Inter–American Institute of Agricultural Sciences
Office in Grenada

AN ANALYSIS OF MARKETS AND MARKETING SYSTEMS FOR FRUITS AND VEGETABLES IN GRENADA

St. George's, Grenada

October 1980

INTERAMERICAN INSTITUTE OF AGRICULTURAL SCIENCES

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P R E F A C E

This report is the results of a two week interdisciplinary and interinstitucional technical cooperation to the Government of Grenada. Three of the specialists were from the Interamerican Institute of Agricultural Sciences and one from the Tropical Products Institute in London. Although none of the team members were familiar with Grenada, three have had considerable experience in the Caribbean Region.

The interdisciplinary approach allowed for a much broader focus on the preharvest/postharvest problems and the interinstitutional nature of the team permitted a concentration of experiences from many other countries and geographical regions.

It is recognized by the team that the brevity of the mission will have resulted in too much emphasis in some areas and too little in others but in general it is felt that this report will serve as a useful base document in developing projects to strengthen the marketing system in Grenada.

ACKNOWLEDGEMENTS

As can be noted from the weight of this report, considerable effort was concentrated into a very short period of time. This was made possible due to valuable support services received from various persons within the MOA, MNIB and IICA working directly with the Mission as well as those many persons who contributed their time, ideas, information and basic documents.

The Members of this Team would like to thank all of those persons who contributed to the success of the mission. A special thanks goes to Leslie Sayers (MOA) and Beverly Paris (MNIB) who acted as mission coordinators from their respective institutions, and to Gale Peters, IICA Secretary, who coordinated the excellent efforts of the secretarial staff.

LIST OF VISITS

	Date	Persons Interviewed	Title/Institution
(1)	22/9/80	Anthony James	Manager Central Marketing Agency/Trinidad
		J. Williams	Foreman CMA/Trinidad
		Clyde Forde	Officer in charge CARICOM jetty
		Miss Carr	Statistical Unit Min. of Trade Trinidad
(2)	23/9/80	Norbert Fletcher	Permanent Secretary MOA
		Denis Noel	Chief Technical Officer MOA
(3)	23/9/80	Milton John	General Manager MNIB
		Beverly Paris	Deputy Manager MNIB
(4)	24/9/80	Ken Buckmire	Director CARDI/Grenada
(5)	24/9/80	Leslie Sayers	Head Div. Statistics. MOA
(6)	24/9/80	V.C. Henry	Director CARDATS
		Bruce Mannarelli	Marketing Specialist CARDATS/FAO
			Farm. mgt/credit CARDATS/FAO
(7)	24/9/80	Terrence Beddoe	Director FAO/UNDP
(8)	25/9/80	George Quashia	Secretary, Banana Cooperative Growers Association
(9)	25/9/80	Norbert Arnold	Secretary/Manager Cocoa Growers Association
(10)	25/9/80	Robin Renwick	General Manager, Cooperative Nutmeg Association
(11)	25/9/80	A. Branch	Chief Extension Service MOA
(12)	26/9/80	Keith Clouden	Leader, Buttlers Cooperative
(13)	26/9/80	Charles Francis	Land-use Officer and
		Mardigras Estate	Proyect Coordinator MOA
(14)	26/9/80	La Sagesse Estate	Extension Officer MOA
(15)	26/9/80	Peter Neptune	Extension Officer MOA
		Paradise Estate	
(16)	26/9/80	E.O. Barret	Principal/Extension
		Mirabeau Farm	Officer MOA
		School	
(17)	26/9/80	Grenville Market	and interviews with Hucksters
(18)	27/9/80	St. George's Market	and interviews with Hucksters
(19)	28/9/80	Inauguration of	Requin Cooperative

Date	Persons Interviewed	Title/Institution
(20) 29/9/80	Lennox Purcell	Large estate Owner
(21) 29/9/80	Mosley Wilson	Ag. Assistant MOA
	Clive Alexander	Ag. Instructor MOA
	Lawrence Grenade	Ag. Instructor MOA
	Clarence Garret	Ag. Instructor MOA
	Osford John	Ag. Instructor MOA
(22) 29/9/80	F. Cord	Permanent Sect. Port Authority
	Mr. Archer	Manager Port Authority
(23) 29/9/80	Mr. Headly	CDB Consultant/Acting Manager Grenada Development Bank
	Daniel Roberts	Assistant Manager G.D.B.
	Winston Bain	Ag. Credit Analyst G.D.B.
(24) 29/9/80	Visit to St. George's and	Grenville docks to observe loading of fruits on sloops bound for Trinidad and interviews with traffickers.
(25) 29/9/80	C. Ferguson	Manager Food Fair Supermarket
(26) 30/9/80	Justin Francis	Manager Geest Industries
(27) 30/9/80	Ian Lambert	Food Processing Engineer Produce Chemist Laboratory
	E. Campbell	Engineer Ministry of Communication
(28) 1/10/80	Joseph Emanuel Lewis	Supervisor of Forests MOA
(29) 1/10/80	Regina Taylor	Executive Secretary NACDA
(30) 2/10/80	Mr. Antoine	Advisor State Farms MOA
(31) 2/10/80	Milton John	General Manager MNIB
	Beverly Paris	Deputy Manager MNIB
(32) 2/10/80	Seminar given to 45 students "principals of horticultural	at Mirabeau Farm School on crop handling" by F.J. Proctor
(33) 6/10/80	Unison Whiteman	Minister of Agriculture
	Denis Noel	Chief Tech. Officer, MOA

Abbreviations Used in this Document

ACP	African Caribbean and Pacific agreement
CARDATS	Caribbean Agricultural Rural Development and Advisory Training Services
CARDI	Caribbean Research and Development Institute
CARICOM	Caribbean Community and Common Market
EEC	European Economic Community
FAO	Food and Agriculture Organization
GDF	Gross domestic product
IICA	Interamerican Institute for Agricultural Sciences
MNIB	Marketing and National Importing Board
MOA	Ministry of Agriculture
MOF	Ministry of Finance
NACDA	National Cooperative Development Agency
UK	United Kingdom
UNDP	United Nations Development Project
U.S.A.	United States of America

TEAM MEMBERS

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FELICITY PROCTOR,	Post Harvest Fresh Produce Technologist, Tropical Products Institute, London
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AN ANALYSIS OF MARKETS AND MARKETING SYSTEMS FOR FRUITS AND VEGETABLES IN GRENADA

I. INTRODUCTION

1.1 Terms of Reference

The terms of reference for this undertaking include those from the three institutions which supported this mission.

1.1.1 Interamerican Institute of Agricultural Sciences

The IICA provided the financing for this project as well as three of the four specialists. The objectives or terms of reference of IICA were the following:

- Undertake a diagnostic analysis of the internal marketing system in Grenada, and
- Identify and prepare a feasible marketing (production) project for financing under the Simon Bolivar Fund.[1]/

This team considers that these objectives were obtained in the fullest.

1.1.2 Ministry of Agriculture.

As the national institution responsible for policy and strategy development in the agricultural sector, the Ministry of Agriculture expressed their need for the following products:

- A systematic analysis of the marketing system divided into its diverse components.
- The identification of key problems and alternative solutions at each stage of the marketing system.

1/ A special fund financed by Venezuela and administered by IICA, to stimulate increased production of food crops and improved marketing.

- The identification of development projects and the preparation of project profiles wherever posible and
- The identification of areas requiring further studies.

It is the feeling of this mission that these products are adequately obtained in this document.

1.1.3 Marketing and National Importing Board

The national marketing instituion, the operational institution of the subsector, had more specific requests:

- Conduct an indepth analysis of the operations of MNIB, with emphasis on organization, training needs and the import/export functions.
- Carry out an analysis of MNIB policy for establishing retail outlets.
- Consider the need and alternatives for pricing policies.

Time and data did not permit an indepth analysis of the MNIB operations however, considerable information is provided herein on these three areas.

1.2 Methodology Followed

Considering the extent of the terms of reference and the relatively short period of time to carry out the mission (September 22-October 7) it was necessary to apply a methodological approach which would assure the collection and analysis of a lot of information over a short time span. The methodology used can be summarized as follows:

1.2.1 Interdisciplinary team.

To assure that the whole marketing system could be adequately covered an interdisciplinary team was organized including the following disciplines:

- marketing systems and institutions specialist
- postharvest fresh produce technologist
- marketing economist, and
- regional and extraregional market specialist.

Three of these persons were provided by the IICA offices in the Dominican Republic, Barbados and Guyana. The technologist was provided by the Tropical Products Institute in London.

1.2.2 Activity planning

Upon arrival in Grenada the memebers of the mission met with IICA, MOA and MNIB officials to define objectives, products desired, available support resources (counterparts, secretarial staff, office space, transportation etc), information availability and the work plan.

1.2.3 Interviews and aide memoires.

During the first week of the mission interviews were realized with representatives of 13 national institutions or divisions within the MOA. Additionally, meetings were held with 6 representatives of the private sector involved with agricultural marketing and 3 international organizations with marketing activities. Eight interviews were carried out while on field trips or visiting markets and wharf facilities. Interviews were realized with approximately 20 trafficers, vendors and bus/truck operators.

The notes from each interview or field visit were written up in detail as "aide memoires" and have been published by IICA as an internal reference document.

1.2.4 Mission document

Based on the experiences of the first week the mission prepared an outline for the mission document. This outline was based on the needs to 1) Provide basic summary information for persons unfamiliar with Grenada 2) Identify the principal institutions of the marketing subsector. 3) Identify the principal marketing problems. 4) Identify the beneficiaries of improvement strategies, 5) Determine market potential for Grenadian produce and 6) Outline a development strategy for the marketing subsector, including project profiles

A detailed outline was prepared to present the four project profiles included in this document.

Each member of the mission was assigned specific responsabilities for sections or chapters of the report. The final document, for the most part, was prepared in draft form and typed in Grenada. The project coordinator was responsible for final project editing and the final draft was typed and copied (35 copies) in Santo Domingo, Dominican Republic in October 1980.

1.3 Members of the Mission

The members of this technical cooperation mission were the following:

Jerry La Gra, Marketing Specialist and Project Coordinator, IICA Office in the Dominican Republic.

Deep Ford, Marketing Economist, IICA Office in Guyana.

James Lahoar, Marketing Specialist (regional markets), IICA Office in Barbados.

Felicity Proctor, Postharvest fresh produce Technologist, Tropical Products Institute, London.

II. COUNTRY DATA

This chapter gives a brief background to Grenada primarily from an agricultural standpoint. The first section deals with the resource endowment of the country. It describes the land areas and topography, it also outlines the infrastructural and human resources available. The second section gives a description of the agricultural sector. The third section pays recognition to Grenada's position as a small open economy and describes the characteristics of its trade sector. The fourth section outlines national agricultural policy as stated in documents of the government of Grenada. The aspects treated in this chapter are important as they place into context the remainder of the report.

2.1 Resources

Grenada is a very hilly country with a total land mass of 133 square miles. This area includes all the off-shore islands.[1]/ The country is characterized by a series of peaks and valleys, with approximately 50 percent of the land area more than 500 feet above sea level. The rainfall distribution pattern ranges from around 50 inches to greater than 160 inches per annum depending on the geographical area. The soils are generally loamy and well drained. The temperature ranges between 65°F to 85°F. The land available for vegetative purpose is approximately 70 percent of the total land area, the remainder being for residential, industrial and infrastructural uses. Grenada has 476 miles of roads primarily along the coastline of the country.

Some 73 percent of the population has access to electricity and 38 percent have access to piped water. The island presently has one airport (Pearls), which has no night landing facilities. A new airport is under construction and planned for termination in 1982. It is located only fifteen minutes from St. George's whereas the present airport is one hour traveling time.

1/ This report is rectriced to mainland Grenada since the team made no visits to any of the offshore islands.

The population of Grenada was estimated at 110,100 in December 1979. The island is densely populated (828 per square mile) and the rate of population increase is very high. The population is mainly found close to the coast of the island. There are four main towns, three of them on the West Coast: St. George's (7,500 population), Gouyave (2,980), Victoria (2,000) and one on the East Coast, (Grenville 2,100). Some 47 percent of the population is below the age of 15 while the same percentage is between the ages of 15 and 64. The remaining 6 percent are 65 years and over. The population is well educated with a literacy rate of 85 percent. The labour force was estimated in 1978 at about 36,200 persons or approximately 34% of the population. The rate of unemployment is estimated at 15 - 20 percent. The large majority of the population remains agriculturally based, approximately 82,575 persons (75 percent of the population). In terms of the labour force 30 percent are in agriculture, mostly small farmers.

2.2 The Agricultural Sector

The gross domestic product (GDP) for Grenada in 1977 was EC$134.3 million[1/] (US$49.7 million) per capital income was EC$1,242. The single most important sector was agriculture, accounting for 33.1% of the GDP. Small farm agriculture is the most common form found on the island. The 1974/75 census reports a total of 12,000 holdings of which 49% are below 1 acre[2/]. Some 89 percent of the holdings are below 5 acres and 95 percent of the holdings are below 10 acres. Five percent of the holdings control greater than 60 percent of the total acreage. Most small holdings are located on hillsides and they produce a variety of crops. The most common are the traditional export crops - Bananas, nutmegs, cocoa and mace. It is normal also to find some fruits and vegetables on these holdings. Of the 46,577 acres of land estimated to be in agricultural use in 1975, 23,153 acres or 50 percent was estimated to be under permanent crops, 6,994 acres or 25 percent was estimated to be under temporary crops. Ministry of

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1/ US$1.00 equals EC$2.68

2/ Data on landholdings and land distribution listed here taken from FAO Report 1976, Agricultural Mechanization, (Fenchow, MA).

Agriculture estimates indicate that 15 million pounds of vegetables, including root crops were produced in 1977. Techniques of production are traditional and hence labour productivity is low. The large majority of the holdings are unirrigated, increasing the uncertainty that characterizes production. The average farmer age is estimated at 51 (1979) and the limited success in promoting the use of improved inputs is a reflection of this. Livestock production is largely restricted to sheep and goats and is at present mininal. Fishing is an important activity in the economy accounting for 4.4 percent of the GDP. Overall, Grenada is estimated to produce less than 50 percent of its food needs.

2.3 The Trade Sector

Grenada is a small country in almost every sense and as a result has traditionally been outward looking. The basis for this being the contention that the domestic market is neither large enough to permit efficient levels of production nor large enough to allow growth for the development of the country. Grenada is tied to the rest of the world by its dependence on four agricultural products which on the average over the period 1973 to 1978 earned nearly 95 percent of its foreign exchange coming from merchandise exports. As a percentage of total merchandise exports during this period nutmeg yielded 35 percent, cocoa 30.8 percent, bananas 22.2 percent and mace 6.8 percent of the export earnings.[1/] All other commodities totaled 5.2 percent of the import earnings. Merchandise exports over the period represented 52 percent of total exports of goods and nonfactor services (tourism). The destination of the products were primarily to European markets. In 1979, 40 percent of the exports went to the United Kingdom, 17 percent to Germany, 16 percent to Belgium and 11 percent to Holland. A small amount of intra-regional trade takes place in fresh agricultural produce, primarily fruits and vegetables and mainly to the Trinidad market.[2/]

1/ The corresponding average values for these commodities over the period were nutmeg EC$4.1 million, cocoa EC$3.6 million, bananas EC$2.6 million, mace EC$1.8 million, all the other commodities EC$ 0.6 million.

2/ This intra-regional trade in fresh produce is an important part ot the study and several aspects of it are detailed in later chapters.

Grenada's total merchandise imports over the period 1973 to 1978 is averaged at US$26.05 million. The major category was consumer goods which, averaged over the period, equalled US$17.3 million. In the consumer goods category imports were divided equally between food, beverages and tabacco on the one hand and raw materials and manufactured goods on the other. Intermediate goods (minerals and fuels, chemicals and fertilizers) averaged US$4.9 million and capital goods (machinery and equipment US$3.76 million over the same period. Merchandise imports over the period represented 100 percent of the imports of goods and nonfactor services. Grenada's major food imports include rice, flour, sugar, pork, poultry, onions and potatoes. Grenada's imports came primarily from the United Kingdom (24 percent), Trinidad (23 percent), Canada (10 percent), USA (9 percent), Barbados (4 percent) for the year 1976. The tourist sector in Grenada is a significant provider of foreign exchange and contributor to GDP. In 1977 the tourist trade contributed 3 percent of the GDP and 40 percent of the export earnings. The number of visitors grew to a high of 166,000 persons in 1973 decreasing in 1974 to 72,000 persons. Since then it has increased steadily and was estimated in 1978 at 148,000 persons. The major deterent to this sector is the incovenience suffered by tourists travelling to Grenada through Barbados. Generally, there is great likelihood that they have to overnight on the way to Grenada because of the lack of a local international jet airport. This will be corrected on completion of the new airport presently in progress.

2.4 Government Policy

The present government in Grenada is of fairly recent origin coming to power just under two years ago (March 1979). As a result of this, general economic policy and more particularly agricultural policy is still in the formative stages. The leaders of the government have indicated in several speeches and interviews that "revolutionary socialism" is the philosophy of the government.[1/] Excerpts from this material are used here to

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1/ Grenada: Towards a New Socialism? The Courier, No. 61, May - June 1980.

give indications of government policy in the agricultural sector.

Co-operatives are the preferred organizational form and it is expected that younger farmers will join together in these units.[1/] The National Co-operative Development Agency (NACDA) was formed in June 1980 to promote activities in this area. Basically, the Government seeks to involve rural people in the decision making framework influencing the development of the rural sector. The Government intends to redistribute land both where its held unutilized (idle land for idle hands) and in areas where there is pressure for land. In a speech recently presented the Minister of Agriculture stated:[2/]

> Basic to our policy is that all farms must become more productive. In particular, our policy will remove the established practice by which large private farmers hold large tracks of land in idleness. Further, government will support and regulate a programme by which large farmers, in areas of great social pressure, will make land available to small farmers on a leasehold basis.

Thus, it appears that the government intends to act positively to ensure that land is used productively and is more equally distributed.

The Government intends to stimulate agricultural development by increasing the availability of inputs to farmers and guaranteeing them a market for their produce. The Prime Minister states:[3/]

> Fertilizer is one of the major problems where the farmers are concerned.....Different types of fertilizers are required..... We are trying to find them and, of course, to increase the quantity available, so that farmers will have a ready supply.

