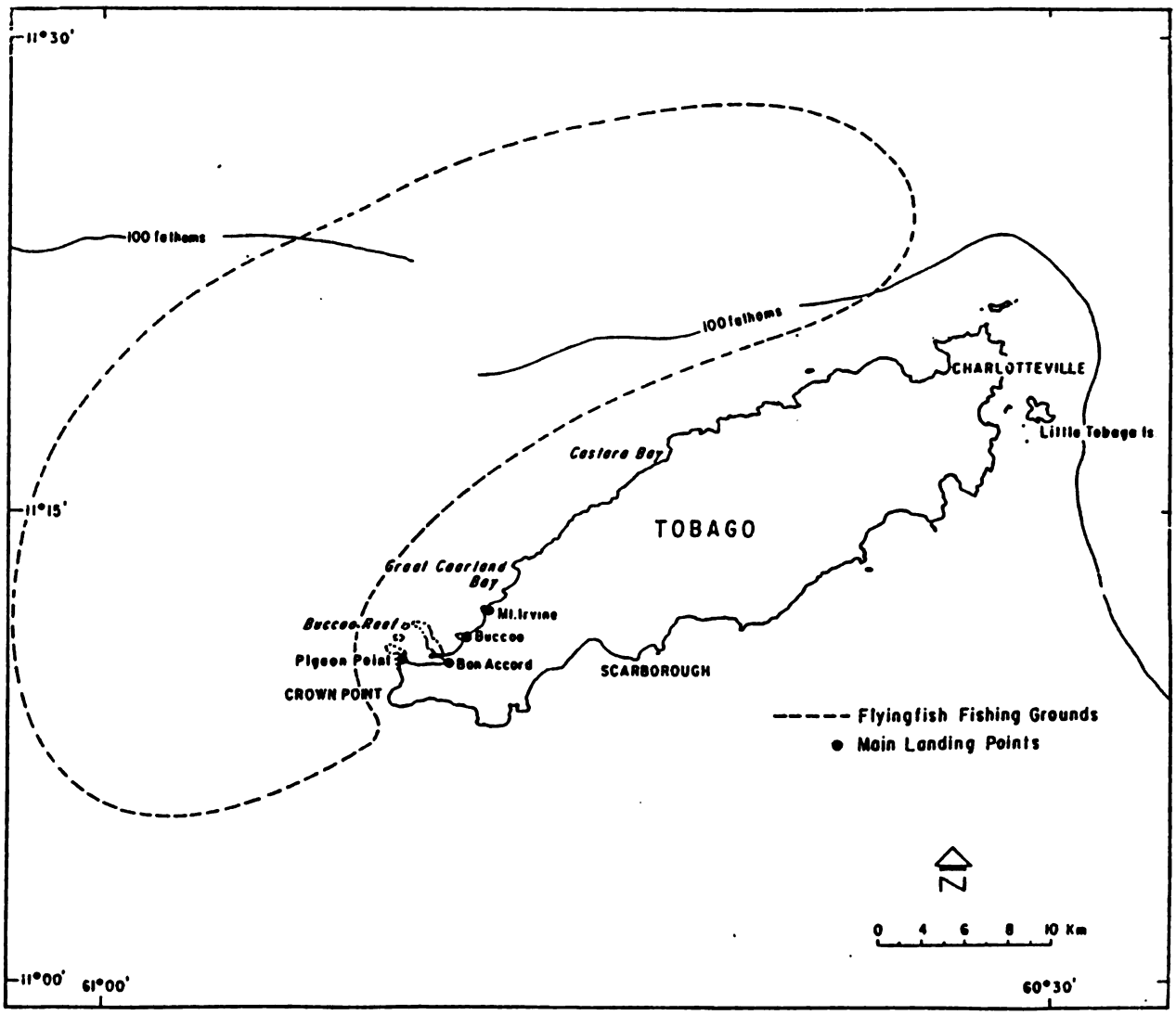
Flying fish activities began in the late 1960s and they are concentrated off the north and western coasts of the island **(FIGURE VI.3)**. There is no comprehensive information on the available fish stocks, but indications are that the flying fish resource is abundant and could be developed into a viable enterprise, particularly processing. Recent research by the Fisheries Division (in collaboration with FAO) has shown that the fish stocks appears to be substantially

---

[66] National Planning Commission, 1988 and Samlalsingh and Pandohee, 1992.

exploited, with little scope remaining to increase the annual landings beyond the present levels[67]. The research also indicated that the local participation has increased to the extent that at least 80% of the amount caught is by Tobago's fishermen and there is sufficient under-utilized potential within the local fleet to take all the potential catch.

FIGURE VI.3
MAIN FYING FISH GROUNDS AND LANDING SITES IN TOBAGO



Source: Samlalsingh et al., 1992.

67 Samlalsingh et al., 1992.

The flying fishery has traditionally been exploited by Barbadian fishermen operating in competition with local fishermen. In the 1990/91 fishing season, a bilateral agreement was made between the two countries to harvest this fish. The agreement granted 40 Barbadian licensed vessels the right to fish outside the territorial sea limits of Trinidad and Tobago, but within the country's EEZ upon payment of a license fee of US$800 per boat for the 1991 season. In addition to the period within which the resource could be exploited, the agreement also regulated the type of equipment to be used, including size of boats, horsepower of the engine and the number of crew, and it required that the Government of Barbados grant licenses for the importation of 300 metric tons of whole and processed flying fish and other pelagic species at mutually agreed prices. No agreements for subsequent years were made, but foreign fishermen continued to operate in contravention of the fisheries legislation[68].

Flying fish make up the largest volume of fish caught off Tobago. Landings of this specie amounted to 359 metric tons in the 1990/1991 season. The major flying fish grounds are on the leeward side of the Island, with the main landing sites being Pigeon Point, Buccoo and Mr. Irvine. It is estimated that 83% of the pelagic landings on the leeward side of Tobago between the months of November and July are flying fish. The windward side of the island may also be rich in the resource, but it has never been as heavily exploited as on the leeward side, largely because of relatively under-developed infrastructure and rougn seas.

An indication of the catch per trip in the flying fish season and the total harvested in the 1987-91 period are given in **TABLE VI.7**[69]. In the 1978-82 period, fishermen deposited their catch in a collector ship and received a guaranteed price, with no limit on the amounts purchased. As a result, the fishermen made much greater effort in a day fishing than they normally would have done. This explains the relatively high average catch per trip in that period. The other period with a high average catch per trip was in 1990/1991. During this period, a 12.5 meter ice boat with a 130 HP engine was contracted from Barbados to one of the fish processing plants to harvest flying fish and this had a significant impact on the catch size[70].

---

[68] The Coast Guard has been prosecuting foreign vessels operating illegally in the waters adjacent to Tobago under the Archipelagic Waters and Exclusive Economic Zone Act. This has created tension between Trinidad and Tobago and Barbados and negotiations are currently being done to have a mutually agreeable fishing arrangement.

[69] The data for the 1978/1982 period was collected when a collector ship system was in operation.

[70] The gap in the data between 1982 and 1988 resulted from problems in collecting the information. In 1988, data collection resumed under the Eastern Caribbean Flying Fish Project, which is still operational.

TABLE VI.7
FLYING FISH CAUGHT (KG.) AND FISHING EFFORT (NO. OF BOAT TRIPS) RECORDED, 1979-1982 AND 1988-1991

FLYINGFISH	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	ESTIMATED TOTAL CATCH FROM PIROGUES	ESTIMATED TOTAL CATCH FROM ALL FLEET
1978/1979											
CATCH	-	-	-	-	-	-	5,951	1,300	-		
NO OF TRIPS	-	-	-	-	-	-	23	19	-		
CATCH PER TRIP	-	-	-	-	-	-	259	68	-		
1979/1980											
CATCH	-	-	-	482	69,488	27,398	91,493	37,639	51		
NO OF TRIPS	-	-	-	5	363	176	368	165	2		
CATCH PER TRIP	-	-	-	96	191	156	249	228	26		
1980/1981											
CATCH	-	-	14,006	10,691	20,316	3,415	10,070	7,059	-		
NO OF TRIPS	-	-	-	108	104	38	48	36	-		
CATCH PER TRIP	-	-	105	99	195	90	210	196	-		
1981/1982			133								
CATCH	-	-	-	-	66,237	16,778	8,263	650	-		
NO OF TRIPS	-	-	-	-	265	78	67	5	-		
CATCH PER TRIP	-	-	-	-	250	215	123	130	-		
1987/1988										186,511	186,511
CATCH	-	-	-	14,144	13,005	4,084	8,957	10,614	243		
NO OF TRIPS	-	-	-	128	233	149	159	186	32		
CATCH PER TRIP	-	-	-	111	56	27	56	57	8		
1988/1989										198,858	198,858
CATCH	55	201	13,930	11,878	11,203	7,991	14,743	4,305	103		
NO OF TRIPS	5	10	72	97	114	178	213	141	12		
CATCH PER TRIP	11	20	193	122	98	45	69	31	8		
1989/1990										329,487	358,276
CATCH	-	-	33,389	17,506	23,566	3,490	31,473	13,362	57		
NO OF TRIPS	-	-	177	160	236	250	346	157	16		
CATCH PER TRIP	-	-	285	109	100	14	91	85	4		
1990/1991										334,510	359,119
CATCH	-	-	5,628	20,683	13,108	15,306	16,183	23,092	1,342		
NO OF TRIPS	-	-	101	130	179	188	135	147	22		
CATCH PER TRIP	-	-	56	159	73	81	120	157	61		

SOURCE: S. SAMLALSINGH, E. PANDOHEE AND E. CAESAR, 1992

In addition, the total amount harvested in the 1989-91 period almost doubled that of the previous two years.

Several public and private sector efforts are being made to support the development of the flying fish industry in Tobago. These include: (i) development of a fish port at Scarborough; (ii) establishment of a blast freezer at the National Insurance Property Development Company (NIPDEC); (iii) providing funds to purchase boats larger size boats (15 meters in length), which can carry ice and stay out for longer periods; (iv) upgrading existing fishing utilities and building new facilities where none exist at present; (v) the Tobago Sea Products has offered higher prices and offered other incentives to support its processing activity.

Assessments are being conducted by the Marine Fishery Analysis Unit, MALMR, and the Fisheries and Aquaculture Research Program of the Institute of Marine Affairs in Trinidad on the flying fish stock of Tobago[71]. Among other things, the sub-project is expected to: (i) analyze commercial catch and effort data to determine trends in the flying fish catch; and (ii) determine a sample method for predict the potential commercial catch.

There are also plans to improve the data collection system for recording flying fish landings in Tobago under the UNDP/FAO/GORTT project. Since the flying fish resource is shared among the Eastern Caribbean islands, Trinidad and Tobago is involved in an eight-year Caribbean Fishery Resource Assessment and Management Program (CFRAMP). Among other objectives, this Program focuses on the resource assessment and management aspects of the flying fish fishery and facilitates exchange of information at the regional level.

Training is essential if the flying fish industry is to develop fully. This would include training of fishermen in the use of ice to prevent fish spoilage at sea and training of fish processors in the area of quality control. The development of new fish products using the flying fish and the manufacture of fishmeal from flying fish "trash" are potential processing areas. In this regard, some training was offered through the Government to the two main processors, Tobago Sea Products and Jacob's Fishing Enterprises in the method of manufacturing fish silage from flying fish "trash" and the smoking of flying fish respectively.

If results from present studies being carried out on the flying fish indicate that the Tobago fleet is fishing below the maximum sustainable yield, it would be possible for the fleet to

---

[71] This activity began in January 1991 as a sub-project of the main UNDP/FAO/GOVERNMENT of the Republic of Trinidad and Tobago (GORTT) project on "Establishment of Data Collection Systems and Assessment of Marine Renewable Resources."

increase its fishing effort by increasing the number of fishing days for the season. However, the increased fishing effort and yield would be economically feasible if there are markets available for the flying fish and the possible by-products. The government would need to work with the processors in manufacturing flying fish by-products and develop a marketing strategy.

CHAPTER VII

AGRICULTURAL MARKETING

7.1 Evolution and Characteristics

During the 1950s and 1960s, when Tobago was considered the "bread basket" of Trinidad and Tobago, agricultural marketing was a major responsibility of the state's Marketing Board, which collected and exported farmers' products. Most communities were served by boats travelling around the island, and subsequently by trucks which visited production centers on a weekly basis. Collection depots were established in many communities, and farmers sold their output at these centers on scheduled days. At the depot, products were weighed and farmers paid immediately. Purchases were indiscriminate, with little attention given to grading and sorting.

Despite the limitations of this rudimentary marketing arrangement, the system functioned relatively well, as it delivered products to Trinidad that were regarded as high quality, wholesome and fresh. With the dismantling of this system, agricultural production declined and this continued over the last two decades.

The current marketing system is characterized by high involvement of the state, mainly in purchasing from farmers and selling to consumers and in storage activities. It also includes several small traditional operators and a few organized enterprises. However, changes in the economic structure and consumption patterns in both Trinidad and Tobago have made this system inefficient and its activities unsustainable over the long term. The state's activities in the system distort the market situation, are insensitive to demand parameters, and have imposed a heavy financial burden on the state itself.

The inefficiency of the market system is partly reflected by large price spreads between farmgate and retail prices, and relatively smaller spreads between prices in the Scarborough market in Tobago and the Port-of-Spain market in Trinidad (**TABLE A.22**). Furthermore, there is a small difference between the wholesale and retail price in the Scarborough and Port-of-Spain markets, compared to the difference between farmgate and retail prices in Tobago. For most vegetables, Tobago's retail prices are at least twice the farmgate prices (**TABLE VII.1**). This price difference is high, considering that Tobago is a small island and the distance to transport products from farms to the market is relatively short.

In addition to the above, the market characteristics in Tobago are indicated by the population size, its spatial distribution, age structure, employment and income levels and consumer preferences. In general, the market size is relatively small. In 1992, the population was estimated to be about 50,000, and most people were located in the south-west area, in the parishes of St. Andrew and St. Patrick. This pattern reflects the location of employment generating activities which are centered around the main town of Scarborough and environs, as well as in the St. Patrick area, where most private sector enterprises are established.

TABLE VII.1
AVERAGE FARMGATE AND RETAIL PRICES FOR SELECTED AGRICULTURAL PRODUCTS IN TOBAGO, SEPTEMBER 1993 (TT$)

PRODUCT	UNIT	FARMGATE	RETAIL
PIGEON PEAS	KG.	2.20	4.40
CORN	EAR	0.50	1.00
PUMPKIN	KG.	1.65	2.20
CABBAGE	KG.	4.40	6.60
HOT PEPPER	EACH	0.10	0.25
TOMATO	KG.	4.40	6.60
DASHEEN	KG.	3.30	4.40
CHIVE	BUNDLE	1.00	1.50
BODIE BEAN	KG.	2.20	4.40
CUCUMBER	KG.	2.20	3.30
WATERMELON	KG.	2.20	3.30
SWEET PEPPER	KG.	4.40	6.60
MELONGENE	KG.	3.30	4.40
CASSAVA	KG.	2.20	4.40
SWEET POTATO	KG.	2.20	4.40
COCOA	KG.	6.60	8.80
ORANGE	EACH	0.60	1.00
COFFEE	KG.	3.30	6.60

SOURCE: DAFMA.

The size of the domestic market is small, due in part to a small population and a relatively high unemployment level (averaging 19.4% in 1991 compared to 18.5% for the country). In 1991, of the 20.7 thousand persons within the 20-59 age group, only 15,800 were employed. The mean income for all income groups in the same year was the same as that for the country (TT$1,600 per month), while the median income was TT$1,400[72]. The distribution of income based on monthly earnings shows that only 200 persons earned above TT$5,000 per month.

In response to adjustments in income and other economic factors, consumer preferences have changed significantly over the years in Tobago. The demand pattern for agricultural products has favored consumption of quality products, convenience, and more processed products. The domestic food marketing system has remained rudimentary and it has not responded to the changes in consumer preferences. Farmers selling through the traditional market outlets have been affected more, as consumers switched their preferences to the services provided by better organized markets (such as supermarkets).

Another important market characteristic relates to the profile of product suppliers. In the case of Tobago, they comprise a number of small part-time farmers who operate plots of less than 2 ha. on average. There is much variation in the range, quantity and quality of the commodities produced on a regular basis, which include pigeon peas, tomatoes, sweet potatoes, yams, dasheen, sweet peppers, and selected condiments, pork, eggs, sheep, goats, and limited

---

[72] CSO, 1991.

quantities of honey. The market uncertainty is increased because of the part-time operation of these suppliers and the inability to predict production.

7.2 Marketing Agents

The marketing system comprises the Marketing Division of the THA, market vendors, inter-island distributors or traffickers, supermarkets, food shop retailers and input suppliers[73]. These agents operate independently or in some form of collaboration in food distribution. Except for the Marketing Division (see **Chapter VIII**), a discussion of the other marketing agents is provided below.

7.2.1 Market Vendors

Market vendors comprise the single largest group of agents involved in agricultural marketing in Tobago. Almost all are small retailers that operate within a competitive market system. It is estimated that there are approximately 200 vendors, of which about 65 are actively involved in trading (purchasing from and selling products to Trinidad). These retailers are small operators, some of whom are farmers that operate on a part-time basis (depending on seasonality). Their operations consist of selling their own production (if the agents are farmers also), purchasing products from other farmers and from Trinidad, and assembling them in public retail markets and occasionally selling to hotels. More than one-half of the vendors are women who sell the surplus generated on the family farm[74].

The volume of products sold by the vendors is small, comprising a wide range of commodities with sales totalling less than 300 kg. weekly. The products include root crops (dasheen, cassava, and sweet potatoes mainly), vegetables (tomatoes, sweet peppers, lettuce, hot peppers, christophene), food crops (pumpkin, pigeon peas, breadfruit) fruits (papaya, mangoes, citrus, watermelons) and condiments (chive, thyme, parsley). Normally, products are not graded or standardized and there is little specialization, especially by the smaller vendors. However, some vendors become specialized over time and their marketing operations focus on a narrow range of commodities. Moreover, those that have had a longer involvement in marketing carry a wider range of products including some agro-industrial and imported foods.

The main venue for vendors is the public retail market, with Fridays and Saturdays being the main "market days." The main buyer is the individual housewife, but products are also sold to small restaurants and hotels on an irregular basis.

---

[73] NIPDEC also plays a key role in marketing through the provision of warehousing and cold storage facilities. Except for fish retailing by one cooperative, agricultural cooperatives and/or farmers groups are not involved in marketing in Tobago.

[74] Although data are unavailable, discussions with farmers and observations suggest that about 70% of the family farm production is consumed at home or by families and friends.

Price determination is influenced by knowledge of the market situation (supply situation), supply sources (Tobago or Trinidad) and some speculation. Price fluctuations are substantial due to lack of market information, seasonality of production and the part-time nature of farm operations. With regard to investment, this depends on the length of time the vendor has been involved in marketing. Some have expanded their product range to include non-food products while others have acquired vehicles to collect and transport products to market.

7.2.2 Traffickers

Traffickers are traders engaged in both food and non-food products who operate between Trinidad and Tobago. Currently, there are an estimated 60 active traffickers involved in trading between Trinidad and Tobago, complemented by several persons that participate on an irregular basis. In general, the traffickers possess many characteristics as regular market vendors, except that they have larger-scale operations and handle more than an average of 1,000 kg. of products weekly. They are the principal agents for fresh agricultural products in Tobago, sourcing a large proportion from Trinidad. Traffickers also wholesale their products to smaller market vendors at different outlets, retail in public markets, and they are the main suppliers to hospitals, restaurants and hotels.

It is estimated that these operators account for about 60% of Tobago's marketed agricultural products. A large share of their purchases of fresh products in Trinidad is actually supplied by other Caribbean Community (CARICOM) traders, mainly from St. Vincent and Grenada[75]. The traffickers make a weekly trip to Trinidad by boat to purchase supplies, either from wholesalers at the Central Wholesale Market (CWM) or from CARICOM traders operating in "undesignated" areas in the retailing section of the market. Some purchases are also made from CARICOM wholesalers on the Port-of-Spain docks, but these are usually small volumes. Traders prefer to source their supplies from the CWM because there is a wider range of products and a large number of traders, factors which allow them to bargain better.

After purchase, the products are transported to the docks where they are stored in bins for shipment to Tobago. Some traffickers also have vehicles that they send to Trinidad to facilitate purchasing and transporting. Generally, each round trip from Tobago to Trinidad is approximately 24 hours. As a result, products from the CWM that are purchased by traffickers on any given day is available in Tobago the following day. However, product losses are high (as much as 20%) during shipment between Trinidad and Tobago due to poor storage and transport facilities, spoilage and praedial larceny.

The lower cost of agricultural products in Trinidad and the large volumes traded allow traffickers to sell at lower prices in Tobago, compared with commodities produced in the island (**TABLE A.22**). The price differentials allow the traders to absorb any negative impact of price variability and other risks associated with marketing in Tobago. To some extent, the markets in

---

[75] This has important implications for the competitiveness of Tobago's agriculture.

both islands are linked by these activities, with the lagged effects of the market situation in Trinidad often manifested fairly quickly in Tobago.

The agricultural and food trade between the islands is largely a one-way activity (from Trinidad to Tobago), except for small quantities of root crops shipped to Trinidad. This situation is attributed to the small size and highly dispersed farming activities in Tobago, lack of market information, the narrow range of commodities produced and supply variability. Rather than purchasing some items in Trinidad and some others in Tobago, traffickers prefer to do a "one-stop" shopping in Trinidad to meet all their supply needs. Furthermore, the volume and supply reliability in Trinidad allows the traffickers to provide regular supplies to institutional clients such as hotels, restaurants and hospitals.

The agricultural trading imbalance between Trinidad and Tobago is also the result of supplies from competitive CARICOM traders to Trinidad. Because other neighboring islands have climatic, topography and soil conditions similar to those of Tobago, they cultivate almost the same products. On the other hand, Trinidad has a significantly different topography and higher rainfall which precludes it from economically producing certain commodities. For these and other reasons, Trinidad has become (since the late 1970s) the major market for root crops, pigeon peas and some exotic fruits exported by other islands[76]. Tobago lost its market share in Trinidad for these products due to both declining production and supplying small quantities on an irregular basis. This provided little incentive for Tobago traffickers to ship products to Trinidad.

7.2.3 Supermarkets and Food Shops

Supermarkets and food shops (sometimes called grocery shops) are the other important food retail outlets in Tobago. Presently, there are about 14 well-established supermarkets, a few of which have two or more branch outlets at different locations on the island. These establishments have small to medium-size operations, selling mainly non-food goods, processed food and very small quantities of fresh agricultural products. Their major suppliers are local distributors, and distributors and manufacturers based in Trinidad.

The estimated number of food shops is approximately 70. These are smaller market outlets that serve rural communities and they sell semi-processed, processed and dry food products. Like supermarkets, they distribute little or no fresh agricultural products.

7.2.4 Input Suppliers

There are only four input distribution outlets, but no input manufacturing or major input wholesaling operations in Tobago. This activity has grown very slowly, partly because of the

---

[76] Trinidad's rapid economic expansion in the 1970s and the first half of the 1980s has also contributed to it being a major market for food products from other Caribbean countries.

small market size, low agricultural input use by farmers and easily accessible supplies at lower costs from Trinidad. The main inputs distributed are livestock feeds, complex fertilizers, fungicides and seeds. Of these, livestock feed possibly has the largest share of agro-inputs sold.

7.3 Product Marketing

7.3.1 Crops

Tobago is small and sales are often made close to the area of production. Generally, this means that products are fresher and are likely to be of a better quality than those brought from Trinidad or elsewhere. Crops are not usually stored for a long period or transported over much distance, which results in little attention being given to post harvest handling. Nevertheless, there are post-harvest losses as high as 30% for perishable crops such as tomatoes. If production increases, a larger output is likely to be marketed, which would require improvements in post-harvest practices. Although storage facilities including chilled space already exist, farmers and vendors will need training and information on all aspects of the marketing process - grading, handling, transporting, packaging and presenting their products.

Most crops are marketed in Scarborough, and to a lesser extent in smaller retail markets located in Plymouth, Roxborough, Speyside and Charlotteville. Retail marketing is an activity dominated by women vendors, while wholesale marketing is often done by men. Transporting products to these markets is by the farmers's own transport, hiring transport or bringing smaller quantities in bags by taxis.

Commercial vegetable producers and households with surplus sell in neighboring communities or in the larger Scarborough market. Products are sold on Fridays and Saturdays mainly, with only a few vendors in Scarborough during the week. Farmers also sell to the Marketing Division (MD). The quantities the MD purchases are relatively small, representing both a small proportion of total production and the amount marketed. The small volume marketed by the MD indicates that it does not play a critical role in vegetable marketing. However, it has been suggested that its influence on the market could be increased if it could facilitate sales for farmers in other markets.

Like vegetables, root crops are sold around the farms, in the Scarborough market or to the Marketing Division. The market demand for these crops are good because they are a traditional part of the Tobago diet. However, their retail prices are high, often in excess of prices in Trinidad, and they are not competitive with imported substitutes, particularly Irish potatoes, which are sold at less than half the average price of root crops.

The market for corn and peas is good, especially for fresh corn and around Christmas for peas, either shelled or unshelled. Shelled peas have been sold for freezing for several years to one entrepreneur and there is a request for this product by a Trinidad enterprise for freezing.

Presently, most farmers are reluctant to expand pea cultivation unless the market situation improves, and this will likely occur soon, as the THA expects to hull and blast freeze this commodity.

Bananas and plantains are sold in bunches or in smaller quantities. Post-harvest operations for these commodities such as field packing and boxing are not necessary for the local market. However, bananas compete with high-quality imports from the Eastern Caribbean.

Fruits are marketed locally, to hotels directly or in the Scarborough market. Few fruits are exported, and at least one mango and avocado producer has attempted unsuccessfully to export to Europe and Canada, but now distributes his products in Trinidad. Watermelons and cantaloupes are usually marketed in Scarborough and to hotels. Sales of these fruits to Trinidad are also being explored.

Much of the cocoa is marketed locally, sold to the government or to agents for sale outside of Tobago. Only a small amount is sold locally. There are three purchasing agents (in Moriah, Pembroke and Roxborough), two of whom buy wet or dry beans, while the other buys beans already dried by the producers. Cocoa is also purchased by the government's Cocoa and Coffee Board and the recent price offered was approximately TT$8/kg. This price is supported by the government depending on changes in the world price. At the current producer price, cocoa is an attractive crop for small farmers because of its low labor costs and a guaranteed market.

Copra is purchased by the Coconut Growers Association (CGA) in Trinidad for processing into coconut meal. A Trinidad manufacturer, Lever Brothers Ltd., uses the oil derived from coconuts for the production of soaps, margarine, etc. This product is also subsidized by the government. The current producer price is TT$121 per 45 kg. bag. Farmers are paid TT$90.25 by processors and the remainder by the government as a subsidy. One estate also sells fresh coconuts at a price of TT$1.00 - TT$2.00 per nut. Although this price is fairly attractive, selling fresh nuts is not aviable option for estates with old trees.

7.3.2 Livestock Products

Cattle: Except for a small number of animals sold by the government stations as breeding stock for dairy production, most cattle in Tobago are sold for slaughter and meat production. Previously, there was a marketing arrangement between farmers and the MD, whereby animals were purchased by the latter and the beef was sold through their retail outlets and to various institutions, while some sides were sold to a supermarket chain in Trinidad. The arrangement allowed farmers to sell their beef in advance to the Division. Animals were slaughtered at the

abattoir and the carcasses were frozen by the Division, then prepared as mixed cuts for sale[77]. There were no price variations as no grading was done in terms of quality cuts. However, the MD has ceased purchasing livestock due to a lack of funds and to limited marketing outlets in Trinidad[78].

On the large estates, beef cattle are sold by weight. The current price is TT$5.50/kg. liveweight for bulls and TT$4.95/kg. for heifers. On the smaller holdings cattle are sold in an informal manner, by visual appraisal and the price is determined by negotiation between the farmer and butcher. The lack of markets usually places the farmer in a disadvantageous bargaining position; in most cases, there is little choice but to accept whatever price is offered.

Market interviews have indicated that butchers prefer small animals (about 250 kg.) because they provide a better quality meat than older, larger animals; more importantly, the entire carcass can easily be sold in one day. The current price for undifferentiated cuts of beef in the Scarborough retail market ranges from TT$11.00 to TT$15.40/kg. In contrast, selected cuts of imported steak are sold at TT$16.50/kg.

Only one large beef farm is engaged in on-farm slaughtering and sale of meat, because of a contraction of the Trinidad market to which it previously exported carcasses[79]. Animals are inspected and slaughtered and the carcasses are chilled first for one week, before they are frozen and then prepared in various quality cuts and packaged for sale[80]. The current prices for beef sold by this farm are shown in **TABLE VII.2.**

TABLE VII.2
AVERAGE PRICES FOR BEEF, 1993 (TT$/KG.)

TYPE	PRICE
BEEF WITH BONE	17.60
BEEF BONE	4.40
SHIN	16.50
RIBS	16.00
BRISKET	16.50
SKIN	6.00

SOURCE: DAFMA

---

77 Hide and offal are the property of the farmer.

78 One large beef farmer also identified the lack of marketing outlets in Trinidad as a major constraint.

79 This farm also produces mutton from sheep and goats, and pork from animals purchased from other farmers.

80 This farmer estimates that his beef enterprise can supply about 20% of the beef requirements in Tobago.

With regard to the breeding stock sold by the government's stations, these are sold at a subsidized price of TT$3.30/kg. for young bulls and steers and at TT$4.84/kg. for other animals.

Dairy: Milk is the only dairy commodity produced, and it is sold fresh due to a lack of processing facilities[81]. This also contributes to high losses. Milk produced by stateland farms is purchased by the state. It is collected at the farm gate by the government during the week and transported to the Hope Farm where it is chilled. This operation is not financially viable, but the DAFMA has a commitment to collect all the milk produced by stateland dairy farmers. To reduce costs, farmers are required to deliver their milk to the Hope Farm on weekends.

Production data available for 1989 and 1990 estimate that a total of 69,000 kgs. and 81,917 kgs. respectively were produced by stateland farms and government stations (**TABLE VII.3**). Distribution of the output comprises a large proportion (about 35%) fed to animals, followed by sales to the hospital and to other consumers. The remainder was distributed to various schools, the Kendal School kitchen, and a high proportion (almost 10%) was lost through spoilage.

TABLE VII.3
MILK PRODUCTION AND DISTRIBUTION BY STATELAND FARMS AND GOVERNMENT STATIONS, 1989-91 (KG.)

PRODUCTION:	1989	1990	1991
STATELAND FARMS:			
HOPE	31,145.3	9,908.7	*
GOLDSBOROUGH	5,222.8	4,054.1	*
GOVERNMENT STATIONS:			
HOPE	20,499.5	2,959.1	*
KENDAL	12,133.5	4,994.7	10,151.9
TOTAL	69,001.1	1,916.6	*
DISTRIBUTION/ UTILIZATION:			
SALES TO PUBLIC	14,577.0	17,368.8	1,851.3
SALES TO HOSPITAL	19,544.7	20,783.1	*
FED TO ANIMALS	24,403.3	29,328.9	5,390.9
SENT TO SCHOOLS	250.8	858.6	*
TO KENDAL KITCHEN	2,145.3	4,283.4	1,958.0
SPOILAGE/LOSS	6,654.6	9,293.8	984.0
TOTAL	67,583.7	81,916.6	*

* - NOT AVAILABLE
SOURCE: DAFMA.

In general, milk is sold at a subsidized price in Trinidad and Tobago. The government's controlled price to consumers for fresh milk is TT$1.42/liter while farmers are paid

---

[81] Output from the other state farm at Kendal is sold also in fresh form, since the pasteurization and storage facilities at Hope Farm has not been operational for several years.

TT$2.16/liter. Small quantities of fresh cows' milk also and goats' milk are sold by private farmers at the farm gate at TT$6.00 per 26 oz. bottle, and TT$5.00 per 26 oz. bottle respectively[82].

Sheep and Goats: Sheep and goats are sold as live animals mainly to traffickers from Trinidad for slaughtering there. A few are sold to butchers locally or to households for use on special occasions. The island does not have a tannery and skins from the animals are not utilized. Animals are usually appraised visually and sold "on the hoof" at the farm gate, and the prices are based on their size and condition. In most cases, the price is in favor of the buyer because the market for fresh mutton is limited[83].

Locally produced animals are sold at TT$8.80/kg liveweight compared to TT$16.50 for imported ones. One large farmer slaughters sheep, then chills and freezes the carcasses before making different cuts. These cuts are packaged and sold on-farm at TT$31.00/kg. for lamb chops and TT$18.00/kg. for other parts. On the retail market, local mutton is sold at TT$22.00/kg., while selected cuts of imported mutton are sold at TT$27.00 to TT$30.00/kg.