1/ Grenada Government Policy on Agrarian Reform and Rural Development held in Rome, Italy, July 10 - 20, 1980 - Page 7.

2/ Ibid, Page 8.

3/ Grenada, Toward A New Socialism? The Courier, No. 61, May - June, 1980, Page 23.

> We are trying to guarantee to the farmers that what they produce, we will buy and then we in turn will sell locally or externally.

It is also planned to develop the Agro-industrial sector which will utilize fruits and vegetables presently available and create a larger market for increase domestic production. The Minister of Finance, Trade Industry and Planning has said:1/

> Our foods and vegetables can be canned, bottled and preserved. You can have juices, nectars, wines, liqueurs and jams made out of them..... So we hope, over a period of years to develop an Agro-based industry with the enormous range of agricultural commodities which lend themselves to this process.

1/ Grenada, Towards A New Socialism? The Courier, No. 61, May.- June 1980 Page 29.

III INSTITUTIONAL ACTIVITIES RELATED TO MARKETING

3.1 National

The national institutions most important to the functioning of the fresh agricultural produce market are the Ministry of Agriculture, the Marketing and National Importing Board, the Grenada Development Bank, the National Cooperative Development Agency and the State Farms. These are outlined in turn.

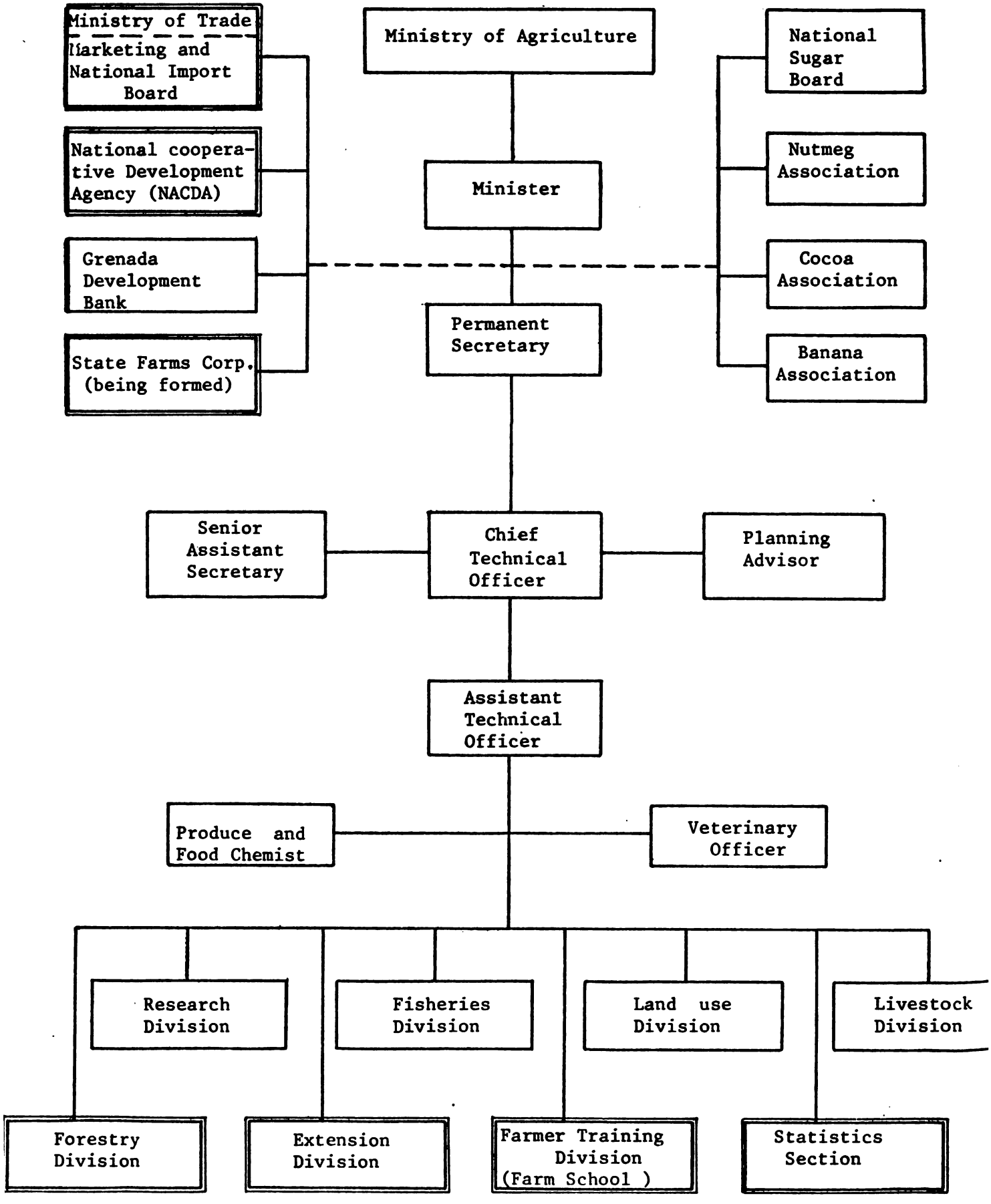
3.1.1 Ministry of Agriculture

The Ministry of Agriculture as can be noted in the organizational chart (Figure 1), is important to the development of the fresh produce market in several respects. Firstly, in the statistics section of the Ministry market and price information are collected. This data will be needed for the proper planning of this subsector. Secondly, the extension division is the vehicle through which technological improvements in crop protection, harvesting, handling and storage would be communicated to producers. The forestry division is important for the development of packing facilities domestically. If a crate factory comes on stream they would be the suppliers of the raw material. The produce and food chemist division will investigate the uses of domestic products in a variety of forms and aid in the development of increased processing of domestic products. The farmer training division (farm school) is critical in the provision of skilled personnel which will be needed at several levels as agricultural development proceeds (See section 4.2.9 for more detail).

3.1.2 Marketing and National Importing Board

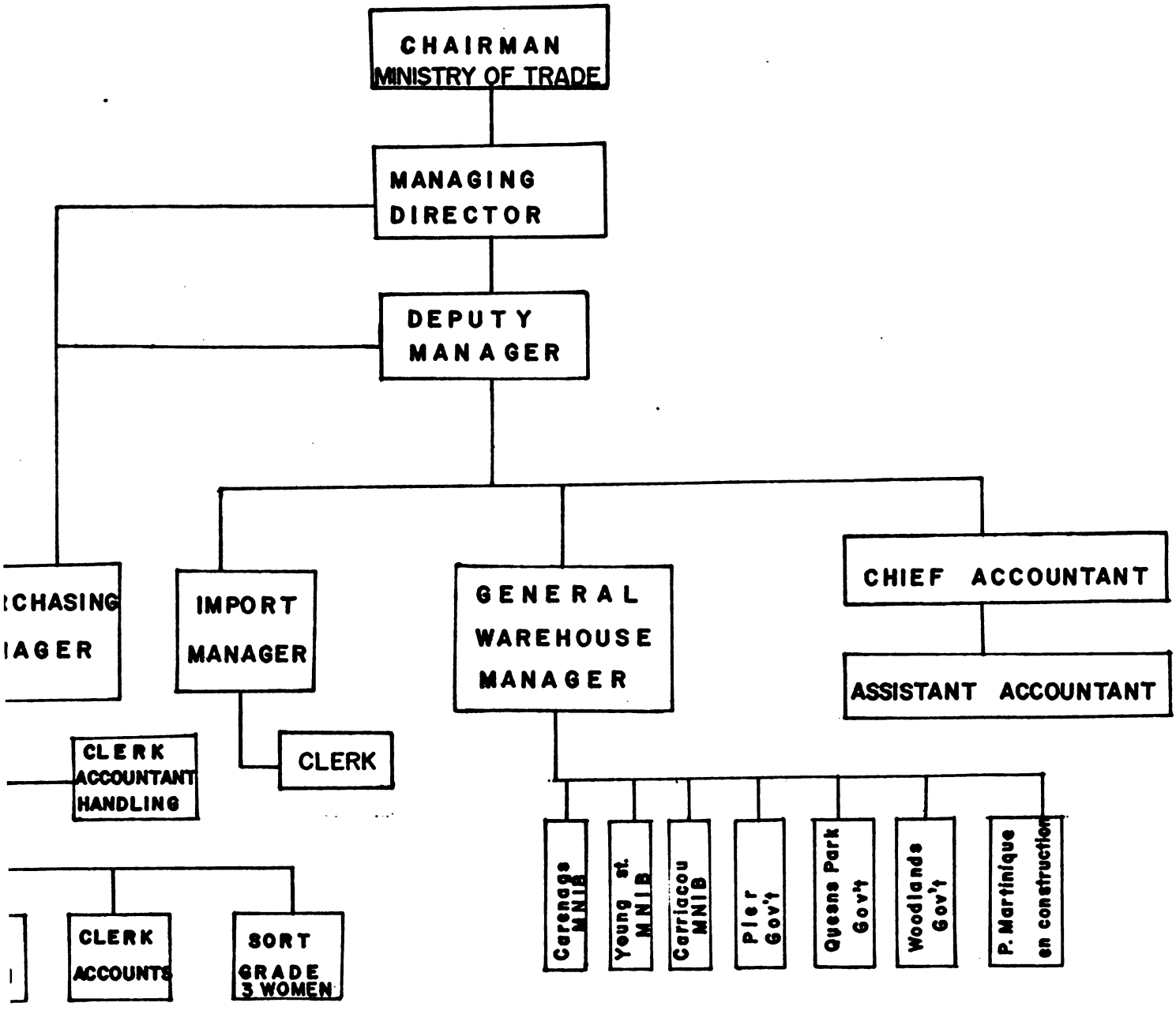
The Marketing and National Importing Board (Figure 2) is responsible for marketing fresh agricultural produce both domestically and internationally and is the sole importer of rice, sugar and cement. This institution has a key role to play in the internal and external marketing systems and is in a position to substantially influence production as well as consumption of all food crops (See section 4.2.9 for more detail).

FIGURE 1: NATIONAL INSTITUTIONS LINKED TO FRESH PRODUCE MARKETING



Note: Key institutions for Marketing Subsector have double lines.

FIGURE 2: MARKETING AND NATIONAL IMPORTING BOARD ORGANIZATIONAL CHART



3.1.3 Grenada Development Bank

The Grenada Development Bank is a lending agency. It was established in 1976 for the purpose of promoting agricultural and industrial development within the state of Grenada. It is an institution through which farmers can obtain credit so as to release some of the bottlenecks presently curtailing the production of large quantities of high quality produce. The Bank engages in the following loan programmes:

(a) The Farm Improvement Credit Scheme
(b) The Agricultural Production Credit Scheme
(c) The Agricultural and Industrial Credit Scheme
(d) The Small Industry Credit Scheme
(e) The Student loan Scheme

3.1.4 National Cooperative Development Agency (NACDA)

NACDA was formed in June 1980 primarily to promote the development of cooperatives under the slogan "Idle Hands for Idle Lands". It is intended to place unemployed and young persons into the farming sector. Production is to be oriented towards vegetables for the export market.

3.1.5 State Farms

Thirty-two state farms are being placed into a corporation. This program is still in its infancy but when established it could provide an important source of fresch produce.

3.2 International

At the present time there are at least 4 international or regional organizations involved directly or indirectly with agricultural marketing. These are detailed below

3.2.1 IICA

The Interamerican Institue of Agricultural Sciences is presently carrying out a diagnosis of marketing systems in Grenada

(the purpose of this document) so as to identify priority projects and needs for institutional and technological development. In 1981, an action oriented marketing subsector development scheme will be implemented through an integrated effort between IICA, MNIB and MOA.

3.2.2 CARDATS

The CAribbean Agricultural Rural Development and Advisory Training Services is financed by UNDP and executed by FAO in coordination with CARICOM. CARDATS presently staffs two marketing experts[1/] both of whom have regional responsabilities. Both are recent arrivees to Grenada and are presently concentrating on evaluation of regional problems and solutions and specialized technical assistance to MNIB, in the evaluation of sites for locating assembly and packaging depots. CARDATS is also working directly with MOA, providing a complete production/marketing package to a few small farmers with the intention of developing a model. They are presently promoting the production of eggplants for the export (UK) market, to be marketed through MNIB.

3.2.2 CARDI

The Caribbean Research and Development Institute is carrying out research on small farmer production systems. They are providing production/investigation assistance to 8 small farmers growing eggplant for export (UK) among their other non-marketing activities.

3.2.4 FAO/UNDP

This organization is supporting a MOA soil/water conservation project in Mardigras oriented towards fruit and vegetable production on machine/man terraced hillsides. Of the 55 acre project area, 15 acres have been cleared and are now producing small amounts of vegetables (50-300lbs/week), marketed through MNIB. Another FAO marketing expert(V. Lumholtz) attached to the FAO/UNDP project terminated his tour in October 1979, leaving behind an extensive document on diverse aspects of internal/external marketing.

1/ B. Mannarelli, FAO and H. Saul, CARICOM.

IV. PROBLEM IDENTIFICATION

For as long as people have been marketing produce there have been marketing problems. Too often the problems are diagnosed from the top down, that is to say, the "felt problems" are identified by high level technicians or decision makers (often non-technical) out of direct touch with those persons affected by the problems. The lack of proper problem identification leads to inappropriate problem solution -- what may be termed the "white elephant syndrome". Throughout the Caribbean, Latin America and the World millions of dollars have been misallocated into unused or unusable infrastructure and institutional services. Examples of, grain silos (cement and metal), cold storage facilities and price information services, originally intended to "solve" the respective countries marketing problems, can be found in diverse stages of abandonment in most developing countries. So as to reduce the risks of the "white elephant syndrome" it is necessary to carry out an intensive diagnosis of the marketing systems, to identify the principal participants in the systems, their problems and the diverse factors causing those problems. Only then can real solutions be identified.

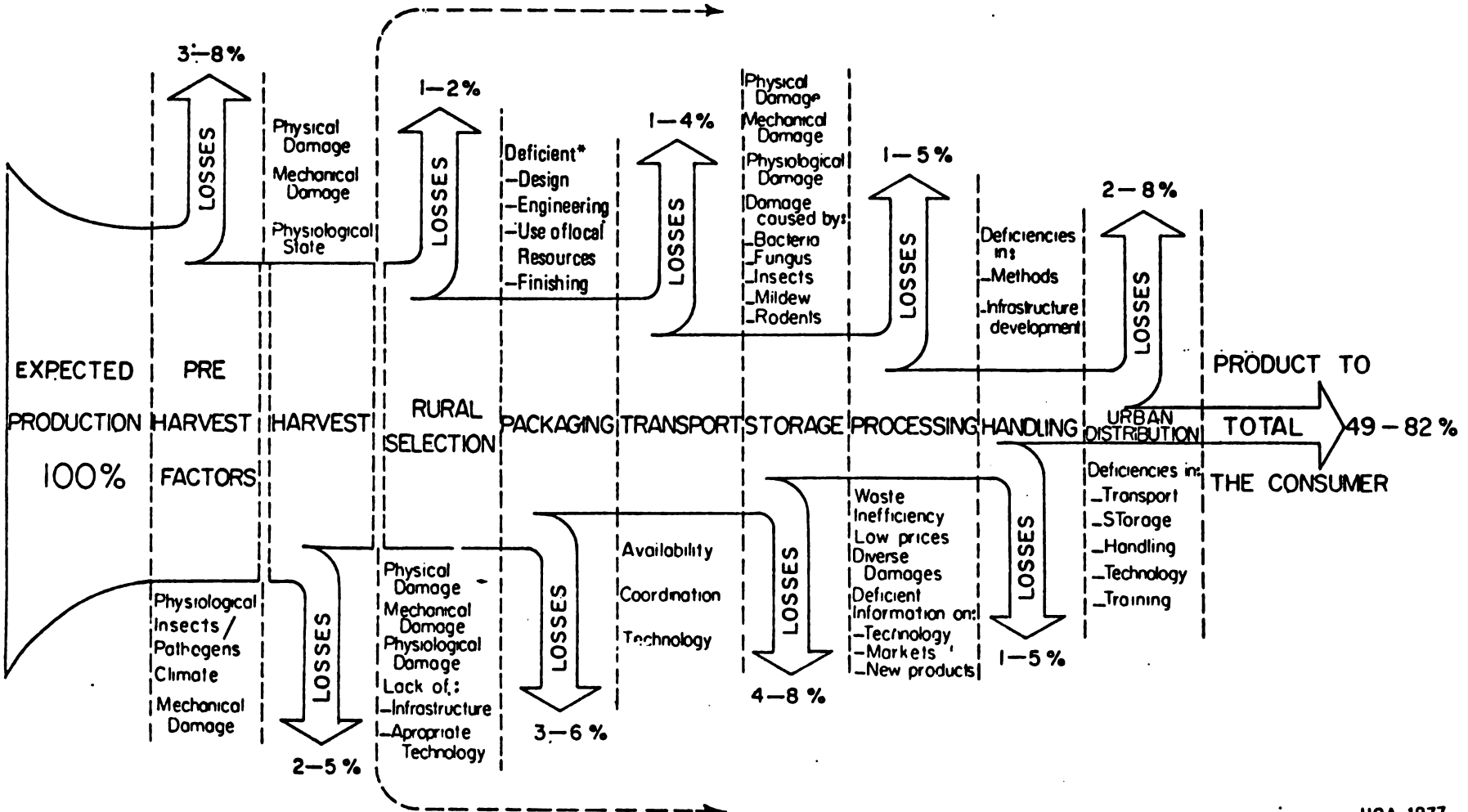
4.1 Marketing Systems

4.1.1 Components and disciplines

Marketing systems are often studied from a product point of view, i.e., following a particular product from farmgate to consumer. One disadvantage to this approach is that the overall view of the system may vary depending on the product (s) selected for study (traditional vs non-tradional or domestic vs export). On the other hand, the marketing system may be viewed from a function point of view whereby marketing functions (packaging, transport, storage, processing) are studied and evaluated for one or more commodities.

One of the disadvantages of this latter approach is that functions are often given more or less importance depending on the discipline and level of expertise of the person carrying out the investigation.

FIGURE 3: STEPS IN THE POST HARVEST SYSTEM
% LOSSES AT EACH STEP



IICA 1977
R. Amezquita.
L. Flores

Source: AMEZQUITA R., and LA GRA,J. A methodological approach to identifying and reducing post-harvest food losses, Miscelaneous. Publication No. 219, IICA.Santo Domingo, Dom.Rep. December 1979.