Recently, CARDI started recording the number of sheep and goats shipped to Trinidad. From December 1992 to August 1993, 892 sheep and 54 goats were shipped to that island. The purchases were made by four main traffickers from Trinidad who supplied the roti shops in the San Juan area with fresh meat. However, due to the tight economic situation in Trinidad and transportation problems between the two islands, these traffickers have visited Tobago less frequently in recent months, with the result that there is a surplus of marketable sheep.

The government stations supply most of the market needs for breeding stock. These are sold at subsidized prices of TT$3.97/kg. and culls at TT$3.30/kg.

Pigs: There are limited marketing outlets for pigs and pig products. The government's livestock stations are the main sources for breeding stock and other pigs. The stations sell animals at subsidized prices - TT$3.30/kg. for breeding stock, TT$60.00 for each weaner and TT$2.64/kg. for culls.

Traditionally, the main purchaser of pigs was the MD which provided a secured market to farmers. The animals were collected at the farm gate and farmers were paid a guaranteed price of TT$7.25/kg. liveweight, regardless of animal quality. Pigs were then slaughtered at the Scarborough abattoir, and the carcasses placed in cold storage until a sufficient volume was accumulated for transport to a processor in Trinidad. However, the Division has stopped

---

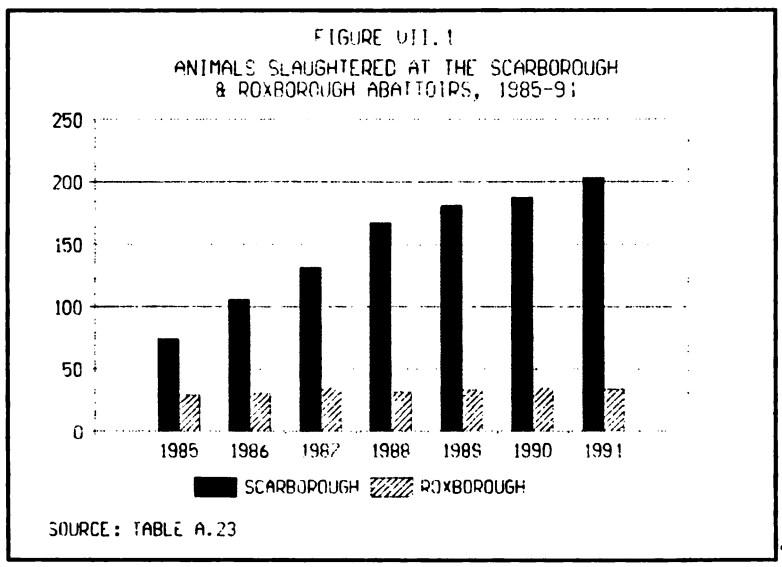
82 Data on production costs are not available.

83 The mission interviewed one butcher who indicated that there are difficulties in disposing of carcasses the same day at the Scarborough market. He has limited slaughtering to one sheep per month for sale in this market, but had to discontinue the practice because of poor sales.

purchasing pigs. The closure of this market, together with other factors such as high cost and unreliable supply of concentrate feeds have severely affected pig production.

A small number of pigs are purchased by butchers on an individual basis and slaughtered at abattoirs in Scarborough and Roxborough. Some animals are also slaughtered on farms for sale in neighboring areas at a market price of TT$15.40/kg.

Besides a few private pig slaughtering activities, the Scarborough and Roxborough abattoirs are the main centers where these animals are slaughtered. Information for the 1985-91 period shows that the number slaughtered at the Scarborough facility increased significantly, compared to that at Roxborough abattoir (**FIGURE VII.1**).



There is one processing plant in Scarborough with a capacity for 2,000 kg. of pork per day. Animals were previously purchased from farmers for processing, but this has stopped due to the poor quality of pork supplied. Presently, the plant makes limited purchases of pigs from one farmer at TT$12.00/kg. of dressed weight. The processed products from this plant are marketed locally and in Trinidad, and there are plans to expand output for export to other Caribbean islands.

Poultry: Most of the market requirements for chicken and eggs are met by imports from Trinidad. Tobago has two commercial poultry operations - a small broiler farmer with a flock size of about 600 birds and a layer producer having a flock of about 7,500 birds. The broiler farm markets chicken at a wholesale price of TT$10.45/kg. and a retail price of TT$11.00/kg.,

the same as those charged by supermarkets[84]. The layer farm markets its eggs to four hotels and most supermarkets in the island and these are retailed at TT$5.50 to TT$6.00 per dozen.

Rabbit: Production and marketing of rabbit meat is in an infant stage and producers are considering various strategies to develop the market for this product. The meat is eaten mainly on festive occasions, and it is being promoted by the TRBA as a high quality meat substitute for chicken. A small amount is sold occasionally by some members of the Association to a few hotels in Tobago. The current price ranges between TT$17.60 and TT$26.40/kg. depending on the supply situation and time of the year. However, the TRBA has indicated that this price is not competitive with that of chicken, and its strategy is to reduce it to between TT$15.40 and TT$17.60/kg. through improved production practices[85]. The market for this meat is growing rapidly, and the Association hopes to expand output to meet the demand, as well as to replace a portion of the chicken market in Tobago.

Breeding stock is supplied by both the TRBA and the government. Members of the TRBA sell breeding stock (at TT$60.00 per animal) among themselves, while the DAFMA sells animals at a subsidized price of TT$10.00 at the Hope livestock station.

7.4 Marketing Constraints

The inadequacy of the market is one of the major constraints to the development of the agricultural sector in Tobago. A review of the marketing system indicates that there are several problems which must be addressed in the context of a long term development plan. These problems are related to: (i) the island's unique position as part of a unitary nation state of Trinidad and Tobago; (ii) lack of a comprehensive strategy for the agricultural sector; (iii) high involvement of the state; (iv) reliability of supplies; (v) insufficient resources and support activities; and (vi) sociological factors that affect production.

(a) Absence of an agricultural strategy: In general, because marketing needs to be addressed in a comprehensive manner, its success requires a logical and consistent policy framework to guide its development. This framework should be a part of an overall strategy for agricultural development. In the case of Tobago, the THA lacks such a strategy for agriculture. Due to the absence of this strategy, farmers and marketing agents have limited guidance on development priorities and potential areas for investment and improvement.

---

[84] This producer indicated there are marketing problems if he expands his operations. In addition, he was previously engaged in layer production but closed this operation due to his inability to compete with imported eggs.

[85] Preliminary studies by the TRBA indicate that production costs average about TT$10.75/kg. for dressed rabbit meat.

The above situation is partly explained by Tobago's position within the nation state of Trinidad and Tobago, in which it depends on Trinidad for national policy formulation and planning. It is often assumed that Tobago benefits from this exercise. Unfortunately, the specific development needs of Tobago are addressed in a limited manner at the national level. Furthermore, the THA does not have the resources (both human and otherwise) to undertake such initiatives.

(b) Impact of Trinidad's agriculture: Being a part of a two-island nation state, Tobago's agriculture is invariably affected by sectoral and overall development in the larger and more developed island of Trinidad. The advantages of large-scale production, sourcing inputs at lower prices, application of more improved technology, and access to better support services make the Trinidad farmer more competitive than his Tobago counterpart.

(c) High state involvement in agricultural marketing: As indicated before, the state has traditionally been the major entity in agricultural marketing in Tobago. Its participation has increased over the years, mainly because strong private marketing operations have not developed in response to the needs of farmers. However, state involvement in marketing has placed much emphasis on merchandising and little attention to the development of other areas such as market information system, and grading and standards. Furthermore, the MD is an inefficient marketing agency that suffers the same problems as public marketing institutions in most developing countries. The problems include a lack of business discipline, poor marketing strategies, price distortions, poor transport and distribution system, lack of information and insufficient skills. Together, these factors contribute to the MD being both a financial burden on the state, as well as a hindrance to agricultural development.

(d) Inadequate entrepreneurial involvement: The size of the private sector that is business-oriented and involved in agricultural marketing in Tobago is relatively small. This fact is attributed to the decline in agriculture and the small marketable surpluses generated from production. Also, with Trinidad being the focus for development, Tobago has not been successful in developing an entrepreneurial group to market agricultural products.

Besides the MD, market operators are limited to vendors, traffickers, few supermarkets and a small number of retail shops. For the most part, the farmer undertakes the functions of moving products from the farm gate to the final consumer. These operations are inefficient and together with other constraints, they contribute to unpredictable supplies, and wide fluctuations in product price and quality. Although some vendors have specialized in retailing in a limited way, their operations remain highly inefficient due to the low level of investment and organization of this group.

The absence of organized private sector marketing, combined with weak public sector participation in this activity, means that critical marketing functions are not undertaken. Functions such as transportation, handling, packaging, grading and sorting are almost non-existent in Tobago. Moreover, the main distributors of food products such as supermarkets,

mini-marts and rural "shops" sell little or no fresh agricultural commodities, the perception being that this is the domain of market vendors. In the area of agricultural processing, this is limited to very small-scale operations in fish, pork and a few indigenous products.

(e) Unreliability of supplies: The volume of the marketable surplus of agricultural output is small, due to almost 95% of farmers being part-time operators; the major share of their production goes to home consumption. Output is often sporadic and unreliable, and it is influenced very little by the market situation. Furthermore, the persistent failure of the state to support market development has dampened any enthusiasm by farmers to expand production much beyond their home needs.

(f) Limited support activities: The marketing suffers from several deficiencies due to inadequate support activities. First, there is a lack of an information system to monitor product movement, market shares of various producers and distributors, wholesale and retail prices, demand characteristics and marketing costs. Second, processing activities to absorb surpluses are limited. Third, packaging and product presentation needs to be enhanced to promote quality attributes. Fourth, infrastructural facilities for transporting, storing and distributing products between the islands are inadequate.

Furthermore, the institutional framework to support the marketing process is weak due to a lack of resources. In the case of the Marketing Division, the skilled human resource base is inadequate and the DAFMA's capability in marketing is very limited. There is no evidence of specialized skills in post-harvest handling or in other areas of market support. The majority of the employees in the Marketing Division are service support staff who are mainly involved in its day-to-day operations.

(g) Norms that limit production: Generally, Tobago is a rural society that has preserved most of its social values and norms. These include those of neighborliness, caring and sharing, and an attitude of self reliance, as a result of most households placing a higher value on their own agricultural production for home use. This social behavior, together with low production efficiency, have contributed to a limited marketable surplus. Although this scenario appears to contradict the reality that a large volume of fresh agricultural products is imported by Tobago, most are commodities not traditionally grown, or for which Tobago does not have a comparative production advantage.

7.5 Linkages to Tourism

The country's tourism sector is largely underdeveloped and it contributed less than 1% to GDP in 1991. It employs about 4,500 persons and generates approximately US$70.6 million annually. The sector in Tobago is also small, but it is expanding rapidly due to major infrastructural development, such as provision of good roads, construction of a deep-water harbor and upgrading the airport to meet international standards. The island's facilities for visitor accommodation is 1,040 rooms, distributed among 19 hotels, 10 guest houses, several

apartments and bed and breakfast operations. Only two hotels have more than 100 rooms, and the remainder are relatively small, averaging between 20 and 40 rooms. The sector is supported by other services such as motor vehicle rentals (with about 15 operators), restaurants, tour operations, specialized rentals, travel agencies and other retail activities.

Although the U.S. is the main source of tourists to the country, a major proportion of visitors to Tobago are from Europe . The peak period for visitors is from November to April. Most arrivals are by air (via Trinidad), but there has been an increase in cruise ship arrivals during the last three years since completion of the Scarborough Deep Water Harbor Project. The island is also visited by people from Trinidad. Most of these come during the April-September period as weekend visitors mainly, staying in guest-houses or with friends. It is estimated that the number of visitors is growing, averaging in excess of 21,000 per year since 1988. The increased number of visitors from Trinidad is related to the economic decline of the country, and the less costly option of vacationing in Tobago compared to foreign destinations.

The linkages between Tobago's agricultural sector and its relatively small tourism sector are limited. Many factors that affect the development of agricultural marketing also limit strong agriculture-tourism linkages. At the moment, hotels and restaurants afford the best opportunity to establish such linkages, particularly in the supply of specialty foods. Interviews with tourism agents in Tobago indicate the following problems associated with sourcing food from the agricultural sector:

(a) Unreliable supply: Most Tobago hotels source their agricultural products from Trinidad because of uncertainty and low supplies from Tobago farmers. Low production and a weak marketing system contribute to this problem.

(b) High price variability: This is directly related to the supply situation. Moreover, farmers do not perceive the hotels to be a priority market. As a consequence, in times of surpluses, products may be offered to hotels at relatively higher prices than those prevailing in the general market place. With scarce supplies at certain times, prices may even be higher. This is a major constraint to hotels since the prices of their food menus are usually advertised as part of the overall hotel/restaurant product, and the flexibility to accommodate large and frequent food price variations is limited. Even when products are sold to the hotels, the quality is low due to poor marketing, quality control and post harvest handling.

(c) Unwillingness to provide credit: Many producers prefer cash payments when sales are made to food and hotel establishments. This is a constraint for these operations, who usually prefer to have a credit facility with their suppliers. In addition, since the tourism sector is not targeted as a regular market, there is a weak business relationship between farmers and this sector, which precludes a strong basis for any credit arrangement.

(d) Weak institutional coordination: There are several institutions that are both directly and indirectly involved in planning and policy making for the agriculture and tourism sectors. These

include the DAFMA, the Divisions of Planning and Tourism of the THA, TCPD, WASA, the Chamber of Commerce and the Trinidad and Tobago Tourism Association. However, there is no institutional mechanism to coordinate the activities of these institutions, and to facilitate a continuous dialogue and resolve problems between the sectors.

CHAPTER VIII

AGRICULTURAL INSTITUTIONS

The institutional framework that supports the agricultural sector in Tobago comprises three groups of institutions - public, cooperatives and producer groups, and regional and international organizations. There are several public institutions of which the Division of Agriculture, Forestry and Marine Affairs (DAFMA) is the principal one. Other important public institutions supporting agricultural activities are the Marketing Division of the THA and the ADB. These area complemented by the Planning and Works Divisions of the THA, WASA, the Lands and Surveys Division and the TCPD. In addition, there are several non-public institutions that operate in the sector, and these include mainly agricultural cooperatives, farmers organizations/associations, regional and international agencies. An assessment of the main institutions in the sector is provided below.

8.1 Public Institutions

8.1.1 Division of Agriculture, Forestry and Marine Affairs

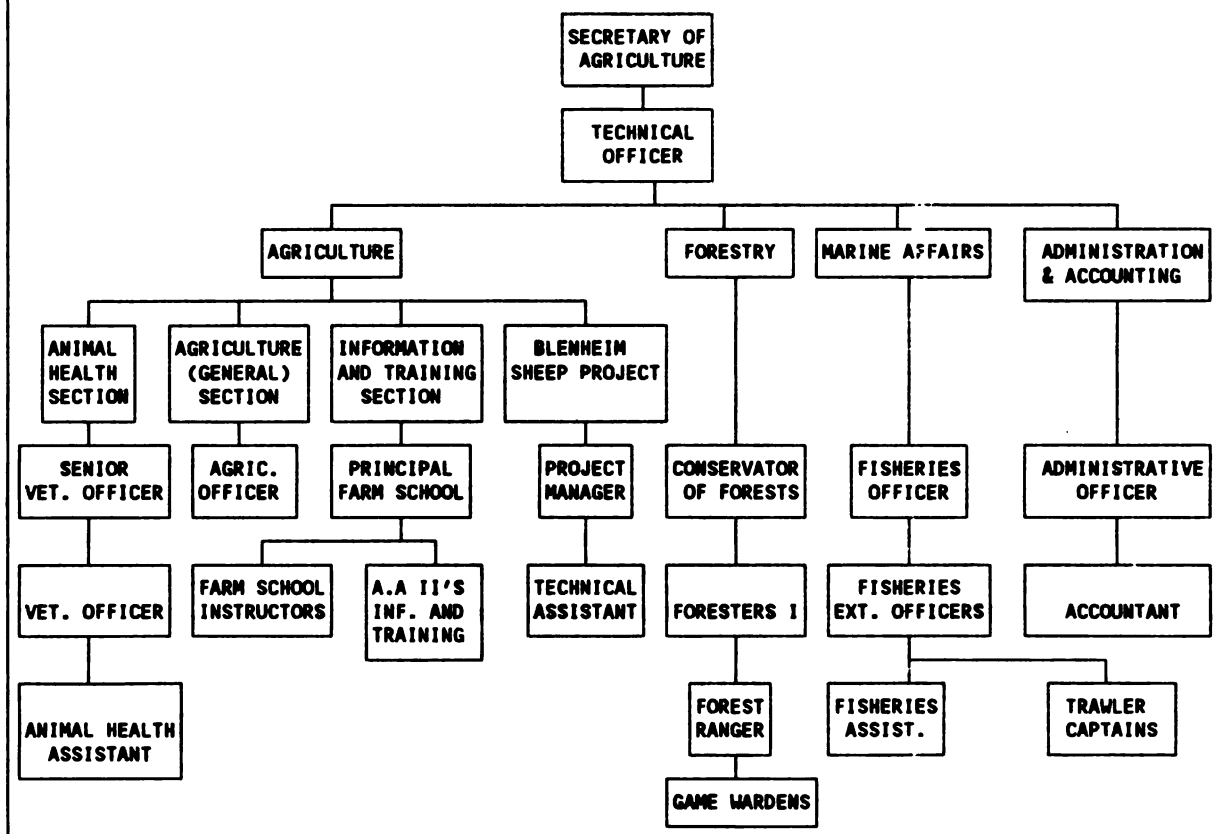
The Division of Agriculture, Forestry and Marine Affairs (DAFMA) is one of 22 state entities that operate under the THA, and is the most important public sector institution supporting agriculture in Tobago. It is primarily responsible for all aspects of planning, policy formulation and implementation, and the development and management of the land, forest and marine resources in Tobago. Specifically, its roles include: (i) proposing policy to guide the sector's development; (ii) performing regulatory functions to ensure sustainability of the sector's development; (iii) transferring management skills and technology through public demonstration farms; (iv) propagating planting materials; (v) providing land preparation services to facilitate production on small farms; and (vi) providing training to the farming community. The Division's head is the Secretary of Agriculture, under whom is the Technical Officer (TO). The TO has responsibility for all administrative and technical matters of the Division.

The DAFMA is structured into four sections - Agriculture, Forestry, Marine Affairs and Administration (**Figure VIII.1**). The Agricultural Section is the largest of these and it consists of four sub-sections - Animal Health, Agriculture (General), Information and Training, and the Blenheim Sheep Project. The animal health section is responsible for regulatory, preventative, curative, diagnostic, advisory and public health of all livestock activities. Moreover, it provides support for improved milk and beef production through artificial insemination services and management.

Within the Agriculture (General) section, there are six units (**FIGURE A.4**): (i) Extension (leeward region); (ii) Extension and Special Projects (windward region); (iii) Livestock; (iv) State Lands Development; (v) Quarantine; and (vi) 4H/YFC. These units implement activities related to crop and livestock extension, livestock and apiary development, distribution of state lands, plant and animal health and provide support to young farmers. To execute its extension program and farm development activities, Tobago has been divided into

eight extension districts (FIGURE A.5), which are grouped into two regions - leeward (Mt. St. George, Runnemede, Plymouth and Bethel) and windward (Charlotteville, Roxborough, Belle garden and Goldsborough).

FIGURE VIII.1
ORGANIZATIONAL CHART OF THE DIVISION OF AGRICULTURE, FORESTRY & MARINE AFFAIRS



A.A - AGRICULTURAL ASSISTANT
SOURCE: DAFMA.

The DAFMA has several operations and support facilities located in various parts of the island for developing agriculture. These include the main propagation station located on the Louis D'Or estate, two demonstration centers at Goldsborough and Louis D'Or, a propagation center in the Botanic Gardens and seven fish centers (FIGURE A.5). Furthermore, it operates two livestock stations at Blenheim and Hope, livestock breeding units at Runnemede, Louis D'Or and Charlotteville, as well as the Kendal Farm School, where both full-time and special training are provided to farmers and other persons interested in agriculture. It also provides a tractor pool service (located at Shaw Park in the Bethel district) for land preparation at a highly subsidized price.

At the Louis D'Or nurseries, all types of planting material are sourced by the farming community. This station produces and sells vegetable seedlings, ornamentals, orchard plants, food crop planting material, and good quality seeds which are obtained from the Chaguaramas Seed Center in Trinidad. The nurseries are supported by small operations at the Kendal Farm School, at the Studley Park Forestry Nursery and at the Botanic Garden Station Nursery in Scarborough.

The Division employs approximately 635 people, of which 19% (121) are monthly-paid staff (TABLE VIII.1). The number of employees is considered very large given the small size and characteristics of Tobago's agricultural sector. However, this is consistent with public sector employment in the country as well as in Tobago, where the state is a large employer of labor and market rigidities constrain adjustments to employment[86].

TABLE VIII.1
STAFF OF DAFMA, JULY 1993

CATEGORIES	NUMBER
MONTHLY PAID:	
PROFESSIONAL	6
SUPERVISORY/ADMINISTRATIVE	2
TECHNICAL/SKILLED	53
CLERICAL	25
MANUAL	35
DAILY PAID:	
SUPERVISORY	32
TECHNICAL/SKILLED	229
CLERICAL	19
MANUAL	234
TOTAL	635

SOURCE: DAFMA.

The Division is financed mainly from appropriations provided by the THA, and it receives small amounts of funding and technical assistance from regional and international agencies for special projects, such as the sheep development project (CARDI and EDF) and fruit crop development (IICA). It also receives a small amount of revenue, less than TT$0.5 million/year from sale of various products and services (TABLE A.24).

The DAFMA's budget consists of annual allocations for recurrent and development activities that are made by the THA. These allocations are based mainly on requests by the Division, and on financial resources (releases) provided by the Ministry of Finance in Trinidad to the THA[87]. Data for the 1983-93 period shows that the amount released for recurrent

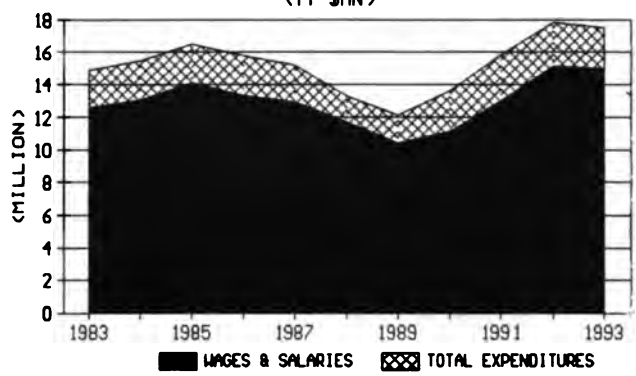
---

[86] From the mid-1993, the DAFMA has been forced to reduce its labor because of severe budgetary problems.

[87] Recurrent spending is for wages, salaries, office supplies, etc., while development expenditures are on project and special activities, etc. Data for the last six years show that the budgetary requests by DAFMA for recurrent and development activities have been higher by at least 20% and 30% respectively, compared to the budgetary releases.

expenditures has remained fairly stable (in nominal terms), averaging about TT$16.9 million per year (TABLE A.25)[88]. Actual expenditures by the Division have also been fairly constant, averaging almost TT$16.5 million/year in the last ten years (TABLE A.26). However, real expenditures have been cyclical in the period, with the level increasing in recent years (FIGURE VIII.2). Of significance also is that salaries and wages have absorbed a high proportion (averaging about 83%) of the total spending of the Division.

FIGURE VIII.2
REAL TOTAL EXPENDITURES ON RECURRENT SERVICES & ON WAGES & SALARIES, 1983-93
(TT $MN)

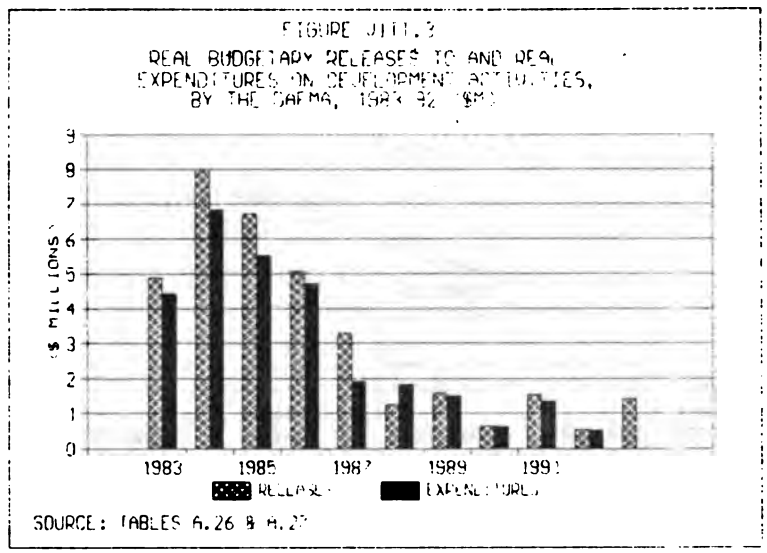


SOURCE: TABLE A.26

With regard to development expenditures, both the amount of real resources released to and expended by the Division peaked in 1984 at about TT$8.0 million, then declined significantly afterwards (FIGURE VIII.3). In recent years spending has been limited to supporting small ruminant development and other on-going activities. This declining support by the state has contributed to low investment in the sector, which reflects in part the low opportunity cost of resource use in agriculture.

The DAFMA suffers from several deficiencies that affect its role in the sector. These include a lack of policy formulation, ineffective planning, and weak control and monitoring. These deficiencies are largely attributable to problems associated with the institutional structure itself and relationships between various units, lack of technical and financial resources and the general low level of importance attached to agriculture in Tobago. There are no clearly defined policies for the medium and long-term development of the sector and very little planning is done. The information base to support planning, programming and policy decisions is almost non-existent, and the technical and financial resources to discharge the institution's responsibilities are very limited. These problems, combined with the current state of the agricultural sector and

[88] Except for the 1987-90 period, when there was a decline below this level due to austerity measures and weak economic conditions.



its potential for development within a wider macro framework, require an urgent reassessment of the future direction for the sector and the public policy requirements to support it.

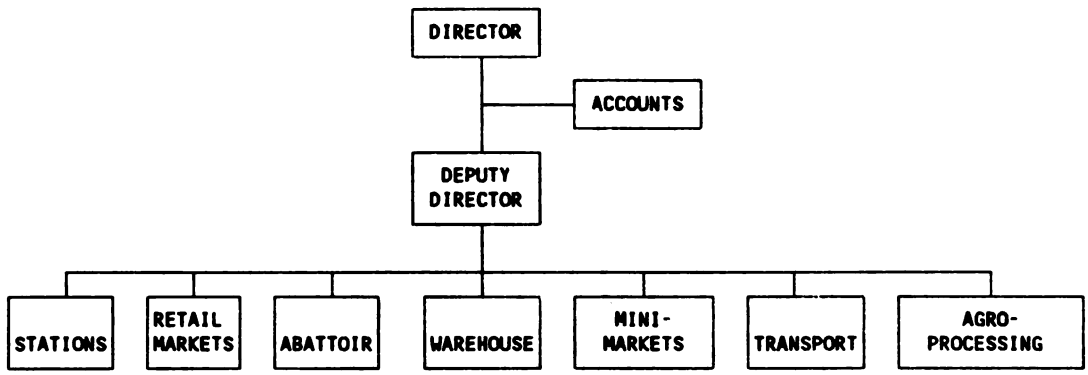
8.1.2 Marketing Division

The Marketing Division (MD) evolved in 1984 from the Tobago branch of the old Central Marketing Agency (CMA) of Trinidad and Tobago. Under the House of Assembly Act of 1980, the THA assumed the responsibility for "public" agricultural marketing in Tobago and it established the MD for this. The basic mandate of the Division is to provide a guaranteed market for agricultural commodities produced in Tobago. Its responsibilities also include providing inputs to farmers at the lowest possible prices, so as to reduce the production cost and supply low-cost food to consumers.

The MD's structure comprises a Director who is responsible for overall management and administration, and eight sections (**FIGURE VIII.4**). It is staffed with 114 employees (September 1993) that include a Depot Supervisor who has day-to-day operations of the Division's stations and mini-markets, a Warehouse Supervisor, an Accountant, six clerical staff members and other support staff.

The MD has been involved in purchasing farmers' products, packaging and storage, distribution, transportation, market intelligence and selling farm products and inputs. Until recently, it fulfilled its role as a purchaser and seller of farm products through the operation of three distribution stations where buying and selling took place - the main station at Shaw Park, Scarborough (currently closed) and Louis D'Or. Besides merchandizing agricultural commodities produced in Tobago, the Division retails other food products such as meat (chicken, beef and goat), macaroni, rice, and a few inputs, particularly animal feed and a limited number of chemicals.

FIGURE VIII.4
ORGANIZATIONAL CHART OF THE MARKETING DIVISION



SOURCE: MARKETING DIVISION

The Division also has responsibility for managing all public markets where private vending is done. This includes two retail markets and four mini-markets which were established in recent years (at Charlotteville, Speyside, Goldsborough and Plymouth) for farmers and vendors. These facilities are located in convenient areas in the island, are generally well maintained, and are financed by user charges and by financial support from the THA. Furthermore, the Division operates two abattoirs in Scarborough and Roxborough where livestock is purchased, slaughtered and sold to one processor in Tobago and two in Trinidad[89]. Recently, a small wholesaling facility was established at the Scarborough public market to be managed by the MD.

In addition to direct marketing and facilitating farmers and vendors, the MD is involved in the processing of fish, pigeon peas, plantain chips and a few fruits. These operations were initiated through small pilot projects, with the objective of stimulating agricultural production and agro-processing, and providing training and employment to the local community and producers. The MD started a small fish processing project at Turtle Beach in 1987, in which it purchased fish from fishermen for smoking and the output was sold in its outlets and supermarkets. This activity produces a good product for both Tobago and Trinidad and it has so far been profitable. The market for smoked fish is very large, especially in Trinidad, but production is very small, averaging 600 kgs. per week (although the project's target is to produce 3,000 kgs. per week).

In 1989, the Division started a plantain chips project at Louis D'Or. It purchased plantains from farmers to make plantain chips and distributed them through its outlets and private supermarkets. Equipment for shelling and freezing peas was installed at Louis D'Or also, with the objective to train farmers and other residents in the use of this technology and to

---

[89] One abattoir is equipped with modern slaughter, chill-room and rendering facilities for both large and small livestock.

increase production of this commodity. Recently, the MD has started processing mangoes, pumpkin, pepper and papaya at Louis D'Or and it is exploring the possibility of processing potatoes into flour.

The Division's involvement in the above activities were based on those commodities which it considered can be produced easily on a commercial basis in Tobago. The initial objective was for the MD to initiate and develop these "infant" agro-processing activities, provide training and withdraw later when they are taken over by the private sector/farmers. However, for various reasons, the projects have remained small and they have not achieved their intended objectives. As a result, the Division continues to be actively involved in them because it feels that its support is still needed to make them economically viable for private sector participation. With the exception of the plantain chips project, feasibility studies were not done prior to the MD's involvement in these projects. Furthermore, marketing the products has not been successful because they were targeted mainly to the Tobago market, which is limited.

The MD suffers from several weaknesses that are typical of state marketing agencies. First, its operations are largely monopolistic and inefficient, and it is highly subsidized by the THA. Second, given its mandate to buy farmers' output, it plays the role of an intermediary of last resort. This provides it with little flexibility to operate in response to supply and demand situations. Third, it is dependent on subventions from the THA for its operating budget. Due to the severe financial constraints of the Assembly, it has been difficult for the Division to guarantee purchases from farmers. Whenever it is able to do this, payment to its suppliers are usually late.

Fourth, the Division's mechanism for product pricing is inadequate. It fixes prices for farmers based on those observed in Trinidad by NAMDEVCO. This method of price determination is not appropriate for Tobago, because production costs are lower in Trinidad[90]. Furthermore, price differentials do not exist for variation in product quality. Fifth, it operates within the civil service's legal and industrial relations framework, which constrains it from performing a dynamic marketing function. Sixth, the MD has a limited impact on agricultural marketing because of a lack of technical and skilled human resources. Skills in such areas as market information, production forecasting, supply management, demand analysis, management of grading systems, market promotion and development are absent in the Division.

Due to the above deficiencies, the MD has incurred heavy financial losses over the years, which have been.covered by appropriations from the THA. It is also financially constrained by its inability to access the revenue it generates from its operations. For example, although the income it obtains from market and abattoir operations is placed in a separate trading account, it is available to the THA rather than to the Division.

---

[90] Many farmers who sell to the MD have identified this as a major disincentive.