The important thing to keep in mind when looking for marketing problems is that there is a whole system involved (Figure 3). It is unlikely that the study of one product or selected functions within the marketing system will permit proper problem identification. However, by viewing the overall system and all of its functions in relation to produce from all the principal product groups (fruits, vegetables, root crops, grains), the marketing systemsproblems and their relative importance can be determined.

As can be seen in Figure 3, diverse types of problems occur at various points in the marketing system. Some of these problems are of a technological nature, others are of an institutional nature, and still others are caused by socio/economic conditions. To properly analyse the marketing system, therefore, it is necessary to use an integrated, interdisciplinary approach looking at the diverse components of the marketing system from a technological, institutional and socio/economic point of view.

4.1.2 The Marketing Systems for Agricultural Produce in Grenada

As one would expect there are two readily identifiable marketing systems in Grenada: that used for the internal marketing of the traditional crops (banana, cocoa, nutmeg and mace) and that used for the internal marketing of fresh produce.

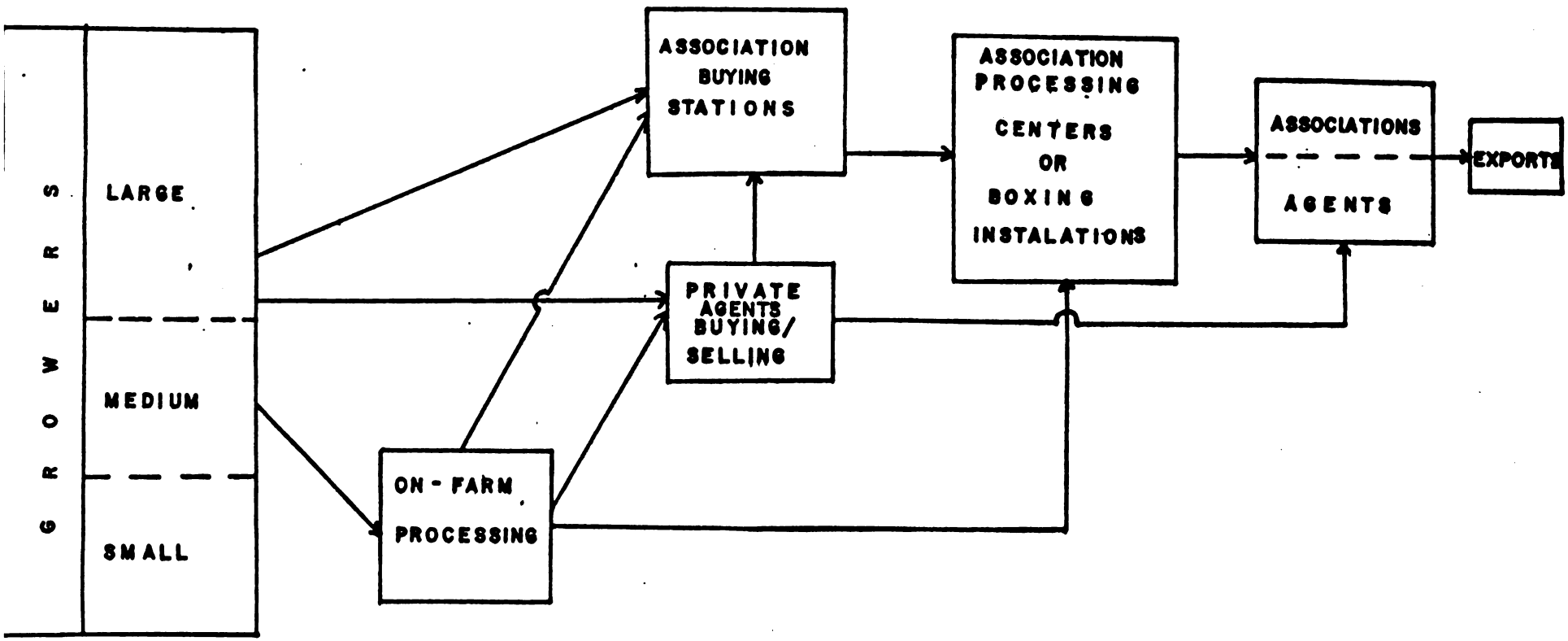
4.1.2.1 Traditional crops

As can be seen in Figure 4 the system for marketing the traditional exports is well organized and straight forward. The produce moves from farm to buying or assembly points then to processing or boxing stations where it is prepared for export. The only participants are the farmers themselves, some private buying/selling agents, in the case of cocoa, and the Associationa (Banana, Cocoa, Nutmeg). The flow diagram

FIGURE 4:

MARKETING CHANNELS FOR TRADITIONAL EXPORTS

BANANAS, COCOA, NUTMEG, MACE.



IICA 1980

for the traditional export crops is presented in Figures 5, 6 and 7.

The identification of the principal participants in the marketing of traditional produce and their general characteristics follow.

a) Farmers:

The farmers of traditional export crops can be distinguished by size: small, medium and large.

Small farmers: The small farmer who produces traditional export crops differs from the small farmer producing vegetable/fruit crops (see 4.1.2. b) . In the case of the small grower of bananas, cocoa and nutmeg his farm is less than 5 acres in size. This farm size grouping accounts for almost 90% of the number of farms (12,510)1/ but only 24% of the land area. However, about one-half of these farms are less than one acre in size and produce only small amounts of traditional export commodities. Thus, one can conclude that the small producer of babanas, cocoa and nutmeg normally works between one and 5 acres of land. He normally lives on or near his property in a small wooden house. He grows small amounts of food for his own needs and sells a few hundred pounds of fruit. He receives farm inputs and technical assistance through the Banana, Cocoa and Nutmeg Associations and markets his produce through these established channals.

Medium size farmer: The average medium size farmer lives in a 2-3 bedroom home constructed of cement block or wood with running water, inside toilet and some modern conveniences. He often has a car, van or jeep.

1/ Farm distribution by size as of 1961, Small Farming Study in the LDCs, 1976 (Weir et al).

FIGURE 5: FLOW DIAGRAM BANANAS

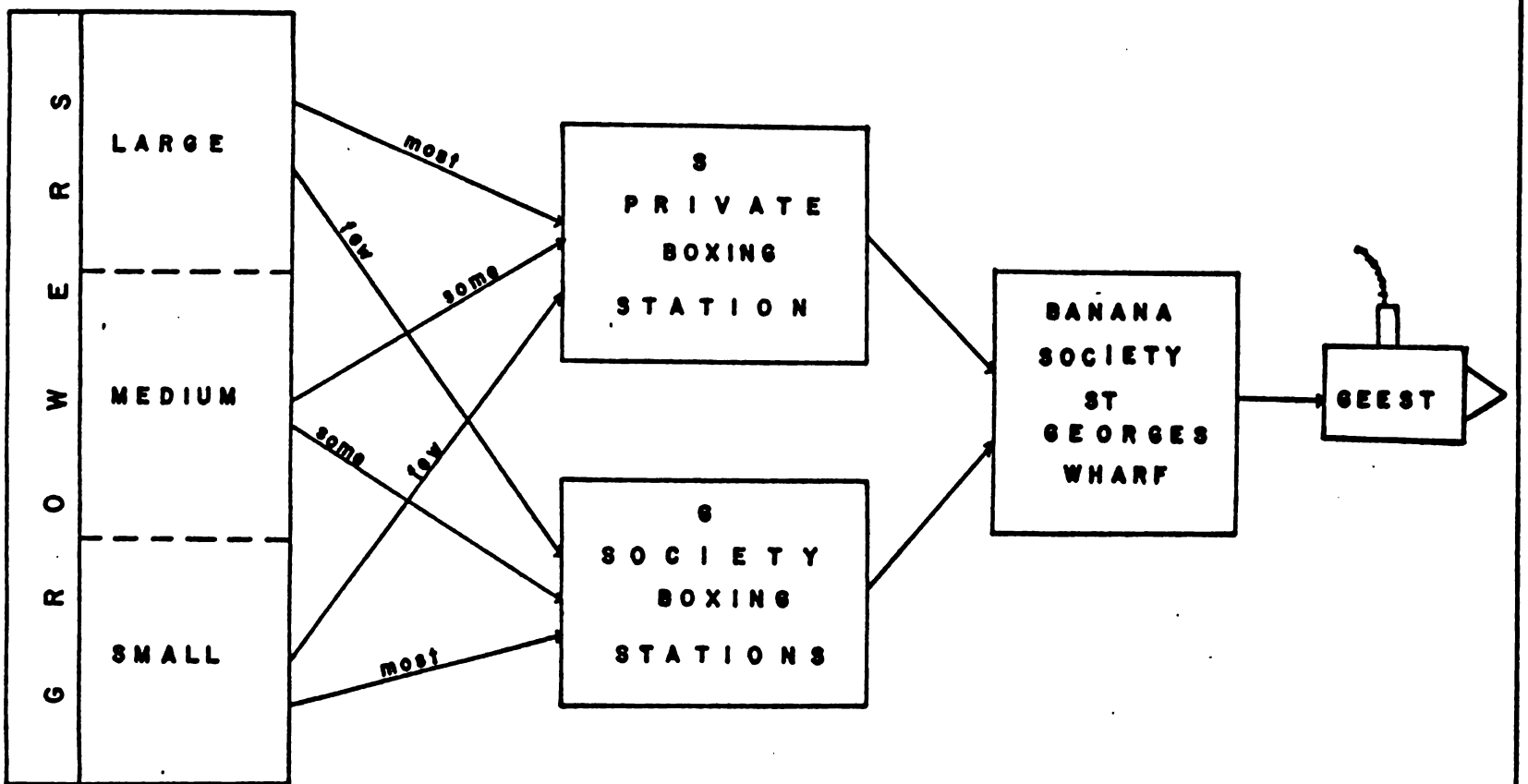


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FIGURE 6: COCOA FLOW DIAGRAM

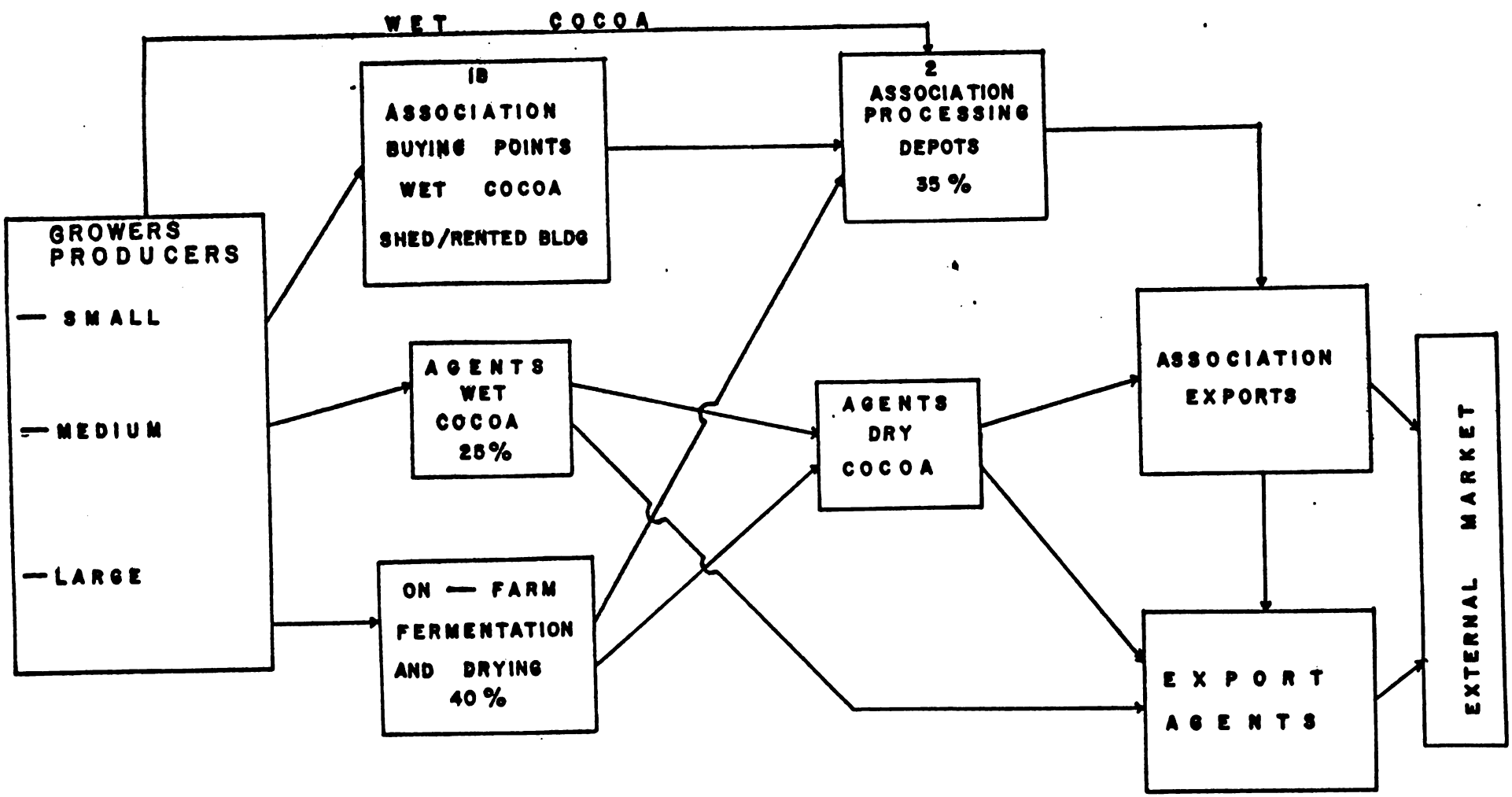
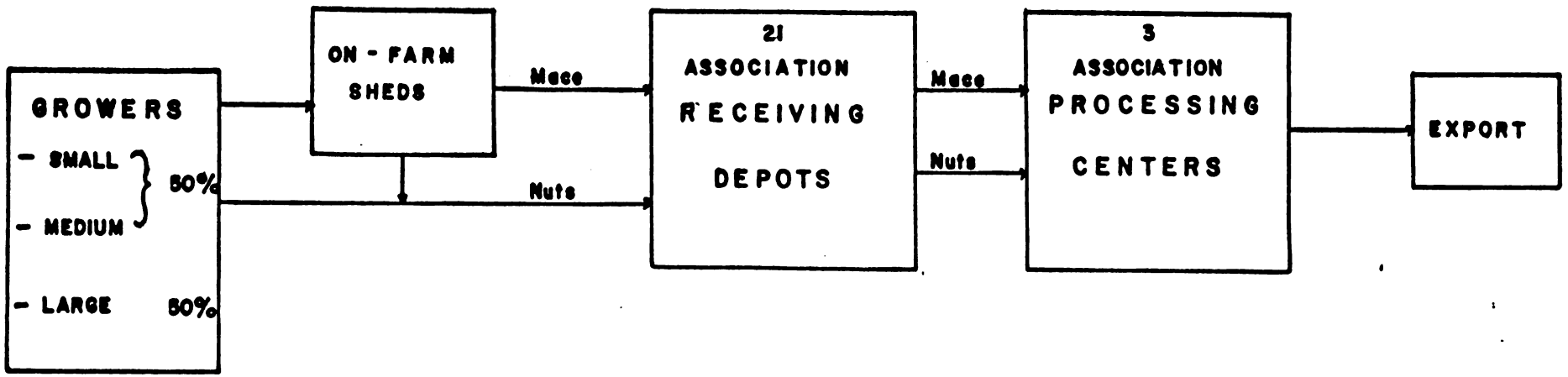


FIGURE 7 NUTMEG – MACE FLOW DIAGRAM



The most common farm size is between 7 and 10 acres intercropped with bananas (2 acres), cocoa (3 acres) nutmeg (2 acres) and cloves or mango windbreak. He will also have a few citrus and avocado trees, bluggoes and miscellaneous fruits. Cocoa is the most desired crop as it is more reliable, requires less labour and suffers less from strong winds. Bananas are the most consistent source of income except when heavy losses occur during hurricane season.

The medium size farmer produces very little or no vegetables, usually purchasing them in the marketplace. He will normally own 2 goats, 2-3 pigs and 2 cows (cow/calf/bull), but seldom chickens.

The marketing of the traditional export crops are handled through the Banana, Nutmeg and Cocoa Societies. The oranges, grapefruit, avocados, mangoes, bluggoes and other fruits are sold to Hucksters who come to the farm to purchase (harvesting the produce themselves). Cloves and some other spices may be sold to private traders and exporters.

Large farmers: Large farms are those over 25 acres. According to the most recent census data (1961) there are only 234 farms in this category, representing less than 2% of the total but controling 56% of the total land area. Of these farms 92 are over 100 acres in size.

The cropping pattern is similar whether the farm has 25 or over 100 acres. Land is cleared of natural vegetation and often intercropped with corn, pigeon peas or vegetables. During or after the first crop bananas are intercropped with cocoa and nutmeg. Bananas produce for 3-5 years until cocao forms canopy and

then they are thinned out. As nutmeg matures cocao is thinned out.

The large farmer produces vegetables in very limited quantities and normally only to take advantage of available land before traditional crops form cover. Food crops and animals (pigs, cows), if grown, are used mainly to feed the local labourers.

Each farm or estate will have an overseer with one or more foremen who live on the property and supervise workgroups who may live in buccan or in nearby communities. Workers are paid by the day (EC$6.50) and will include regular older labourers as well as younger persons with a high turnover rate. Labour is noticeably scarce on those days when bananas are harvested. Farm houses normally are well built, comfortable and have water and electricity.

Marketing of the traditional crops in handled through the 3 societies already mentioned. Non-traditional fruits and vegetables are marketed through the traditional huckster/trafficker channals or, as is often the case the overseer or farm owner will haul his produce (fruits/vegetables) to St. Georges and retail it directly to the supermarkets, hotels or other institutions.

b) Agents:

In the case of cocoa the produce may temporarily leave the traditional channal through the Association and pass through the hands of an intermediary known as a "wet" or "dry" agent. The wet agents will buy the unfermented cocoa from the producer, ferment it himself, dry it and sell the product to a"dry" agent or directly to an export agent. The "dry" agent will buy only dryed cocoa, either from the "wet" agent or directly from the farmer, and resell it to the Association or an export agent working with the Association.

c) Associations:

The organizational structure of the Banana, Cocoa and Nutmeg Associations are identical. In each case the Associations or Cooperatives are controlled through a management committee comprised of 10 members: chairman, 2 representatives of Government (MOA and MOF) and 7 growers. Since 1972 all members are nominated by Government, not elected.