The Division is currently reviewing its organizational structure and operations with a view to rationalizing its activities and improving its efficiency[91]. The proposed structure is larger and more diversified. It includes an assistant manager with additional units responsible for public relations and promotions, information, research, project development and management (**FIGURE A.6**). Moreover, it proposes to concentrate its purchasing and distribution operations in a limited number of commodities based on the following criteria: (i) the potential to export products in both fresh and processed form (e.g., fruits such as mangoes and papaya); (ii) the potential to develop commercially viable activities such as agro-processing; (iii) the perishability and shelf life of products; (iv) the availability or ease to have distribution arrangements with vendors, hotels, etc.; and (v) the need to provide incentives to produce new crops such as cantaloupes, beets, pineapples, and others.

Based on the above criteria, the MD proposes to purchase and distribute a number of priority products which would be grouped in two categories - Category A and Category B. Category A products would have a higher priority and it includes plantain, pumpkin, pigeon peas, beet, melons, sorrel, cabbage, sweet peppers, tomatoes and bodi beans. Category B products would be those having a lower priority and these include papaya, hot peppers, sweet potato, corn, mangoes, pineapples, avocado, lettuce and ginger[92]. The Division also proposes to continue marketing meat (particularly sheep, goat and pork), and it is considering distribution a few imported food items (carrots, onions and potatoes), with the objective to supply these at lower cost to consumers than currently provided by the private sector.

The new proposal also includes a change in the pricing system. The price for farmers would be based on production costs plus a margin. In this regard, the Division hopes to work closely with the DAFMA to generate farm budgets on the priority products to be purchased from farmers. It proposes also to improve its payment arrangements - immediate payment would be made to farmers for purchases of less than TT$100, and payment in excess of this amount would be made within seven days.

As part of the proposal to improve the marketing system, the MD plans to establish a wholesale market in which it would improve linkages between farmers and vendors. It is constructing a new building for this, and auctions would be organized regularly to eliminate surplus agricultural products. It is also strengthening its relationship with NAMDEVCO, which is providing assistance to develop a market information system for Tobago.

8.1.3 Agricultural Development Bank

The Agricultural Development Bank (ADB) of Trinidad and Tobago was established in 1968 to support agricultural development through the provision of low interest loans to the

---

[91] This proposal will soon be submitted to the THA for review and approval.

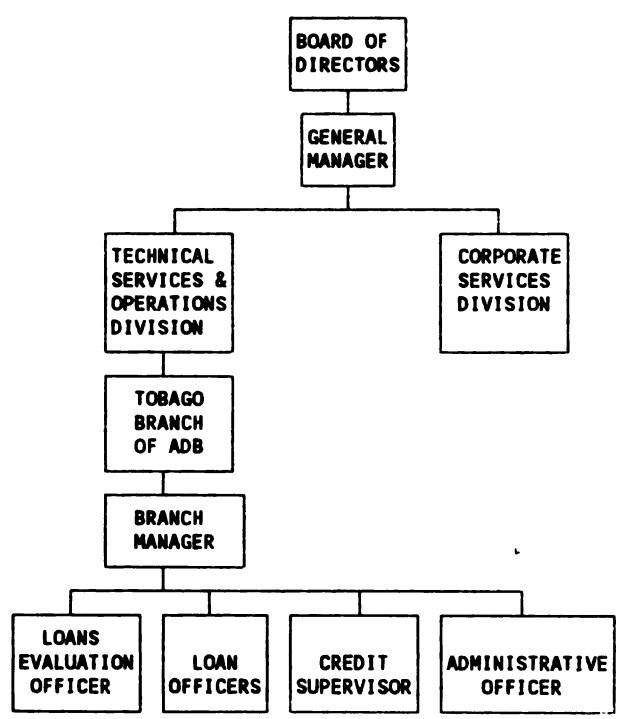
[92] Category B products may enter into category A depending on their profitability and the priority for development by the THA.

sector. It is a public sector institution with responsibilities to finance agricultural development activities (crops, livestock, fishing, forestry and agro-industry) in the twin-island. The government originally financed the Bank, but this support greatly declined during the 1972-74 period, and again since 1983, due to the high default rate on loans and the institution's poor performance. As a result, the ADB curtailed some of its lending activities and has relied heavily on external lending agencies for funds.

The ADB is headquartered in Trinidad and has six branches, of which the Tobago branch is one. The Bank gets most of its funds from the Caribbean Development Bank (CDB) and the Inter-American Development Bank (IDB). When using either of these funds to lend to borrowers, it has to comply with the terms and conditions specified by the agreements with these institutions. In 1992, 5% of the total loans approved by the Bank was done by the Tobago branch.

Although the Tobago branch of the Bank was established in the early 1980s, the bank has been financing agriculture in Tobago since the beginning of the 1970s. This branch falls under the Technical Services and Operations Division of the Bank in Trinidad. It is managed by a branch manager whose responsibilities include supervision of the branch's four units (**FIGURE VIII.5**).

FIGURE VIII.5
ORGANIZATIONAL CHART OF TOBAGO'S BRANCH OF THE AGRICULTURAL DEVELOPMENT BANK



SOURCE: ADB, TOBAGO.

As indicated in Chapter IV, the Bank has allocated a large proportion of its lending to the fishing, small ruminant and agro-processing sub-sectors. It has also financed processing of dried fruit and horticulture development. In the livestock sub-sector, funding has been channelled mainly to projects related to ruminant production (sheep and goats) and for pig and pig feed purchases. However, these projects have not been successful, primarily because the small market size has limited most farmers to have small livestock operations (preference for small stock) only. Larger estates borrow from commercial banks mainly because they have other business transactions with these institutions.

Presently, the Bank has 306 active loans in Tobago. The process of approving a loan is determined by its size. Prior to January 1993, loans up to TT$50,000 were approved by the branch manager but the limit is now TT$20,000. Above this amount and up to TT$250,000, approval of the general manager in Trinidad is required; amounts over TT$250,000 require the Board's approval. In recent years, most loans have been small. This is indicated by a larger number of loans being approved by the branch manager (**TABLE VIII.2**). Recent procedures of the ADB require that branches approve loans within 5 working days of receipt, the General Manager within 10 working days and the Board in 15 working days. If these procedures are observed, they are likely to result in a more timely delivery of credit to the sector.

TABLE VIII.2
LOANS APPROVED FOR TOBAGO BY APPROVAL AUTHORITY, 1989-92 (TT$ '000)

	1989		1990		1991		1992	
AUTHORITY	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT	NO.	AMOUNT
BRANCH MANAGER	30	11.6	120	1,615.6	138	1,680.4	120	1,474.3
GENERAL MANAGER	64	2,026.3	13	1,171.8	3	179.9	8	783,4
BOARD	3	1,459.5	6	2,728.6	2	116.1	2	750.0
TOTAL	97	3,597.4	139	5,516.0	143	1,976.4	130	3,007.8

SOURCE: ADB, TOBAGO.

The main policies of the Bank that affect operators in the sector and their ability to access credit are those related to security and loan costs. The ADB requires the value of the security provided to be at least equal to the loan amount. Fixed assets, cash and insurance policies are acceptable forms of security. Leases are acceptable in some cases, but the lease must be valid for at least one year beyond the repayment period.

Various fees are imposed on borrowers to cover the Bank's costs to process loans. For each loan, an appraisal fee of TT$250 is required, which comprises a processing fee of TT$150 and an application fee of TT$100. There is also a service charge of 1% for loans less than TT$50,000 which increases to 1.5% for loans above this amount. Fees are also required for

various types of searches and closing charges. For judgement and land title searches, the fees are TT$80 and TT$300 respectively. The fee for closing charges such as stamp duties, swearing, etc., ranges from TT$50 to TT$100.

The Bank charges interest rates of 12% per year generally, and 11% to agricultural credit societies. These rates are competitive with the rates of between 16% to 19% charged by the commercial banks in Tobago. The Bank still has some old outstanding loans with interest rates of 6.5% to 10%.

With regard to working capital, the ADB's policy is to limit the amount for this, to between 20 and 25% of total lending. The institution's emphasis is to allocate as much capital as possible for funding development activities in the sector, expanding its loan portfolio and minimizing its operating costs.

The overall financial position of the institution has been poor. There were operating losses over the years, but since 1989 these have been reduced. Arrears on sub-loans have grown each year from 35.4% of portfolio outstanding in 1988 to 45.6% in 1991. In the case of Tobago, the branch's viability has been affected by the general problems of agriculture there. These problems have in large part contributed to the high overall default rate of the Bank, which currently averages about 45%, and its performing portfolio averages approximately 28%. The default rate is about 75% on crop loans, 55% on livestock loans, 50% on fishing loans and approximately 30% on agro-processing loans[93]. The ADB has responded to the situation by curtailing its operating expenses through the elimination of the post of deputy branch manager, and a reduction of the number of technical personnel from five to four.

The ADB offers supervised credit and has established a working relationship with extension staff of the DAFMA and CARDI in Tobago. All the institutions agree that this relationship could be improved and some initiatives are being taken in this direction. In particular, the Bank would like to work more closely with the DAFMA to strengthen its extension services and its timely disbursements of loans, such as that practiced by commercial banks.

8.2 Cooperatives and Producer Groups

Cooperatives have existed in Tobago for a long time, but their performance has fluctuated due to changing economic conditions. Most cooperatives have their origin in agricultural credit societies which borrowed from the ADB in earlier years to loan to their members. However, repayment to the Bank was very poor due to the low level of commitment to farming, production and marketing problems.

---

[93] It has been observed that the default on fishing loans occur more frequently with smaller operators who mainly fish just off-shore.

The Division of Cooperatives of the THA has the responsibility to assist the formation and registration of cooperatives, provide training, support feasibility studies and to assist in procuring financing. It also audits these organizations and attends their Board meetings. According to the Division, there are several registered agricultural cooperatives but most have become either non-existent or inactive over the years, due to poor organization, mismanagement, lack of interest, limited working capital, the part-time nature of farming and low returns from agriculture[94]. Of those which are active, the more important are discussed below.

8.2.1 Pembroke Cocoa Fermentary Cooperative

The Pembroke Cocoa Fermentary Cooperative (PCFC) became a registered organization in 1932. Its membership comprises 142 cocoa farmers located primarily in the windward area. The cooperative is governed by a seven-member Board of Directors while its day-to-day operations are managed by a full-time paid Secretary-Manager[95].

In the 1960s some lands were distributed to farmers from the Richmond estate, which the government had acquired, while the estate's building was given to the cooperative for use as an office and for drying cocoa beans. The principal activity of the cooperative is to purchase wet cocoa beans from farmers, dry these and sell them to the Cocoa Planters Association (CPA), a producer organization located in Trinidad. Beans are delivered to the cooperative's fermentary during the crop year (October to September). No beans are purchased by the PCFC unless farmers provide proof (by submission of documents such as land tax receipts, land titles, etc.) of ownership of the product. The cooperative also buys beans from the government's farm stations[96].

The cooperative makes payment immediately to farmers upon delivery of cocoa beans. For the 1992-93 crop year, it purchased 109 bags of beans from farmers at TT$1.32/kg., and it received TT$6.40/kg. for dried beans sold to the CPA. Although the CPA has a differentiated price structure for producers based on bean quality, the cooperative is not subject to this pricing system because it supplies a high-grade bean. Small quantities of lower-quality beans are sold to the local community, the current price being TT$3.30/kg.

Since 1987, bean purchases by the cooperative have increased significantly, an indication that output has been on the rise in Tobago (**FIGURE VIII.6**). Two main factors could possibly explain the improvement in production. First, there has been an increase in the trend of both

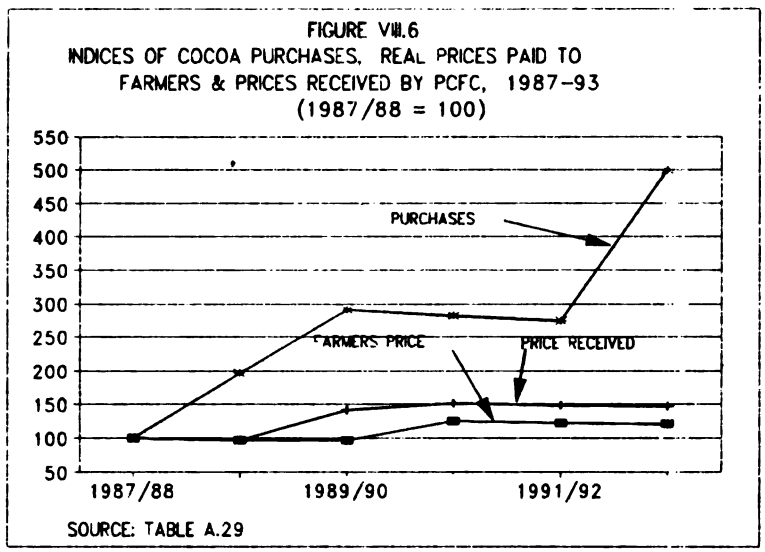
---

[94] Some agricultural cooperatives that existed previously include those located in Blenheim, Speyside, Charlotteville, Belle Garden, Castara, Parlatuvier, Campbelton and Louis D'Or.

[95] The Cooperative also employs four persons during the crop year for drying the beans.

[96] The government is the largest supplier of beans to the fermentary. They are produced at the Louis D'Or station, Roxborough Estate and a small amount by the Kendal farm School.

the real prices paid by the PCFC to farmers for wet beans and the prices it has received from the CPA. Second, cocoa production is economically more attractive compared to other crops, because of a guaranteed market price and low production costs[97]. The amount sold by the



cooperative to Trinidad has also increased during the period, from less than 2,500 kgs. in 1987/88 to almost 7,200 kgs. in 1992/93.

Until 1990, a subsidy (via a support price mechanism) was paid by the government of Trinidad and Tobago to the CPA for cocoa. The corresponding portion was then paid to the cooperative at the end of crop year and redistributed to farmers. In addition, the cooperative gives a bonus to farmers at the end of the crop year based on the profits made. Since 1988, no subsidy has been paid to the cooperative by the CPA and the total bonus it paid to farmers varied between TT$5,000 and TT$15,000. The PCFC also provides small loans to its members. Repayment is made either when the beans are delivered to the fermentary or at the end of the crop year.

As indicated above, this cooperative is one of the few active ones in the country. Although its activities have been profitable so far, the fermentary's operations have been reduced considerably, due to lower cocoa production in recent years. Production has been affected by several factors, one of the most important being bird pests. According to an IICA study, cocoa is the fruit most attacked by birds, with an estimated 80% of farmers losing more than 50% of their cocoa output to these pests[98].

---

97 Cost are mainly related to harvesting, because almost all the cocoa trees in Tobago are old and very little maintenance is done.

98 Brigitte Berthol Isthom, 1992.

8.2.2 Tobago Wood Industry Cooperative

The Tobago Wood Industry Cooperative (TWIC) was formed in 1976 with 31 members. The cooperative currently has about 300 members and it is managed by a nine-member Board of Directors. The membership fee (entrance fee) is TT$2.00 and the cost per share is TT$5.00. Full membership to the cooperative requires a minimum purchase of 40 shares[99].

The cooperative is located at Argyle and it operates the Cameron Estate (45.3 ha.)[100]. The estate has adequate water, including a spring and two waterfalls, one of which is approximately 14 meters, and the other in excess of 30 meters. The Cooperative's members financed 10% of the estate's cost, but it borrowed in excess of the remaining amount required from the ADB (at 13.5% per annum interest rate), with the objective that some development activities be undertaken. Initially, the cooperative intended to be involved in logging operations (because of timber availability on the estate) and set up a sawmill. Some logging was done in the early years and the revenue generated from timber sales was used to repay part of the loan from the ADB. However, the Cooperative was not managed properly during this period and the logging activities gradually declined.

As a result of inactivity, increasing debt, lack of proper management and praedial larceny of the cooperative's timber resources, the TWIC was in receivership in 1991 and the ADB had proposed selling the estate to recover its loan[101]. The cooperative was reactivated however, and a proposal was submitted to the ADB that included increased timber production, cultivation of both short- and long-term crops and rehabilitation of the estate. This proposal was not implemented, and the TWIC was forced to sell 12.2 ha. to repay TT$225,000 of its outstanding debt to the ADB.

The cooperative formulated another proposal later for development of the estate. An agriculture-tourism project was planned with the objective of cultivating crops, developing facilities (including the two waterfalls located on the site), and creating a nature reserve to attract tourists. Some activities were initiated by the members, including erection of a building, cleaning the estate, delineation of trails and some promotional activities to attract tourists. However, this plan was not successful, and the cooperative continued to experience severe financial constraints.

---

[99] To relinquish membership of the Cooperative, six months prior notice is required and the share capital is reimbursed.

[100] The estate was purchased for TT$2,470/ha. About 25% of the estate is flat land, the remainder being hilly. Its original size was 57.5 ha. but the Cooperative sold 12.2 ha. in 1992 to repay part of its debt.

[101] In October 1991 the estimated membership was 231 and the debt to the ADB was TT$470,000. At the time, the Cooperative also owed TT$25,000 to the Workers Bank and TT$35,000 to the National Commercial Bank.

Another proposal was submitted recently to the ADB to sell an additional 12.2 ha. to fully repay the Bank. The TWIC has planned to continue developing short- and long-term crops and the tourism projects on the remaining 33.2 hectares. The plan includes employment of a farm manager and full-time farming with cultivation of cash crops and fruits for sale to the hotels and for processing.

The cooperative's activities have been unsuccessful due to several factors. Its members are employed full-time elsewhere, meetings are held irregularly, and together with low returns to agriculture, there is a lack of motivation to develop the estate. In addition, there is little timber remaining on the estate for logging. The main option for the cooperative is to utilize the existing resources to develop feasible economic activities. One course of action is for it to lease the estate for agricultural production or develop scenic amenities for tourism. However, this would require additional capital and capable, full-time management.

8.2.3 Tobago Fishing Cooperative

The Tobago Fishing Cooperative (TFC), located at Charlotteville is the only active fishing cooperative in Tobago. It began in 1959 as a producer association with 35 members and a share capital of TT$300, before becoming a registered cooperative in 1972. Its current membership is 130, of which approximately 30 are active including five who are women. It is administered by a nine-member board that meets monthly. The membership or entrance fee is TT$1.00 and full membership requires ownership of at least 5 shares (at TT$5.00/share)[102]. The share capital of the cooperative is currently valued at TT$29,000.

The TFC has a non-paid manager and it employs one full-time and two part-time persons. Its activities include purchasing fish for resale, fish processing (particularly salting), operating a gas station and selling ice and some fishing accessories. The scale of its fish operations is small, which is similar to that of most other fishing operations in Tobago. Its purchases of fish are limited by its storage facilities and the time period of the year. In the peak season, the market requirements are limited to about 2,730 kgs. per week, while in the off-peak season, it is between 1,350 and 1,800 kgs./week.

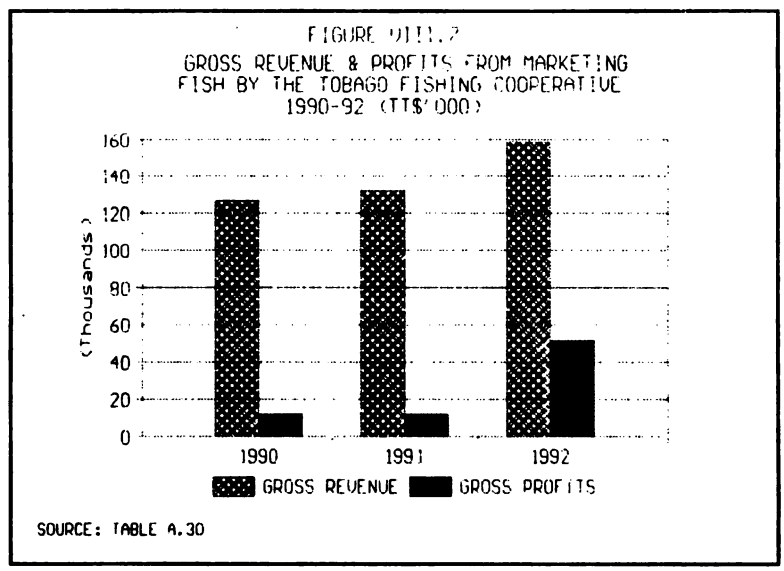
The cooperative purchases fish from both members and non-members and makes immediate payment to them. Previously, fish was sold to various markets in the country, but these were subsequently lost; now, public institutions such as the hospital are its largest clients. No exports of fish are done because the quality is considered low.

Compared to other cooperatives and farmer organizations, the TFC has been managed relatively well. Data for the last few years indicates that its gross revenue and profit have been increasing (**FIGURE VIII.7**). It is one of the few cooperative organizations in the agricultural sector that makes a profit. In 1992, on gross revenue of TT$158,299, it made a profit of

---

[102] No member can own more that one-fifth of the total shares.

TT$51,800 and paid a dividend of 8% per share, a return that it has been paying for several years.



The main constraints of the cooperative are: (i) lack of cooperation among its members; (ii) lack of training of fishermen; (iii) inadequate processing facilities; and (iv) inadequate response by fishermen despite good market opportunities and profitability.

8.2.4 Tobago Agricultural Society

The Tobago Agricultural Society (TAS) is the oldest non-public agricultural organization in Trinidad and Tobago. It was formed in 1833 and membership was open to all farmers in Tobago. Presently, the TAS is a branch of the Trinidad and Tobago Agricultural Society (TTAS), a statutory body. The current membership of the TAS is 130 members, of which 35 are considered active.

For more than 12 years, the society received an annual subvention of TT$3,000 from the TTAS[103]. This subvention was part of a larger one given annually by the government of Trinidad and Tobago to the TTAS. In addition, the TAS gets an income twice per year from the Percy Neal Legacy[104]. In 1992, this amounted to TT$23,000 and for 1993, the amount so far received was TT$10,000.

---

[103] Since 1990, no money has been paid to the TAS and there has been no indication that it is officially discontinued.

[104] This is a trust fund that was established many years ago.

The society works closely with the DAFMA and makes representations in various fora on behalf of its members. It also assists the members to secure loans from the ADB. In the last decade, its role in these areas has declined, because many farmers become members for short periods of time only so as to receive certain specific benefits. Previously, the society organized the backyard kitchen garden and school garden competition, but this also has been discontinued.

The TAS's objective is to be an umbrella organization representing all agricultural organizations and farm groups in Tobago. However, this has not been realized and only a limited number of individual farmers have remained as members of the society. It would like to reactivate itself more fully by resuscitating the garden competition and increasing its membership, and it plans to form a credit society to loan money to its members.

The society's dormancy is largely a result of the problems affecting agriculture in Tobago. Most of its members are part-time farmers engaged in small mixed cropping activities, and they are faced with constraints such as lack of markets, finance, and inadequate tenure and land security. The decline of farming as a full time occupation and its low economic viability have weakened the society over time, and it appears that its survival has largely depended on the assured income it gets from the Percy Neal Legacy.

8.2.5 Other Groups

There are several farmers groups/farm associations throughout Tobago. These are groups of farmers that have been organized for certain specific activities such as marketing of farm products, purchasing inputs, and accessing certain services such as training and extension. Included in these groups are producers of specific products and other interest groups, such as the Tobago Horticulture Society (for promoting horticultural activities), the Tobago Rabbit Breeders Association (promoting rabbit farming) and the Tobago Bee Keepers Association (for beekeeping and honey production).

At the district level, several farmers groups have been organized. Support to these are provided by the DAFMA and occasionally by CARDI. These groups are involved sometimes in specific activities that are organized by the DAFMA (e.g., World Food Day). However, like cooperatives, the farmers' groups are weak primarily because most members are small part-time farmers and agriculture is a declining economic activity.

8.3 Regional/International Organizations

The principal regional and international institutions supporting agriculture in Tobago are the CARDI and the Inter-American Institute for Cooperation on Agriculture (IICA). The sector has also received support at various times from other agencies such as the European Development Fund (EDF), Canadian International Development Agency (CIDA)[105], UWI and the Food and Agricultural Organization (FAO).

---

[106] Funding from CIDA to the agricultural sector has been indirect.

Since 1981, CARDI's activities have focused on supporting the crop and animal production programs of the DAFMA (APPENDIX C). IICA's involvement in Tobago has been very recent. So far, it has supported fruit crop activities, conducted a survey of bird pests affecting farmers and executed this agricultural study.

CHAPTER IX

DEVELOPMENT POTENTIAL AND RECOMMENDATIONS

9.1 Agricultural Strategy

Tobago's agriculture has declined steadily in the last three decades, and the THA needs to arrest this trend by exploiting the island's agricultural potential. In this regard, the THA needs to formulate a comprehensive agricultural strategy for the island that involves a multi-institutional and multi-sectoral approach (particularly with linkages to tourism, natural resources and marketing) approach. **The strategy should be the Tobago component of the country's national agricultural strategy, and it should be developed with the MALMR.** As such, Tobago's agricultural sector should be viewed as contributing to the aims and objectives of the national strategy.

Two critical issues are of relevance in the formulation of the strategy. First, Tobago is part of the nation state of Trinidad and Tobago, and as such it is subject to national policies and regulations. Therefore, the THA has limited flexibility to pursue a separate development strategy for the island. While recognizing the existing constitutional framework of Trinidad and Tobago, those areas where Tobago's full developmental potential could be compromised by current arrangements should be highlighted. Secondly, Tobago has limited potential in several areas for development and the THA has resource constraints (both human and otherwise) to support a development strategy. As a result, the THA's strategy should seek to maximize the benefits the island can derive from being part of the nation-state.

The agricultural strategy should incorporate certain important considerations. These include: (i) the limited and fragile natural resource base of Tobago; (ii) the prospects for the island's agriculture to compete in both the national and regional markets, given few commercial farming operations, limited scale of production, low level of technology and high cost of production; and (iii) current and future developments in the tourism and other sectors which are likely to intensify competition for resources between agriculture and these sectors.

Given the characteristics and constraints of Tobago's agriculture, there is potential for agricultural development, but in limited areas. The THA needs to identify these areas and design its strategy to emphasize that agricultural production be market-led, focusing on a selected number areas in which Tobago has a competitive advantage and on which a sustainable agriculture could be developed. The development strategy should link production with marketing. It should target a select group of farmers in the specific areas, commercialize their production activities and improve the production efficiency. It should aim to reduce the production risks and uncertainty, by strengthening and organizing the production and marketing system, improved planning, institutional coordination and networking, providing a suitable institutional framework, developing an informed and innovative marketing strategy, and providing the necessary physical infrastructure and support services (training, extension, credit, etc.).

The THA has a limited capability to both develop and execute an appropriate strategy for Tobago. Therefore, it is suggested that the Assembly pursue arrangements with the MALMR to access resources from other key national and international agencies to support this initiative. Efforts should be made to forge a close working alliance with these agencies and to ensure that the unique interests of Tobago are given adequate consideration in the strategy's formulation. The institutions that could be accessed for such support include the Ministry of Planning and Development, the Ministry of Finance, NAMDEVCO, ADB, NGOs, Institute of Marine Affairs, CARDI, UWI, FAO, and IICA.

A phased approach is needed for the design and execution of the strategy. A high-priority area is the information base, which needs to be improved considerably to support policy decisions and planning. The design of an agricultural strategy would require additional information. Therefore, the DAFMA, Division of Planning and the MALMR should design a program to collect data at both the micro (farm level) and macro levels to support policy decisions and planning. Further evaluation is also needed of the economic feasibility and competitiveness of the products that have potential for development. In this regard, improving the collection of farm-level data and market information are critical areas to be addressed.

9.2 Marketing

Marketing is perhaps the most limiting factor affecting agricultural production in Tobago. The small market size, the lack of market information and the inability of producers to compete with cheaper food from Trinidad and from abroad are among the most important marketing constraints. Farmers are faced with high risks, and this largely explains why production has remained at or is near the subsistent level, with most farmers preferring to produce small amounts of many crops to spread their risks, rather than concentrating on a few activities.

Designing and implementing an innovative marketing strategy that includes improving the marketing system, expanding the current market size and identifying new markets should be included in the long-term development strategy for the agricultural sector. In general, Tobago does not require a sophisticated marketing system, given its small population and the volume of marketable agricultural products. Nevertheless, the marketing strategy should seek to improve production, to reduce farmers risks and uncertainty, post-harvest losses and marketing costs, and facilitate a higher volume output. In this regard, the strategy should include a re-evaluation of the roles of both the Marketing Division and non-public marketing channels and strengthen farmers groups to expand their role in marketing.

The role of the Marketing Division should be changed, from its primary function as a merchandiser to that which supports market development[106]. While the MD's role should remain as being developmental, its focus should be to provide support services that facilitate the marketing process rather than being involved in buying and selling operations. Unfortunately,

---

[106] This intervention may be timely because the THA is currently considering a proposal to restructure the MD's operations.

the Division's proposal to continue its involvement in such operations is not the best long-term strategy for improving the market. It is likely that such activities will continue to be costly to the THA.

In the short run, the Division should continue merchandising products, but this activity should be phased out over time, and increased emphasis be given to developing and facilitating non-public marketing channels - the private sector, NGOs and farmer groups. In the medium to long term, it should focus on coordination and promotion of Tobago's food products in targeted markets at the national level, facilitate both the production system and marketing agents to respond to the dynamics of changing market situations, and develop a market information system. These roles are consistent with those indicated in various studies of public marketing agencies that function under similar developmental circumstances[107]. Some specific developmental activities for the MD are suggested below.

The MD's new proposal of operations include a change in its pricing system. The new pricing system would be based on production costs, plus a margin. This pricing mechanism needs further evaluation. The guaranteed prices to farmers should not only be related to production costs, but also to the price at which competitive products enter Tobago from Trinidad.

(a) Market Information: The lack of adequate market information is a critical constraint that needs to be addressed immediately. Collecting, analyzing and disseminating adequate, accurate and timely market information should be a critical responsibility of the Division (in collaboration with the DAFMA, MALMR and NAMDEVCO). Information that is seriously lacking which is needed to support both production and marketing includes: production, wholesale and retail prices, consumption, processing activities, profile of key marketing agents and channels, agricultural trade, costs of production and distribution, marketing margins, grades and standards, trading opportunities, competitiveness in the various markets, and prospects for new product development.

(b) Market Development: A strong, sustained market development program should be designed to exploit market niches and promote Tobago's agricultural products as having the attributes of being fresh, natural and wholesome. The tourism sector is small and it is rapidly growing, but this market for food needs to be developed. Therefore, a comprehensive strategy to develop the tourism sector for Trinidad and Tobago is needed, and it should include a marketing strategy that links agriculture with tourism.

Activities to promote the attributes of Tobago's agricultural products could include market promotions at national food festivals, delivery of samples to target clients such as hotels (local, national and regional), restaurants, health centers, and specialized nutrition centers, organization of food preparation competitions which emphasize the use of Tobago products, and linking food production with the tourism sector.

---

[107] FAO, 1987.

(c) Grades and Standards: Together with the DAFMA, MALMR and various marketing agents, the Division should develop and manage a system of grades and standards for both primary commodities and agro-processed products. This is essential both for promoting the island's products as having distinct attributes, as well as guiding producers about the specific needs and requirements of the market place.

With regard to agro-processing, Tobago already produces some indigenous items such as sesame balls, coconut cakes and other candies, but these activities and others need to be coordinated, standardized and expanded to create additional opportunities for primary production.

(d) Market Infrastructure: The risks for the private sector or other non-government involvement in marketing are high, especially in areas that require much investment capital. The Division already has a responsibility to manage some cold storage and slaughter facilities. Alternative arrangements should be pursued for leasing these either to farmers groups, cooperatives or to the private sector. Where possible, efforts should be made to develop the services, facilities and resources already installed at the national level, such as facilities for shipping products at the air and sea ports.

The infrastructure constraint could be further addressed by providing incentives and by facilitating private and other non-government participants to invest in specific agricultural marketing activities. Some areas for additional investment include transportation and handling facilities within Tobago and between Trinidad and Tobago, packaging, primary processing, wholesaling and retailing, input supply and new product development. The strategy should be a coordinated initiative, involving the MD, the Small Business Development Corporation (SBDC), the ADB and other relevant agencies. Furthermore, the strategy should take into consideration the risks which non-government agents may not be willing to undertake.

(e) Improving supply: Together with the DAFMA, the MD should pursue efforts to improve supply reliability, by targeting a selected group of farmers to produce specific commodities for certain market niches (including that of the tourism sector). The criteria to select the farmers should include, among others, those that have a high potential to commercialize their operations and those with good farming skills. Having identified the target group, the DAFMA and MD should provide a package of support services to improve production and marketing and to keep farmers committed to their respective groups.

(f) Training: Education and training should be important elements of a market development strategy. Activities in this area should be implemented to sensitize participants of those factors relevant to market development. These could take place at two levels. First, farmers and other producers should be sensitized of their responsibilities in the system. Second, special training should be provided in areas such as post-harvest techniques, retailing, wholesaling, product presentation, management and credit for agents operating in the market channel. This responsibility should be a service provided by the Marketing Division.

Institutional strengthening of the MD is also critical if it is to have an effective role in marketing. The focus should be on expanding its skills to support and facilitate other participants in the marketing system. The MD should gradually shift its operations from actual involvement in marketing to providing services such as information, identification of market opportunities, facilitating investment and training. In this regard, the support of other institutions such as the MALMR, NAMDEVCO, the Management Development Centre (MDC), the SBDC, CARIRI, UWI, the Trinidad and Tobago Bureau of Standards (TTBS) and CARDI should be requested.

9.3 Production Potential

The MALMR's draft national agricultural policy framework suggested that the strategy for Tobago's agricultural production should be one of developing "high-priced, small-scale production systems with an agro-processing bias..... and specialized production systems especially for quality livestock..."[108]. This is an appropriate strategy, since it gives Tobago a good opportunity to have a viable sustainable agricultural sector, through development of high-value products on small-scale production systems. Given that Tobago's role would be supportive of the national agricultural strategy, its agricultural production would be contributing to improving national food self-sufficiency, rather than trying to achieve this policy goal for the island.

One approach is for Tobago to increase its output efficiency of products that are organically grown. There are several positive factors on both the demand and supply side that support the viability of this approach. Tobago has easy access to a relatively large market for agricultural products in Trinidad. There is a large client group in both islands comprising middle- to high-income consumers and tourists that could be targeted for selling "wholesome" and organically produced food. The tourism sector in particular is expanding rapidly and it is a potential market niche for exotic and quality food. However, the island can exploit this market potential only if it is competitive, and if it could supply products that are clearly differentiated from those produced in Trinidad and by other countries. The THA can promote a farm production system that is sufficiently different from that of Trinidad - a small-scale system that de-emphasizes the use of pesticides and other agro-chemicals in food production. At present, farmers in Trinidad rely on the excessive use of chemicals, especially in vegetable production. This is a source of concern to consumers in both Trinidad and Tobago, where health consciousness is growing. In this regard, Tobago has a distinct advantage in producing agricultural commodities with minimal use of inorganic chemicals.

The above approach is supported by the current socio-cultural orientation of Tobago farmers, who are inclined towards a more natural mode of production. To a large extent, Tobago has mixed farm systems which are already close to having organic farming practices but the concept needs to be promoted and public awareness be increased. The use of chemicals, for instance, has been traditionally very low, and it is likely that populations of natural predators

---

[108] Green Paper Report, MALMR, June 1993.

are high[109]. Support to organic farming could be sourced from both CARDI and IIBC which are involved in biological control research and dissemination in the Caribbean.

Closely related to the above is that, despite the decline of agriculture in Tobago, the island is still highly regarded by Trinidad's consumers as a source of natural, high-quality agricultural products. This perception could be further exploited with a strong marketing strategy that promotes the quality of the island's agricultural products, and supported by an organized production system. Therefore, the strategy to be pursued should focus on the farmers producing a differentiated product that possess "organic" and "naturalness" characteristics.

The promotion of organic farming provides other benefits to the island. Given the fragility of the environmental system and expanding pressures from built development, this type of farming is ideal for maintaining an agro-ecological balance that is much needed in Tobago. It is evident that the environment cannot sustain high-input agriculture based on extensive use of inorganic inputs. The organic farming system promotes a more environmentally secure and sustainable system in which: (i) mixed and integrated systems exist whereby animal and crop enterprises are linked, and by-products from both are used within the system; (ii) resources such as soil, water and energy are conserved; and (iii) chemical fertilizers are replaced by pen manure and compost, and biological control, natural pesticides or resistant varieties are used as pest and disease control measures.

However, for some farmers vegetable production without chemical use would be difficult, and the use of integrated pest management may be easier where cultural, chemical and biological methods of control are coordinated. In order to maintain a "organic" product credibility, a quality control mechanism would be needed. Farmers who are prepared to grow such crops should be trained, registered and regularly monitored to ensure that certain practices are followed.

It is not recommended that all commodities be organically produced. Organically grown products usually have higher production costs, and Tobago is already a high-cost producer of food products. Farm efficiency needs to be improved considerably and commercial farming expanded if the island is to compete with imported foods and its agricultural sector is to survive. Therefore, the DAFMA should evaluate the market potential for organically grown products and their economic feasibility of production under both commercial and part-time farming operations.

9.3.1 Crops

Although Tobago has potential to produce a variety of crops, the THA's policy should be to focus its efforts on developing a selected number of products. The agro-ecological constraints in the island, limited resources of the THA to support agriculture and the inability for the island's agriculture to compete with cheaper food products from both Trinidad and

---

[109] For instance, the Brachon specie, the natural predator of the pigeon pea borers, has been observed feeding on the borers in Tobago.

abroad are critical considerations that warrant this strategy. Some criteria for selecting the priority crops are: (i) their competitiveness in the market based on economic and technical considerations; (ii) a high market demand for the product; (iii) the crops should be indigenous to the lowland tropics and should perform well under local conditions; (iv) initial investment costs and technological needs are not high; (v) perishability should be low and they should store and transport easily; (vi) the potential for processing is high, so as to maximize value added and minimize storage and marketing problems; and (vii) the crops should allow easy substitution of capital for labor, in order to minimize labor requirements but at the same time, to improve the efficiency of part-time farming.

Based on the above criteria, the following crops should be considered as priority ones for development:

Fruits: Within the fruit group, citrus, mango and pineapple are the most important because of the existing knowledge to cultivate them, their popular use as fresh fruit, their potential for processing, and the market demand. In addition to meeting local requirements, the demand for fresh local fruits and fruit juices in the tourism sector is expanding rapidly. This situation is likely to continue, as the sector plans to increase its capacity from about 1,000 rooms to 5,000 rooms in the next few years. Furthermore, fruits can be processed in several ways and Tobago labels could be placed on products such as juices, jams, jellies, dried fruit and other preserves for promotion as natural and exotic items. A variety of other local fruits such as paw paw and avocado could also be promoted for sale in the fresh fruit market.

Pigeon Peas: The Tobago pea already has an excellent reputation because of its quality, and its market prospects as both a fresh and processed product are good. Its productivity should be increased and processing should be expanded, to benefit from value added, as well as to compete with lower priced fresh peas that are available in Trinidad. Shelled peas have been purchased by a local entrepreneur for several years and they are frozen and sold both locally and in Trinidad. In addition, the THA has acquired a huller recently and its full utilization would require a constant supply of peas. Output of fresh peas should be expanded gradually based on the incremental demands of consumers and processors.

Root Crops: Tobago's reputation in previous years as the "food basket" of the country was based on the quality of its root crops. This perception could be retained if more attention is given to production, post harvest handling, storage and presentation, with an emphasis on the product being chemical-free. However, their costs of production need to be examined further, as these crops compete with cheaper imports from the Eastern Caribbean. Within this group, dasheen, sweet potato and cassava should be priorities, as these could be produced well in the present low-input part-time farming systems in Tobago.

Besides production for the fresh food market, there is potential for processing. In particular, cassava has a good potential; farine processing could be further developed and cassava chips could be used as a component in local animal feeds. Simple methods of storage of cassava for human consumption have been studied at CIAT and these should be evaluated for

Tobago. However, consideration should be given to some form of quarantine restrictions and improving farmers' awareness, in order to protect cassava from diseases from Trinidad. Cassava Bacterial Blight (CBB) has not been identified yet in Tobago, and superelongation has only recently been observed. With regard to sweet potato, research should include evaluation of non-sweet varieties, with the objective of at least partially substituting this product for imported Irish potatoes.

Vegetables: In general, Tobago does not appear to have any comparative advantage in vegetable production, but this needs to be further evaluated. Of the various vegetables in this group, tomatoes, cabbage, cucumber, pumpkin, and sweet peppers are the more important produced in Tobago. However, their production costs are higher than those of Trinidad. More evaluations are required to determine the potential for these commodities to compete successfully with those that are imported. In addition, the economics of organically grown vegetables for niche markets in the country should also be assessed.

Strategies: The strategies to develop the priority crops should be implemented on a phased basis. Those to be implemented in the short term include: (i) evaluating the economics of production; (ii) providing more technical training and improved farm management techniques to farmers on priority crops; and (iii) upgrading the skills of the extension staff in both technical areas and in extension methods, including social/gender aspects.

Assuming that the priority crops have good economic feasibility, the following are suggested for implementation in the medium and long term: (i) encourage commercial farming operations through acquiring unproductive estates and accelerating the land distribution program, and encourage contract/leased arrangements on estates to minimize squatting; (ii) provide adequate healthy planting material for the priority crops; (iii) more technical support should be available in the areas of plant protection, irrigation/engineering and marketing, with at least one person trained in plant protection to coordinate plant protection queries and liaise with MALMR; (iv) encourage installation of irrigation systems on larger plots and rehabilitate the abandoned estate systems where possible; (v) promote farmer associations/groups and networking activities to reduce production and marketing costs; (vi) promote small-scale agro-processing activities in the private sector, especially for fruits; (vii) provide easy access to basic laboratory facilities; (viii) improve local marketing facilities and expand market opportunities through promotion and advertising; (ix) reduce the level of subsidies as production becomes commercialized, and support the development of small private enterprises such as contracting services, nurseries, etc.; (x) actively pursue efforts to obtain external assistance to support future development activities and training initiatives; and (xi) use a multi-institutional approach to resolve legal problems related to praedial larceny, stray animals and wildlife pest control.

There is a lack of skills and information to support crop production. A training program should be designed to upgrade the skills of extension officers, and improve the training of farmers and information flow to them on a continuous basis. Institutions in the country such as UWI, CARDI/CTA, IICA and FAO should be accessed.

Group training of farmers is essential and should continue to be an important part for promoting priority crops. The most important site for this activity is on the farm where hands-on training can be given and farmers' techniques observed. Interaction between extension officers and farmers could be improved by learning from farmers' experiences and encouraging farmer-to-farmer information transfer. The DAFMA's library should also be upgraded to facilitate the information flow to the agricultural community.

The problems of pests and diseases need to be addressed in a comprehensive, joint manner between the DAFMA and MALMR. The study of bird pests on fruits by IICA should be extended to determine the economic impact of birds and other pests on production of vegetables, food and root crops. In the interest of conservation and for the promotion of tourism, it is suggested that a pest census be done before wildlife is indiscriminately reduced because of the damage to some crops in certain areas. In addition, given the fruit fly-free and other pest and disease-free status of Tobago, the DAFMA and the MALMR should execute the appropriate actions to maintain this situation. In this regard, monitoring of pests and diseases and quarantine facilities should be strengthened in both islands to regulate movement of agricultural products and more evaluations need to be done to determine the disease status of Tobago.

There are several institutions in Trinidad whose skills and other assistance could be accessed by the THA for specific areas of support to develop the priority crops (**Table IX.1**). An effective mechanism would be required (with the MALMR) to coordinate the assistance of these agencies. In the short term, the most effective and economical approach would be adequate coordination of the support from these institutions.

TABLE IX.1
POSSIBLE AREAS AND SOURCES OF INSTITUTIONAL SUPPORT FOR CROP PRODUCTION

AREA	COOPERATING INSTITUTIONS
RESEARCH AND DEVELOPMENT	MALMR, CARDI, UWI & CARIRI
SOURCING HIGH QUALITY PLANTING MATERIAL	MALMR, CARDI & IICA
PLANT PROTECTION	MALMR & IICA
MARKETING	NAMDEVCO, LOCAL AND TRINIDAD-BASED ENTREPRENEUR
TRAINING	CARDI, CTA, UWI/CEPAT, IICA & MALMR
FINANCIAL SUPPORT	FAO, COMMONWEALTH SECRETARIAT & EEC

Within Tobago, there is scope to improve coordination between the public and private sectors in agriculture, and a suggested strategy to achieve this is through a task force approach. This body should be coordinated by the DAFMA and it should include representatives from the

Marketing Division, the Implementation Unit of the THA, CARDI, ADB, the farmers' groups/associations and the Tobago Hotel Association. It is critical that members of the task force be decision-makers also, so that plans and decisions could be executed easily.

9.3.2 Livestock

In general, there are some positive factors that support further development of the livestock sector in Tobago. Among these are: (i) the existence of a good land resource base for certain livestock activities; (ii) there is an expanding market for livestock products due to a growing population and tourism sector; and (iii) Tobago is free of the major diseases that affect livestock production in many other countries.

Despite the above, further development of this sub-sector should focus on a few areas, because of certain limiting factors. These include: (i) Tobago cannot unilaterally implement policies (such as restricting imports) to protect its livestock sector because it is a part of the state of Trinidad and Tobago; (ii) competition of less costly products from Trinidad and from abroad, which are likely to become cheaper as the country moves towards trade liberalization; (iii) although production cost estimates are not available, they are undoubtedly high for most farmers; (iv) commercial livestock operations are few, and huge subsidies would be required as incentives to increase profitability, convert part-time farmers into full-time ones and attract resources into commercial operations; (v) the costs of support services, infrastructure and market opportunities to bring current production to an efficient level are high; and (vi) the current levels of support to agriculture by the THA cannot be sustained in the foreseeable future, due to the tight financial and economic situation in the country.

Furthermore, although the country imports a considerable amount of meat and dairy products, it has achieved higher self-sufficiency levels over the years for several products - a 100% self-sufficiency in pigs, poultry and eggs, 25% for beef and veal, 20% for mutton and goat meat and 17% in milk production. Tobago's contribution to this achievement is fairly limited, and this will likely to continue due to the island's resource constraints and high production costs.

Ruminants: Of the various livestock activities, small ruminants (particularly sheep and goats) have the best potential for further development because: (i) the terrain is better suited to small rather than large ruminants; (ii) the historical and economic factors make small ruminant production an integral part of the farming system; (iii) they are easier to manage; (iv) they can be successfully reared as a backyard enterprise by many small farmers for meat and for income; (v) they easily utilize local forages, thus minimizing the need for imported feed; and (vi) their by-products (skins and hides) could be utilized for making handicrafts which could be supplied to the tourist sector.

Two other factors are indicative of the island's potential in this area. First, the ADB has channelled a high proportion of its loans for ruminant production. Second, through CARDI, the government has received assistance from the Canadian and European governments to undertake

two major projects. The Canadian funding, through the Canadian International Development Agency (CIDA) and CARDI, is for improving production and marketing of sheep. The European funding, through the European Development Fund (EDF), focuses on productivity improvement of local breeds of sheep and goats and transferring the improved technology to farmers.

In the short and medium term, the DAFMA's strategies should focus on improving production efficiency, by strengthening the current ruminant development programs and addressing certain constraints. The breeding and multiplication program of the Blenheim Sheep Project and the goat breeding program at Hope farm should be continued and expanded to support production, by making breeding stock become more easily available to farmers. This program has the potential to be a major supplier of breeding stock. With construction of a new slatted floor pen at Studley Park, the project now has the capacity to carry 700 ewes. These could generate about 1,200 lambs per year to supply farmers, and for stock replacement for the station itself and for the wider Caribbean region.

Other areas that should be addressed include: (i) import semen and use of artificial insemination to improve the animal stock; (ii) procure improved genetic material for bucks, does, rams and ewes through importation; (iii) promote forage conservation techniques to cater for dry season feeding and utilize more local feed ingredients to reduce production costs; (iv) support the establishment of satellite farms to produce quality breeding stock for both the local and Trinidad market; (v) market development and improvement of the marketing system, grades and standards for live animals and for meat; (vi) distribute idle state lands to potential commercial sheep and goat farmers; (vii) formation of a farmers organization to support production and marketing of sheep and goats; and (viii) expand the training programs for farmers and extension officers in all aspects of ruminant production.

Rabbit: Rabbit farming also has some potential for development. Although this is a relatively new activity, interest in it is rapidly expanding and it has good economic potential to: (i) the meat provides a high quality and low calorie protein; (ii) the high rate of converting feed material into protein; (iii) good proliferation in production together with a high conversion ratio under good management systems, making it an excellent activity where land and feeding materials are scarce; (iv) the animals can be reared easily under an intensive production system; (v) possibilities exist for spin-off activities from the use of the skin; and (vi) the market demand for the meat is expanding and it can be a good substitute for chicken.

However, some caution should be applied in developing rabbit production. The production cost is currently too high for it to be a substitute for chicken. Furthermore, it is likely that the current and future technology for chicken production could continue to make this product more competitive than rabbit meat. Nevertheless, there are a few options that could be pursued. It is suggested that the DAFMA support an increase in production efficiency and facilitate importation of breeding stock. Alternative production systems should be explored to improve production efficiency. In addition, a public relations campaign that includes meat preparation, etc., should be initiated to promote the consumption of rabbit meat.

Pig: Given a reliable feed supply, better management and an improved marketing system, it is possible that pig production could easily expand to achieve a higher self-sufficiency in pork and to provide a surplus for export. The existence of a pork processing plant on the island could facilitate higher production of a more acceptable product. However, development of this sub-sector should be approached cautiously due to the high dependence on imported feed. Research is needed to develop feeds that utilize more locally available ingredients.

Beef: Beef production is constrained by several factors and it is not recommended as a priority activity for development. Although certain constraints such as land availability, a reliable supply of breeding stock and marketing may be easily overcome, the feasibility of commercial beef cattle operations is limited. Expanding beyond the current few large enterprises is not recommended. With regard to small farmers, those with limited land space could possibly use a feedlot system, but the economics of this operation needs to be further assessed. Furthermore, although there is land on various estates and in private properties, the opportunity cost of allocating this to beef cattle appears to be too high.

Dairy: It is not recommended that dairy cattle production be expanded due to constraints related to the topography, the farming system and the market. Wherever dairy farms exist, state support can be provided in the short run to increase their production efficiency, but this should be phased out over time. In contrast, goats have more potential than cattle as dairy animals because: (i) they are more adaptable to the hilly terrain in Tobago; (ii) they are easier to manage; and (iii) there is an existing market for goats' milk.

Poultry: The country is already self-sufficient in broiler and layer production. Furthermore, Tobago's poultry production activities are not competitive with those of Trinidad. Therefore, the potential for expanding such activities in Tobago is very low. It is suggested that limited support be provided to this area.

The support services for livestock production should be strengthened, particularly in the area of ruminant production. These include the animal health section and the artificial insemination unit of the DAFMA. Among others, these units are constrained by: (i) lack of adequate transport; (ii) shortage of drugs; (iii) insufficient staff; (iv) lack of equipment; (v) unreliable supply of fresh semen from Trinidad; (vi) poor semen quality; and (vii) inaccurate heat detection by farmers. These constraints should be addressed, and efforts to access as much technical support and other resources from the MALMR in Trinidad should be pursued.

Other Strategies: Although the state plays a significant role in Tobago's livestock sector, private sector participation could be increased considerably in several areas if the incentives and support system is improved. Areas with potential for private sector participation include: (i) a stronger farmer organization could assume the responsibility for auctioning sheep and goats which is currently done by the state in collaboration with CARDI; (ii) establishment of satellite breeding farms to produce high-quality breeding stock of sheep, goats and rabbits; (iii) production of animal feed utilizing fish offals and other locally available ingredients; (iv) importation of

breeding stock for sale to farmers and to the state; and (v) development of a craft industry utilizing the skins and hides of cattle and small ruminants.

Due to the resource limitations of the THA, stronger institutional linkages and networking relationships should be developed with the MALMR and other agencies (FAO, UWI and NAMDEVCO) based in Trinidad to access information and training of farmers and extension officers. With regard to the MALMR, the THA could strengthen its relationship with the livestock section to share experiences and benefit from that institution's breeding stock program, research, training and information. Given the relative advantages of Tobago in small ruminant production, it is possible that the country's ruminant development program could be located in Tobago in the longer term.

9.3.3 Other Sub-sectors

Tobago's fishing sub-sector has much potential for development and make a larger contribution to the island's economy. The recognition of the 200-mile Exclusive Economic Zone provides the island with an opportunity to exploit a relatively large expanse of marine territory. While this allows the possibility for increased income through production and export of fish products, it also involves higher costs for patrolling and protecting the resources.

In general, the production efficiency of fishing could be expanded through the introduction of improved technology and training of fishermen. Of the various fish species, the flying fish has much potential to be further developed, particularly processing activities. A viable fish processing industry could be developed and the products marketed within the domestic market, the tourism sector and in external markets. Moreover, fish by-products could be used as ingredients for local livestock feeds. However, it is critical that the fish stock be assessed and monitored, in order to protect against overfishing.

Tobago has some potential to expand honey production and export queen bees. Although the island produces a good-quality honey and has been awarded several medals abroad for this product, there is much work to be done to improve production and marketing. Also, there is a need to examine the cost/price factors and quantify the market potential.

9.4 Land Policy

Land is a scarce factor in Tobago, both for agriculture and for other uses, and the competition for this resource is likely to intensify in the future. The THA would have to carefully evaluate the alternative uses of land, taking into account the medium- and long-term development objectives for the island, and the future land needs to meet these objectives. In this regard, the Assembly needs to develop a comprehensive land policy.

The THA should give high priority to implementing a land audit of both public and private lands to determine the availability of this resource for developing agriculture in the future. Presently, the only available public land are the government-owned estates and these

comprise a sizable area. These estates constitute a valuable asset that provides the state with much leverage for guiding agricultural development and efficient land management. It is important that the conditions for private use of state agricultural lands should not permit the long-run alienation of these lands from productive agricultural uses. Accordingly, built development on such lands should be avoided and the condition of lease should allow the land to revert to the state when it is no longer maintained in productive use by the lessee.

The state's land distribution program has not been effective, and this strategy needs to be re-evaluated. Future distribution of state land for agriculture should consider zoning, priority activities to be developed, plot size, leasing arrangements, infrastructure costs, etc. The current list of applicants for statelands is about 250. Given the limited land that is available, strict criteria should be applied for distributing it for agricultural activities. To support more effective use, land distribution should, as far as possible, be made in conjunction with the provision of support services such as infrastructure (access roads and irrigation, perhaps by rehabilitating the old systems on some estates), training, extension support and credit facilities. The strategy should also take into account those areas for which temporary statelands leases have been granted.

In addition to the above, more efficient utilization of land (both public and private) is needed if there is to be a significant expansion in agricultural output. Several options could be pursued to improve efficiency and expand production. Not all the land abandoned since 1982 would be available for cultivation, nor would all be suitable for crop production, but a significant area with much potential does exist for farming. Land utilization by small farmers and large estates could be improved, since most small farmers cultivate only a part of their plots, and most large estates are under-utilized or completely unproductive. Furthermore, the cropping practices suggest that the productivity of currently farmed land could be increased by as much as 50%-100% by more intensive cultivation.

Low productivity and land under-utilization are associated with high risks and other disincentives. Therefore, strategies should be adopted to reduce the production risks and uncertainty of farmers. Some options include addressing the technical, marketing and credit constraints. Many farmers are informed about improved technologies, but these are not adopted if substantial additional financing is required. Risk reduction through improved technology adoption and management, complemented by an improved market and information system could contribute to higher production. For example, farmers are likely to respond positively if certain risks are reduced such as providing market opportunities and improving plant protection services. The technological constraints to crop production would require additional institutional support for more investigation and evaluation of alternatives. In this regard, the assistance of the MALMR and CARDI should be actively sought.

Topography, infrastructure and fertile soils make present production and future development preferable and easier in the southwest, but this area is also being developed for other purposes such as tourism and housing. The alluvial valleys, particularly of the windward coast, are areas where crops are produced and could be further developed since they have

suitable soils and access to water. However, there are many hillside farmers in the north and northeast, producing crops on very steep slopes because this is all that is available to them. The number of hillside farmers attempting to produce on these unsuitable soils is likely to grow, as more suitable land is absorbed by competing activities, and rising unemployment forces more people to eke a living out of whatever land they can find. It is essential that these farmers be guided in soil conservation techniques if crop production is to be sustained in these areas. Furthermore, farmers should be prevented, if possible, from using the steepest slopes if land degradation is to be curtailed.

9.5 Institutional Support

While there are several institutions providing support to Tobago's agriculture, the island's institutional structure is not sufficiently capable to develop the island's agricultural sector. The financial resources and range of technical expertise is limited to support a dynamic commercial agriculture. Given that Tobago's agriculture will be developed within the national context, the institutional support to the island's agriculture requires a comprehensive national approach. It should include strengthening Tobago's institutional relationship with Trinidad. In addition, it should emphasize networking activities among various groups (NGOs, farmers groups, hotels, etc.) within Tobago and between those in Tobago and in Trinidad.

The DAFMA is the principal institution providing public support to the agricultural sector. However, the Division suffers from several deficiencies which need to be addressed if it is to play an effective role. The areas to be addressed include institutional organization, planning, coordination and provision of support services.

In general, Tobago should concentrate on producing a smaller range of agricultural products, and public policy should actively support this strategy. The DAFMA's organizational structure may therefore require modifications to support the THA's efforts for improving the production of these commodities. However, the specific institutional adjustments will require further evaluation.

The role of the THA's Division of Planning (DP) should be expanded to provide additional support to the DAFMA, particularly in the areas of data collection, annual planning, budgeting, monitoring and evaluation. Presently, the DAFMA is not involved in agricultural planning and it depends on support in this area from the DP. With the DP and the MALMR, the DAFMA should develop a system of annual programming, monitoring and evaluation (APME) to support formulation, coordination and monitoring of plans and programs for the sector. This system will program the Division's activities, including annual work programs for each Unit/Section, identify resource needs, their availability and use, and monitoring and evaluating these on an annual basis. Besides broad planning activities, the DAFMA has a permanent in-house capability for information management, program/project evaluation, monitoring and control.

The information base to support agricultural planning needs to be considerably improved. The DAFMA should develop an agricultural data base, with support from the MALMR, the CSO and the THA's Division of Planning. Presently, systematic data collection is not done and the statistical base for decision making is very poor. Much of the existing information is based on speculation. Data on costs for Tobago are virtually non-existent; the little information that exists, is based on estimates rather than on actual field evaluations. More accurate figures are required to assess production efficiency and its constraints.

Developing Tobago's agriculture will require the support of several institutions from both the public and private sectors. The DAFMA has limited capability in institutional coordination, as well as the capability to negotiate and access resources. These areas need to be improved if the sector is to be supported by both national and international institutions.

The DAFMA should re-examine its role in providing the tractor service directly. There are several problems associated with this service that warrant a review of the Division's role in this area. First, the service is not provided efficiently. Second, the rates charged are highly subsidized, and they are not a sufficient incentive in production. Third, the service is not a guarantee that farmers use their land effectively. Fourth, the service has not improved production efficiency. Basically, the service supports largely part-time rather than full-time commercial farming. Fifth, under present economic circumstances and budgetary problems, the DAFMA's support to the service cannot continue indefinitely.

However, a decision to reduce the tractor service or to eliminate it may not adversely affect production. It is utilized by small farmers in particular, but these could continue in operation by increasing the efficiency of low-input production systems. Farmers with larger plots and cultivatable land should not be affected significantly, if they could cultivate crops more efficiently at commercial rates for such services. In Trinidad, the services were discontinued by the government and replaced by private ones without significantly affecting farmer numbers or productivity. In the case of Tobago, since there are only three private contractors, the DAFMA should gradually reduce the service until it is completely eliminated, or it could continue to provide it at more cost effective rates.

Similarly, the DAFMA should review its role in delivering various services to the sector such as providing planting material and other inputs. Almost all its services are highly subsidized and budgetary constraints have already begun to affect their provision. In particular, the operations of facilities and the sale of planting material should be reviewed to: (i) determine the cost of delivery of these services; (ii) determine the extent to which they are sustainable; and (iii) whether other cost effective methods can be pursued.

In the area of plant and animal health, the infrastructure and technical needs to support the control of pests and diseases are costly and this could be a burden on the DAFMA over the long run. It is suggested that cost-effective methods be used to meet the needs of the farming community in pest and disease control. One option is to have an improved mechanism for laboratory testing of samples by the MALMR and the UWI. A second option is to provide

minimal laboratory facilities with trained staff to meet certain basic needs of crop farmers. The DAFMA should seek external funding to establish a small lab, with support from both the THA and the MALMR to maintain it.

9.6 Links to Tourism and Agro-Processing

Tobago's tourism sector is expanding rapidly and this has implications for both agriculture, the island's natural resource base and its environment. The THA should define a clear development policy for the tourism sector that includes identification of the broad goals of tourism development, linkages with agriculture and other sectors and possible implications on the natural resource base and the environment.

Given the importance of tourism to the economy, the strategy for agricultural development should consider the potential impact of production on the environment as well as the potential linkages between tourism and agriculture. On the one hand, a vibrant tourism sector could be the basis for the growth and development of agriculture. On the other hand, agricultural development, if not managed properly, could result in environmental degradation and a lower quality of the tourism product. Unsuitable enterprises in certain areas, inappropriate cultivation methods, indiscriminate use of toxic chemicals for pest and weed control, and effluent from livestock operations could severely impair the quality of the environment. In a sense, the sustainability of agricultural development is clearly a function of sustainable tourism development, which in turn is a function of quality of the land and marine resources on which agricultural activities could have tremendous negative impacts.

The tourism sector is a niche market for quality food products which Tobago is capable of producing, but its linkage with agriculture remains weak. In general, farmers do not recognize the full market potential which this sector has for Tobago's agriculture. However, this potential needs to be assessed, and improved mechanisms should be put in place to link the sector's demands with production and marketing. Besides having an improved production and distribution system, institutional coordination and information sharing are critical components of the strategy. In this regard, there should be: (i) improved liaison/coordination between the hotels' food and beverage managers and farmers on product requirements and prices (at present this is done on a one-on-one basis), with the DAFMA, the Tourism and Marketing Divisions providing institutional support and playing a "broker role" in the process; and (ii) a public relations campaign with the hotel sector, to purchase more local farm products once these are available and promote the foods of Tobago.

With regard to agro-processing, a variety of products of excellent quality are produced for home use and for sale in small quantities. These include seasoning, hot pepper, jams and jellies, juices, nectars, wines, confectionery, dried fruits, dried sorrel and farine. Some are also produced in small commercial quantities such as cherry nectar, hot pepper sauce, seasonings, locally produced wines, coffee and chocolate. Efforts could be directed to improve production efficiency of these activities and expanding their operations. CARIRI and the SBDC could assist in training and financial support in this area.

9.7 Natural Resource Development

The key to the future prosperity of Tobago is largely based on the effective management of its natural resources and environment. In general, the resources of the island offer good potential for economic development through linkages with tourism. The potential areas for development include: (i) leisure/recreational tourism based on coastal resources initially, then expanding into the inland resources (e.g., hiking); (ii) eco-tourism; (iii) agro-eco tourism; (iv) handicraft production; (v) exploitation of therapeutic and pharmaceutical potential of trees and plants in the forest reserve; (vi) food production targeted to the tourism sector as well as meeting domestic demand; and (vii) services related to the above economic activities.

The economic possibilities listed above are largely natural resource-based. They are consistent with both the THA's development strategy for the tourism sector, as well as the proposed physical development plan, which is based on a strategy of dispersed development with concentration zones of highest potential. Exploitation of eco-tourism and agro/eco-tourism, and the potential linkages between tourism and agriculture, tourism and handicraft, tourism and services (food, accommodation, tours, transport, cottage-based products) provide a sound basis for establishing viable economic, social and culturally-based communities.

The strategies for natural resources development in Tobago should reflect the current issues, problems and potentials. In this regard, five broad areas are discussed below.

9.7.1 Policy, Legal and Institutional Framework

Policies and Legislation: The existing proposals (policies, plans and legislation) together provide an effective comprehensive framework for the future resource use and resource management needs of Tobago. Some of these have already been reviewed by the THA, but the Assembly should request the central government to expedite their enactment. These proposals include: (i) for forests and related resources (all draft proposals) - the Forestry Resources Policy (1981), the Forestry Plan (1989), the Plan for National Parks (1980), and the Forest Resource and National Park Conservation Act and Regulations (1993); (ii) for the environment - the proposed Environmental Protection Policy Act and the establishment of a 'National Environmental Authority'; (iii) for land administration - the proposed reforms in administration (e.g., titles and leases), revision of land tenure laws and proposed 'land zoning'; and (iv) for physical development -the Tobago Regional Physical Development Plan prepared by the TCPD.

Three additional measures are proposed for Tobago. These are: (i) development of environmental guidelines and standards; (ii) formulation of a tourism policy and strategy; and (iii) development of guidelines for the use of state lands for agriculture so as to avoid alienation over time.