Each Association has staff and facilities to meet its needs, e.g. buying stations and processing depots for cocoa, nutmeg and mace and boxing stations for bananas. All exports are realized or controled by the Associations

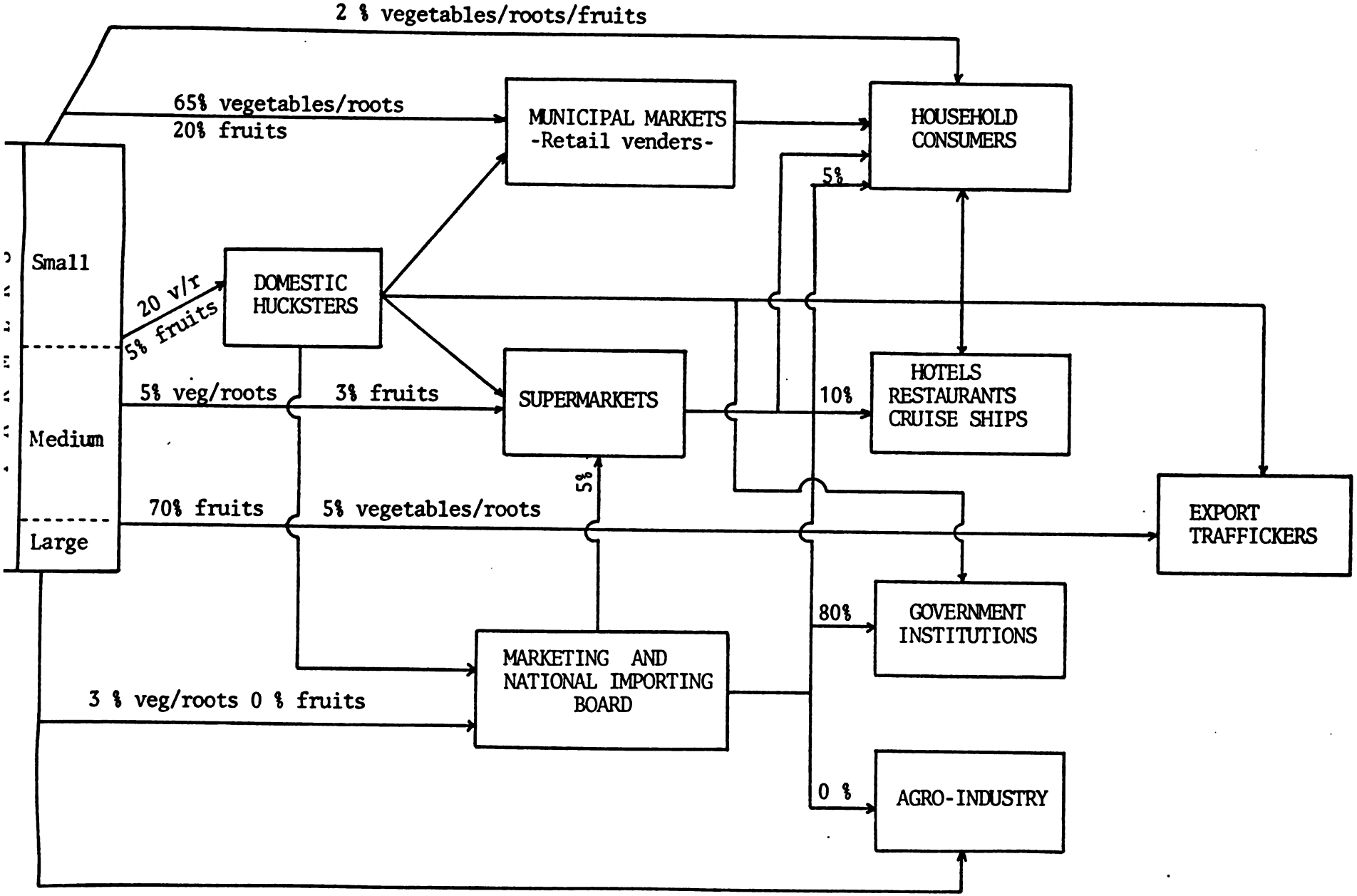
4.1.2.2 Fresh produce

The marketing channels for fresh produce as depicted in Figure 8 are short and direct but differ substantially from those of the traditional crops. The farmers, principally small and mediun sized growers, have at least 7 alternative channels to market their produce. The most common is for the grower to retail it himself (herself) in the Saturday municipal markets, in the case of vegetable or food crops , or sell it directly to export traffickers in the case of fruits. The municipal markets are really the focal point for fresh produce consumed in Grenada, as neither the supermarkets nor the MNIB handle more than 5% of national production. The principal participants in these systems are the following:

a) Farmers:

The small, medium and large growers of traditional crops were discussed in the previous section. As was pointed out these farmers produce mainly bananas, cocoa and nutmeg and have an export orientation. They also produce small amounts of vegetables and fruit but withoout any degree of planning. When the opportunity

FIGURE 8 : MARKETING CHANNELS FOR FRESH PRODUCE



1/ The percentages of produce flowing through the diverse channels are estimates made by the authors.

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arises small amounts are grown or harvested (in the case of fruits) but little effort is made to produce these commodities on an organized basis, mainly because "markets" are viewed as "uncertain" and "too risky". While the largest percentage of fruits are probably grown by medium and large producers of traditional crops, vegetables tend to be grown by another type of small producer located near the principal populated areas of the country.

Small vegetable growers:

According to a local saying a Grenadian Small Farmer is a person with "12 chickens or 12 fruit trees". He is normally a part-time farmer and earns additional income by working as a labourer on an estate, on road patching, as a tradesman (carpentry, cement, etc), as fisherman or perhaps as a clerk in a store.

He lives on a small piece of land (1/4-1/2 acres) but may own other parcels which may total up to five (5) acres. His home is constructed of wood with 2-4 rooms including kitchen, living and 1-2 bedrooms. His toilet is normally outside. If he lives along a main road he usually has access to the public water supply, although not in the home. He owns farm tools (cutlass, fork, etc) and constantly listens to his radio.

The small vegetable grower in Grenada has from 6 to 12 chickens, 2 goats or sheep and one or 2 rabbits. These fowls and animals are used for home consumption except the goats or sheep which are often sold for cash (and often exported to Trinidad). All small farmers have dogs.

Typical fruit trees found on the farm will include coconuts (1) limes (1-2) grafted or common mangoes

(1) and bluggoes (2). Between 25 and 50% of production is sold, the balance consumed by the family. Corn and pigeon peas are intercropped and produce one crop per year. Small amounts of yams, sweet potatoes, tannias and dasheen are produced as food crops, only yams are stored for any length of time (up to six (6) months). Due to high rainfall ground crops must be harvested when mature. The small farmer consumes about 50% of his food crop production gives 10% to his relatives and sells the remaining 40%. Both green and yellow vegetables are produced intensively but in very small amounts. Low lands usually produce one crop and high lands 2 crops. About 15% of these are consumed, 5% are given to relatives and 80% are sold, usually in the Saturday retail markets, in the principal towns, by the female farmer or the farmers wife.

The small farmer sells produce to neighbours and visitors for their own consumption. Hucksters frequently pass by the farm to purchase a sack or two of fruits (avocadoes, mangoes, soursops, bananas, sapodilla). On Saturdays, and sometimes on Fridays, those growers (often female) their wives, or both of them, will take their produce (50-100 lbs) to the nearest municipal market where they will retail it directly to consumers. A case study of a sale made by husband/ wife combination is as follows:

> "In this case the husband and wife live in a small house on 1/4 acre of land 3 miles from Gouyave. The husband works as a labourer, the wife takes care of the house, a very small garden and buys small amounts of produce from nearby farmers, both small and estates. In this particular case, (27-9-80) the wife purchased 300 oranges from a small grower at EC$12./100 on Thursday and transported them to her home in a sack where they were transferred to a

cardboard box obtained from a retail store. On Friday morning she cut a stem of bluggoe bananas from her garden and placed the hands in a plastic bag (100 bluggoes). She caught a jeep to Gouyave and from there rode a bus to St. George's. She paid EC$6.00 to the jeep driver (3 miles) and the same amount to the bus driver (12 miles). She was charged EC$2.00 for herself and EC$2.00 for each package. She arrived in St. George.s before noon and located herself in the Central Market in an open area between the covered market and Granby Street. She sold approximately 25% of her produce on Friday and spent the night with a friend. On Saturday norning she was joined by her husband and their 10 year old son. The produce was divided between husband and wife to speed up the sales. They remained in the market place until 4.00 p.m. and then returned to Gouyave by bus taking with them necessary groceries (rice, sugar, oil etc.). They sold nearly all their produce, dumped that which had spoiled and took home the rest. Their net return was EC$13.00 based on the following breakdown:"

PRODUCE	COST	SALES	PROFIT
Oranges	EC$36.00	$60.00	$24.00
Bluggoes	from garden	12.50	12.50
		Gross profit	$36.50

TRANSPORT COSTS:

Wife	$12	
Husband/child	6	
Return all three	5	
Subtotal		$23.00
Market tax (2 days at $0.25)		.50
Net profit (less transport cost and tax)		$13.00

b) Domestic huckster:

This type Huckster is usually female and may either live in St. Georges or in one of the rural production regions. She may handle a variety of produce (fruit, vegetables, and food crops) but tends to pruchase from the same farmers (small-medium-large) and sell to the same retailers on a regular basis. The number of this type Huckster is not known but it is unlikely that there are more than 50 or so given the reduced size of the domestic demand. In some cases these Hucksters have their own van or jeep transportation but more frequently they use public transport (buses/trucks) to get their produce from the farm to St. Georges. They tend to buy from small farmers on a cash basis for small quantities of produce. They often buy from larger farmers or estates on credit, making payment after selling the produce in St. Georges or Grenville. The domestic Huckster has at least 7 alternative markets including; municipal market retailers, supermarkets, MNIB, the tourist trade (hotels, restaurants), government institutions, household consumers, and export traffickers.

c) Municipal market vendors:

This type vendor operates primarily out of the municipal market of St. Georges as the other public markets of Grenada only function on Saturdays and thus have no permanent retailers. This type vendor has stalls within the covered areas of the marketplace and retail produce to the consumer 6 days a week. She is always female and purchases her produce from the domestic Huckster or directly from the farmers themselves.

d) Traffickers

The Traffickers are large scale Hucksters who "traffick" between Grenada and Trinidad. They handle mainly fruits and some root crops and vegetables (very few) which tend to vary with the seasonal supply. They buy produce directly

from the farmer either on-the-farm or in St. Georges. The Trafficker is the most important participant in the inter-island fresh produce trade (mainly fruits). A questionnaire applied to 9 Traffickers at the Carenage in St. Georges (Sept 30, 1980) produced the following information concerning their operations:

> The principal products shipped are soursops, avocadoes and sugar apples. The average number of packages per trafficker is eight. Wooden crates are the most common container followed by wire/wood boxes and jute sacks. Containers are purchased on Carenage, in shops or are handmade (in the case of wood). Good solid containers are expensive, costing between EC$10.00 and EC$15.00 per unit. Most traffickers obtain their produce over five miles from St. George's but a significant number buy in St. George's directly from farmers. Produce may be harvested by the farmers or directly by the traffickers. In all cases considerable attention is given to the act of harvesting and cutting with "poles and bags" is common practice as broken or dammaged fruit is of little value to either the farmer or the trafficker. The bus is the most common form of transport from point to point. Vans are often rented in rural areas to haul produce from farm source to home of trafficker. Produce is most often selected at the traffickers home but more frequently packaged on the Carenage . Losses between Grenada and Trinidad are expected to be small unless the sloop is delayed in berthing in Trinidad in which case the losses may reach 50% or more.
>
> Approximately half of the traffickers (or less) accompany their produce on the sloop or fly to Trinidad to receive it. The other half (or more) send their produce to relatives or friends in Trinidad. In the latter case exercise books are sent with the captain who delivers them to the agents or relatives. These books or notes give instructions as to the type of produce, number of containers, selling instructions and requests for groceries and other items to be purchased in Trinidad. They are then returned with messages from Trinidad concerning market, sales, purchases and family news.

Due to the relative importance of the Trafficker in the fresh produce export trade two typical Traffickers were interviewed in detail, the profiles of these two Traffickers follow:

Profile of Grenada/Trinidad Male Fruit Trafficker:

In this case the fruit trafficker is male, and approximately 45. This is atypical, as approximately 95% of the traffickers are female. The produce shipped to Trinidad included seven large wooden crates (40'x24'x24') and five large sacks (jute bags) of avocados, thirty stems of plantain and two cardboard boxes of mixed fruit and bananas (destined for relatives of a farmer friend). He purchased the avocados and plantain directly from the farmer and harvested the avocados himself, picking some and using a long pole with cutters and a bag for those he could not reach. He was assisted by small boys who picked from the ground and handled the sack, which is lowered from the tree by a rope. He and the boys carried the fruit to the roadside in sacks and hired a van to take the produce to his home where they are graded and rejects having holes and cracks, or those which are too small, are fed to the pigs.

He has good working relations with the farmers who he pays immediately, if a small farmer, or upon returning from Trinidad, if a large farmer. The price agreed upon with the farmer for the avocados was between EC$25.00 and EC$35 per 100 depending on size. The plantains were purchased at the price of 40¢ per pound with payment depending upon the number of pounds to be sold in Trinidad.

From his home the produce was taken directly to the Wharf (Carenage) in St. George's in sacks (avocados) and by the stem. The bus transport charge between St. Mark's and St. George's was negotiated and EC$70.00 was agreed upon for the total amount of produce. (The driver wanted EC$80.00). Five large crates were purchased on the Carenage for EC$48.00 and the five jute bags were bought from shopkeepers for EC$2.00 - EC$3.00 each. The produce was packed into the crates and bags and a cartman was paid EC$10.00 to move the produce across and down the road about 100 feet to the edge of the two sloops (Glidden Star and Piccadilly) which began loading around 1:30p.m. and finished shorlty past 6:00p.m. His produce was placed in line with the other waiting traffickers and manipulated closer to each ship as other traffickers got their produce on board. His shipment was divided with the bananas going on the Gliden Star and the avocados on the Piccadilly. Since the Gliden Star left about 5:30p.m. this trafficker rode to Trinidad with his avocados, where he will sell the produce to retailers on the dock awaiting the "fruit boat" or take it to the central market to sell to retailers, if the dock market is too slow.

No profit data was obtained however, total costs can be estimated at EC$1,100. including produce ($900.) packages ($60.) and transportation ($140.)

Profile of Grenada/Trinidad Female Fruit Trafficker

This lady is around 40 years old and has been trafficking to Trinidad for over ten years. She used to go to the rural areas and purchase directly from the farmer but for the past two years has been buying in St. George's from a producer who brings the produce to her home on Tuesday mornings. This week she has purchased three sacks of plums, two of soursops and three cases of avocados. She flies to Trinidad on every Tuesday to receive her own produce. Because she could not get confirmed on the late afternoon flight she had to leave on Tuesday morning. As a result her husband, who is a plumber, took charge of loading the produce on the Piccadilly for her. The wife will receive the produce and sell to retailers at the dock or she will take directly to the central market and sell to retailers. Any spoiled produce will be discarded on the wharf in Trinidad. She will purchase small amounts of groceries in Trinidad for her family and other dry goods which may be scarce in Grenada. Her earnings from the fruit trade are normally superior to her earnings from dry goods, although, from time to time the return trip is more profitable. If the sloop goes directly and gets an early berth, food losses are not a serious problem, however, when the sloop is delayed 24 hours the losses are very high. On one occasion she had to make three trips to pay for one major loss.

e) Other participants

The other participants in the marketing system as the fresh produce moves toward the final consumer are the supermarkets and the Marketing and National Importing Board. These two groups are discussed in sections 4.2.7 and 4.2.9 respectively. In summary it can be said that relatively small amounts of fresh produce (less than 5 % in either case) pass through these two points at the present time, however, the MNIB may be playing a much more active role in fresh produce marketing in the future.

In the case of the tourist industries, Government institutions and the private/public agro-industries they are viewed as end consumers rather than participants in the marketing chain.

1. Assembling Vegetables at Mardi Gras

2. Packing shed at the state Farm La Sagesse

4.2 Components of the Marketing System

4.2.1 Preharvest

The production of fruits and vegetables in Grenada is seasonal. Table 1 provides an indication of the periods of availability. Whilst some fruits may be obtained all year, the production of vegetables on a year around basis is limited by prevailing wheather conditions and lack of investment into required infrastructure, e.g., irrigation.