Because of the importance of environmental quality to sustainable development, urgent action is required to prevent further degradation. Therefore, guidelines and standards need to be established immediately and the necessary enforcement mechanisms operationalized. With

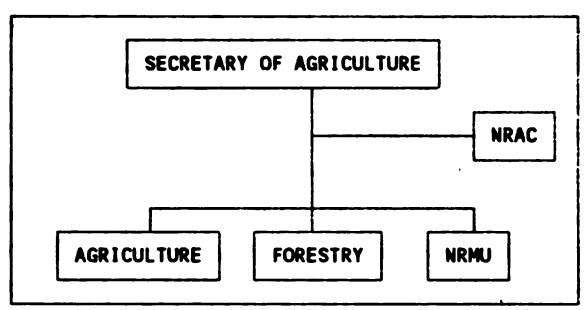
regard to tourism, the general direction for Tobago appears to be one based on the exploitation of eco-tourism and a more dispersed type of development. Such policies and strategies tend to promote conservation and proper resource use, but they need to be better articulated.

Institutional Framework: The DAFMA has responsibilities for natural resources development and management in Tobago. The centralization of this function under one Division is an asset, as it provides an opportunity for effective coordination of various activities. However, given the importance of natural resources to the island's development, effective conservation and management of the resource base is a critical factor for future success. In this regard, the following are proposed to enhance the Division's managerial capacity in this area: (i) establishment of a "Natural Resources Management Unit" (NRMU); and (ii) establishment of a "Natural Resources Advisory Council" (NRAC).

The NRMU should be located within the DAFMA, and it should be staffed with a multi-disciplinary team comprising expertise in various aspects of the natural environment. The role of this unit should be to develop plans, (with external assistance) for the utilization and conservation of natural resources. The NRMU's responsibilities should also include policy formulation, development of guidelines and regulations for natural resource use, monitoring, and it should be empowered to enforce guidelines and regulations. For the most part technical personnel for it could be drawn from various departments of the Division, providing a proportion of their time to NMRU functions.

Basically, the NRAC would be a group with expertise in resource conservation and management that would serve in an advisory capacity to the Secretary for Agriculture. It is proposed that the NRAC comprises representatives of the environmental NGOs, farmers, fishermen, the tourism sector and community, the IMA and UWI. The suggested institutional framework comprising these groups is shown in **FIGURE IX.1** below.

FIGURE IX.1
PROPOSED INSTITUTIONAL FRAMEWORK FOR THE NRAC



9.7.2 Priority Conservation Initiatives

The current trend of rapid resource degradation in the southwest and coastal areas threatens the future potential of one of the most valuable parts of the island. Urgent actions for limiting degradation and for conservation are needed, and the following are proposed:

(i) development of a physical plan including EIA, environmental guidelines and proposed resource enhancement programs for the southwest; (ii) immediate technical examination and design of short-term action, including monitoring to prevent further sewerage and waste discharge in the ocean; (iii) implementation of the proposed sewer system for the southwest; and (iv) zone all lands in the south-west, particularly agricultural lands.

The above proposals are intended to arrest the current problems associated with: (i) waste and sewerage handling/disposal; and (ii) the conversion of agricultural lands to built-development. The physical plan and environmental guidelines are intended to provide a plan for the development of the southwest that promotes enhanced environmental quality.

9.7.3 Resource Conservation in Agriculture and Forestry

Pesticide Control: The strategy proposed for agriculture is one which links the sector to tourism as well as to the domestic market. The specific strategy for gaining market, share particularly in tourism, is to develop agriculture based on minimum chemical and pesticide application, biological control, integrated pest management and organic systems. Research to develop appropriate production systems for farmers based on these concepts are suggested. The success of this strategy relies on the effectiveness of a market promotional program for the type of products being targeted. If successful, this strategy could provide major health and environmental benefits.

Soil Conservation: The intensification of the agricultural effort in Tobago should also be based on good soil management practices in order to avoid soil loss and erosion, given the potential for this problem. Research and the development of guidelines for farmers is proposed in the area of soil conservation.

Forestry: In an effort to enhance the protective cover for soils on the steep slopes outside of the main ridge, it is suggested that the re-afforestation program be accelerated in all areas where the slope exceeds 25^0 on public lands. In the case of privately-owned lands, incentives and guidelines for the establishment of forests and agro-forestry should be provided.

National Parks: The system of national parks for Tobago contains nine proposals on both national parks and other protected areas. A program should be formulated for their implementation and for their effective management and operations. The national parks provide opportunities for recreation, scientific observation and protection of valuable resource stock. Moreover, a system of national parks, if well-managed, could create greater awareness of environmental issues as well as provide positive changes in attitudes and values. The strategy should include user charges to meet the operational costs of these facilities.

9.7.4 Rural Development

The creation of economically viable rural communities is one of the objectives of the Tobago Physical Plan. Development of such communities requires strong economic, social and

cultural foundations. An integrated rural development approach is suggested for the communities, based on activities that are all natural resource/environmental-based. These include agriculture, eco-tourism, agro-eco tourism, handicraft production. tour guide services, other services (e.g., accommodation, food and transport) and cottage industry products.

The sustainability of these economic activities is directly a function of the sustainability of the resource base, and the communities themselves depend on the sustainability of the economic activities. The strong dependence of the community on the natural resource base and the environment, makes it a natural custodian of the resource base, because it is the foundation of a conservation strategy which is likely to be sustained. Therefore, it is proposed that opportunities be created for exploiting the economic potential through: (i) designing programs, management systems, guidelines for the various components of the integrated rural development plan for each community; (ii) providing training in services, crafts, cottage products; (iii) constructing facilities and infrastructure needed for the development of the sectors; (iv) establishing standards and providing on-going technical assistance; and (v) providing market/promotional support for services and products.

A key to the strategy's success is full community participation, including women, the retired and the dispossessed. Although the scope of input and various support required for rural development is beyond the capacity of the DAFMA, it is proposed that the Division play a coordinating role in these activities.

9.7.5 Training

To improve the internal capacity to manage and develop natural resources, it is suggested that an appropriate training program be developed both for personnel comprising the NMRU as well as other technical staff in the DAFMA. High priority should be placed on environmental assessment, environment monitoring, enforcement techniques and legal aspects. Such training is generally available internationally and opportunities exist for funding under technical assistance program.

The other major proposal with respect to training relates to residents and entrepreneurs in the various communities. Training would be required for these groups of people in the proposed economic activities for development, that are to be linked to the natural resource base.

BIBLIOGRAPHY

Allahar, C. T. Review of the Draft Resources and National Parks Conservation Act 1990. Summary of Presentation to the Representatives of the THA and Environmental NGO's, 1992.

Archibald, K.A.E. Prospects for Increasing the Production of Milk and Beef in Tobago in Report of the Conference on Agriculture in Tobago, June 26-29, 1984.

Balintulo, M. Sociocultural Impacts of Tourism in Tobago. Economic Commission for Latin America and the Caribbean, 1991.

Berthold, B. Survey on Birds' Damage to Fruits in Tobago. IICA, Trinidad & Tobago, 1992.

Brathwaite, O. Overview of Livestock Production in Tobago in FAO Report of the Round Table on Small Farmers' Livestock Development in the Caribbean. Port-of-Spain, Trinidad and Tobago. July 24-26, 1991.

Brown, C. B., Hansell, J. R. F., Hill, I.D., Stark, J. and Smith, G. W. Land Capability Survey of Trinidad & Tobago. No.1. Tobago. Caribbean Printers, Trinidad, 1965.

Brown, C. B. et al.,. Land Capability Survey of Trinidad and Tobago. Phase I Reports, 1965.

CARDI. A Census of Sheep, Goats and Cattle in Tobago. 1988.

CARDI. Caribbean Sheep Production and Marketing Project. Tobago Sondeo Report, 1990.

CARDI. Technology Transfer and Applied Research (Project EDF Project #6100-33-94-297). The Programme in Tobago.

CENTRAL STATISTICAL OFFICE. First Caribbean Conference on Ecotourism, Belize, 1991.

CENTRAL STATISTICAL OFFICE. Agricultural Census, CSO, Ministry of Finance & Planning, Trinidad & Tobago, 1982 and 1963.

CENTRAL STATISTICAL OFFICE. Annual Statistical Digest, Trinidad and Tobago, 1988 to 1991.

CENTRAL STATISTICAL OFFICE. Cattle and Buffalo Survey, Trinidad, 1986 .

CENTRAL STATISTICAL OFFICE. Economic Indicators, Office of the Prime Minister, Trinidad & Tobago, 1992.

CENTRAL STATISTICAL OFFICE. Labor Force Report 1991, Trinidad and Tobago.

CENTRAL STATISTICAL OFFICE. Quarterly Agricultural Report, 1977 to 1991, Trinidad, (Various Issues)

CENTRAL STATISTICAL OFFICE. Third Quarterly Survey of Pig Farmers, Vol. 13, No. 174., Nov. 1991

Dahl, C.D. & Hammond, J.W. Market and Price Analysis - The Agricultural Industries, Rose Press, 1982.

DIVISION OF AGRICULTURE, FORESTRY & MARINE AFFAIRS, TOBAGO HOUSE OF ASSEMBLY. Annual Report, Tobago (various issues 1985-92).

DIVISION OF AGRICULTURE, FORESTRY & MARINE AFFAIRS, TOBAGO HOUSE OF ASSEMBLY. Annual Report, Marine Affairs Section, Tobago 1990.

FAO. Agricultural Price Policies in the Near East - Lessons of Experience, Economic and Social Development Paper.

FAO. Commodity and Area Planning - A Review of Planning Methodologies and Guidelines Relating to Agricultural Commodity and Area Development Programmes in Trinidad and Tobago, FAO, Vols. 1 and 2, May 1989.

Fisheries Act, Chapter 67:51, Laws of Trinidad and Tobago

Fisheries Division, Ministry of Agriculture, Land and Marine Resources. Summary of the need for Fisheries Management: Objective for Fisheries Management and Policy Issues, March 1994. Trinidad.

Fitzhugh H.A. Hair sheep of Western Africa and the Americas in G. E. BRADFORD, _ Winrock, 1983.

Griffith, R. A New Industry for Tobago - A Citrus Processing Programme, Ministry of Food Production and Marine Exploitation, Trinidad & Tobago, 1991.

James, V. Business Failure and Success in Tobago, Department of Economics, UWI, St. Augustine, 1992.

JOINT MINISTERIAL COMMITTEE. Report of the Joint Ministerial Committee to Develop Proposals for the Beef Industry, 1988 (unpublished).

Jordan, Carlisle M. Development of the Artisanal Fisheries of Tobago in Report on Conference on Agriculture of Tobago, Tobago, June, 1984.

Lans, C. Tobago Status Report, June 1991

Laughlin & Associates Ltd. Development Proposals for Estates in the Windward Area-Tobago, Report submitted to the THA, 1987.

Marine Fisheries Analysis Unit, Fisheries Division, Ministry of Agriculture, Land and Marine Resources. Stock Assessment of Flying Fish (HIRUNDICHTHYS AFFINIS) 1994 Programme, Trinidad and Tobago, June 1993.

Marine Affairs Section, Division of Agriculture, Forestry & Marine Affairs, Tobago House of Assembly and the Marine Fisheries Analysis Unit, Fisheries Division, Ministry of Food and Production and Marine Exploitation. Nominal Statistics for the Tobago Drifting Fisheries: (Flying Fish and Associated Species), Trinidad and Tobago, February-July, 1988 and January-July, 1989.

McIntosh, C. Food Security in Trinidad and Tobago. Paper presented to the 5th. Bienniel Update in Nutrition-Related Topics, Trinidad & Tobago Association of Nutritionists and Dieticians, 1983.

MINISTRY OF AGRICULTURE LANDS AND MARINE RESOURCES. Annual Statistical Report 1992, Agricultural Data and Information Unit, Trinidad.

MINISTRY OF AGRICULTURE, LANDS AND MARINE RESOURCES. Draft National Policy for Food and Agriculture (Green Paper), Report of the Team Appointed by Cabinet, June 1993.

MINISTRY OF AGRICULTURE, FORESTRY AND MARINE AFFAIRS. Agricultural Policies, Draft Report, 1993

MINISTRY OF FINANCE. National Physical development Plan of Trinidad and Tobago, Vol.1 - Survey and Analysis, Town and Country Planning Division, July 1973.

MINISTRY OF FOOD PRODUCTION, MARINE EXPLOITATION, FORESTRY AND THE ENVIRONMENT. National Agricultural Development Plan 1988-92, Trinidad and Tobago, March 1988 (Revised Draft).

MINISTRY OF FOOD PRODUCTION & MARINE EXPLOITATION, TAHAL CONSULTING ENGINEERS LTD. & AGROCON LTD. Basic Agricultural Studies, First Stage Report - Diagnosis, Trinidad, May 1991.

MINISTRY OF ENVIRONMENT AND NATIONAL SERVICES. The National Forest Resources Plan, Trinidad, June 1989.

NATIONAL PLANNING COMMISSION. Draft Medium Term Macro Planning Framework 1989-95, Trinidad and Tobago, July 1988.

NATIONAL PLANNING COMMISSION. National Agricultural Development Plan 1989-1995, Summary of Proposals, October 1988.

NATIONAL FOOD AND NUTRITION COORDINATING AND ADVISORY BODY. A Food and Nutrition Profile of the Republic of Trinidad and Tobago, Trinidad, March 1992.

Neptune, M. Proposals for the Reorganisation of the Marketing Division - Towards a New Marketing Horizon. THA Report, 1993 (Unpublished).

Orden, David. Agricultural Trade and Pricing Policies in Trinidad and Tobago, Draft Paper for IDB Investment Sector Loan, July 1992.

Phillips, A. Constraints on Business Growth and Development in Tobago, Small Business Development Corporation, 1993.

Phillips, R.O. Agricultural Development in Tobago - Past, Present and Future, DAFMA, Tobago, 1987 (Unpublished).

Phillips, R.O. Division of Agriculture, Forestry and Marine Affairs - A Strategic Plan, Tobago, 1993.

Phillips, R.O. The Role of the Marketing Division in the Development of Agriculture in Tobago, Division of Agriculture, Tobago House of Assembly.

Phillips, R.O. Orientation of State Farms in Tobago. A paper prepared for the Planning Committee of the Tobago House of Assembly, 1990.

Razack, T. A. & Hosien, A. A. Social and Gender Experiences in the CIDA/CARDI Sheep Production and Marketing Project in Opportunities and Constraints for the Development of a Sustainable Small Ruminant Sub-Sector in the Caribbean Region, CARDI, Barbados, September 1992.

Ramkhelawan, E. & Baksh, N. Chemical control of Birdvine Phthirusa adunca (Meyer) Maguire in citrus. Paper presented at a Seminar on "Horticulture in the 90s", MALMR, October 1993.

Rankine, L. B. & Bruce, C. J. Fiscal Policies and Their Impact on the Structure of Incentives for the Agricultural Sector in Trinidad and Tobago, UWI, Trinidad, October 1991.

RASTOGI, RAJ. K., ARCHIBALD, K.A.E. & KEENS-DUMAS, M.J. Sheep Production in Tobago with Special Reference to Blenheim Sheep Station, Winrock 1983.

REPUBLIC OF TRINIDAD AND TOBAGO. Land Capability Studies Phase II Report, Trinidad, 1973.

REPUBLIC OF TRINIDAD AND TOBAGO. Public Sector Investment Programme 1993-95, Trinidad, 1992.

REPUBLIC OF TRINIDAD AND TOBAGO. Forest Resource and National Park Conservation and Regulation Act, 1990 (Draft).

REPUBLIC OF TRINIDAD AND TOBAGO. Programme Formulation Report for Establishment of a Civilian Conservation Corps, Trinidad, 1992.

REPUBLIC OF TRINIDAD AND TOBAGO. Medium-Term Policy Framework 1993-95, Ministry of Planning and Mobilization, 1992.

Samlalsingh, S., Pandohee, E., & Caesar, E. The Flying Fishery of Trinidad and Tobago in H.A. Oxenford, R. Mahon and W. Hunte (eds.), Biology and Management Options for Flying Fish in the Eastern Caribbean. UWI, Barbados, 1992.

Samlalsingh, S. & Pandohee, E. Preliminary Stock Assessment for the Flyingfish Fishery of Tobago. Technical Report of the Project for the Establishment of Data Collection Systems and Assessment of the Fisheries Resources. FAO/UNDP: TR1/91/001/TR11, Port-of-Spain, Trinidad, July 1992.

Singer, Norman & Judy, D. P. Comments on the Draft Forest Resource and National Park Conservation Act and Regulations, 1990 (Draft).

Sinha, D. P. Food, Nutrition and Health Part II: Healthy Diet. Cajanus 25 (4), 1992.

MALMR/TAHAL CONSULTING ENGINEERS LTD. Basic Agricultural Studies. Report prepared for the Ministry of Agriculture, Land and Marine Resources, Trinidad and Tobago, 1992.

TFAP. Project Profile for Tobago. Report Prepared by TFAP Secretariat, Forestry Division, Rome 1991.

TFAP. Report on National Parks. (Report prepared by Christine Toppin-Allahar for TFAP), 1991.

TFAP. Report on Wildlife. (Report Prepared by Elisha S. Tikasingh), 1991.

TFAP. Report of the Country Mission Team for Trinidad and Tobago, 1992.

TOBAGO HOUSE OF ASSEMBLY. A Decade of Achievement: 1980-90, Tobago, 1990.

TOBAGO HOUSE OF ASSEMBLY, DIVISION OF AGRICULTURE, FORESTRY AND MARINE AFFAIRS. A Strategy for Agriculture Development in Tobago 1983-1987. Tobago (Unpublished).

TOBAGO HOUSE OF ASSEMBLY, DIVISION OF AGRICULTURE. Rationalization of the Agriculture and Marketing Sectors in Tobago, Tobago, 1987.

TOBAGO HOUSE OF ASSEMBLY. Report on Conference on Agriculture of Tobago, Tobago, June, 1984.

TOBAGO HOUSE OF ASSEMBLY, DIVISION OF AGRICULTURE, FORESTRY AND MARINE AFFAIRS. Proposals for the Development of Agriculture and Marketing in Tobago, 1987.

TOBAGO HOUSE OF ASSEMBLY, DIVISION OF AGRICULTURE, FORESTRY AND MARINE AFFAIRS. A Brief Look at Dairy in Tobago, 1991

TOBAGO HOUSE OF ASSEMBLY, DIVISION OF AGRICULTURE, FORESTRY AND MARINE AFFAIRS. Slatted Floors - A Different Approach to Intensive Lamb Rearing in Tobago, Factsheet #2, Tobago.

TOBAGO HOUSE OF ASSEMBLY. The Tobago Development Plan, 1981-1990, Tobago, 1980.

TOBAGO HOUSE OF ASSEMBLY. Report on the Proposed Fish Port Scarborough Harbour Development, Tobago, January 1990.

TOBAGO HOUSE OF ASSEMPLY, DIVISION OF AGRICULTURE, FORESTRY AND MARINE AFFAIRS. Livestock Policy for Tobago, (Unpublished).

TOWN AND COUNTRY PLANNING DIVISION, MINISTRY OF PLANNING AND DEVELOPMENT. Tobago Region Physical Development Plan, 1991 (Draft Report).

TOWN AND COUNTRY PLANNING DIVISION, MINISTRY OF PLANNING AND DEVELOPMENT. National Physical Development Plan - Trinidad and Tobago, 1978.

TRINIDAD AND TOBAGO TOURISM DEVELOPMENT AUTHORITY. Strategic Plan-1990 to 1994. January, 1990.

WORLD BANK. Country Economic Report - Trinidad and Tobago, Vols. I and II, Washington, D.C., April 1988.

WORLD BANK. Trinidad and Tobago - Policy Agenda for Sustained Development, Washington, D.C., June 1992.

APPENDIX A

TABLES AND FIGURES

TABLE A.1
POPULATION OF TRINIDAD AND TOBAGO AT CENSUS DATES

	1960	1970	1980	1990
TRINIDAD AND TOBAGO:				
BOTH SEXES:	834,350	931,071	1,071,971	1,234,388
MALE	415,270	459,512	539,640	618,050
FEMALE	419,080	471,559	540,151	616,338
TOBAGO:				
BOTH SEXES:	33,333	38,754	40,745	46,261
MALE	16,481	19,017	20,304	23,186
FEMALE	16,852	19,737	20,441	23,075
% OF THE TOTAL POPULATION	4.0	4.2	3.8	3.7

SOURCE: CSO.

TABLE A.2
EMPLOYMENT BY INDUSTRIAL GROUP AND PARISH, 1991 (%)

INDUSTRIAL GROUP	TOTAL	ST. GEORGE	ST. MARY	ST. ANDREW	ST. PATRICK	ST. DAVID	ST. PAUL	ST. JOHN
AGRIC. HUNTING, FORESTRY/FISHING	6.0	8.3	19.6	3.4	4.9	2.0	14.2	6.5
MINING/QUARRYING	0.3	-	2.2	0.6	-	-	-	-
MANUFACTURING	2.0	2.5	-	1.5	4.5	1.4	-	-
ELECTRICITY, GAS AND WATER	3.8	4.2	2.2	4.5	4.1	5.3	-	3.2
CONSTRUCTION	22.2	16.7	30.4	16.2	15.8	27.3	35.7	48.4
WHOLESALE AND RETAIL TRADE	8.4	8.3	10.9	12.3	6.9	6.0	4.7	3.2
RESTAURANTS/HOTEL	6.7	5.8	4.3	7.2	8.5	7.3	1.9	6.5
TRANSPORT/STORAGE & COMMUNICATION	8.2	6.7	6.5	6.3	11.4	10.7	5.8	8.0
FINANCE/INSURANCE & REAL ESTATE	4.7	3.3	2.2	6.3	5.3	3.3	4.7	1.6
COMMUNITY/SOCIAL/ PERSONAL SERVICES	37.7	44.2	21.7	41.7	38.6	36.7	33.0	22.6
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: CSO.

TABLE A.3
TRINIDAD AND TOBAGO: SOME DIRECT AND INDIRECT INCENTIVES TO AGRICULTURE DURING THE LAST TWO DECADES

1. DIRECT INCENTIVES: A. INPUT SUBSIDIES; B. IMPORT RESTRICTIONS; C. MINIMUM GUARANTEED PRICES; D. DEFICIENCY PAYMENTS; AND E. FISCAL INCENTIVES AND SUBSTANTIAL AGRICULTURAL CREDIT.
2. AGRICULTURAL INPUT SUBSIDIES: A. LAND PREPARATION; B. FERTILIZER; C. SPRAYING EQUIPMENT; E. WATER STORAGE (IRRIGATION); F. COFFEE REHABILITATION; G. COCOA REHABILITATION; H. ORCHARD ESTABLISHMENT; I. SOIL CONSERVATION; J. PASTURE ESTABLISHMENT; K. GROUND LIMESTONE; L. LIVESTOCK HOUSING; M. ANIMAL FEED; N. VEHICLES; O. DRYING FACILITIES; P. FARM ROADS, BRIDGES AND CULVERTS; Q. FENCING; R. MOLASSES; S. JIFFY PELLETS AND POTS AND T. BEEKEEPING EQUIPMENT.
3. SUBSIDIZED SERVICES PROVIDED BY THE MINISTRY OF AGRICULTURE: A. SOIL TESTING; B. TRACTOR OPERATIONS; C. CROP PROTECTION; D. SALE OF PLANTING MATERIAL AND BREEDING STOCK; E. SALE OF TEAK POSTS AND FENCING AS WELL AS EXTENSION SERVICES CONCERNING FARMING AND FISHERIES PRACTICES.

SOURCE: MALMR.

TABLE A.4
PRODUCTION OF SELECTED AGRICULTURAL COMMODITIES IN TRINIDAD AND TOBAGO, 1973-91

	SUGAR	COCOA	COFFEE	CITRUS*	MEAT ('000 KG.)				EGGS	MILK
YEAR	'000 TONNES	'000 KG.	'000 KG.	'000 KG.	BEEF/VEAL	PORK	MUTTON	BROILERS	'000 DOZENS	'000 LITERS
1973	184.0	3,162	2,717	3,824	1,562	2,420	48	18,174	3,938	7,236
1974	186.3	4,161	1,940	27,100	1,468	1,979	54	19,530	4,143	7,280
1975	162.6	5,240	4,024	8,949	1,228	1,571	53	27,039	6,972	7,742
1976	203.6	3,249	2,671	15,016	1,296	2,382	78	27,091	4,157	6,320
1977	176.0	3,345	2,918	3,414	1,312	2,615	72	33,029	4,997	5,868
1978	147.0	3,398	2,500	7,815	1,436	2,157	80	26,930	5,866	5,927
1979	142.7	2,628	2,497	6,038	1,969	2,418	94	21,396	4,721	6,253
1980	112.7	2,380	2,239	6,665	2,013	1,790	79	23,464	3,487	5,681
1981	92.6	3,145	2,433	4,737	1,746	1,613	76	25,646	3,557	5,841
1982	79.9	2,247	1,794	1,836	1,648	2,931	67	37,522	2,026	7,848
1983	77.4	1,732	1,389	2,939	1,396	3,519	67	34,267	3,142	9,017
1984	69.7	1,560	852	3,264	1,375	3,553	59	33,919	2,292	10,065
1985	80.9	1,307	2,141	6,079	1,236	3,364	51	34,232	2,958	10,557
1986	82.3	1,426	1,334	4,322	1,233	2,885	67	29,654	3,007	11,325
1987	85.4	1,501	1,842	2,869	1,324	3,382	64	29,483	3,018	9,892
1988	91.3	1,635	581	4,754	1,783	2,973	85	26,372	3,198	9,664
1989	97.0	1,492	1,206	4,116	1,499	2,286	53	28,457	4,242	10,420
1990	118.2	2,127	1,935	2,230	1,206	2,443	57	30,887	3,682	10,812
1991	100.3	1,512	914	2,465	1,203	2,449	58	26,460	3,851	11,230

* INDICATES DELIVERIES TO PROCESSORS/PACKERS
SOURCE: CSO.

TABLE A.5
FOOD IMPORTS BY TRINIDAD AND TOBAGO
1973-91 (TT $MILLION)

FOOD IMPORTS	VALUE (TT$M)	FOOD IMPORT INDEX (1973=100)
1973	138.8	100.0
1974	250.3	180.3
1975	284.9	205.3
1976	290.9	209.6
1977	329.5	237.4
1978	389.3	280.5
1979	536.0	386.2
1980	707.8	509.9
1981	834.7	601.4
1982	904.7	651.8
1983	923.8	665.6
1984	894.1	644.2
1985	764.1	550.5
1986	786.7	566.8
1987	833.4	600.4
1988	720.2	518.9
1989	863.8	622.3
1990	859.9	619.5
1991	895.1	644.9

SOURCE: CSO.

TABLE A.6
MAJOR SOIL GROUPS OF TOABGO

GROUP	LOCATION
GROUP A	SOILS OF THE ALLUVIAL PLAINS AND VALLE'S
GROUP B	SOILS OF THE LOWLANDS AND VICINITY
GROUP C	STEEPLAND SOILS
GROUP D	MISCELLANEOUS SOILS THAT COULD BE MAPPED AS SOIL TYPES OR AGRICULTURAL LAND

SOURCE: BROWN, 1973.

TABLE A.7
LIMITATION OF SOILS WITHIN CAPABILITY CLASSES

CAPABILITY CLASS	PERCENT OF SOILS LIMITED BY VARIOUS FACTORS		
	SLOPE WITH RISK OF EXPLOSION	EXCESS SOIL MOISTURE	FERTILITY OF SHALLOW SOIL
I		100.0	
II	11.1	84.8	4.0
III	70.5	25.6	3.8
IV	85.1	14.8	0.1
V	100.0		
VI	100.0		
VII	100.0		

SOURCE: BROWN ET AL.

TABLE A.8
LAND CAPABILITY BY SUB REGIONS

SUB REGION	CLASS I, II, & III LAND (HA)	%
NORTH COAST	151.84	1.3
NORTH EAST	158.47	1.4
WINDWARD	3,591.48	31.8
CENTRAL	1,641.51	14.5
SOUTH WEST & SCARBOROUGH	5,745.89	50.8
TOTAL	11,289.19	99.8

SOURCE: AGRICULTURAL CENSUS 1982.

TABLE A.9
ESTIMATED LAND USE AREA, 1973 AND 1982

LAND USE	1973		1982	
	HECTARES	%	HECTARES	%
CROPLANDS	5,472.9	18.2	2,527.8	43.1
GRASSLANDS	1,813.8	6.0	966.7	16.5
LAND UNDER FALLOW	1,500.4	5.0	278.2	4.7
ABANDONED AND SEMI-ABANDONED CROPLANDS	1,150.6	3.8	652.6	11.1
NEW LANDS PREPARED FOR CROPS/PASTURE	--	--	185.9	3.2
NATURAL & OTHER FOREST	19,521.0	65.0	873.2	14.9
BUILT ON AND SERVICE AREA	492.7	1.6	233.2	4.0
OTHER LANDS	92.6	0.3	154.4	2.6
TOTAL	30,044.0	100.0	5,872.0	100.0

NOTE: DATA FOR 1973 IS FOR THE ENTIRE ISLAND WHILE DATA FOR 1982 IS BASED ON HOLDINGS SURVEYED.
SOURCE: LAND CAPABILITY STUDY, 1973 & AG. CENSUS 1982.

TABLE A.10
PRIVATE ESTATES IN TOBAGO

NAME	HECTARES
ALMA	109.3
ADVENTURE	36.4
BACOLET	242.9
BON ACCORD	242.9
CLUILLE	N/A
COURLAND	230.8
DIAMOND	230.8
FRIENDSHIP	230.8
GOLDEN GROVE	283.4
HERMITAGE	91.1
INDIAN WALK	161.9
KILGWYN	79.0
L'ANSEFORMI	89.5
LOWLANDS	283.4
PROSPECT	N/A
CAMERON	121.5
KING'S BAY	N/A

N/A - NOT AVAILABLE
SOURCE: DAFMA.

TABLE A.11
AGE DISTRIBUTION OF FARMERS, 1976 AND 1982

YEARS	1976		1992	
	NUMBER	%	NUMBER	%
UNDER 25	24	1	81	4
25-34	181	7	184	9
35-44	392	16	317	16
45-54	555	23	480	25
55-64	593	25	455	23
65 AND OVER	674	28	427	22
TOTAL	2,419	100	1,944	100

SOURCE: 1975-76 FARMERS REGISTRATION PROGRAM & 1982 AG. CENSUS.

TABLE A.12
ANNUAL AND MONTHLY RAINFALL OF TOBAGO, 1982-91 (mm.)

YEAR	ANNUAL RAINFALL	MONTHS											
		JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC
1982	1,832.0	73.0	118.0	36.0	43.0	65.0	217.0	195.0	143.0	254.0	250.0	230.0	208.0
1983	1,945.0	72.2	18.7	14.2	71.3	251.2	280.3	234.9	208.7	181.2	209.4	198.1	204.5
1984	1,744.4	128.8	39.4	32.4	15.8	68.5	106.9	202.4	195.8	103.9	354.9	306.1	198.6
1985	2,125.4	62.0	108.7	27.5	80.0	65.2	137.1	255.3	190.6	327.0	337.0	259.8	275.2
1986	1,610.5	53.0	32.0	85.4	20.0	56.7	224.5	135.5	168.3	268 3	239.5	217.6	109.9
1987	1,643.4	16.2	10.9	9.3	7.4	94.5	224.2	246.7	129.6	339.0	171.0	254.2	140.4
1988	2,069.8	46.5	79.4	15.2	10.1	39.9	228.9	189.5	293.2	272 9	422.7	208.2	203.3
1989	1,649.5	53.7	64.6	111.5	30.0	47.2	85.3	223.5	113.0	255.5	218.5	400.0	46.4
1990	1,822.8	67.2	96.9	39.9	62.4	192.0	222.5	216.1	223.2	110.6	260.5	247.6	83.9
1991	1,821.1	70.7	79.9	61.6	118.2	36.7	85.7	189.7	175.1	276.2	199.2	344.9	182.2

SOURCE: CSO, 1991.

TABLE A.13
NUMBER OF REGISTERED FARMERS
BY DISTRICT, 1992

DISTRICT	NUMBER	%
MT. ST. GEORGE	501	18.4
ROXBOROUGH	404	14.8
GOLDSBOROUGH	401	14.7
BETHEL	346	12.7
RUNNEMEDE	315	11.6
PLYMOUTH	297	10.9
BELLE GARDEN	238	8.7
CHARLOTTEVILLE	225	8.2
TOTAL	2,727	100.0

SOURCE: DAFMA.

TABLE A.14
CONTRIBUTION OF AGRICULTURAL INCOME TO TOTAL HOUSEHOLD INCOME IN TOBAGO, 1982

AGRICULTURAL INCOME AS % TOTAL INCOME	% OF HOUSEHOLDS
< 25	41
25 - 49	29
50 - 74	17
75 - 100	9
NOT REPORTED	3

SOURCE: 1982 AG. CENSUS.

TABLE A. 15
CULTIVATION OF VEGETABLE CROPS IN TOBAGO, 1982

VEGETABLES	NO. OF HOLDINGS	HA
TOMATOES	128	17.9
SWEET PEPPER	95	9.6
OKRA	71	6.2
CUCUMBER	61	6.9
PUMPKIN	59	5.1
CHIVE	54	5.5
CABBAGE	51	5.7
BEANS	43	4.6
PATCHOI	34	2.7
HOT PEPPER	33	2.9
LETTUCE	33	3.2
MELONGENE	27	2.6
CELERY	16	1.1
THYME	14	1.3
DASHEEN BUSH	8	0.7
SQUASH	6	0.6
CAULIFLOWER	5	0.3
WATERCRESS	2	0.4
MIXED VEGETABLES	110	27.2
OTHER VEGETABLES	12	2.7
TOTAL	-	102.6

SOURCE: AG. CENSUS, 1982.

TABLE A.16
CULTIVATION OF MAJOR FRUIT CROPS BY DISTRICT, 1992

FRUIT	RUNNEMEDE	MT ST GEORGE	GOLDSBOROUGH	BETHEL	PLYMOUTH	ROXBOROUGH	BELLE GARDEN	CHARLOTTEVILLE	#FARMERS	#TREES
CITRUS										
#FARMERS	20	20	15	11	11	42	8	25	152	
#TREES	784	1035	473	383	764	3200	840	355		7834
MANGO										
#FARMERS	20	20	15	6	11	35	6	20	133	
#TREES	174	236	207	1040	331	525	140	270		2923
AVOCADO										
#FARMERS	20	20	15	4	9	10	6	10	94	
#TREES	97	152	172	318	195	300	510	60		1804
OTHER*										
#FARMERS	20	8	15	4	6	10	7	12	82	
#TREES	127	75	215	43	108	350	110	120		1148

* SOURSOP, CHERRY, SAPODILLA, GOLDEN APPLE, POMERAC.
SOURCE: DAFMA.

TABLE A.17
LIVESTOCK POPULATION ON GOVERNMENT STATIONS IN TOBAGO, DECEMBER 1992

LIVESTOCK TYPE	NUMBER
DAIRY CATTLE	75
BEEF CATTLE	60
SHEEP	1.023
GOATS	224
RABBITS	43
PIGS	228
HORSES	2
POULTRY:	
LAYERS	1,016
DUCKS	97
GEESE	31
GUINEA BIRDS	17

SOURCE: DAFMA.

TABLE A.18
SUMMARY OF DISEASES CONFIRMED & PARASITES IDENTIFIED BY ANIMAL SPECIE, 1992

DISEASES/PARASITES	CANINE	OVINE	BOVINE	CAPRINE	RABBIT	TOTAL
	DISEASES CONFIRMED					
DIROFILARIASIS	13		-	-	-	13
ENDOPARASITISM	1	324	2	27	-	354
ECTOPARASITISM	-	-	-	-	-	-
HEMOPARASITISM	1	-	-	-	-	1
	PARASITES IDENTIFIED					
TRICHOSTRONGYLUS	-	117	1	15	-	133
STRONGLYE	-	43	-	5	-	48
COCCIDIA	-	142	1	21	1	164
HOOKWORM	1	-	-	-	-	1
TAPEWORM	-	24	-	1	-	25
ASCARID	-	2	-	-	-	2
STRONGYLDAE	-	23	-	2	-	25

SOURCE: DAFMA.

TABLE A.19
NUMBER OF PRIVATE PIG FARMS AND POPULATION OF PIGS ON PRIVATE FARMS IN TOBAGO, 1985-91

YEAR	NUMBER OF PRIVATE PIG FARMS	POPULATION OF PIGS ON PRIVATE FARMS
1985	317	2,880
1986	84	511
1987	71	737
1988	79	809
1989	187	1,722
1990	108	2,220
1991	132	1,553

SOURCE: CSO, 1991.

TABLE A.20
REGISTRATION OF FISHING BOATS AND AREA REGISTERED, 1993
(BOAT LENGTH IN METERS)

BEACH	5M. - 6M.	6M. - 7M.	7M.- 8M.	8M. - 9M.	9M.	TOTAL
BELLE GARDEN	-	-	1	-	-	1
PEMBROKE	-	1	-	-	-	1
CASTARA	-		1	-	-	1
KILGWYN	-	-	1	-	-	1
ARNOS VALE	-	1	-	-		1
GRANBY BAY	-	1	1	-	-	2
MT. IRVINE	-	-	-	-	1	1
MAN OF WAR BAY	-	3	-	-		3
PARLATUVIER	1	1	-	-		2
PIGEON POINT	-	-	-	1		1
ROXBOROUGH	-	1	-	-		1
SPEYSIDE	-	1	-	-		1
ROCKLY BAY	-	-	-	-		1
STORE BAY	-	-	-	1		1
TOTAL	1	9	4	2	2	18

M - METERS.
SOURCE: DAFMA.

TABLE A.21
FISH LANDINGS AT PIGEON POINT, BUCCOO & MT. IRVINE, 1988-93 (KGS.)

SPECIES	1988	1989	1990	1991	1992	1993*	TOTAL
	PIGEON POINT						
FLYING FISH	33,913	37,191	88,909	76,460	101,845	82,025	420,343
DOLPHIN	7,994	18,249	10,796	15,428	9,115	6,858	68,440
KING FISH	203	250	26	127	485	2,791	3,883
TUNA	1,128	1,573	245	648	1,024	456	5,074
SHARK	433	859	605	603	1,185	912	4,597
TOTAL	43,670	58,122	100,581	93,266	113,654	93,042	502,335
	BUCCOO						
FLYING FISH	28,053	24,794	33,471	23,745	40,768	32,056	182,887
DOLPHIN	14,667	17,708	6,580	6,639	3,598	2,270	51,462
KING FISH	1,523	2,018	579	1,286	686	596	6,688
TUNA	450	902	397	1,360	1,476	271	5,358
SHARK	1,202	618	690	729	1,116	47	4,802
TOTAL	45,895	46,041	41,716	33,760	47,644	36, 41	251,197
	MT. IRVINE						
FLYING FISH	2,551	680	10,388	5,291	8,714	1,641	29,265
DOLPHIN	1,096	405	4,195	2,081	196	765	8,738
KING FISH	141	120	135	128	208	160	892
TUNA	85	84	176	150	132	0	627
SHARK	189	236	416	311	282	2	1,436
TOTAL	4,062	1,525	15,310	7,960	9,531	2,568	40,958
TOTAL LANDINGS	93,628	105,689	157,608	134,986	170,829	131,751	794,491

* DATA FOR 1993 IS ONLY UP TO AUGUST
SOURCE: DAFMA.

TABLE A.22
AVERAGE WHOLESALE AND RETAIL PRICES FOR SELECTED PRODUCTS IN THE SCARBOROUGH AND PORT-OF-SPAIN MARKETS SEPTEMBER, 1993 (TT$)

PRODUCT	UNIT	WHOLESALE PRICES		RETAIL PRICES	
		SCARBOROUGH	PORT-OF-SPAIN	SCARBOROUGH	PORT-OF-SPAIN
PIGEON PEAS	KG.	2.20	10.28	4.40	27.45
CORN	EAR	0.50	0.54	1.00	0.83
PUMPKIN	KG.	1.65	0.62	2.20	0.99
CABBAGE	KG.	4.40	6.20	6.60	7.38
HOT PEPPER	EACH	0.10	0.12	0.25	0.17
TOMATO	KG.	4.40	4.37	6.60	5.44
DASHEEN	KG.	3.30	3.15	4.40	4.08
CHIVE	BUNDLE	1.00	0.56	1.50	0.73
BODIE BEAN	KG.	2.20	3.93	4.40	5.04
CUCUMBER	KG.	2.20	1.39	3.30	2.10
WATERMELON	KG.	2.20	1.96	3.30	2.61
SWEET PEPPER	KG.	4.40	7.13	6.60	9.12
MELONGENE	KG.	3.30	2.66	4.40	3.60
CASSAVA	KG.	2.20	2.38	4.40	3.12
SWEET POTATO	KG.	2.20	2.94	4.40	4.80
ORANGES	EACH	0.60	0.48	1.00	0.66

SOURCE: DAFMA & NAMDEVCO.

TABLE A.23
NUMBER OF ANIMALS SLAUGHTERED AT SCARBOROUGH AND ROXBOROUGH ABATTOIRS IN TOBAGO, 1985-91

YEAR	SCARBOROUGH	ROXBOROUGH
1985	74	29
1986	106	31
1987	131	35
1988	167	32
1989	181	33
1990	187	35
1991	203	34

SOURCE: CSO QUARTERLY AG. REPORT, 1991.

TABLE A.24
REVENUE OF THE DIVISION OF AGRICULTURE, FORESTRY & MARINE AFFAIRS, 1983-93 (TT$)

ITEM	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
VETERINARY FEES			1,549	1,451	476	2,102	2,301	2,927	2,971	6,506	1,355
SALE OF PLANTS			13,450	13,114	22,885	15,364	16,392	18,074	13,313	64,967	12,023
EXTENSION SERVICES			216,963	273,594	172,936	177,233	163,071	135,277	145,844		140,400
GOVERNMENT FARM SALES			48,827	120,420	187,925	146,439	144,644	133,183	136,030	161,307	99,500
SALE OF APIARY PRODUCTS			2,454	3,075	1,487	2,896	1,800	2,460	792	1,311	2,711
TRACTOR POOL EARNINGS			7,324	28,893	32,731	25,467	24,501	20,484	23,739	58,666	23,020
KENDAL FARM SCHOOL			27,564	35,830	15,903	20,374	22,320	28,341	26,006	13,879	34,497
SALE OF DRUGS			708	818	446	89	1,777	2,701	2,073		811
SALE OF TIMBER PROD.					434	6,075	2,755				
KENDAL FARM SCHOOL (MEALS)											
SALE OF FISH PRODUCTS							8,339	739	6,622	2,775	163
SALE OF PROD.:											
ROXBOROUGH ESTATE								2,182	7,194		
RENTAL OF ESTATES								670	1,720		
FOOD & AGRICULTURE	1,871,065										
SALE OF FORESTRY PRODUC.							3,711	1,688	84		500
TOTAL	1,871,065	0	318,839	477,194	435,224	396,038	391,610	348,725	366,388	309,412	314,980

SOURCE: DAFMA.

TABLE A.25

BUDGET RELEASES TO DAFMA FOR RECURRENT SERVICES, 1983-94 (TT$)

ITEM	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
SALARIES & C.O.L.A	3,618,030	3,683,745	3,879,639	3,913,420	3,687,356	3,570,977	3,289,828	3,245,566	3,315,923	3,870,000	3,960,000	3,960,000
WAGES & C.O.L.A.	11,172,603	11,211,858	11,054,650	10,718,048	9,912,832	9,543,476	8,220,425	8,959,350	9,994 993	12,017,400	12,000,000	11 838,000
OVERTIME	652,127	694,424	434,180	544,268	434,275	406,210	425,000	470,000	585,000	450,000	400,000	400,000
GOVERNMENT CONTRIBUTION TO NATIONAL INSURANCE	394,094	398,416	422,013	487,692	455,102	422,013	436,000	450,000	430,000	430,000	430 000	430,000
TRAVELLING	280,000	291,000	291,582	315,000	325 000	325,000	310,331	274,620	275,070	275,000	250,000	250 000
FUEL, LIGHT & WATER	68,000	30,000	151,227	95,000	101,040	101,040	61,194	78,347	80,000	70,000	75,000	75 000
TELEPHONES	20,500	60,500	88,078	28,927	102,617	64,000	92,000	123,624	35 000	25,000	55,000	55 000
OFFICE SUPPLIES	11,718	11,700	11,700	11,700	11 700	117,000	7,000	7,000	8,736	10 000	12 000	12,000
MATERIAL & SUPPLIES	829,804	829,804	753,258	815,871	800 000	800,000	430,716	617 407	777 312	760,000	760 000	719 700
REPAIRS & MAINTENANCE	200,000	220 000	152,241	200,000	200,000	200,000						
CONTRACTED SERVICES	4,900	4 500	4,500	4,500	4,500	1,510	400	51 012	120,000	160,000	150,000	150 000
EXHIBITIONS	1	1	1	1	1	1						
EXPENSES TO KENDAL FARM SCHOOL		237 123	137,965	160 000	160,000	160,000	190,807	266 016	300 000	180,000	200,000	175 000
OTHER GOODS & SERVICES	280,000	103 615	92,613	103,031	95,000	95,000						
UNIFORMS							28,000	35 000	40,000	20,000	25 000	25,000
REPAIRS TO VEHICLES							50,000	255 000	110 000	147,000	150,000	150 000
UPKEEP OF VEHICLES							58 000	228 984	136 507	206,600	200 000	200,000
WATER & SEWERAGE AUTH							26 594	75 629	30,000	48,000	25,000	25,000
TRAINING								50,000	40 000	32,000	40 000	40 000
REPAIRS & MAINTENANCE OF BUILDING & EQUIPMENT									30,000	20,000	20 000	20,000
LAND & BUILDING TAXES										1 000	1 000	1 000
TOTAL	17,531,777	17,776,686	17,473,647	17,397,458	16,289,425	15,806,227	13,628 293	15,187 555	16 268,541	18,722 000	18,753,000	18 525,700

* INDICATES BUDGETARY ALLOCATION FOR THE YEAR

SOURCE: DAFMA

TABLE A 26

EXPENDITURES BY DAFMA ON RECURRENT SERVICES, 1983-93 (TT$)

ITEM	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
SALARIES & C.O.L.A	3,651,971	3,683,645	3,879,639	3,913,419	3,687,355	3,570,977	3,289,828	3,242,055	3,312,130	3,873,020	3,926,921
WAGES & C.O.L A	10,837,199	11,210,695	11,179,040	10,718,048	10,289,624	9,543,246	8,074,878	8,944,411	9,993,811	12,188,456	12,623,552
OVERTIME	641,454	694,424	433,640	544,269	434,274	355,624	359,264	388,840	584,900	387 540	399 745
GOVERNMENT CONTRIBUTION TO NATIONAL INSURANCE	528,434	398,416	421,108	487,568	455,102	405.518	377 924	415,967	419,550	448.108	433,029
TRAVELLING	275,838	282,326	291 133	312,692	319,106	320,099	309,663	274,619	274,407	290 214	287,792
FUEL, LIGHT & WATER	22,353	28,185	151,227	79,693	99,356	88,224	57,245	78,346	54,778	76 129	66,989
TELEPHONES	15,593	59,292	88,077	24,654	102,616	8,518	31,586	123,623	31,858	37.062	47,665
OFFICE SUPPLIES	10,339	7,385	8 191	10,521	6,092	5,270	923	6,279	10,000	9 982	9,489
MATERIAL & SUPPLIES	790,025	797,668	753,258	815,871	717,062	375 009	430,715	592,324	764,572	732 644	785 593
REPAIRS & MAINTENANCE	164,551	177,041	141 626	192,403	119,321	54,306					
CONTRACTED SERVICES	3 767	2,399	807	405	1,420	1 510		28 892	116 885	195 198	132 456
EXHIBITIONS											
EXPENSES TO KENDAL FARM SCHOOL		215,405	137 965	157,302	134,790	127 215	190 709	266,015	260.041	239 167	199,850
OTHER GOODS & SERVICES	244 988	95 607	92 613	97 427	92 579	63,691					
UNIFORMS							3 798	29 684	33 388	16,483	23,929
REPAIRS TO VEHICLES							33,497	242,066	109,548	144 073	148,890
UPKEEP OF VEHICLES							57,594	192 276	126 494	196 254	152,464
WATER & SEWERAGE AUTH							26,594	75,629	23 320	50 428	67 894
TRAINING								29,463	33.523	30 091	31,320
REPAIRS & MAINTENANCE OF BUILDING & EQUIPMENT									19,492	9 615	16 193
LAND & BUILDING TAXES										771	872
TOTAL	17 186,511	17,652,486	17,578,325	17,354 27:	16,458,695	14,919,207	13,244,218	14,930,489	16,188,697	18,925 235	19,354,643
REAL TOTAL EXPENDITURES ($MN)	14.89	15 47	16.47	15.81	15 20	13.31	12.12	13.64	15.82	17.85	17.47
REAL EXPENDITURES ON WAGES & SALARIES ($MN)	12.56	13.05	14.11	13.33	12.91	11 70	10 40	11 13	13 01	15 15	14.94

AMOUNT FOR 1993 INDICATES ALLOCATION

SOURCE DAFMA

TABLE A. 27

BUDGET RELEASES TO THE DAFMA FOR DEVELOPMENT ACTIVITIES, 1983-93 (TT$)

ITEM	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
GENERAL AGRICULTURE	1,750,000	1,500,000	1,000,000	1,605,000	832,500	275,000					
LIVESTOCK & POULTRY	470,000	500,000	400,000	500,000	257,500	25,000	22,000				
TRACTOR POOL	1,000,000	800,000	500,000	250,000	79,000	30,000					
LAND DISTRIBUTION/SETTLEMENT	250,000	500,000	280,000	400,000	195,000	70,000					
GOVERNMENT STOCK FARM	460,000	600,000	470,000	400,000	200,000	130,000					
KENDAL FARM SCHOOL	720,000	859,473	1,300,000	40,000	1,000	90,000					
REAFFORESTATION	285,000	314,236	300,000	300,000	40,000	60,000					
DEV. OF GAM SANCTUARY	12,000	20,101	20,000	14,000		25,000					
WILD LIFE PROTECTION	24,000	66,948	70,000	50,000	11,000	35,000		22,000	40,000	20,000	
OTHER FORESTRY PROJECTS	210,000	284,802	210,000	190,000	75,000	40,000					
IMPROVEMENT TO BEACHES & LAND-FAC	190,000	152,868	200,000	200,000	75,000	125,000					
RESEARCH & EXPLOITATION	25,000	19,734	25,000	25,000	72,500	30 000					
RESEARCH & MARKETING	10,000	41,833	50,000	23,000	35,000	20,000					
IMPROVEMENT TO REEFS	229,000	294,506	200,000	68,000		25,000					
TRAINING		6,493	25,000	15,000	20,000						
GOLDSBORO/LURE PROJECT		300,000	235,000	100,000	35,000	35,000	39,000				
RICHMOND PROJECT		330,220	300,000	100,000	75,000	30,000	30,000				
STUDLEY PARK PROJECT		274,858	320,000	75,000	180,000	50,000					
BLENHEIM SHEEP PROJ		1,589,563	885,000	1,026,800	1,379,000	320,000	836,200				
BELLE GARDEN ESTATE		100,000	175,000	35,000							
CONSTRUCTION OF MARKETING BUILDING		115,316	210,000	150,000							
PISCES LTD RENTAL FACILITY		57,750									
EXTENSION OF SIBORD MARKET		408,000									
EXTENSION.							18,000				
TRAINING 4H FARMERS											
IMPROVEMENT OF FACILITIES &											
REHAB OF FRUIT ORCHARD							64,000		25,000		80,000
ESTABLISHMENT OF											
AG. EXHIBITION SITE							144,900				
ESTABLISHMENT OF PILOT CROP							13,500				
PROJECT AT CASTARA ESTATE							13,500				
DEV OF IRRIGATION FACILITIES									200,000		
FOR VEG. & FOOD CROP FARMING							12,000	38,000	242,189		10,000
DEBONING DEMONSTRATION											
AT SCHOOLS & VILLAGES							3,600				
PAYMENT OF SUBSIDY & COMPENSATION											
FARM PRICE & INCOME SERVICES							10,000	10,000	100,000		
FISHING & FISHING COMPLEX.											
CONST OF PLYMOUTH SEA WALL							40,000		200,000		

TABLE A.27 (CONT'D)

BUDGET RELEASES TO THE DAFMA FOR DEVELOPMENT ACTIVITIES, 1983-93 (TT$)

ITEM	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
IMPROVEMENT & REPAIRS TO EXISTING FACILITIES							33,000	42,811	38,000	65,000	200,000
FORESTRY:											
REAFFORESTATION OF MATURE FOREST							11,000	72,000			
PRODUCTION OF SEEDLINGS							8,000				
EXTENSION & IMPROVEMENT OF NURSERY & COMPOUND							4,500				
UPPER WATERSHED MANAGEMENT							2,500	70,990		100.000	90,000
LAND MANAGEMENT:											
SUB-DIVISION OF GOLDSBORO EST								195,000	209,010	200.000	160,331
CONTINUATION OF VEG. FOOD CROP FAR							150,500		55,000		
IMPROVEMENT OF FACILITIES L D'OR											270,000
RESEARCH & DEVELOPMENT:											
CONSTRUCTION OF IRRIGATION							8 000				
AT HOPE FARM							8,000				
REHABILITATION OF LIVESTOCK PENS							15,000				
PILOT RESEARCH PROJECT - ON FLYING FISH & KING CRAB							13 200	31,000	60,000	30.000	
RESEARCH ON SEA MOSS CULTIVATION & TURTLE HATCHERY							17 600				40,000
MARKETING RESEARCH & DEVELOPMENT							63 000	67,000	295,000	120 000	
OTHER SERVICES											250,000
PAVING FARM ROADS							3 000				170 000
REHAB OF 40 HA. PASTURE							24,300		35,000		
TRAINING OF PERSONS IN FISHING ACTIVITIES							40 000				
TRAINING IN SHARK FISHING							19 000				
RECREATION.											
REHABILITATION OF BOTANIC GARDEN							15 000				
DEVELOPMENT OF TRAILS							2 000				
EXTENSION TO BOAT HOUSE							12 000	49 000			
DEVELOPMENT OF RECREATION AREAS							3 000	72.000	70 000		36.000
COMPLETION OF DEMARCATION OF BUCCOO REEFS							8 000	43 000			
COMPLETION OF PERMANENT ANCHOR AT BLACK ROCK							10 000				
CONTINUATION OF ECONOMIC							20 000			30 000	
SURVEY OF REEFS							20 000			30 000	
TOTAL	5,635,000	9,136,701	7,175 000	5 566,800	3 562 500	1 415 000	1,737 300	712 801	1,569,199	565 000	1 096,331
REAL BUDGETARY RELEASES ($MN)	4.88	8.01	6.72	5 07	3 29	1 26	1 59	0 65	1 53	0 53	0 99

SOURCE DAFMA

TABLE A.28

DEVELOPMENT EXPENDITURES OF THE DAFMA, 1983-93 (TT$)

ITEM	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
GENERAL AGRICULTURE	1,792,656	1,018,554	854,446	1,508,988	581,992	202,597					
LIVESTOCK & POULTRY	346,875	466,195	280,033	546,602	242,557	22,039	24,084				
TRACTOR POOL	684,951	552,741	486,813	195,492	44,837	20,773					
LAND DISTRIBUTION/SETTLEMENT	279,960	476,605	267,038	264,851	123,656	200,377					
GOVERNMENT STOCK FARM	473,403	535,206	394,285	334,958	142,500	173,458					
KENDAL FARM SCHOOL	775,988	720,650	604,463		58	70,299					
REAFFORESTATION	289,575	262,631	285,717	244,548	30,224	53,225					
DEV OF GAM SANCTUARY	8,456	12,970	19,705	13,100		24,662					
WILD LIFE PROTECTION	27,613	33,619	69,610	32,678	5,990	33,678		15,206	39,217	19,280	
OTHER FORESTRY PROJECTS	182,436	221,936	164,010	27,757	62,908	37,688					
IMPROVE TO BEACHES & LAND-FAC	180,121	113,306	192,837	173 456	21,100	59,997					
RESEARCH & EXPLOTATION	24,764	11 855	19,601	21 741	65 727	34 480					
RESEARCH & MARKETING	9,540	23 817	35 445	22 081	34,415	48 323					
IMPROVEMENT TO REEFS	38,498	249,471	118,272	57 222		44,953					
TRAINING		2,504	17,791	14 217	9 433						
GOLDSBORO/LURE PROJECT		299 562	228 012	118 257	28 517	85 169	18,855				
RICHMOND PROJECT		313 104	296,922	130,057	49,425	52 142	24 157				
STUDLEY PARK PROJECT		267 711	313,092	210 432	47,948	101 804					
BLENHEIM SHEEP PROJ		1,559,443	913,255	1 105 024	585 890	766,923	803 960				
BELLE GARDEN ESTATE		76,083	155,053	35 155							
CONSTRUCT. OF MARKET BUILDING		115,315	193,163	147,923							
PISCES LTD. RENTAL FACILITY		57 750									
EXTENSION OF SIBORD MARKET		408 000									
EXTENSION.							8,186				
- TRAINING 4H FARMERS											
- IMPROVEMENT OF FACILITIES &											
REHAB OF FRUIT ORCHARD							52 493		22 119		77 897
- ESTABLISHMENT OF							113 542				
AG. EXHIBITION SITE							113 542				
- ESTABLISHMENT OF PILOT CROP							7 330				
PROJECT AT CASTARA ESTATE							7 330				
- DEV OF IRRIGATION FACILITIES									207 203		
FOR VEG. & FOOD CROP FARMING							6 127	35 779	53 677		9 276
- DEBONING DEMONSTRATION											
AT SCHOOLS & VILLAGES							112				
SUBSIDY & COMPENSATION											
FARM PRICE & INCOME SERVICES							6 931	9 885	101,764		
FISHING & FISHING COMPLEX											
- CONST OF PLYMOUTH SEA WALL							3 080		199,824		

TABLE A.28 (CONT'D)

DEVELOPMENT EXPENDITURES OF THE DAFMA, 1983-92 (TT$)

ITEM	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1,993
- IMPROVEMENT & REPAIRS TO EXISTING FACILITIES							27,888	42,811	42,811	51,689	199,208
FORESTRY:											
- REAFFORESTATION							8,265	73,433			
- PRODUCTION OF SEEDLINGS							6,643				
- EXTENSION & IMPROVEMENT OF NURSERY & COMPOUND							3,589				
- UPPER WATERSHED MANAGEMENT							2,398	70,854		98,707	90,029
LAND MANAGEMENT:											
- SUB-DIVISION OF GOLDSBORO EST.								174,271	209,010	198,187	157,090
VEG. FOOD CROP FARM							170,471		51 561		
IMPROVE. OF FACILITIES L. D'OR											250,030
RESEARCH & DEVELOPMENT:											
- CONSTRUCTION OF IRRIGATION AT HOPE FARM							7,961				
- REHAB. OF LIVESTOCK PENS							14,988				
- PILOT RESEARCH PROJECT - ON FLYING FISH & KING CRAB							12,912	30,007	59 602	34 893	
- RES. ON SEA MOSS CULTIVATION & TURTLE HATCHERY							18,072				39 783
- MARKETING RES. & DEVELOPMENT							62,974	78,985	292,252	119 677	
OTHER SERVICES:											232,620
- PAVING FARM ROADS							2,913				159 427
REHAB. OF 40 HA PASTURE							22,217		33 410		
- TRAINING OF PERSONS IN FISHING ACTIVITIES							3,884				
- TRAINING IN SHARK FISHING							17,861				
RECREATION:										35 511	
- REHAB. OF BOTANIC GARDEN							14 918				
DEVELOPMENT OF TRAILS							2,377				
- EXTENSION TO BOAT HOUSE							5 368	42 704			
- DEVE. OF RECREATION AREAS							2,903	21 874	67 983		35 511
- COMPLETION OF DEMARCATION OF BUCCOO REEFS							8 001	36 751			
- COMPL.OF PERMANENT ANCHOR AT BLACK ROCK							9,655				
CONTINUATION OF ECONOMIC							19 183			26 010	
SURVEY OF REEFS							19 183			26 010	
TOTAL	5,114,836	7 799 028	5,909 563	5,204,539	2 057 177	2 032 587	1,643 131	682,560	1,380,433	548 443	1,053,654
REAL DEVELOPMENT EXPENDITURES (	4 43	6 84	5 54	4 74	1 90	1 81	1 50	0.62	1 35	0.52	0 95

SOURCE. DAFMA.

TABLE A.29
QUANTITY OF COCOA PURCHASED, PRICES PAID TO FARMERS & PRICES RECEIVED FROM TRINIDAD BY PCFC, 1987/88-1992/93

YEAR	QUANTITY PURCHASED (KG.)	PRICES PAID TO FARMERS (TT$)	PRICES RECEIVED FROM TRINIDAD (TT$)
1987/88	4,813.2	1.10	4.40
1989/89	9,462.3	1.10	4.40
1989/90	14,000.5	1.10	6.40
1990/91	13,553.2	1.32	6.40
1991/92	13,214.5	1.32	6.40
1992/93	24,090.9	1.32	6.40

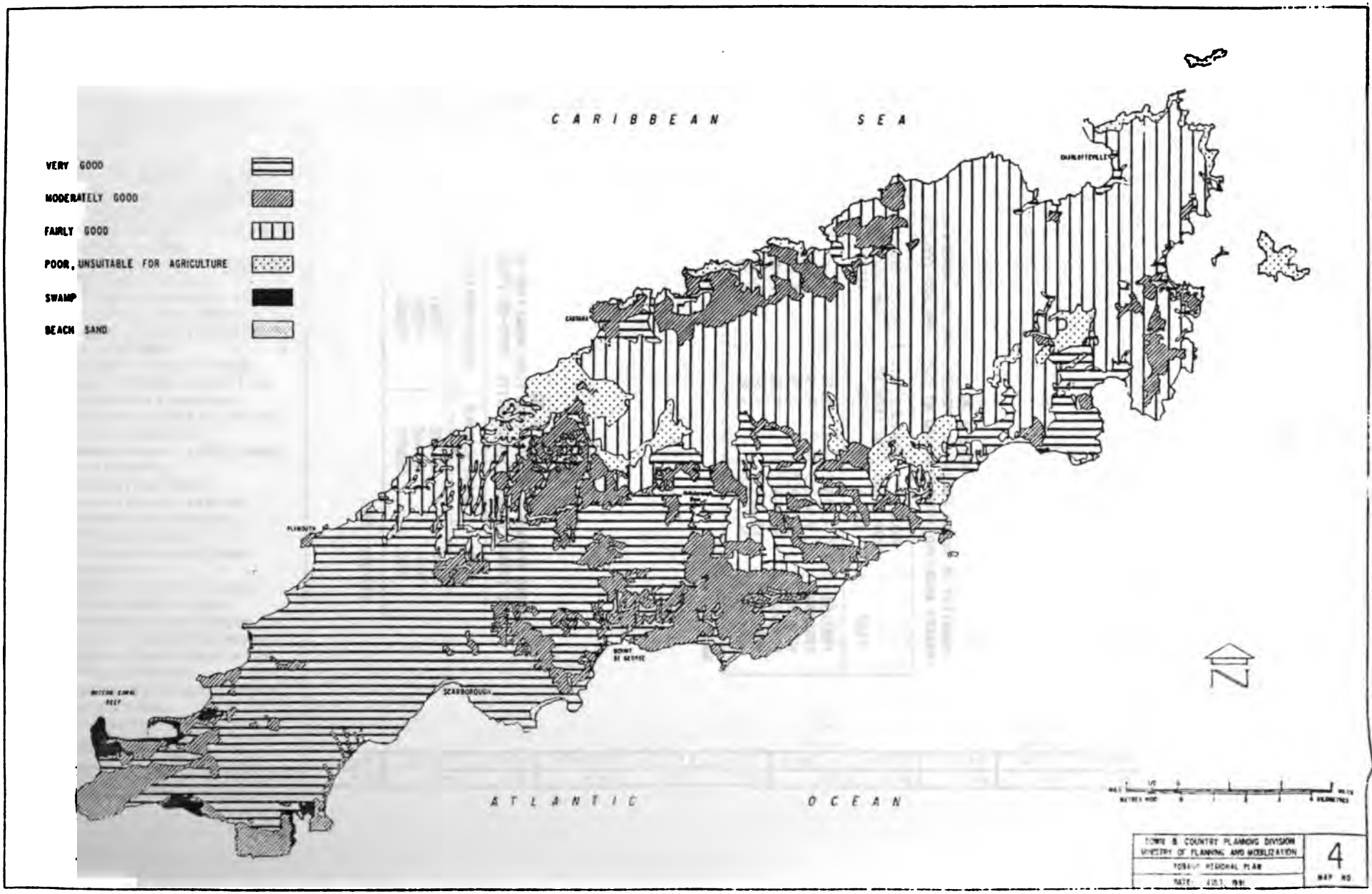
SOURCE: PCFC.