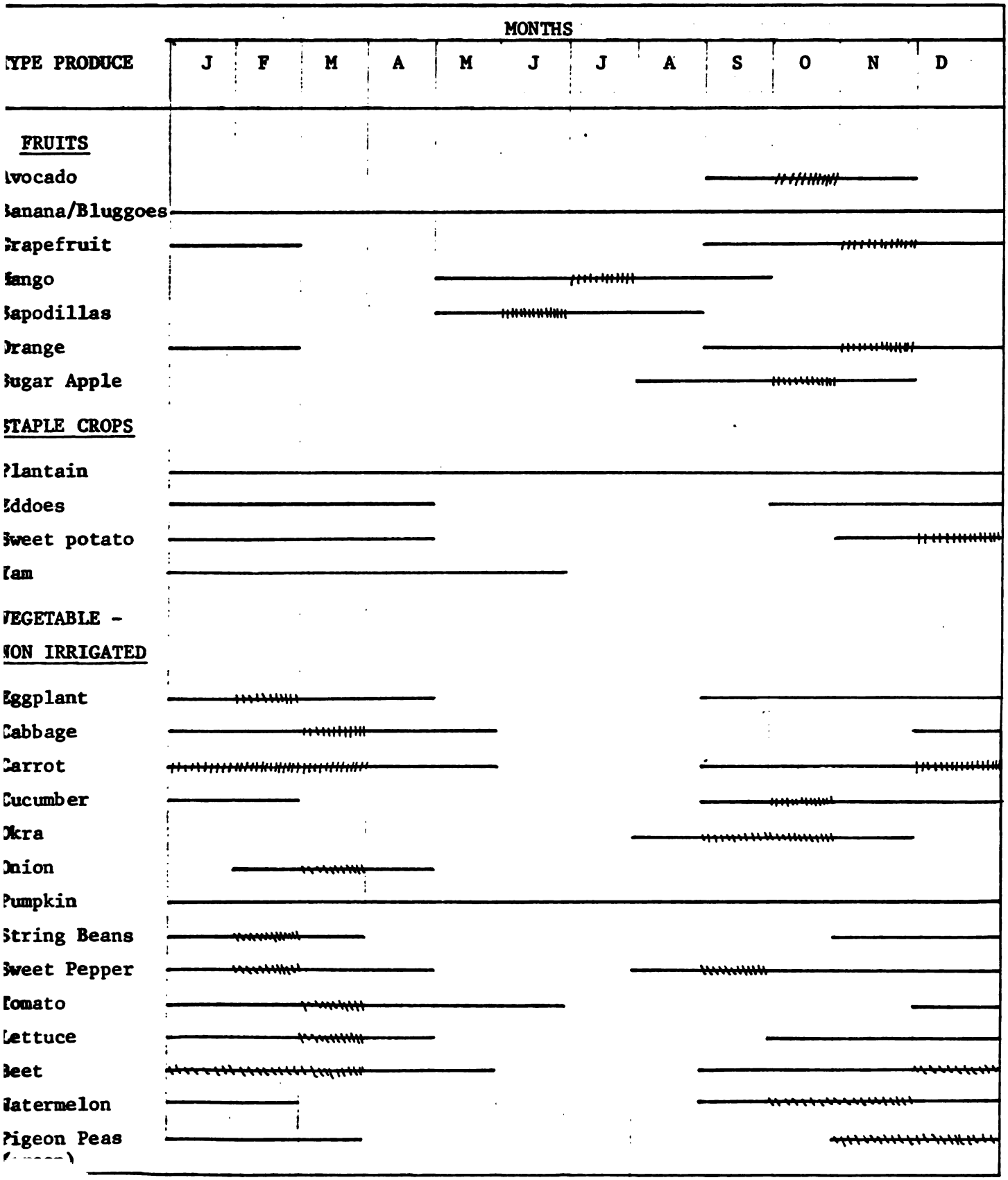
Vegetables are produced in the "dry" season on the hillier interiors, where precipitation is sufficient, with movement to the drier extremities of the Island for the wet season. Vegetable crop production is characterised by the use of traditional methods and production of mixed vegetable types on small plots. There are very few (if any) growers who specialize in large/medium scale commercial production.

State programmes in which there exists a vegetable component are La Sagesse State Farm, Paradise State Farm, and Mardi Gras Estate--project of land and water management. Both CARDI and CARDATS have limited involvement in small vegetable grower support schemes (see 3.2). Vegetable production is also viewed as an important cash crop in the context of the establishment of cooperatives (see 3.1.4). There are no currently established State fruit tree production operations although a number are currently under discussion.

For the traditional crops banana, cocoa and nutmeg modern technologies are successfully applied at all producer category levels. There exists a lack of adoption of improved horticultural crop and fruit tree crop production methologies including fertilizer useage,and pest disease control. The productivity of vegetable crops is low.

Varietal trial work together with extension demostration programmes were carried out for vegetable crops between 1975-1977 (I W. Stewart, FAO Vegetable production expert in collaboration with MOA).

TABLE 1: PRODUCTION SEASON OF HORTICULTURAL PRODUCE



W. Lumholtz, FAO - Final Report (1979)

* Cross hatched line denotes peak production periods

These demonstrations do not appear to have been continued nor have recommendations to continue the evaluation of specific varieties of certain vegetable crops been taken up. The use of varieties with resistance to disease (i.e. bacterial wilt in eggplant, potato), the selection of varieties with characteristics required by the market and showing good shelf life or storage life characteristics, are essential to any expansion programme. These areas are not being fully evaluated and developed at this time.

Most of the vegetable crops could be produced all year around with the use of supplementary irrigation: sprinkler or ridge and furrow depending on soil type. The limitations in increasing this spread of production appears to be:

(a) Lack of expertise for production during the "off" season where disease/pest control problems are greater.
(b) Lack of investment into irrigation systems.
(c) Lack of confidence in the market to obtain the higher returns required to justify investment, and
(d) Technical contraints.

The expansion of production of the two commodities which are imported in large quantities into Grenada, onion and potato, are constrained on technical grounds. It is unlikely that Irish potato production will become a viable propostion unless varieties resistant to or tolerant of, Bacterial Wilt and suitable for production in Grenada become available. The variety Desiree has so far been the only variety to show any potential promise.

The development of a local onion industry is still emerging, onion varieties Texas Early Grano and Texas Early Yellow Grano, of good quality have been produced and with the use of irrigation there is no reason why the growing season cannot be extended. Storage of up to 4 months may however be required. As these varieties do not have good keeping qualities further varieties should be evaluated. There exist

no drying or storage facilities for onions (see 4.2.4).

Outside of National and International special programmes linked to vegetable crop production, the MOA extension input into Fruit, Vegetable and Root Crop production is low (see 3.1 and 3.2) concerntrating primarily on the provision of assistance in land preparation and inputs of seed and fertilizers. There are no national specialist horticulturists or fruit tree agronomists available in Grenada.

The production of the varieties required by the market, free from pest and disease infestation (preharvest factors may later affect postharvest quality), at the required time and in the required quantities are essential prerequisities to the success of any national or export marketing programme.

4.2.2 Harvesting

Traditional methods of harvesting and lifting of vegetable and root crops are practiced. Harvesting tools include the use of knives, poles and hoes. Produce is usually trimmed and washed in the field. It is common practise for the men to carry out the lifting of roots and for women to wash and prepare the roots, and to harvest and prepare the other vegetable types. Whilst it is probable that inadequate use is made of field shade to protect the produce after harvest, the quantities involved are small and the time scheduling between harvest and arrival in the market generally appears satisfactory.

Harvesting methods for fruits vary depending on the commodity. For the more perishable fruits, e.g., sugar apple the traffickers prefer to harvest or arrange for harvest of the entire crop (100%); with commodities such as avocado approximately 70% of the harvesting will be "supervised" by the buyer while the remainder is harvested by the farmer himself.

Harvesting of fruits is carried out by small boys (with the traffickers, farmers or the traffickers herself). The fruits are most often harvested with one of the following methods.

(a) Picked, thrown and caught.
(b) Picked and placed in shoulder bags.
(c) Pulled with use of pole with cutting edge and caught.
(d) Pulled with use of a pole with cutting edge and collection bag for 4-5 fruits attached to the top of the pole.
(e) Collected from the ground after shaking the tree.
(f) Collected from the ground after natural fall.

It is not known the extent to which these methods are practised for each commodity nor the level of mechanical damage which occurs to the fruit during this operation.

After harvesting the traffickers will negociate the buying price; general appearance and size being two main quality criteria.

Little or no attention is paid to product maturity, although it is generally considered one of the most critical factors in ensuring a good shipping and market life of the fruit

Fruits destined for the local market are either picked by the retailer (huckster) or more frequently collected from or delivered by, the grower to the retailer.

4.2.3 Produce Selection Packaging and Packing Stations

4.2.3.1 Produce selection and preparation

In the traditional vegetable production and marketing sector where the producers retail their own produce or sell to retailers, produce selection is carried out on the farm at the time of harvest and preparation. The farmer generally will not carry wastey produce to the market. However, the quality, i.e., selection, size grading, physical appearance, maturity and ripeness, of produce in the market is highly variable. It is also

anticipated that there is seasonal variability influenced by the supply situation.

Farmer/retailers and retailers of vegetable crops frequently make up a load for market sale with fruits purchased from Estates. The produce will have been harvested under their supervision and selected out at that stage or purchased at their home or retail outlet. In the latter two cases no selection may be made but the price offered will reflect the quality.

Vegetables, fruits and root crops selected for supply to the MNIB should theoretically conform to the specifications drawn up by CARICOM (1978) but they are not applied. However, on delivery to the MNIB depots, the produce is examined. Rejected produce is returned to the grower. As specifications are not followed standards of purchase may fluctuate according to the market demand. This adversely affects growers confidence in sale to MNIB. The MNIB estimate wastage levels of 2-3% primarily due to periodic low turnover of some commodities. Suppliers of produce to supermarkets, hotels and restaurants have usually established firm contacts and from experience are aware of the selection and quality required. This nominal selection is carried out at the farm level.

At the retail level for vegetables, both in the open markets and supermarkets, the quality of produce offered is low, produce is not selected by size nor are attempts made to present the produce in an attractive manner. In supermarkets, where reportedly the turnover is low, the quality and presentation is very often poor. Both supermarket groups pre-pack the bulk of produce in polyethylene bags. The bags are either not perforated or poorly preforated, thus reducing the market life of the product. The prices demanded both in open markets and supermarkets are high; the combined effect of these factors does not encourage the consumer to purchase quantities of fresh locally grown produce.

Very small quantities of vegetables are exported, intra-regionally and the selection is likely to be as inadequate for that sector of the industry as it is for the local market.

The MNIB have over the past two years commenced the development of export of eggplants, pumpkins and mangoes to the U.K. market. The eggplants are produced at present on La Sagesse and Paradise Estates.

The procedure currently followed for product preparation is as follows:

- harvesting with clippers
- carry in buckets to packing shed
- trim with knife
- wash and treat with fungicide Benlate 1oz/gallon (10-12 mins)
- wipe dry
- tissue wrap and pack
- check weight

Whilst under good supervision the operations are relatively straight forward, it was clearly apparent that the facilities for washing, postharvest treatment and packing were inadequate. No one could identify the postharvest disease problem which apparently exists justifying the use of a postharvest fungicide.

It is essential that the correct treatment is used to control a known pathogen. The soaking of eggplants in decaying wood barrels for periods up to 12 minutes can only be seen to potentially create, rather than solve postharvest problems.

Product selection and quality control for the one export shipment observed (3/10/80) was poor and below a standard acceptable for the U.K. market, however, in previous years the quality and selection was reportedly higher. This low quality reflects lack of production of the desired variety, poor supervision at

the packing house level and lack of experience and knowledge of the market requirements on the part of MNIB.

In general, the traffickers of fruits to Trinidad pay reasonable attention to selecting out produce which is physically damaged or showing heavy disease or pest infestation. This selection is done either at the point of procurement, the farm, or at the time of packing into the export container, either at the farmers house or the port. No attention is paid to selecting for size or product maturity. It was reported that traffickers could not ship produce which had reached a stage of ripeness whereby they would be overripe at the time of discharge in Trinidad; this report does however require verification.

4.2.3.2 Produce packaging

Table 2 lists examples of the range of containers which are used for the local and export markets.

The fibreboard containers used for export to U.K., the cotton net, polyethylene sack and the bruce box are the only containers which are standardized in size. The baskets, wood crates and second-hand fibreboard boxes are all of variable capacity. The baskets are locally made and last approximately 5 export shipments, the fibreboard boxes are obtained from any source, usually supermarkets, and are often of in adequate strength to carry the volume expected; they are tied liberally with tape, string and wire.

Wood crates for export are made from broken pallets discharged from the port area. These crates are continually being repaired and rebuilt, usually at the port entrance or on the Carenage.

These containers used at various stages during the marketing chain for local and intra-regional trade are unsuitable for

TABLE 2: CONTAINER TYPE USED IN LOCAL AND EXPORT TRADE BY COMMODITY, CAPACITY AND COST.

TYPE	COMMODITY	CAPACITY (approx.)	MARKET	COST EC$
Sack (a)hessian	Fruits and Vegetables	50-70 lbs	Local/Trinidad	1.50-3.00
(b)Woven polyethylene	Fruits and Vegetables	25-30 lbs	Local/Trinidad	1.00-1.50
Net - Cotton	Vegetables e.g., carrots, cabbage	25-30 lbs	Local	3.00
Box - fibreboard (non-standard cardboard)	Fruits and Vegetables	20-50 lbs	Local	Free
	Fruits	20-80 lbs	Trinidad	Free
- Standard	Eggplant	9 lbs	U.K.	N/A
- Standard	Mango	12 lbs	U.K.	N/A
Bruce Box (wire bound wood box)	Highly perishable Fruits, e.g., sugar apple	25-30 lbs	Trinidad	1.00
Crate - wood non-stardard	Fruits	300-700	Trinidad	10.00-15.00
Basket with lid of/ polyethylene sheet-stiched on	Fruits and Vegetables	50-100 lbs	Local	10.00-15.00
	Fruits	50-100 lbs	Trinidad	10.00-15.00
Loose Handling	Banana on stem		Local and Trinidad	-

horticultural produce. Perishable fruits and vegetables easily suffer mechanically damaged when transported in sacks or bags. The fibreboard boxes and wooden crates carry excessive quantities offering little means of ventilation through the pack, excessive pressure is exerted on the product and due to their heavy unit weight the cases are frequently mishandled.

The containers used for export of produce to the United Kingdom are imported from the fibreboard box plant in St. Lucia. The container used for eggplant is of unsuitable design, being of inadequate strength and too shallow in depth. The container and label lack visual appeal.

Within the domestic market any container type is used to transport produce from the farm to (where applicable) a second point of packing. For the horticultural export schemes at La Sagesse and Paradise Estates, plastic buckets of low capacity, i.e., 10-15 fruits are used. The black plastic boxes used by the banana industry are also used by MNIB for transport of vegetables from Government Estates to their depot. These containers are too high a unit capacity and lack means of ventilation.

In 1976 three (3) alternative designs for wooden crates were drawn up but never developed.

There is no local manufacturer or supplier of a standard wood, plastic or fibreboard container or basket suitable for field handling or local and export marketing of fruits and vegetables.

4.2.3.3 Packing stations and produce collection facilities

No facilities offering cover to the small or medium sized private grower for the preparation of produce, or for roadside holding, are available to protect the vendor and produce from the prevailing weather conditions. Traffickers having harvested or collected produce for export sale frequently prepare their export

shipment in their own homes and hold until delivery (or collection) time for the ports of St. George's or Grenville.

The only physical facilities which are used in fruit and vegetable marketing for the purpose of preparation, sorting and packaging are the MNIB "buying depot" and sheds available on the three State Farms; La Sagesse, Paradise and Bocage.

La Sagesse and Paradise Estates are the two Estates involved with producing eggplant for export (35% and 65% respectively) to the U.K. The former produced lettuce for air-freight shipments to Trinidad, resulting in a 100% loss. The following facilities are available:

La Sagesse Estate - wood structure, tin roof, earth floor, no electricity or running water, no washing tanks, balances or equipment. Covered area approximately 27' x 24'. The shed is located adjacent to vegetable production area, and 1/2 mile off main road.

Paradise Estate - wood structure, tin roof, earth floor, no electricity or running water, no washing tanks, balances or equipment. Covered area 18' x 18', open on three (3) sides. The shed is located adjacent to the production area, 1/2 mile from main road and 2 miles from Estate Office.

The maximum size consignment which has been made up on a single day has been three (3) tons. The MNIB supply support staff, packaging materials and equipment when export shipments are being made up.

The facilities at Bocage Estate used for the preparation of mango shipments are reportedly similar to Paradise Estate.

The MNIB operate a mobile packing station when collecting produce from growers, some mango growers are responsible for the preparation of mangoes for export. This preparation includes

selection, washing, fungicide treatment and packaging. Further study is required on mangoes to determine preharvest diseases and the most suitable fungicide treatments.

The MNIB buying depot, used for purchase of produce for local and export markets, transferred to a new site on Young Street in October 1980. The two story facility comprises:

- A supermarket/retail area
- A delivery area with access to Young Street
- A holding area
- A chill room approx. 10'x12' (Bully USA)
- A cold room approx. 10'x12' (Bully USA)
- A pre-packaging area
- Extensive Office facilities

The previous facilities were congested, off the main traffic route and poorly ventilated. The new facilities are an improvement in terms of space and environment. However, as a centre for farmer delivery, the location has inadequate access for vehicular traffic. It is acticipated that difficulties will arrise in this area in the near future.

4.2.4 Storage

4.2.4.1 Storage at rural level

The only commodity which is held for any extended time period at the rural level is yam, whilst a number of the root crops are effectively held in the ground for short periods until required for consumption, yam is held for a number of months, usually on racks or in piles under the house. Information on the methods used was not readily available, however, as a staple commodity yam and other root crops are of significant importance at the rural level, and any problems in rural storage should be identified and solutions sought.

4.2.4.2 Common storage

Fruits, vegetables and root crops are frequently held overnight prior to marketing in the open markets or export marketing to Trinidad, without undue loss in quality. However, produce held in the markets, often in direct sunlight, deteriorates rapidly. When there are excess quantities of produce available, vendors are forced to dump or return home with it. There exists no holding area for this produce, nor perhaps should there be since municipal markets only operate 1-2 days per week with any volume. Vendors operating in the covered market area of St. George's and the MNIB leave produce in the market and warehouse respectively, at the prevailing ambient. The most serious problem reported was not reduction in product quantity or quality through lack of chill storage space but infestation by rats.

Sea freight shipments of eggplants and mangoes are harvested the day prior to loading (usually between 10:00 - 12:00 noon). The produce is held overnight in MNIB warehouse space. Consideration should be given to selection of the coolest common warehouse space and to the use of the MNIB cool rooms (recommended temperature 50-55°F) in order to reduce the level of wilting observed in the one shipment (3/10/80).

4.2.4.3 Chill storage

There is limited chill storage space available in Grenada for the holding of fruits and vegetables. That which is available is on the premises, and used by the two supermarkets groups (The Food Fair and Price Rite). These stores have small walk-in chill rooms. The supermarkets do not buy produce daily, their largest purchasing day is Thrusday to supply the increased demands of Friday and Saturday. The chill room is therefore used extensively during this period.

There is one chill room (10' x 12') and one cold room (10' x 12') on the premises of the newly acquired MNIB retail/ wholesale facility. It is proposed that the chill room operate at 45°F. This facility is poorly located for useage in operations linked to sea export programmes and most probably will only serve the MNIB retail outlet's needs. Technical notes on chill storage are given in Appendix 1.

4.2.4.4 Onion storage

Onion production in Grenada is currently low, however, should production increase to meet the Government policy of import substitution then the need to establish an onion drying and holding unit will become essential. Principle points related to onion drying are given in Appendix 2. Such facilities do not at present exist in Grenada.

4.2.4.5 Banana ripening

There are no banana ripening facilities available in Grenada. It is reported that there is demand both locally and to supply cruise ships with well ripened bananas. There is also reportedly a demand for ripened bananas in Trinidad. Ideally bananas should be boxed and shipped green to Trinidad and commercially ripened there immediately prior to marketing.

If improved shipping becomes available and in view of the shipping time between Grenada and Trinidad, it may be possible to trigger ripening in Grenada and ship at colour break storage; this would allow for an adequate market life in Trinidad. However, with the current poor shipping facilities and lack of a satisfactory transport time schedule, this approach could not be recommended. Principal points related to banana ripening are given in Appendix 3.

1. Packaging fruits into cartons and wooden boxes prior to loading on sloops

2. Stitching polyethylene bags on top of basket full of fruit prior to loading

3. Closing and labeling crates

4. Controling the loading of the Picadilly. Each unit pays from EC$ 3.00 to EC$ 5.00 depending on size.

5. Locaing the Gliden Star. The hold was full of empty beer cases thus fruit was carried on deck.

6. Inside the hold of the Picadilly. Note empty gas cylinders.

4.2.5 Transport

4.2.5.1 Road transport

Fruits, vegetables and root crops are transported within the island in a wide range of vehicles; trucks, pickups landrovers, vans, cars and buses. With all transport systems the produce is poorly stowed and mishandled. It is common for heavy goods to be placed, or people to sit, on top of sacks and boxes of perishable commodities. Produce carried in open vehicles is rarely protected from the prevailing weather.

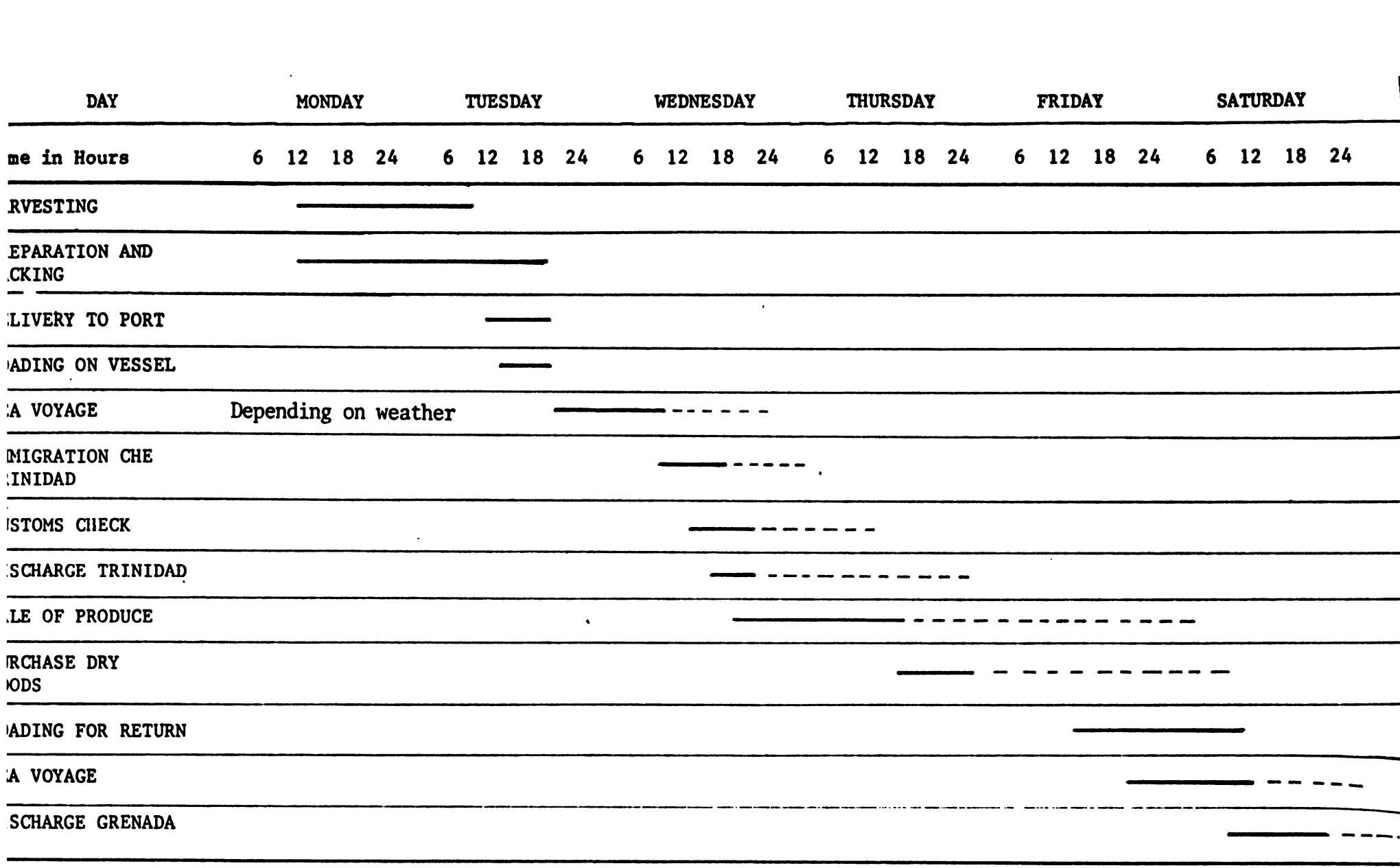
Transport charges are based on cost per unit piece almost regardless of size. This encourages the use of large containers for the carriage of perishables.

The large country buses, with adequate space for transporting produce, are now being replaced by mini-buses; space that is available on these mini-buses is often overfilled. With the facilities available for transportation and the manner in which they are used, it is probable that high levels of mechanical damage occur to the product and package.

4.2.5.2 Sea transport

The principle commodities transported by sea to Trinidad are golden-apples, avocado, soursop, sugar-apples, plantains, sapodilla and mango. All these items are highly sensitive to mechanical damage and have relatively short storage lives under ideal storage or transportation conditions.

Table 3 provides a time schedule of the sea export operation. Assuming a normal transport time with no excessive delays (6 hrs or over) the time period for the transportation these highly perishable fruits is not excessive; the problems arise with the conditions under which the product is actually transported and when delays occur (mainly berthing time in Trinidad).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SCHARGE GRENADA

4.2.5.3 Wharf facilities:

The schooner trade to Trinidad used the port customs area until the early 1960's. As this industry earned no revenue, was a security hazard, caused congestion and left debris, it was moved out of the customs area; it re-established itself on the Carenage. A covered area (9' x 75') was at one stage provided in an attempt to consolidate operations immediately outside the port area, however, this was never used.

An area (Figure 9) on the Carenage is now used for delivery of produce, preparation of wood crates, packaging of export shipments and general dealing prior to loading of the Schooner. The area used is entirely on the road causing severe traffic congestion and creating grave risk to traffickers, box makers and schooner crew. The area offers no protection from the weather; the fruit may remain for 6 hours in the sun and rain. Following rain deep puddles of water form in the area used for loading and fibre board containers become sodden. After vessel departures, reject fruit, wood and other debris is left lying on the road.

If the container is fibre-board (cardboard) the product and container will, if there has been rain, already be damaged.

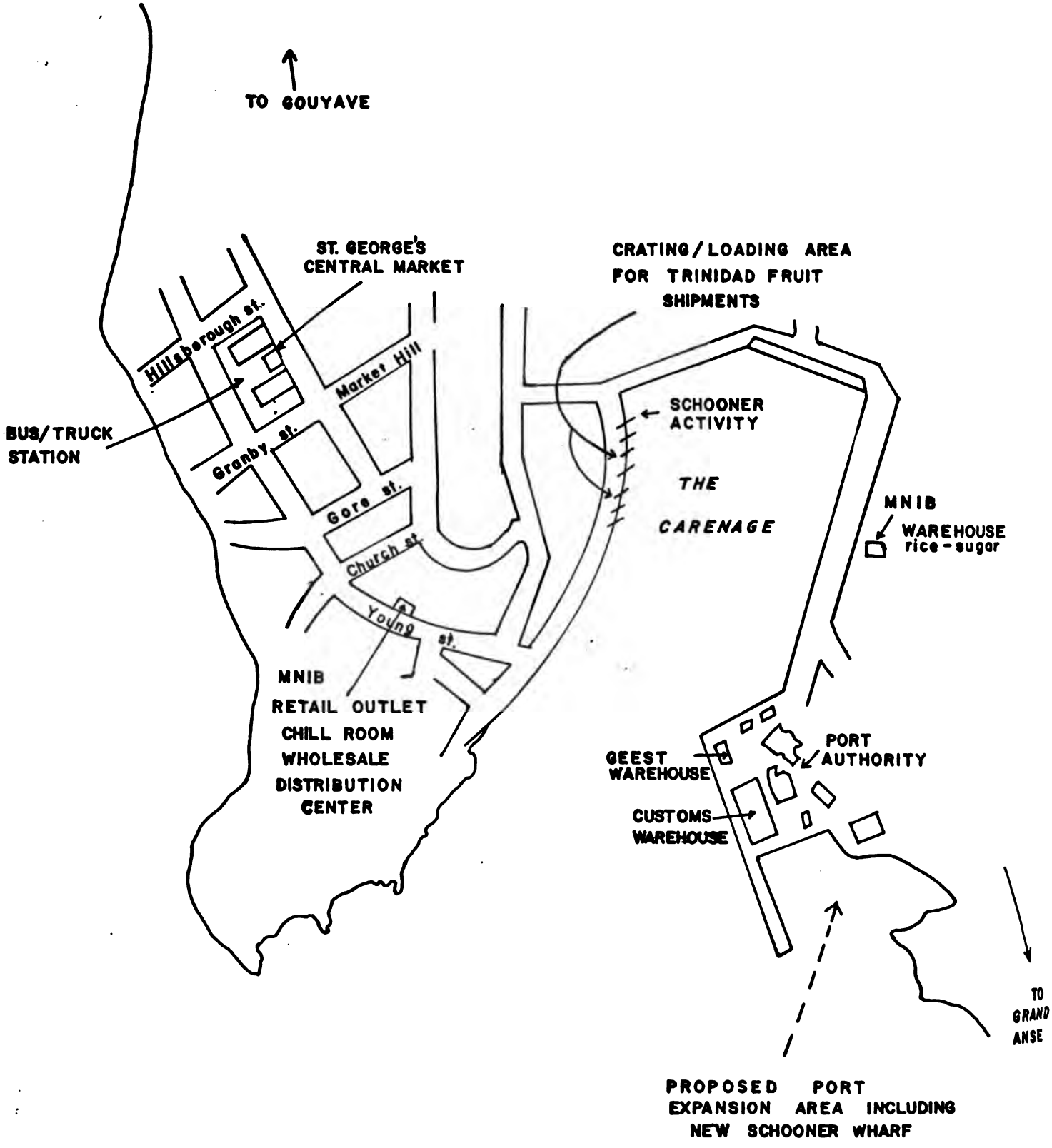
The environment for selection and packaging is hardly conducive to improving quality grades and procedures on the part of any of the participants in the marketing system.

4.2.5.4 Vessel type

There are a number of vessels which regularly ply between Grenada and Trinidad; most are registered in Grenada.

Picadilly - The largest with 40 ton pay load out of St. George's. The hatch opening is 8' x 10' the hold is 12' x 20' stacking approximately 5 feet with the exception of the hatch

FIGURE 9: IDENTIFICATION OF MARKETING INFRASTRUCTURE -- ST. GEORGE'S.



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area which can be stacked to 7 feet. Total hold capacity is 1,200 cu feet. There are two storage areas adjacent to the engine, these are considered too warm for perishables. Miscellaneous boxes of produce are also stowed on deck 2-3 deep. The wall between the hold and the engine room is wood, two layers thick and cracks between the boards were observed.

Reform - 40 ton pay load out of St. George's.

Albert George - 40 ton pay load out of St. George's/ Grenville.

Alexia - 35 ton pay load out of Grenville.

Waheeda M - 20 ton pay load out of Grenville.

Faith H - 15 ton pay load out of Grenville.

Gilden Star - out of St. George's

The common loading pattern is for dry goods or large wood crates, usually carrying avocados, to be loaded first. After one or two layers of wooden crates, large sacks followed by smaller sacks and baskets are stowed. Nearly all small wood boxes and cardboard boxes are placed on deck.

It is common for large crates to drop 3-4' during loading, damaging the crate and any neighbouring crates. The containers in the hold and on-deck are frequently stepped upon causing mechanical damage to product and pack.

During the voyage, if the sea is calm, the hatch remains open to facilitate a degree of outside air ventilation. Since no dunnage is used or systematic stacking applied, the effectiveness of leaving the hatch open would be minimal. No studies have been conducted on transit temperatures, however, with the combined effect of high product temperature at loading, the total lack of ventilation and poor insulation between the hold and the engine

room, the temperature must be excessive for the commodity range. The effect of high temperature is to shorten the market life and with some commodities to inhibit normal ripening; both contribute to the low level of product quality on the Trinidad Market.

In general, the crew do load systematically and avoid placing produce too close to the engine room and it was felt that they do attempt to minimise loss within the constraints of time, people and with the wide range of containers that are in use.

4.2.5.5 MNIB Sea transport capability

The MNIB have purchased a vessel Albatros III steel hull net 197 ton, 247 ton gross, 7 knots, one hatch principally for the transportation of dry goods. A vessel of this type is too large and too slow for the perishables transport trade. Consideration is being given to installing a small refer container either on or below deck however, it is likely to be uneconomic to transport relatively small quantities on intra-regional trade routes unless the vessel can be filled with an additional dry cargo.

The Albatros III was in dry dock (October 1980) for maintainance and repair, MNIB have however, recruited a captain and crew.

The government has also purchased two fishing vessels of 10 knots each and it has been suggest that these may be used for fruit exports to Trinidad. This requires further investigation, however, a vessel such as this is not easily interchangeable for the carriage of fish and that of fruits.

4.2.5.6 Air transport

The air export of fruits and vegetables from Grenada is still in the development phase. There are currently no regular cargo planes routing through Grenada and little cargo space on scheduled passenger aircraft. Pearls Airport has no facilities

for handling perishables and no allocation of cargo warehouse space has been made for the export operation in the proposed new airport, South of St. George's. The new airport is due to open in 1982/83

A commercial shipment of lettuce was made to Trinidad in 1978; very high losses were experienced. This was probably due to bacterial soft rot induced by washing the lettuce prior to shipment.

A high level of co-ordination of production, organization and management is required to satisfy a regular air cargo service of between 7-15 tons per week. Two alternatives for air shipment are a) to charter special flights out of the existing air terminal or b) to await the inauguration of the new international jet airport and use available cargo space on regular passenger flights.

4.2.6 Quality Control

Standards for horticultural produce, mainly the principal vegetable commodities, have been agreed upon within CARICOM. These are not enforced in Grenada at any stage during the marketing of produce, either locally or externally.

Buying specifications of MNIB, Institutions, hotels and restaurants tend to vary depending on the supply situation. However, in general, growers do not offer extremely low quality. i.e., wastey or heavily mechanically damaged, produce to the buyer.

Produce offered at retail level in the open markets or supermarkets may have been trimmed to improve appearance, however, no commodity is sold from a single outlet at two price levels reflecting a quality range. Some fruits are sized and priced accordingly; avocado, mango and citrus are usually sold at two size grades.

There is no control of export quality of fruits to Trinidad. A MOA official surveys the shipment prior to loading, making an assessment of commodity range, condition and volume prior to issue of a phytosanitary certificate.

The principle quality problems identified in export shipments to Trinidad are:

- lack of achievements of minimum quality standards.
- mixed sizes in a single pack.
- high variability of maturity or stage of ripeness in a single pack.

There are no specifications or guidelines drawn up for quality control, grading and packaging of export produce destined for the United Kingdom market. There is no information available in Grenada on EEC quality specifications, grades supplied by competitors in the UK market or UK market requirements.

Within both the public and private sectors, there is a lack of understanding of the rational of supplying a consistant product quality, a lack of experience in how to achieve the required quality, and the criteria to be applied, and a lack of personnel to implement quality improvement or control systems.

4.2.7 Distribution System

This section is divided into two parts. The first part covers the domestic distribution system for root crops, fruits and vegetables, and the second the export distribution system for fruits and vegetables.

4.2.7.1 Domestic

There are four main outlets through which produce reaches final consumers in Grenada. These are the public markets, the supermarket, the instituions and the tourist outlet (hotels, restaurants and cruise ships). These are each described below.

Two Views of St. George's retail market. Saturday is the principal day of operation and the number of retailers will vary between 150 and 200.