TABLE A.30
GROSS REVENUE & PROFIT FROM FISH MARKETING OF THE TOBAGO FISHING COOPERATIVE, 1991-93 (TT$)

YEAR	GROSS REVENUE	GROSS PROFITS
1990	126392	12261
1991	131960	12251
1992	158299	51804

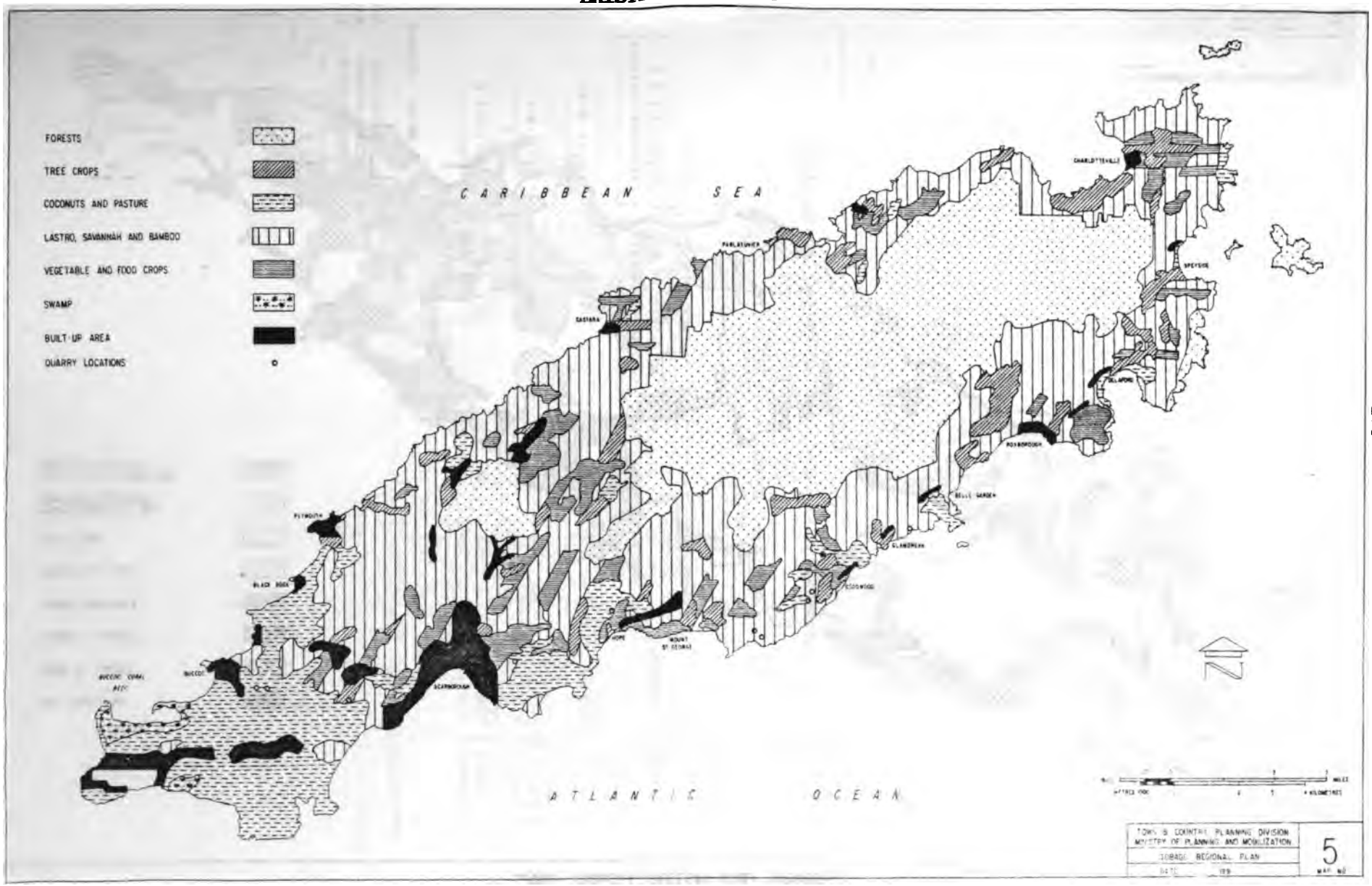
SOURCE: TFC.

FIGURE A.1
LAND CAPABILITY FOR AGRICULTURE



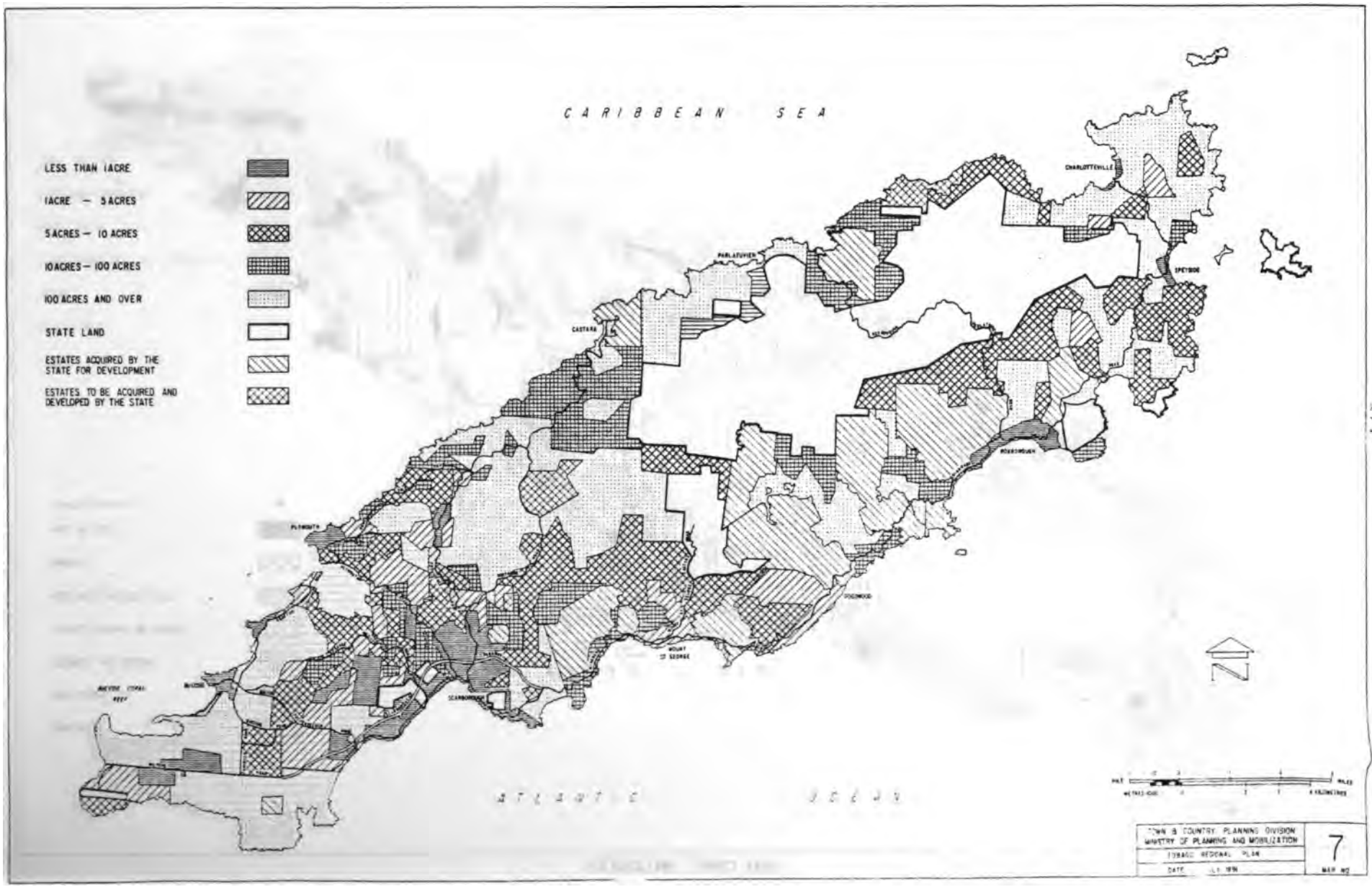
SOURCE: TCPD, 1991.

FIGURE A.2
EXISTING LAND USE



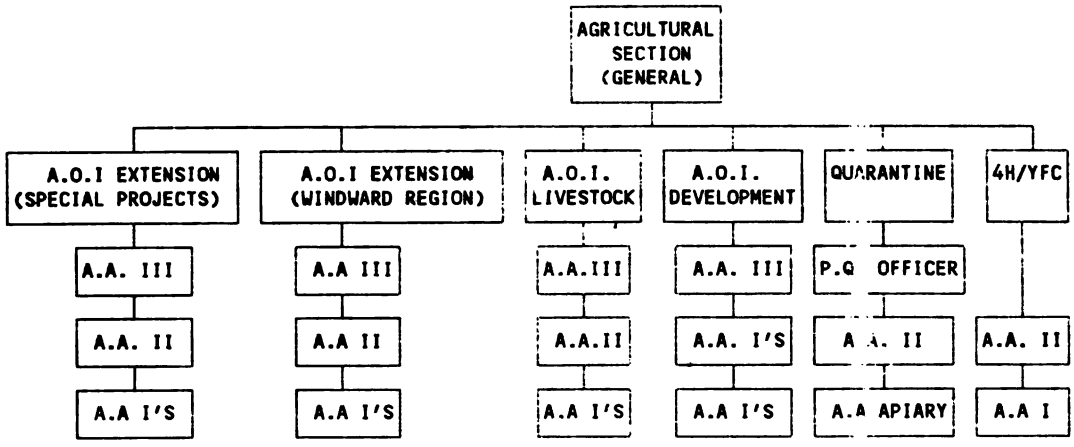
SOURCE: TCPD, 1991.

FIGURE A.3
LAND PARCELLATION AND TENURE



SOURCE: TCPD, 1991.

FIGURE A.4
ORGANIZATIONAL CHART OF THE AGRICULTURAL SECTION OF THE DAFMA

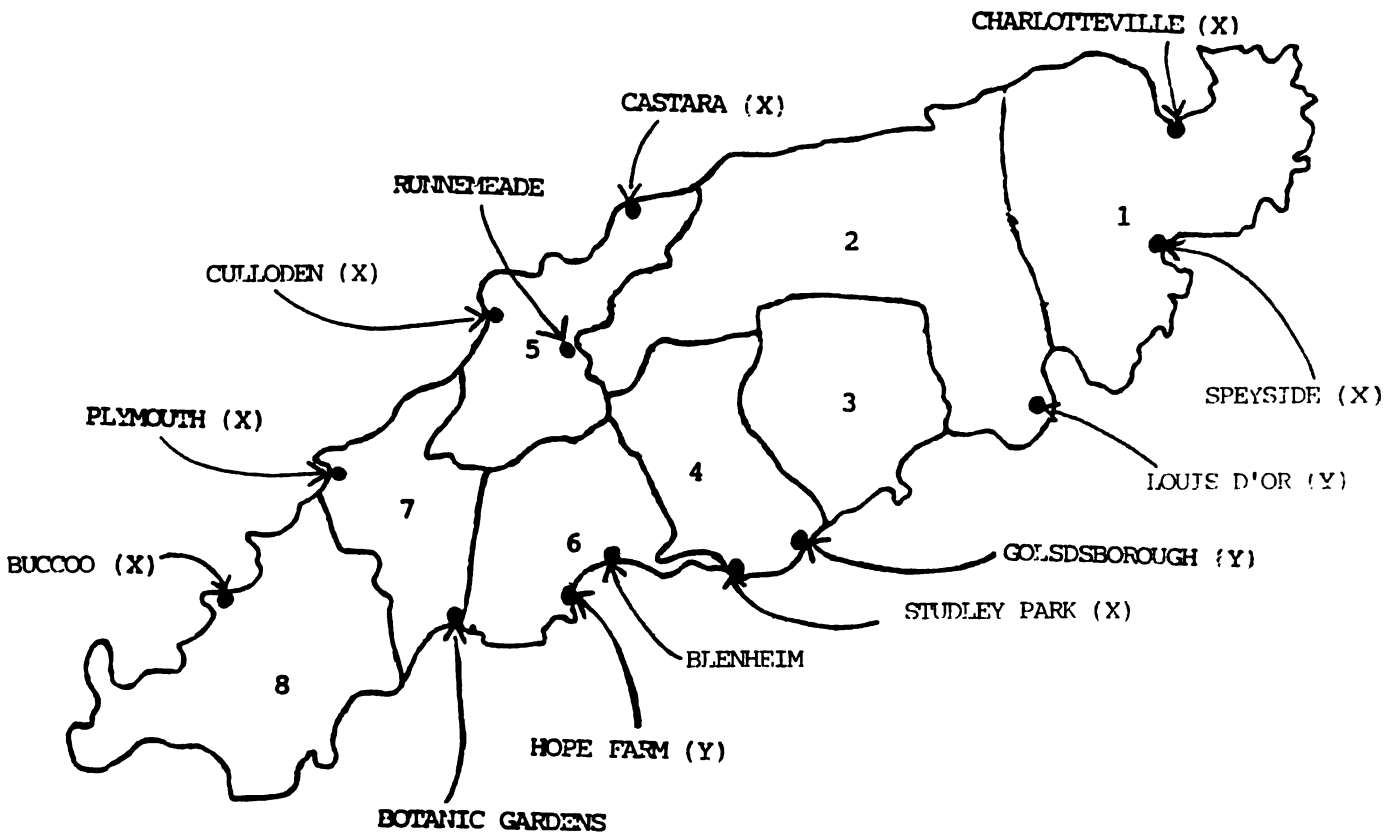


SOURCE: DAFMA

A.O. - AGRICULTURAL OFFICER.
A.A. - AGRICULTURAL ASSISTANT.
P.Q. - PLANT QUARANTINE.

FIGURE A.5

EXTENSIONS DISTRICTS AND THE LOCATING OF MAIN SUPPORT FACILITIES OF THE DAFMA



EXTENTION DISTRICTS

A. WINDWARD REGION:

1. CHARLOTTEVILLE
2. ROXBOROUGH
3. BELLE GARDEN
4. GOLDSBOROUGH

B. LEEWARD REGION:

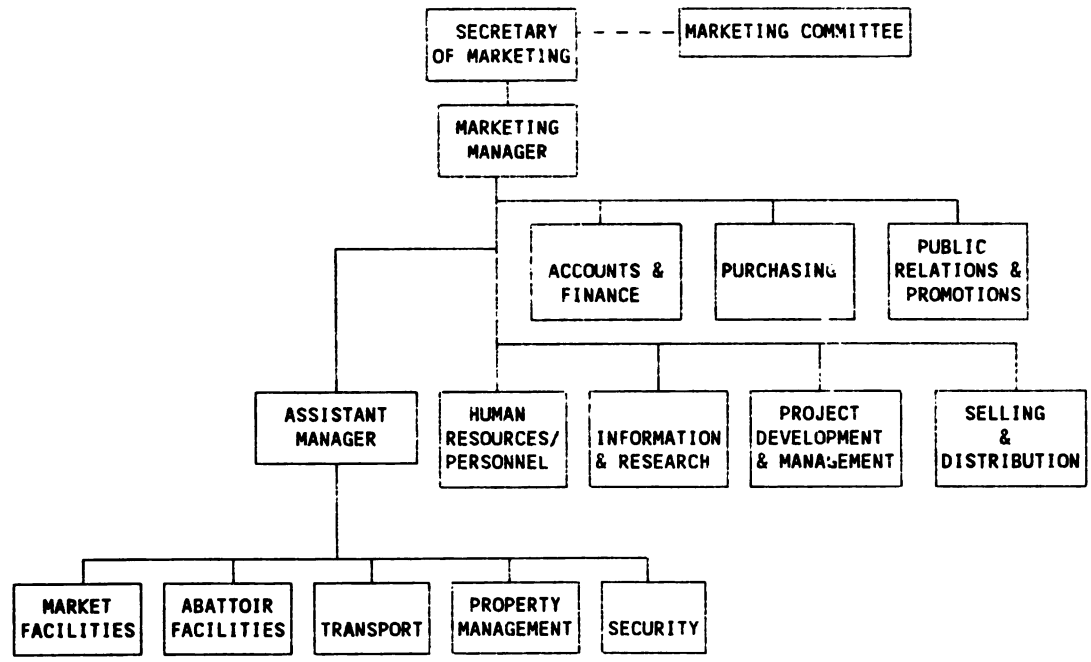
5. RUNNEMEADE
6. MOUNT ST. GEORGE
7. PLYMOUTH
8. BETHEL

SYMBOLS

X: FISH CENTERS
Y: DEMONSTRATION STATIONS

SOURCE: DAFMA.

FIGURE A.6
PROPOSED STRUCTURE OF THE MARKETING DIVISION



SOURCE: MARKETING DIVISION

APPENDIX B

SUMMARY OF PROPOSALS FOR IMPROVING RESOURCE USE AND MANAGEMENT IN TRINIDAD AND TOBAGO

1. The Medium-Term Policy Framework (1993-95)

The Medium-Term Policy Framewofk (MTPF) was developed as part of the Government's Structural adjustment effort to address the secular decline of the economy. This document provides the broad macro-economic framework and sectoral policies for Trinidad and Tobago for the period 1993-95. The MTFP identifies six broad policy goals which includes conservation and safeguarding of the environment. For the development of the agricultural sector, the MTFP indicates that strategies will be directed "to the expansion of non-traditional export agriculture, reduction in the current levels of dependence on imported foods and increasing productivity and efficiency of traditional exports."

With regard to the land resource, the MTPF indicates that ***"Government will resolve the land issues by reviewing and implementing, as appropriate, the findings of a recent study which, among other things, makes recommendations for improved land administration and management"***[1]. This is to be implemented in 1993. The above also includes a review of existing legislation which are major impediments to efficient land use. These are the **Agricultural Small Holding Act** and the **Agricultural Contracts Act**. The intention is to also **"include appropriate incentives to facilitate wider and more efficient utilization of land zoned for agriculture. Measures will also be introduced to discourage underutilization and abandonment of agricultural land**[2]**."**

With respect to forestry utilization and management, the MTFP indicates that ***"forestry sector development, watershed protection, conservation, national park development and expansion of timber production is being articulated with the contex of the National Forestry Action Programme."***

The MTPF proposals for the environment is based on the view that economic, social and physical development should proceed in ways which would facilitate the attainment of sustainable development. The focus of the plan is on :

(a) promotion of efficient use of resources;
(b) conservation;
(c) promotion of environmental education, information, training and public awareness;
(d) strengthening of environmental monitoring and enforcement through the development of standards and enactment of legislation;
(e) the establishment of appropriate administrative and organizational structures; and
(f) intensification of environmental research and development

Implementation of the above measures were expected to commence in 1993.

---

1 MTFP, p.35.

2 Ibid.

2. Draft Food and Agricultural Policy (1993)

The Draft Food and Agricultural Policy (FAP) document by the MALMR has been made available to the public for comments. It emphasizes the *"wise use of the natural resource base for farming, forestry and fishing'*. Included among its objectives are the *"sustainable management of land, water, forest and marine resources as well as (to) ensure environmental protection"* and *"to, revitalize agriculture in Tobago*[3]*."*

The proposed policies in the draft document regarding land and natural resources *"aim to maximize the benefits..... from natural resources while seeking a balance between current gains and sustainable development."* It includes the following strategies:

(a) institutionalization of land zoning to prevent prime agricultural land from being subjected to non-agricultural use as well as protecting environmentally sensitive areas;
(b) provision of adequate security of tenure for tenants of state lands;
(c) discouragement of land speculation and initiation of steps to bring idle land into production;
(d) reformation of the institutional and administrative framework for land distribution;
(e) development of management systems for a wide range of wildlife habitats;
(f) development of management systems for all forested state lands;
(g) regulation of streamflow, improvement of quality and quantity of water, reduction in flooding and erosion and protection of the aesthetic values of watersheds; and
(h) protection in perpetuity of those areas of the country which represents significant examples of the country's natural heritage by declaration as National Parks.'

With regard to agriculture in Tobago the draft policy places emphasis on:

(a) small-scale high-value production;
(b) maintaining ecological balance with agro-forestry - cocoa in the north-east and coconuts in the southwest; and
(c) rationalization of the land tenure system in Tobago.

The proposed sector policies for agriculture therefore conform to and elaborate on the medium-term Macro-Policy Framework discussed earlier.

3. Draft Tourism Policy (1987)

The draft tourism policy, particularly in the context of Tobago, aims to develop the sector through the promotion of the richness and diversity of the natural and cultural heritage of the island. Accordingly, the proposed policies recognize the need to preserve, restore and promote historical sites, cultural festivals, art forms and natural beauty spots. The strategy also focuses on the exploitation of eco-tourism on the island. Clearly, the sustainability of tourism,

---

[3] MALMR, 1993, p. 32.

as is now conceived, is very much linked to the enhancement and conservation of the natural environment and preservation of the cultural heritage of Tobago.

4. The Tropical Forestry Action Programme (1992)

The Tropical Forestry Action Programme (TFAP) project was initiated at the request of the Standing Committee of Ministers for CARICOM, funded by the Overseas development Administration (ODA) and implemented by the FAO. The objective of the project included a survey of the country's forest resources, identification of factors which are affecting or likely to affect its long-run sustainability, development of an action program for protection/conservation, and the optimization of the economic and social benefits from the resource base. The scope of TFAP, in terms of potential benefits envisaged, include the following :

(a) water quality and yield;
(b) bio-diversity - the flora and fauna of forested watersheds;
(c) nature reserves, national parks and protection of critical areas.
(d) timber production;
(e) non-wood products eg. handicraft material, medicinal plants, forest fruits;
(f) eco-tourism;
(g) micro-climate stabilization/amelioration; and
(h) wildlife production.

TFAP's Projects for Trinidad and Tobago, with respect to the first-five years, were prioritized for implementation with the assistance of donor funding agencies. It is intended that during the course of this first phase, the program would be reviewed in order to strengthen existing projects, as well as to add new ones. However, implementation has not yet commenced.

A total of 18 projects were identified for implementation during the first phase (**TABLE B.1**). All except project numbers 6, 12 and 18 apply to both Trinidad and Tobago. The highest-priority projects include :

(a) a country capacity project for training and institutional capacity development for the sustainable management of forest resources;
(b) inventory and assessment of forest resources;
(c) establishment of national parks and protected areas;
(d) conservation and management of mangroves; and
(e) a comprehensive public education/awareness program.

Projects ranked as priority number two include :

(a) development of a manual for sustainable management systems for natural forests;
(b) eco-tourism: design and development of sites, services and training in management and tour guide and promotion;

(c) development of handicraft: identification and production of raw materials;
(d) watershed management research for water resources conservation; and
(e) improvement in forest fire protection.

TABLE B.1
PROJECTS SELECTED FOR THE TROPICAL ACTION
FORESTRY PROGRAMME (FIRST PHASE)

PRIORITY	PROJECT NOS.	PROJECT TITLE
1	01	COUNTRY, CAPACITY PROJECT: *TRAINING *EVALUATION OF EXISTING ORGANIZATIONAL RESOURCES AND STRUCTURE *PROVISION OF EQUIPMENT AND FACILITIES
1	02	COMPREHENSIVE INVENTORY & ASSESSMENT OF THE FORESTRY & ANCILLARY RESOURCE EASE
1	03	ESTABLISHMENT OF NATIONAL PARKS & PROTECTED AREAS
1	04	CONSERVATION & MANAGEMENT OF MANGROVES
1	05	PUBLIC EDUCATION/AWARENESS PROGRAMME
1	06	RE-AFFORESTATION & DEVELOPMENT OF AND INTENSE MANAGEMENT SYSTEM FOR THE MORUGA RANGE NATIONAL FORESTS
2	07	DEVELOPMENT OF A MANUAL FOR SUSTAINABLE MANAGEMENT SYSTEMS FOR NATURAL FORESTS
2	08	ECOTOURISM: DESIGN AND DEVELOPMENT OF SITES, SERVICES AND TRAINING IN MANAGEMENT AND TOUR GUIDE AND PROMOTION
2	09	DEVELOPMENT OF HANDICRAFT: IDENTIFICATION AND PRODUCTION OF RAW MATERIAL
2	10	WATERSHED MANAGEMENT RESEARCH FOR WATER RESOURCES CONSERVATION
2	11	IMPROVEMENT IN FOREST FIRE PROTECTION CAPABILITY
2	12	SANTA ROSA CARIB COMMUNITY FOREST PROJECT
3	13	ESTABLISHMENT OF A BUFFER ZONE ALONG SELECTED WATER COURSES & COASTAL AREAS
4	14	AGRO-FORESTRY DEVELOPMENT PROJECT
5	15	ESTABLISHMENT OF A BIODIVERSITY DATA BASE AND INFORMATION CENTRE FOR TRINIDAD AND TOBAGO
6	16	EXAMINE WOOD & SAWMILLING INDUSTRY TO IMPROVE EFFICIENCY IN ADMINISTRATION, PRICING, MANAGEMENT
7	17	RESEARCH ON SUSTAINABLE UTILIZATION OF WILDLIFE FOR FOOD
8	18	ESTABLISH ARBORETUM & PARK AT 4M TOCO MAIN ROAD

SOURCE: TAFP, 1991.

Overall these projects are expected to provide a major boost to the environmental and resource management issues facing Tobago.

5. Civilian Conservation Corps

Trinidad and Tobago established a civilian conservation Corps Programme in 1993, with the objective of creating temporary employment for young persons between ages 18 and 25, and at the same time to undertake conservation activities. The program employs 250 persons in five regions. Tobago is one of the regions with an allocation of 190 persons. The program involves the training of recruits in a number of areas including environmental education and tourism. Projects to be implemented include:

(a) reforestation;
(b) planting fruit trees;
(c) establishment of nature trails and beach beautification projects;
(d) log extraction; and
(e) establishment of forest nurseries.

The civilian conservation program is expected to contribute to the long-term sustainability of the natural resource base by creating positive values among youths and increased awareness of the potential role of forests, natural resources and the environment in sustainable economic development. In the short-term, it is expected to make a significant contribution to conservation through resource development projects.

6. The Aliens Land Holding Act

The Aliens Land Holding Act sought to prevent the alienation of the country's limited land resource, from citizens of the country into the hands of foreigners. The recent program of economic and institutional liberalization pursued by Government include a repeal of this Act. With the growth experienced in Tobago, particularly with respect to tourism, foreign interests to own land have increased. Some of the transactions appear to be entirely speculative. The evidence suggest that:

(a) land prices are being driven to levels which are beyond the reach of most Tobagonians, and
(b) large tracts of arable lands, which were in private estates, are being sub-divided and converted to built uses.

While some transactions also involve local conglomerates, the effects are generally likely to be the same. That is, the alienation of Tobagonians within their own island, and the erosion of the agricultural potential through the conversion of the best arable lands to other uses. It is doubtful whether the intention of the liberalization of land ownership was to encourage speculation. The social and economic future of the island could be seriously affected if this trend continues. One option to safeguard the conservation and more effective use of land is for the state to acquire the private estates that are being sold.

7. The Draft Tobago Region Physical Plan (1991)

The Draft Tobago Region Physical Plan was prepared by the TCPD of the Ministry of Planning and Development, in consultation with the THA. The principal goals and objectives of the plan include[4]:

(a) the promotion of spatial integration to minimize the conflict among land uses;
(b) the creation of a regional economy which will contribute meaningfully to the national economy;
(c) the maintenance of the strong community spirit of the villages and improvement in the quality of life;
(d) creation of a safe and pleasant physical environment, and
(e) creation of viable local communities.

Tobago was divided in six sub-regions in order to facilitate spatial analysis of development options. The alternative strategies considered included

(a) dispersed development;
(b) concentration of development in the southwest;
(c) concentration on the windward coast; and
(d) concentration on zones of highest potential.

The last mentioned is the preferred strategy and it involves the development of both the south-west and windward coastal areas. It takes advantage of the existing infrastructure, while facilitating the dispersion of economic and social activities over a larger area of the island (**FIGURES B.1, B.2 & B.3**). This strategy was preferred because it spreads social and economic benefits to sub-regions outside of the southwest, thereby facilitating the establishment of viable and sustainable rural communities, while avoiding further over-concentration and congestion in the southwest. The broad land use proposals are presented in **FIGURE B.4**.

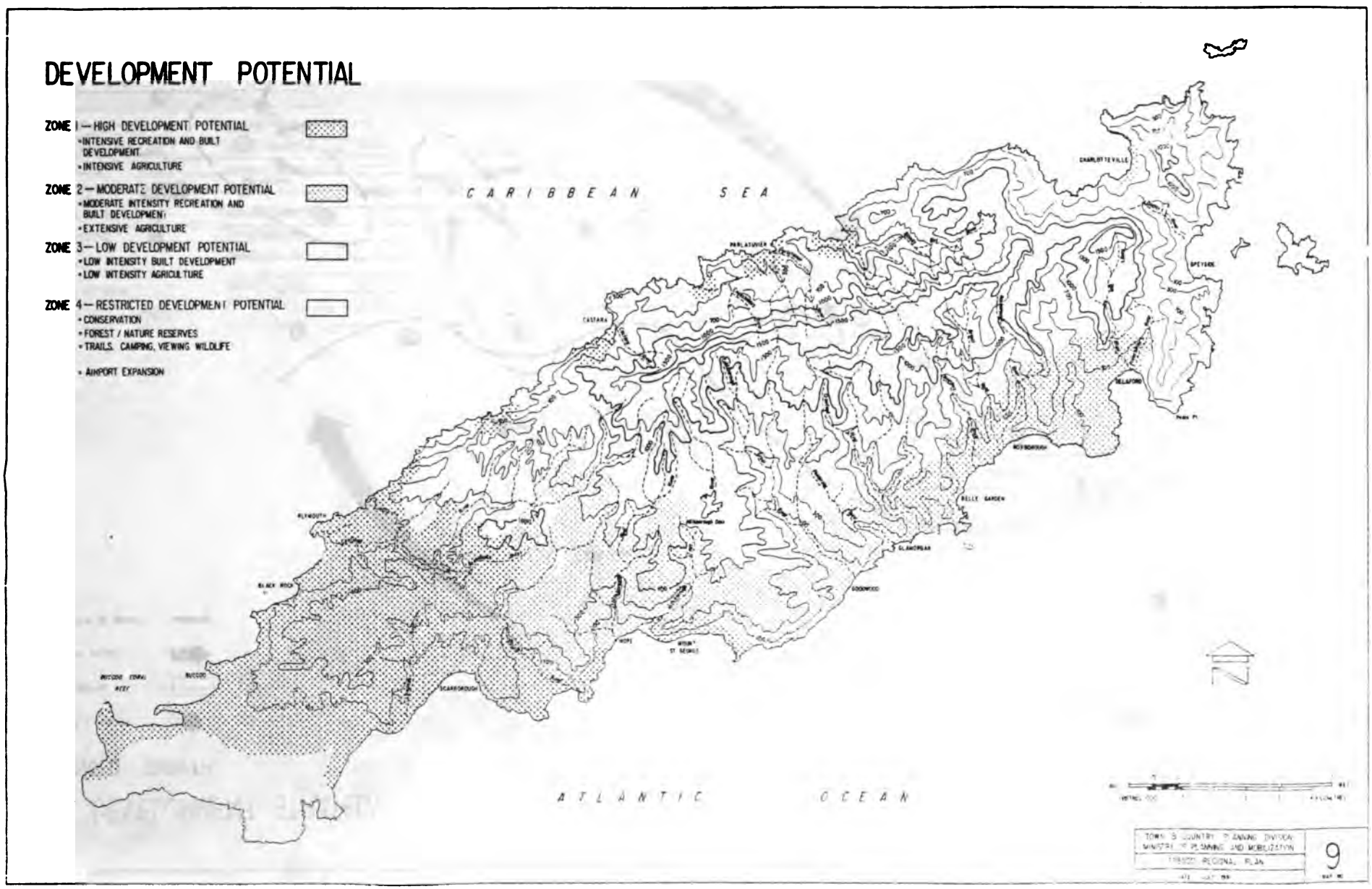
With respect to agricultural land use planning, the Plan proposes: (a) the development of comprehensive management plans for agriculture; and (b) the establishment of a comprehensive land policy.

The development of a comprehensive land-use policy is necessary to facilitate the long-term sustainable development of all sectors - agriculture, tourism, built-development, recreation and forest resources. The southwest has the majority of the best arable lands. Seventy-five percent of the land area here is of capability classes I and III.. Given the rapid conversion of lands to built development in this area in recent years, policies and mechanisms are urgently required to ensure that the remaining arable lands are retained for agricultural production, and that environmental enhancement programs are pursued.

---

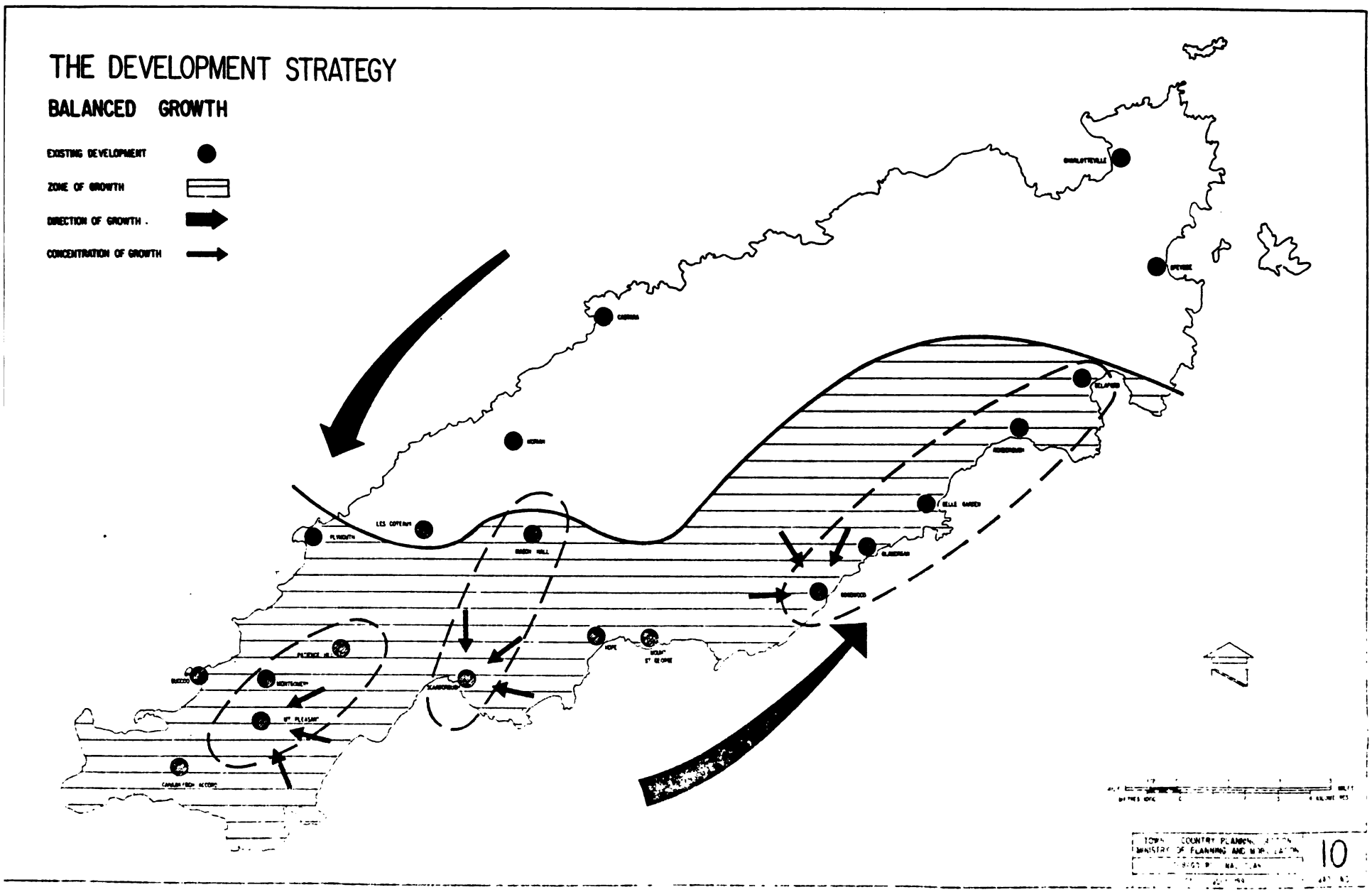
[4] TCPD, 1991, p.6.

FIGURE B.1



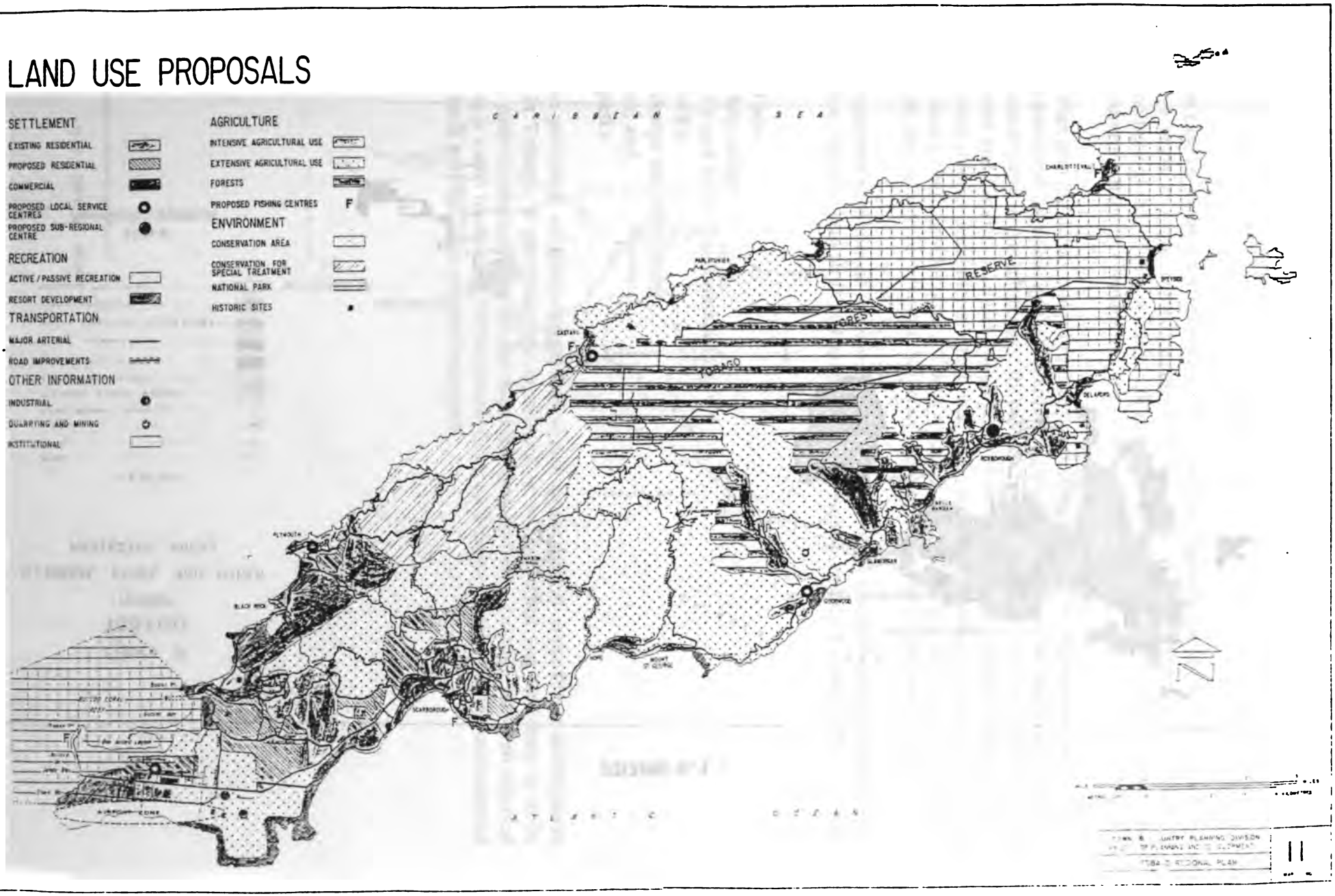
SOURCE: TCPD, 1991.

FIGURE B.2



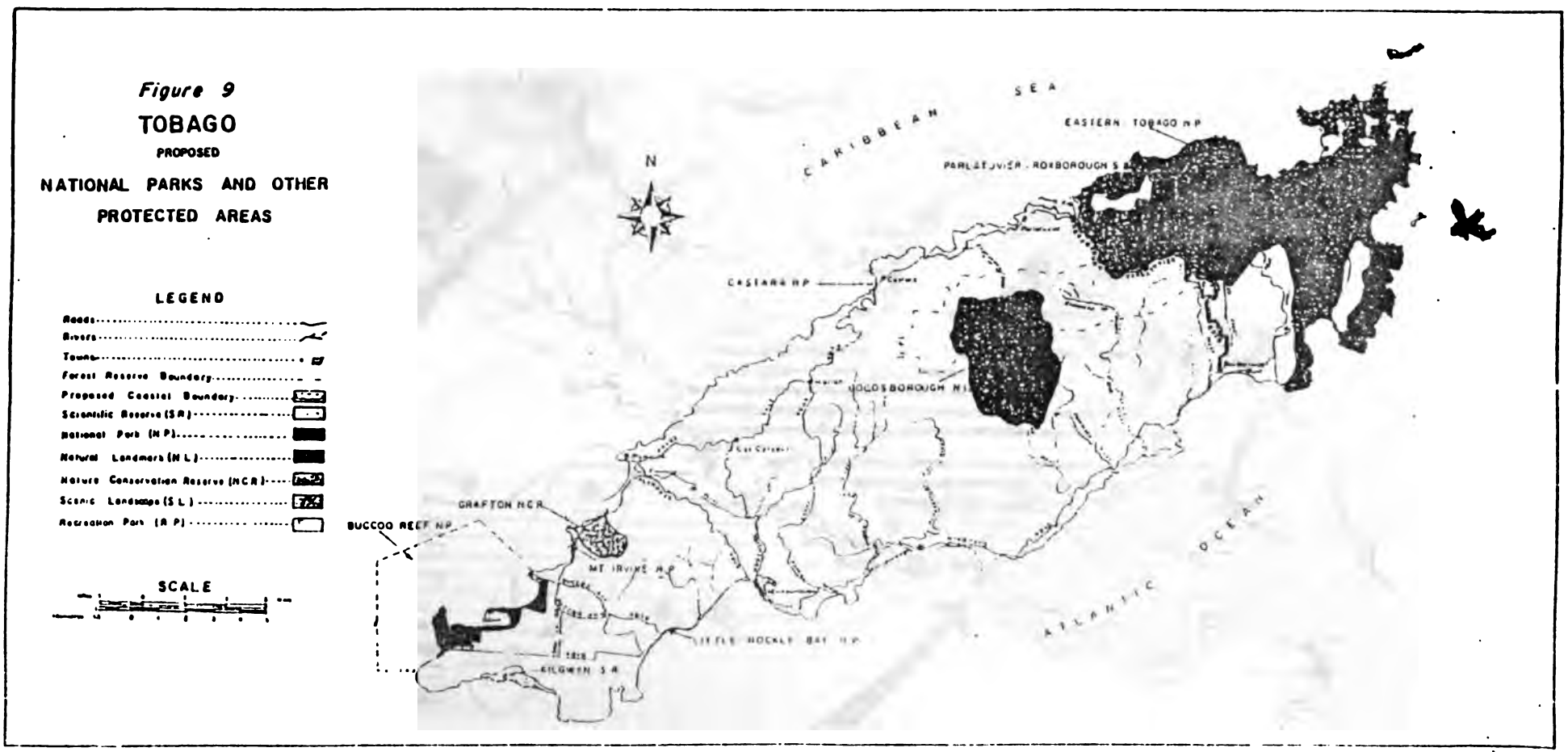
SOURCE: TCPD, 1991.

FIGURE B.3



SOURCE: TCPD, 1991.

FIGURE B.4



SOURCE: TFAP, 1992.

In the case of tourism the proposal is to avoid mass tourism since it is felt that this is likely to have negative social consequences on the local community. Additionally, the plan recognizes the need to resolve the conflict with respect to the demand for coastal resources - the demand for leisure versus the demand for conservation.

The Plan also highlights major problems associated with the natural environment. These include environmental degradation in the southwest stemming from: (a) the high concentration of development activity in this sub-region; (b) the lack of appropriate and effective sewerage and waste treatment and disposal facilities which result in polluted waters, some of which exceed mandatory international recreational standards; and (c) the conversion of large tracts of agricultural land to built-development. These activities are collectively altering the ecological balance of the area as well as adversely affecting the aesthetic value of the sub-region.

In an attempt to minimize adverse environment and social impact from expansion of the tourism sector, specific standards and guidelines have been proposed by the TCPD[5]. These include:

(a) hotel size;
(b) building design;
(c) density and form of accommodation;
(d) set-backs;
(e) site-design and landscaping;
(f) access; and
(g) car parks.

These guidelines are fairly comprehensive and appear critical to the future development of tourism in Tobago, if environmental degradation is to be avoided and the sector is to be placed on a path of sustainable social and economic development. Overall, the draft physical plan provides a sound framework for the development of Tobago, in terms of the utilization of the islands lands and the other physical resources.

---

5 TCPD, 1991 p. 96-98.

APPENDIX C

A SUMMARY OF CARDI'S ACTIVITIES IN TOBAGO

CARDI's activities in Tobago are part of the Institute's program of activities in Trinidad and Tobago. These are planned and executed in collaboration with the Division of Agriculture, Forestry and Marine Affairs of the THA. Below is a summary of the activities executed by CARDI since 1981.

1. Animal Production Program

(a) Pasture Development on Commercial Farms: This program was funded by EDF between 1986 to 1991. It was designed to introduce improved forage species into livestock systems either for grazing pastures or cut-and-carry systems. Forty farmers were assisted with pasture development and nurseries were established at Hope Farm and Kendal Farm.

(b) EDF-Funded Technology Transfer and Applied Research Project: This project is part of the Regional Sheep and Goat Improvement Sub-project. It is executed under the CARDI/EDF project for Technology Transfer and Applied Research that was initiated in 1990. The project's activities include upgrading the infrastructure at Blenheim and Studley Park Stations (equipment and animal housing), as well as executing outreach programmes and Extension Officer Training.

(c) CIDA-Funded Sheep Production and Marketing Project: This project was also initiated in 1990 and it aims to improve the overall welfare of low-income sheep farm families in Tobago. Its purpose is to develop production and marketing capabilities of the targeted farm families.

2. Crop Production Program

The activities of this Program focused on experimentation and development of 5 main crops. These were: (a) **pigeon pea** - participated in regional trials of eight varieties wich were planted in Tobago in 1987; (b) **aloe vera** - collaborated in research with the Caribbean Industrial Research Institute (CARIRI) and other institutions to investigate and foster commercial uses of gel extracted from the aloe vera leaves; (c) **sesame** - developed a tech-pack based on local trials; (d) **peanut** - a large commercial plot was established in 1990 at Goldsborough using 1 ha. of land to evaluate the tech-pack formulated as a result of earlier trials, and test a CARDI-designed equipment; and (e) **thyme** - collaborated in research with THA and CARIRI to evaluate thyme production for oil extraction and for use in liquid seasonings.

3. Technology Adaptation and Transfer Program

The activities implemnented under this program were:

(a) Crop Management: Management of plots for demonstration or evaluation (e.g. variety trials) of the following crops - sweet potato, cassava, yam, thyme, garlic, peanut, aloe vera, sesame, onion, beet, sweet pepper, tomato, cabbage, ginger and cantelope.

(b) Technical Assistance to THA in the Following:

- assistance to the extension services of the Division of Agriculture with technical information required to introduce selected crops (sesame, peanut, onion, ginger, pineapple, beetroot, carrot, canteloupe) to farmers.

- small ruminant survey in Tobago.

- prepared eight Tobago Farmers' Guides for publication on behalf of the Division of Agriculture (beetroot, cantelope, carrot, onion, pineapple, sesame, peanut and broccoli).

(c) Organized the Following Seminars/Workshops:

- Pasture Improvement, 1986 and 1987
- Seedling Production and Crop Management of Alternative Crops, 1988
- Banana Production Workshop, 1988
- Pest & Disease Control in Vegetables, 1991
- Post harvest handling of vegetables, 1991
- Orchard Management, 1992.

APPENDIX D

SUMMARY OF MAIN PROBLEMS/CONSTRAINTS, RECOMENDATIONS AND ACTIONS

AREA/ACTIVITY	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Agricultural development strategy	Tobago lacks a comprehensive strategy to develop its agricultural sector.	Execute a multi-institutional approach involving the DAFMA, Division of Planning, the MD, the MALMR and other relevant agencies to formulate an agricultural development plan.	
Agricultural policy formulation, implementation, monitoring and coordination.	The DAFMA has a weak capability to formulate, implement, monitor and coordinate agricultural policy	- Design an appropriate mechanism for improved collaboration between the DAFMA, the Division of Planning & the MALMR for policy formulation implementation, monitoring & coordination; - liason between the Minister of Agriculture in Trinidad and the Secretary of Agriculture of Tobago should be improved.	- In collaboration with the Division of Planning, establish a group in the DAFMA with responsibilities for policy formulation, implementation and monitoring, - prepare a corresponding proposal that outlines the responsibilities, resource availability, etc., for this group.
Annual programming of activities, budgeting, monitoring, evaluation and project development.	The DAFMA lacks an adequate system for programming activities, budgeting, monitoring and evaluating on an annual basis	- The DAFMA should replace the current system with an annual programming monitoring and evaluation system (APME) - The DAFMA should seek collaboration with the Division of Planning and the MALMR to develop the APME system	Establish a small unit in the DAFMA to execute the APME system and for project development
Agricultural statistics	Lack of an organized statistical base to support decision-making and planning in the sector	DAFMA should develop an agricultural data base	Collaborate with the Division of Planning, the MD the CSO and the MALMR to develop an agricultural data base for Tobago - provide training to extension officers and other technical support staff of the DAFMA in data collection methods
General sectoral issues	- Low competitiveness of agricultural activities,	The DAFMA should evaluate various production activities select those having the best potential and provide support to improve their competitiveness;	- With support from MALMR, CARDI and UWI develop farm budgets to evaluate the competitiveness of targeted production activities

AREA/ACTIVITY	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
General sectoral issues	- prevalence of part-time farming with little marketable surplus;	- DAFMA should design strategies to convert the more efficient part-time farmers to commercial producers;	- evaluate least cost approaches to improve the efficiency of part-time farmers; - select a target group of the more successful part-time farmers and provide a package of support services to these;
	- low accessibility to land for farming accompanied by a large amount of idle state land;	- the THA should develop a comprehensive land use policy for Tobago; - review the land distribution program and apply strict criteria for distributing land in the future; - review current leasing arrangements for statelands and improve tenure security;	
	- diversion of arable land to non-agricultural uses.	- as part of the land use policy, the THA should design strategies for more effective agricultural land use for both private and public lands.	
	- lack of adequate infrastructure, particularly access roads and irrigation facilities;	- the THA should improve access roads and rehabilitate old irrigation systems on former estates, and improve irrigation facilities in areas where priority production activities are undertaken	
	- praedal larceny	- THA and the appropriate legal institution (s) should review the legal regulations - enforce punitive measures	
Crop production	- Production risks and uncertainty are high;	- The THA should select priority crops for development based on their competitiveness; - design crop improvement strategies for selected crops; - improve institutional support to reduce risks and uncertainty of priority crops, - strengthen farmers/producer organizations;	Execute crop feasibility studies to identify priority food and fruit crops
	lack of information on improved production techniques and farm management.	- the DAFMA should improve extension support and expand farmer training in priority crop areas, - improve production and farm management techniques - organize farmers' groups to minimize training costs and improve crop marketing;	

AREA/ACTIVITY	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Crop Production	- lack of planting material;	- the DAFMA should expand sources of supplies for good planting material;	- encourage private sector involvement in supplying planting material; - improve germplasm collection of priority crops on government stations; - request support from CARDI & IICA to develop good planting mateurial.
	- inefficient tractor services by DAFMA;	- phase out tractor pool services and/or charge more realistic rates; - the THA should encourage increased private sector participation to provide such services;	
	- prevalence of pests and diseases;	- the DAFMA should design measures and allocate resources to control pests and diseases affecting the priority crops to be determined;	- DAFMA should seek assistance from the MALMR, CARDI and UWI to design and execute the measures;
Livestock production	- Tobago's competitiveness in livestock production is limited;	- The DAFMA should expand the livestock improvement program focusing primarily on small ruminants, - Target a select group of farmers and provide the necessary support to develop commercial operations of sheep and goats.	- design a strategy to access additional financial and technical resources for the program.
	- Lack of an adequate supply of high quality breeding stock	- DAFMA should facilitate importation of high quality breeding stock and semen. - DAFMA should expand its artificial breeding activities using improved genetic material - DAFMA should select a few private farms and support these as satellite farms to supply quality breeding stock; - DAFMA should introduce new genetic material for pigs	- liaise with the MALMR to provide support measures for easy importation of breeding stock and semen, - expand breeding herds at the Hope farm, Blenheim Sheep Project and other livestock stations; - DAFMA should work closely with the MALMR and the UWI to develop the required genetic material.
Fishing	Absence of information on the fish stock.	- design a system to provide information on a periodic basis on the fish stock and yields.	- Seek support from the IMA MALMR and FAO to develop the system

AREA/ACTIVITY	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Fishing (Cont'd)	- low productivity; - lack of processing facilities.	- the DAFMA should improve fishing methods in Tobago; - DAFMA should evaluate the feasibility of establishing a fish processing facility.	- introduce improved fishing technology, - expand training of fishermen; - strengthen fishing cooperatives.
Marketing	- The THA lacks a comprehensive marketing strategy;	- Execute a comprehensive assesssment of the marketing system to serve as a basis for formulation of the marketing strategy;	
	- low efficiency of the Marketing Division;	- the Division should be reorganized and should expand its support services in areas such as market development, market information system, grades & standards, etc.; - reduce the MD's role in buying and selling activities and strengthen private marketing operations, as well as farmers groups to become involved in marketing, - improve coordination between the MD, the DAFMA, ADB, NAMDEVCO and the MALMR	- the current proposal to restructure the MD should be reviewed in view of priority areas to be identified, - the MD should seek support from NAMDEVCO and the MALMR for its reorganization and for the development of its future activities;
	lack of an adequate market information system;	- the MD should seek support from the DAFMA NAMDEVCO and the MALMR to improve the market information system.	
	- limited size of the domestic market;	- having identified the priority products to be developed, the MD should target domestic niches markets (tourism sector, etc.,) through promotional activities, - design strategies to promote the island's products as "Tobago" products having certain intrinsic attributes, - improve transport facilities to expand marketing between the two islands, - export markets should not be pursued until production efficiency is improved,	

AREA/ACTIVITY	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
	- the MD has an inadequate pricing system for farmers;	- the MD should provide guaranteed prices for the priority products for a specific time period; the prices should be based on Tobago's production costs; - the MD's system of payment to farmers needs to be improved;	- the MD should collaborate with the DAFMA to generate farm budget data to support price determination;
	- lack of a quality control system for agricultural production;	- the MD should develop a system of grades and quality standards for agricultural products, with support from NAMDEVCO and the MALMR; - the DAFMA and the MD should provide farmers the relevant guidelines and support to produce quality products;	- the DAFMA should facilitate the availability of good quality inputs and provide the necessary extension support in production, harvesting and post harvest methods
Credit	- Lack of accessibility for most small farmers;	- Longer term leases should be issued to farmers occupying stateland that are acceptable to the ADB, - the DAFMA, MD and the ADB should improve their working relationship to facilitate the provision of credit to farmers involved in the priority production activities;	- the DAFMA should establish strict criteria for selecting farmers to occupy statelands and implement a monitoring system to ensure effective use of the land
Agricultural inputs	- Input costs are high	- The DAFMA in collaboration with CARDI should evaluate least cost production alternatives using more locally available inputs, especially in ruminant production (e g produce animal feeds using locally available ingredients) the THA should liase with the Central Government to have Tobago farmers benefit from the production support programs that exist in Trinidad, the DAFMA and the MD should organize farmers groups and provide necessary support (e g credit, etc) for them to do bulk purchasing of inputs.	- the DAFMA and the MALMR should examine the existing national production support programms and define strategies to extend these to Tobago farmers.

AREA/ACTIVITY	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Agro-processing	- Linkages to agro-processing sector are weak,	- The DAFMA and MD should facilitate closer interaction between farm production and processing activities;	- provide market information and establish networking arrangements between farmers and agro-processors;
	- inadequate processing activities;	- the DAFMA and the MD should provide support to improve the efficiency of existing processing operations;	
	- insufficient processing facilities;	- the THA should provide incentives to potential private investors to establish new facilities;	- the THA should evaluate alternative incentives for private investors given its fiscal constraints;
		- the DAFMA together with the Ministry of Industry and the Community Development Department in Trinidad should support development of small scale processing operations at the community level and among farmers groups;	
Linkages with the tourism sector	- Linkages between agriculture and tourism are weak,	- the DAFMA and the MD should develop networking arrangements between farmers and the tourism sector; - the THA should promote Tobago's foods among hotels and restaurants.	the MD should facilitate information flow between farmers and the tourism sector; - food fairs should be organized periodically and training be provided to chefs in the preparation of local dishes
Natural resource management and conservation	- The THA has limited capabilities to effectively manage the island's natural resources.	- Establish a Natural Resources Advisory Council (NRAC) & a Natural Resources Management Unit (NRMU); - train DAFMA personnel in natural resources management and conservation.	the THA should consult with the Central Government, private institutions and NGOs to establish the NRAC and the NRMU; - the THA should seek support from institutions such as UWI and CARDI to implement training programs,
Forestry, wildlife, ecosystem and water resources	- existing policies, guidelines, legislation are ineffective and/or non-existent;	- the THA should support adoption of the various policies, legislation and guidelines that have been proposed to the Central Government, - the THA should implement those proposals that are specific to Tobago as quickly as possible.	- the THA together with national private and public institutions and NGOs should lobby the Central Government for early adoption of the proposed policies and legislation,

AREA/ACTIVITY	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
	- erosion risk of steep slopes where tree cover is absent;	- the THA should negotiate with the Central Government to implement Tobago's component of the TFAP; - the THA should develop a forestry plan for statelands; - THA should design incentive measures for private land owners to reforest their land; - establish guidelines and monitor tree cutting activities;	- seek funding to implement forestry projects; - seek support from the Central Government, UWI and FAO to formulate a forestry plan for statelands;
Land administration	- Absence of effective regulations governing land use;	- THA should review the existing policies and approve legislation to manage Tobago's land resources properly; - create a unit within the THA to implement and enforce the policies and legislation, - THA should implement the suggestions of the Government-commissioned report on "Land Rationalization" that are specific to Tobago.	- establish a technical group to review the policies and design the appropriate legislation,
	- excessive land speculation and diversion;	- in addition to the suggestions contained in the Land Rationalization report, consider other measures (such as a windfall tax, land zoning, impose a time limit to put land into productive use, etc.) to curb land speculation, - the criteria for granting land use approvals by the TCPD should include the land use policies of the THA;	- review recent land transactions in Tobago in order to design appropriate policies for more efficient land use; - create a public advisory and monitoring group for planning approvals by the TCPD, - THA should seek support from the Central Government for the TCPD to operationalize its land use policies and guidelines for Tobago;
	- alienation of good agricultural land,	- THA should not grant approvals for permanent built development on leased lands, - THA should ensure that public lands having good agricultural potential be used for farming;	- THA should implement the corresponding policy measures;
Soil conservation	- risks of soil erosion from farming are high,	- DAFMA with support from CARDI and UWI should provide soil management guidelines and training to farmers;	

AREA/ACTIVITY	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
Soil conservation	- risks of soil erosion from farming are high;	- DAFMA together with CARDI and UWI should develop soil conservation techniques for agriculture and agro-forestry activities;	
Developments in the south-west	- Built development is adversely affecting the natural resource base and the environment.	- The THA should formulate a physical development plan for this sub-region with the TCPD; - new proposals for built development should be put on hold until a physical plan is developed. - the THA should execute environmental enhancement projects including reforestation, set-aside green areas and leisure parks,	- execute an environmental impact assessment of the sub-region,
	- lack of adequate sewer and waste disposal facilities;	- the THA should review the proposals for waste and sewer treatment; - the THA should seek technical assistance to develop and fund project(s),	
Eco-tourism and agro/eco tourism	- Tobago's potential is under developed;	- the THA should design strategies with the Tourism organizations and private sector institutions to develop eco-tourism,	- the THA should form a technical group of people drawn from the public sector, tourism organizations and other relevant agencies to prepare a tourism plan;
		- the THA should expand facilities and services for tourists,	- allocate part of the resources generated from tourism activities to expand the facilities, - improve scenic amenities and locations in the forestry rerserve and in farm communities,
		- together with the Tourism organizations the THA should provide training to tour operators, tourism guides and other individuals servicing the tourism sector, - promote Tobago's food and scenic beauty among tourists, the THA together with the Tourism organizations should develop the local handicraft activities through training providing incentives and market promotional efforts;	

AREA/ACTIVITY	PROBLEM/CONSTRAINT	RECOMMENDATIONS	ACTION
National parks	- Lack of adequate protection for national parks and heritage areas.	- the THA should implement the National Parks proposals that are specific to Tobago, - the THA should impose fees for use of the Parks and heritage areas as a means to finance additional protection to these areas;	
Technical Cooperation and Networking	- the THA has limited coordination and networking with national, regional and international institutions working in agriculture.	- the THA with support from the Central Government should expand its functional cooperation linkages with these institutions to seek support for developing Tobago's agriculture; - the DAFMA should strengthen its networking activities between farmers groups within Tobago and between those of Tobago and Trinidad	- the THA should seek to have a permanent presence in the relevant Central Government agency that liases with external organizations, - establish a formal mechanism to network with farmers groups in Tobago, - the DAFMA should work with the MALMR in order to establish networks between farmers groups in Tobago and those in Trinidad

APPENDIX E

LIST OF INDIVIDUALS AND ORGANIZATIONS CONSULTED OR INTERVIEWED BY THE MISSION

Division of Agriculture, Fisheries and Marine Affairs (DAFMA) f the Tobago House of Assembly (THA):

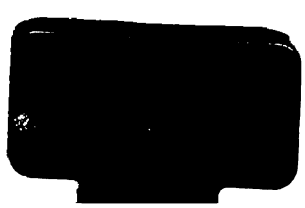
Jerome Keens-Dumas	Technical Officer
Ethelbert Harris	Agricultural Officer II
Carlyle Dick	Principal, Kendal Farm School
Patricia Barrow-Smart	Veterinary Officer
Carl De Freitas	Plant Quarantine Officer
Euthan Yeates	Fisheries Officer
Rosslyn Barrow	Accountant
Rosamond Keith	Clerk
Carl Groome	Agricultural Assistant (AA) III
Isaac Holder	AA III
Henry Bobb	AA III
Ruby George	AO I (stateland)
Keith George	AA I Extension
Paul Williams	AA I Extension
Clyde McDonald	AA I Extension
Harold Legerton	AA I Extension
Sandra Timothy	AA I Extension
Wellette Toby	AA I Extension
Kathy Woods	AA I
Rodney Jones	AI Technican

Others:

Reginald Phillips	Former Technical Officer, DAFMA
Micheson Neptune	Manager, Marketing Division, THA
Hensley Manswell	Division of Planning, THA
Vaughn Thomasos	Head, Agricultural Planning Unit, Ministry of Agriculture, Land and Marine Affairs, Trinidad
Curtis Mc Intosh	Advisor in Food Economics, Caribbean Food & Nutrition Institute, Trinidad
Barbara Rampersad	Director, Central Statistical Office, Trinidad and Tobago
Aman Hosein	CARDI
Gerald Kalloo	Branch Manager, ADB, Tobago
Ancilla Stewart	CSO Office, Tobago
Sylvia Wright	Tobago Cocoa Fermentary Cooperative
Rowenna James	Secretary, Tobago Agricultural Society
Andre Phillips	Manager Small Business Development Corporation, Tobago
Carlos Dillon	Manager, Mount Irvine Hotel
Allan Clavie	Manager/Owner, KARIWAK VILLAGE Hotel, Tobago
LLoyd Anthony	President, Tobago Bed & Breakfast Association

Fitzroy Allard	Tobago Rabbit Breeders Association
Kenrick Alfred	Tobago Goat Farmers Association
Gladstone Solomon	Tobago Apiculture Society
Arthur Moore	Manager, Tobago Fishing Cooperative
Gloria Cudjoe	Lambau Credit Union
T. Telemacque	Mywin Food Processing Limited
Olsen Gardiner	Olka Foods Limited
Charles James	Mason Hall Farmers Association
R. T. Morshead	Beef Farmer/Retailer
Marcelle Latour	Golden Grove Estate
C. Lincoln Archer	Farmer
Freddie Wilson	Farmer
Lawrence Mc Conney	Poultry Farmer
David Belizaire	Poultry Farmer
Daniel Balfour	Pig Farmer
Stanfor Bapliste	Pig Farmer
James Taylor	Butcher


FECHA DE DEVOLUCION
IICA
E14
Autor
Trinidad and Tobago: an agri-
cultural sector study of Tobago
Título
Nombre del solicitante
Fecha
Devolución



INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE
HEADQUARTERS
P.O.Box 55-2200 Coronado, Costa Rica / Tel.: 229-02-22 / Cable: IICASANJOSE /
Telex: 2144 IICA CR / FAX (506) 229-47-41, 229-26-59 IICA COSTA RICA