(a) Public markets

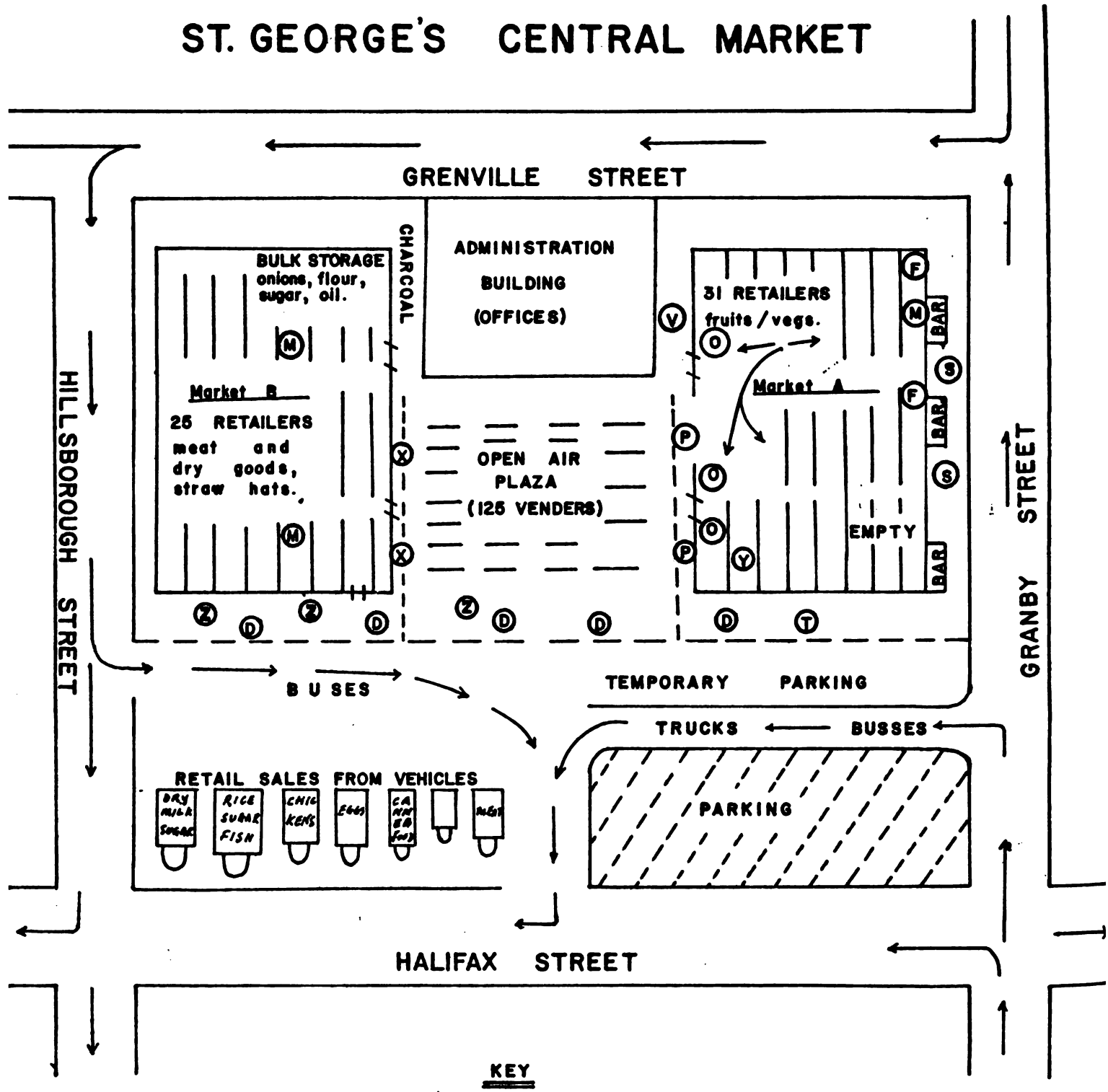
There are 5 public marketplaces in Grenada located in order of importance in the following towns: St. George's, Grenville, Gouyave, Sauteurs, and Victoria. Of these five the last four operate only on Saturdays. The St. George's central market (Figure10) operates six days per week, with Friday and Saturday being the principal days of activity.

The market plaza covers one block, approximately 64 by 55 meters. There are three buildings including two covered markets having 6,000 ft^2 each (see Figure 10A & B) separated by the office for market administration. The two markets are identical with the following characteristics: Cement block walls up to a height of four feet, well ventilated heavy duty mesh from there to the ceiling and metal roofs with 4 slopes. Each has cement floors and seven rows of permanently fixed cement tables with 2 divisions in each row. These covered areas lack maintenance and are poorly lit. The administration building is constructed of cement, has 2 storeys with a metal roof and office space for the market administrators. The second floor is occupied by a spice cooperative.

The other important aspects of the market as depicted in the drawing includes the Central plaza, with an area of 4,200 ft^2 where 29 wooden temporary table stalls, many in disrepair, are placed for the busy market days (Friday/Saturday). Each table is 3 feet high, 2 feet wide and 9 feet long. Each table is divided into three (3) parts for three vendors. Since the tables are insufficient in number, and broken, other vendors place their produce on empty sacks spread over the cement floor. When the market is crowded the retailers spread into all available space including the alleyways on the sides and in front of the two covered markets. In front of market A there is a temporary

FIGURE 10

ST. GEORGE'S CENTRAL MARKET



KEY

- (D) COLD DRINKS (10)
- (F) HOT FOOD PREPARATION (2)
- (M) DRY FOODS, MILK, SUGAR, RICE, CORNMEAL TRAFFICERS - 5
- (O) LARGE FRESH PRODUCE RETAILERS
- (P) 7 VENDERS GREENS, POTATOES, AVOCADOS, ONIONS, CORNMEAL, SPICES.
- (S) 7 VENDERS LEMONS, ORANGES, BANANAS, DASHEEN, BREADFRUIT, BLUGGOES
- (T) 8 VENDERS ORANGES, BANANAS, AVOCADO, CUCCUMBER, COCONUTS
- (V) 7 VENDERS COCONUT, OKRA, MANGO, CUCCUMBER, CASHEW
- (X) 8 VENDERS COLD DRINKS & DRY GOODS
- (Y) 1 VENDER OF SPICES
- (Z) 15 VENDERS FRUIT/VEGS. MISC.

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parking area for about 8 vehicles. Adjacent to it is a driveway used by buses and trucks after which is found a second parking area for longer periods and capable of holding 8 vehicles. In front of Market B there is a driveway for buses to enter the market place plus a parking area for vendors of fish, chicken, eggs, flour, sugar, rice and miscellaneous items from trucks and pickups. In the corner between the administration building and market B charcoal is retailed.

Management and operation is the responsibility of the MOA which in the case of St. George's maintains a staff of one manager, 5 supervisers for the collection of fees, one cleaner and 7 "scavengers" who pick up the bulky material after market day. The Ministry of Communication is responsible for the maintenance of the buildings, the Ministry of Health for the registration of vendors of prepared food and market hygiene while the police control vehicle movement.

In the case of the 4 markets operating on Saturdays only a staff of from 3 to 5 persons is maintained in each market to clean, collect fees and clerical work. The staffing by market is as follows: Grenville 5, Gouyave 5, Sauteurs 3 and Victoria 3.

Market fees include those paid by the market women at the rate of EC$0.25/day or EC$3.00/month, depending on the type vendor (permanent or Saturdays only). Buses are charged a flat rate of EC$0.50 and vans retailing on the edge of the market are charged EC$1.00 - 2.00 depending on quantity and type produce. Total revenue received for the period 15-20 September 1980 was EC$240.50.

On Saturday (27/9/80) fees were collected from 157 market women (99% were women) in the St. George's market. Some 20% of these vendors were semi-permanent retailers located within the

covered portion of the market. The majority sell fruits and vegetables on a relatively small scale (50-100 lbs). There are reportedly only 3 large retailers handling large volumes of produce, all of which are located next to the entrance ways of the covered markets. Additionally there are some 5 traffickers who deal in dry goods located within the market. The remaining 80% of the vendors are either farmers, wives of farmers or friends or agents of farmers who bring small quantities of produce (20-80 lbs) for the Saturday market.

In the 4 markets outside of St. George's there are no permanent retailers and the number of farmer-type vendors of fruits and vegetables frequenting the Saturday markets are approximately as follows: Grenville 120-150, Gouyave 10-20, Sauteurs 10-20, Victoria 10-20. The number of retailers is a function of the urban population and non-farmers residing in an area.

The bulk of the produce is carried to the market in sugar bags (cost EC$1.00), cardboard boxes, or baskets (cost EC$10-12.00). It is common for a number of commodities to be mixed in the same container. Green bananas are transported on the stem, ripe bananas, plantain and bluggoes in baskets or sacks.

The majority of the produce seems to be fresh and of acceptable quality. For all items only one quality grade is offered. Price differentials do exist for different size fruits, as in the case of citrus and avocados.

In terms of outlets marketing domestic agricultural produce, public markets are by far the most important. Considering data for St. George's and St. Andrew's (Grenville) markets only, for 1975, it was observed that more than 90 percent of domestic production of rootcrops, fruits and vegetables are sold through public markets.

(b) Supermarkets

The supermarkets in Grenada are located in the parishes of St. George's and St. Andrew's. Four supermarkets are located in St. George's three in the city limits and one at Grand Anse. There is one supermarket in Grenville, St. Andrew's. The supermarkets deal with more growers than with hucksters and although there are no formal contracts there are growers who have an established relationship with supermarkets and plant their crops with these markets as the intended outlets. Occasionally supermarkets will purchase from the marketing board.

The fruit and vegetable trade in supermarkets takes place primarily on Fridays and Saturdays and as a result 75 percent of the deliveries are made on Thursdays. Fruits are sold by the unit unpackaged while vegetables are sold in 1 lb polyethylene bags. In general supermarket prices are higher than public market prices.

The major problems regarding the development of the supermarket is the low quality produce offered for sale and the irregularity of sufficient amounts being available. Presently the supermarkets pay cash for vegetables but in the case of fruits often pay for only the produce sold. The supermarkets have chilling and freezing facilities but they are not presently used for storing fruits and vegetables. A higher standard product and continuous supply will be critical to selling more produce through supermarkets.

In 1975 supermarkets purchased 224,792 lbs of produce. This amount was approximately 5 percent of the amount going through the public markets in St. George's and St. Andrew's (Table 4). The 1978 figure was estimated at 225,000 lbs which tends to show that there is no development taking place in this area of the supermarket trade.

TABLE: 4 1975 SALE OF AGRICULTURAL PRODUCE THROUGH SELECTED OUTLETS

TYPE PRODUCE	SUPERMARKETS	PUBLIC MARKETS		TOTAL
	LBS	ST. GEORGE'S LBS	ST. ANDREW'S LBS	LBS
Food Crops	76,236	1,265,353	681,800	2,023,389
Pulses and Grains	8,995	67,810	45,055	121,860
Ginger	495	25,084	12,226	37,805
Fruits	65,548	1,073,616	131,007	1,270,171
Vegetables	73,518	510,153	169,872	753,543
Total	224,792	2,942,016	1,039,960	4,206,768

Source: V. Lumholtz, End of Tour Report, FAO Expert FAO/UNDP (Grenada, 1979

(c) Institutions

The institutions in Grenada purchasing produce are both government and non-governmental. The main governmental institutions are the hospital, army and prisons. The non-governmental institutions are the American Medical School and old age winter home. The government institutions are supplied produce by the marketing board and data was only available for the first half of 1980. If these figures are projected for the year it is expected that institutions will consume approximately 150,000 lbs of produce valued at EC$175,000. Farmers supply the non-governmental institutions and no information was available on this trade. The government policy in respect to institutional programs is as of yet unclear thus it is difficult to project institutional demand since it is tied closely to policy and level of spending.

(d) The tourist outlet (hotels, restaurants and cruise ships)

The requirements of the hotels and restaurants and the sale generated by the cruise ships are a function of the number of tourists visiting the island. This number is increasing and is expected to increase rapidly upon completion of the new airport (1982). Similarly to supermarkets, hotels have established relationships with growers and face many of the same supply problems regarding quality and regularity.

The estimates of the fresh fruit and vegetable produce sold to hotels and restaurants in 1978 was 155,000 lbs. and was valued at EC$125,000. This places their demand quite close to that of Government institutions. Cruise ship purchases have been minimal. They continue to rely for fruits and vegetables on the more established ports of call. There is the potential for Grenada to sell the tourist sector more fresh produce but reliable quantities and a high quality would have to be supplied with regularity.

4.2.7.2 External

In addition to the weekly export of produce by the traffickers to Trinidad, the Grenada Marketing and National Import Board is the major means of exporting produce to other markets. When a market has been identified, farmers are informed and requested to deliver the particular type of produce required to the Board's premises in St. George's or to temporary collection points elsewhere according to a time schedule.

The produce is then graded, packaged and transported to the St. George's wharf or to Pearl airport in case of the occasional exports by air.

The main problem in ensuring that export markets can be adequately served are:

1) A lack of good coordination and organization between the producing side and the marketing side.
2) A lack of supply on a continuous basis.
3) A lack of good quality produce on a regular basis.
4) A lack of proper packages.
5) A lack of assured transport to nontraditional markets

In most cases, the required organizational and technical improvements for the export market are the same as for domestic sales. These include the following:

1) Strengthen the institutional capacity to advise and assist growers in fresh produce production.
2) Encourage improvements in the selection, handling and packaging of produce for export.
3) Establish regional collection and packaging centres in order to streamlime the movement of produce from farm to the port.
4) Train national personnel in proper product handling and

5) Continue to investigate alternative or improved methods of transportation by both sea and air.

4.2.8 Pricing

Price information and pricing systems as they relate to the market for fresh agricultural produce in Grenada both need much attention. On the procurement side the present practices can be described under the categories of open market purchases and informal contract buying. There are no guaranteed price systems nor minimum guaranteed price systems. On the distribution side there appears to be a price leader that uses a cost-plus method of pricing with a variable percentage. The remainder of the distribution channels use the price leader's rate as a guide.

The open market purchases on the procurement side relates primarily to the trade in fresh produce between the farmer and the intermediaries. Presently, the major intermediaries are the hucksters and vendors who sell to consumers in the municpal markets, the Grenada Marketing Board and the supermarkets. Basically, the interaction of supply and demand determine the price. In periods of glut hucksters and vendors know they can push prices down and in periods when produce is in short supply farmers know they have the upperhand.

The informal contract buying refers to the trade between farmers and the supermarkets, hotels and restaurants. Although the contracts are not inforceable they have been established by long relationships between producer and buyer. For the farmer it removes some of the risks and uncertainty that might normally result when his produce is ready to be sold. There may be some adjustment at the time of sale reflecting the present market situation but generally the farmer gets what he considers a fair return and continues to plan with these informal contract buyers in mind.

The Grenada Marketing Board presently falls somewhere between the open market purchaser and the contract buyer. Procurement prices were not available.

On the distribution side the price leader seems to be supermarkets. Hucksters and vendors and the Marketing Board observe prices in the supermarkets and then set their own retail and wholesale prices in relation to this price. The present supermarket procedure is to add on to its purchase price a percentage that will cover its marketing plus a return for handling the produce. This percentage varies between 30-40 percent. Distribution prices for the three outlets were availabe and are listed in Table 5 below. It is difficult to compare prices of fresh agricultural produce across outlets because of the obvious problems of variety, size, quality and packaging. However, in general it appears that the Marketing Board sells produce at lower prices than the municipal markets and the municipal markets sell at lower prices than the supermarkets.

Pricing policies are critical to stimulating agricultural development. In response to the question: "What do you see as the best ways of encouraging and recognizing agriculture?" The Prime Minister of Grenada replied: "In terms of encouragement the key question to us relates to prices".[1/] Price policy has long been recognised as a critical factor in agricultural development. It is also one of the most difficult areas because while higher prices for produce may mean greater food availability and agricultural development it will also mean higher prices to consumer. This trade off must be faced. The goals of the government largely determine the type of pricing policy to be adopted and it is the government who decides in whose favour the trade-offs fall. Further, price policies must be viewed within the larger environment of social and economic policies upon which they depend.

In general there are three categories of price policies. Each has specific goals as well as specific instruments:

Category 1:

Goals:
- Increase producer welfare
- Increase agricultural development

1/ Grenada: Towards a New Socialism? The Courier, No. 61 May - June 1980.

TABLE: 5 SALES PRICES OF SELECTED AGRICULTURAL PRODUCE IN SELECTED OUTLETS IN ST. GEORGE'S (E.C.$)

PRODUCT	UNIT	MUNICIPAL MARKET 1/	SUPER MARKET 2/	MARKETING BOARD 3/
Oranges	One	.25/.30	.40	n.a.
Avocadoes	"	.30/.35	40/.65	"
Mangoes	"	.15/.25	.30/.60	"
Soursop	"	.75/1.75	n.a.	"
Bananas	"	.10	n.a.	"
Plantain	"	.50	.35	"
Sweet Peppers	"	.25/.50	.20/n.a.	"
Cucumbers	"	.25/.50	n.a.	"
Cabbages	lb	2.50/3.00	n.a.	"
Tomatoes	"	2.50	2.50	"
THE FOLLOWING DATA PERMITS A COMPARATIVE ANALYSIS ON A PER POUND BASIS				
Oranges	"	1.00/n.a.	.55	.37
Avocadoes	"	n.a.	n.a.	n.a.
Mangoes	"	1.00/.50	"	.38
Soursop	"	1.00/n.a.	"	n.a.
Bananas (ripe)	"	.50/.25	"	.28
Plantain	"	1.00/n.a.	"	.58
Sweet Peppers	"	2.50/1.75	"	1.70
Cucumbers	"	1.75/1.00	"	.70
Cabbages	"	4.00/2.50	"	2.26
Tomatoes	"	4.00/1.50	"	2.11

1/ Where prices are listed for units of one they are based on observation of sales in the market on Saturday 27/9/80, e.g., oranges for .25/.30 represent the price reflecting the range of small through large product. Where prices are listed on a per lb. basis they were supplied by the Statistical Division of the Ministry of Agriculture. In this case oranges for $1.00/n.a. means that over the period the maximum price was $1.00 per lb but the minimum price was not available.

2/ Three supermarkets were visited in St. George's on 27/9/80. The price reported is the average of the three supermarket prices.

3/ The prices listed under the marketing board are average on the basis of depot sales over the period January through June 1980.

Instruments:
- Guaranteed prices, minimum guaranteed prices, price agreements.
- Subsidies.
- Regulate prices of agricultural inputs and ensure greater availability.

Category:

Goals:
- Improve the balance of payments.
- Promote import substitution.

Instruments:
- Control and regulate food imports, exports and product prices.

Category 3:

Goal:
- Increase consumer welfare by providing more food at lower prices.

Instruments:
- Control of maximum prices on food.
- Regulate distribution of food.

The potential to implement these policies vary with the country.

The first category is most relevant to our purposes in this report and is discussed below. However, it is important to bear in mind the linkage and interrelationship of the first category with the other two categories.

The most commonly found pricing policies are in the area of guaranteed prices and minimum guaranteed prices. The guaranteed price is often used with export crops which are not highly perishable. It offers the farmer a price which does not fluctuate with the market price (world market prices). In other words, if the market is good and prices are high the intermediary providing the guaranteed price reaps all the benefits. If the market is down he also absorbs the entire loss.

The minimum guaranteed price is much more common. It is widely used for crops produced both for the international market and for the domestic market. Basically, the farmer is offered a minimum price (the floor price) which he receives if the market price is lower than the floor price. If the market price is higher he receives the market price. In Grenada the traditional export crop, nutmeg, operates under a variation of this pricing system. Presently there are no minimum guaranteed prices for domestically marketed food crops in Grenada. However, the marketing boards handling fresh agricultural produce sold domestically in Guyana, Jamaica, Barbados and Trinidad/Tobago all have utilized minimum guaranteed price system.

Minimum guaranteed prices are based upon cost of production plus a profit margin. In this way once a farmer is efficient he is ensured a reasonable income. It is very important when using a minimum guaranteed price system to revise and update regularly the cost of production study on which the prices are based. The experience in the Commonwealth Caribbean has been that these prices cease to be meaningful to farmers because while input prices have increased the agencies offering the minimum guaranteed prices have failed to update the cost of production estimates.

While guaranteed prices are implemented to lower the risks to producers by stabilizing prices, input subsidies and input price regulation are intended to instigate the use of improved cropping systems. The distribution of improved inputs at subsidized prices is widespread and warrants no further discussion.

In the case of distribution pricing policies, the most common, cost-plus pricing, was alluded to earlier. Basically the intermediary evaluates his costs and adds a markup to cover these and allow a return. Customer bias pricing is also commonly used. In this case the intermediary discriminates between purchasers and may use the high paying customer (external market) to subsidize the low paying one (domestic market).

The same can be done by outlets within the domestic market. If the intermediary controls enough quantity he can also attempt to act as a price leader and lower prices to consumers, if that is the goal.

In concluding this section it is important to mention that the experience in the Caribbean with minimum guaranteed price for domestic food crops (roots, vegetables, fruits) is not a success story.

The major limitations of the pricing policy efforts have resulted from:

(1) Lack of clearly defined goals which the pricing policy should achieve.

(2) Lack of market development planning.

(3) Lack of back-up services such as research and price market information.

(4) Lack of coordination between relevant institutions.

(5) Lack of resources (human, financial, physical).

Therefore, in implementing a pricing strategy it is essential to ensure that these problem areas are considered and dealt with adequately.

4.2.9 Government Institutions

The principal Government institutions involved in marketing are the MOA, the MNIB and to a much lesser degree the State Farms Corporation and NACDA:

4.2.9.1 Ministry of Agriculture

The 5 Divisions within MOA involved in one way or another in marketing were mentioned in 3.1.1 (see Figure 1). a) Produce Chemist Laboratory: In the case of the Produce Chemist Laboratory no serious problems were detected. They seem to know where they are going and have adequate staff (6 technical people) and Government support to carry out their task. The food processing industry is due to begin operations in October-November 1980 and they are likely to run into raw material supply problems as they

are unsure of quantities required and sources. They seem to be relying on extension agents to coordinate supply; however, little has been done by the extentionists to guarantee supply. b) Extension Division: This Division seems to be well organized and have well motivated and high level staff. The 26 extensionists are distributed between 5 agricultural districts: East (8), West (5), North (5), South (5) and Carracou (3). Some posts are presently vacant. They seem to know what the production and marketing problems are, however, they lack information on alternative and priority solutions, particularly in the case of preharvest control of disease problems which affect postharvest produce quality and the proper methods for fresh produce handling. They have not received any training to speak of in the field of marketing. They also lack transport facilities and the proper equipment and infrastructure for fresh produce handling. c) Farmer Training Division: This Division operates as the Mirabeau Farm School in St. Andrews. This agricultural school is run by MOA, with a permanent staff of 2 persons with instructors from the MOA and other institutions (public, private and international) donating their time. The school has 50 students (32 male, 18 female) for the 1980-81 school year. It has a practical to theory ratio of 70:30 and the students learn agriculture and marketing by operating a 10 acre farm (2 cocoa and 8 vegetables). Several 1979-80 graduates are employed by MOA and they seem to be well motivated. This school could be a valuable instrument for both theoretical and practical training in marketing. d) Statistics Section: This section consists of the section head, one farm school graduate (data collector) and one clerical assistant. The following types of data are collected:

- 2 surveys each year on fresh produce acreage (extension agents).
- production data from nutmeg, banana, cocoa associations.

- municipal market price/quantity information.
- quantity fresh produce sold to supermarkets and hotels and prices paid.
- volume and price data for agricultural inputs.
- weekly fresh produce shipments to Trinidad from St. Georges and Grenville.

Some good data is collected, however it is not analyzed or disseminated neither in published form or by radio (price information, etc). e) Forestry Division: This Division is important in marketing in that it is responsible for the control and harvest of public forests which can be used in the manufacturing of crates for the export of fresh produce. Its basic problems are:

- the lack of laboratory analysis to determine the type of wood most suitable for crate manufacturing.
- the lack of equipment to build roads into public forests.
- the lack of a sawmill to prepare lumber for crate manufacturing.

4.2.9.2 Marketing and National Importing Board

The Grenada Marketing Board was reorganized in 1979 and became what is now known as the Marketing and National Importing Board (MNIB). The MNIB has taken a practical approach to developing its import, export and internal marketing responsabilities. It has minimal staff and infrastructure and is adding new staff and infrastructure only as operations present the need.

a) Personnel:

The present staff (Oct 1980) of MNIB and their respective functions are as follows (see Figure 2).

Managing director: Overall supervision and direction, responsible for international purchases and sales, coordinator between MNIB and Ministries of Trade an Agriculture. Helps to determine marketing policy with Ministries.

Deputy manager: Substitutes for managing director, directly responsible for supervision of personnel and accounts. Plays a planning role and responsible for costing and statistical analysis of purchases, sales, profit/losses, etc.

Purchasing manager: Coordinates produce purchasing with the growers and produce exports with the import (export) manager. Supervises personnel responsible for sorting, grading and retailing. Staff under this division includes one assistant who acts as clerk for produce handling and accounts, one clerk for accounts and 3 women for produce grading and sorting (for retail and for export shipments).

Import manager: Responsible for the supervision of operations for import/export. Contracts stevedores, talleys produce received and sent and delivers to warehouses, also supervises field work arm of exports. He has one assistant who operates as shipping clerk, clears from pier and pays bills.

General warehouse manager: Is responsible for the supervision of the 6 warehouses or storage facilities (Figure 2) and their respective personnel: Carenage, rice storage, one clerk; Young St. rice storage and retail sales (see personnel under purchasing manager); Carriacou, produce assembly and retail sales, manager and assitant; Pier, sugar storage no personnel; Queens Park, cement storage, one clerk; Woodlands, sugar storage, no personnel. An outlet in Petit Martinique similar to Carriacou will be in operation before the end of 1980.

Chief accountant: Responsible for receipts and payments and all accounting and statistics related to the operations of MNIB. Staff includes one assistant accountant who looks after financial statements and the accounting related to Albatros III. Accounts (rice, cement, exports, farmer groups) are divided between two accountants.

Other MNIB personnel include: 2 secretaries (Young St/ Carenage), 2 porters (van/retail outlet), 2 drivers (MNIB/MOA) and crew on steel hulled ship the Albatros (captain, engineer, 3 seamen one ablebodied seaman and cook). For names of some MNIB personnel see Appendix 4.

b) Facilities and Equipment:

In addition to the warehouses and retail outlet mentioned above the MNIB has ample office space on Young St. The MNIB owns the facilites at the Carenage, Young St. and Carriacou and receives the other warehouse space from the Government at no charge.

Equipment owned by MNIB is limited and include: office machines, furniture, one van, one small lime crushing mill with motor, one staple machine and 2 scales.

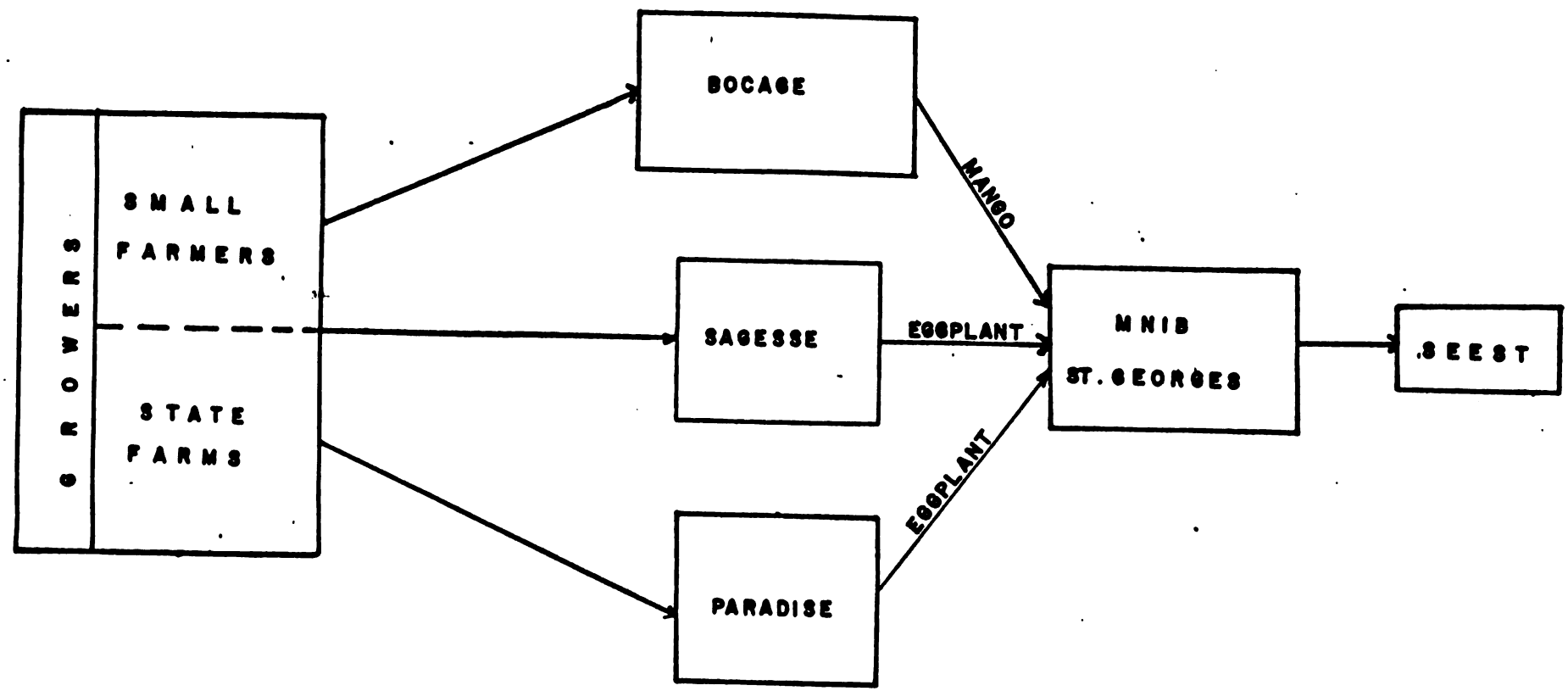
The MNIB recently purchased a steel hulled 131 foot long vessel (Albatros III, 247 tons gross and 197 tons net). It has one hatch and is designed for carrying lumber, light poles and other dry goods. Its maximum speed is 7 knots. It is presently heading for dry dock for repairs.

c) Operations:

Although the MNIB is presently sole importer of rice sugar and cement a relatively low percentage of the technical staffs time is spent on these operations. Imports are only made every 4-5 months and once the produce is on land distribution is done through the use of warehouse vouchers.

In the case of exports the amount of technical staff time required is also relatively low as exports are seasonal and have thus far been limited to mangoes and eggplant (Figure 11). The exports are channeled to MNIB facilities in St. Georges from three State Farm collection

FIGURE II: FLOW DIAGRAM MNIB EXPORTS



points (Bocage, Paradise, La Sagesse). In 1979/80 total exports were less than 100,000 lbs and will probably not greatly exceed that figure in 1980/81. The principal problems occuring with these shipments are: 1) the lack of coordination between the production side and the demand side (the varieties of eggplant planted are not the most desired for the EEC market), 2) preharvest disease problems affecting postharvest quality, 3) lack of proper facilities for grading and packing produce and 4) lack of trained personnel for handling and packing the produce for export.

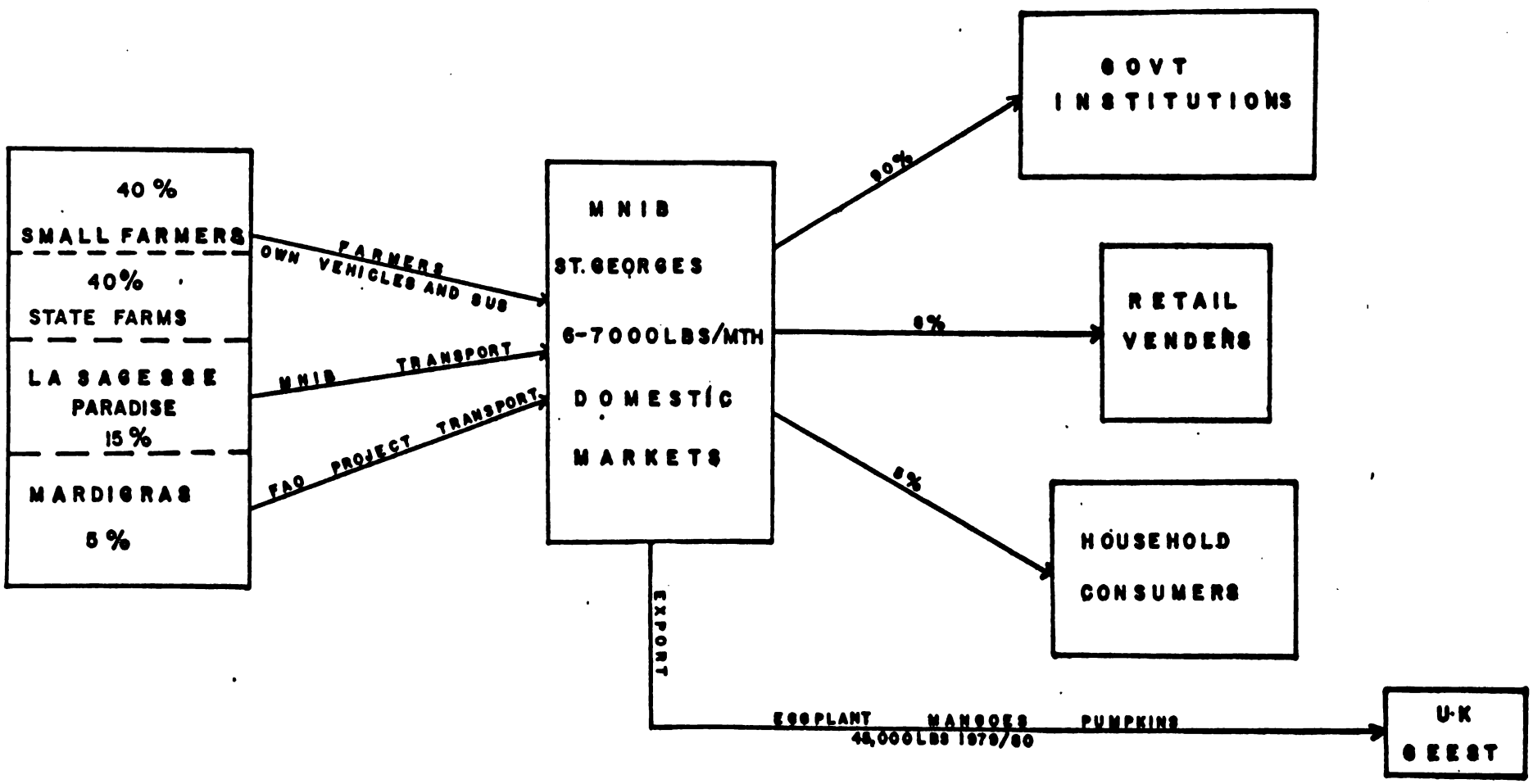
The activity which is most time-consuming for the MNIB managers and their staff are those dealing with the domestic marketing of fresh produce (Figure 12). Although the volume of produce handled on a monthly basis is relatively small (6-7,000 lbs) considerable time is dedicated to receiving, sorting, grading, packaging and distribution.

d) The future for MNIB:

The Ministry of Trade has passed down a series of instructions to MNIB which indicate the direction of the future, these may be summarized as follows:

- The MNIB should become sole importer of up to 18 different articles including milk, poultry, flour, other basic food stuffs, drugs, building materials, etc.
- The MNIB should establish at least 6 retail outlets and include sales of selected farm inputs (seeds, tools).
- Should retail the products of the state owned agroindustry.

FIGURE 12: FLOW OF FRESH PRODUCE PASSING THROUGH MARKETING BOARD



- MNIB should establish a network of fresh produce collection points.
- It should establish small scale rural processing of produce when required (cornmill, lime processing, etc.).
- The MNIB should establish grain storage facilities and expand its facilities for storing rice, sugar and other imports.

If these goals are to be met the MNIB will have to grow considerably both in terms of facilities and in technical and administrative personnel.

e) Needs:

In order to develop the considerable work load as outline above the MNIB will need assistance in the following areas:

Training: Training will be required at nearly all levels and for most of the MNIB staff including: planning, administration, accounting, pricing, inventory control, statistics, marketing and market research, warehouse management, retail outlet management, export promotion, and produce handling at all stages.

Technical assistance: Short term consultants will be required in the areas of planning and project preparation, price determination, market information systems, research methodologies, postharvest technologies and others related to training in specific areas mentioned above.

Neither data nor time was availabe to permit an evaluation of MNIB operations to date, however, the general impression of this team is that the MNIB is making positive strides to meet and solve marketing problems in a very practical manner, with minimum staff and facilities. There is a very grave danger

that policy makers will push the MNIB into undertaking too much too fast and thus endanger the possibility of success for what has promise to become a valuable service instituion. The MNIB must learn to walk well and efficiently before it can run thus it should not become burdened with infrastructure such as grain silos, cold storage facilities, interisland shipping etc. until the proper feasibility studies have been made and evaluated. There are too many examples of marketing boards within the region and the world in general that have grown too fast only to falter under the burden.

4.2.9.3 Other instituions

Besides the MOA and the MNIB the other national institutions involved (or soon to be involved) with the marketing subsector are the State Farms and NACDA. In each case these institutions are incipient and have not reached the point where marketing has become a limiting factor. However, as these instituions begin to develop and the state and cooperative farms begin to produce greater volumes of food crops, marketing will become a major problem area. Both of these institutions are looking to the MNIB to solve these future problems.

V. IDENTIFICATION OF BENEFICIARIES

In Chapter 4 the principal problems affecting the marketing of fresh agricultural produce were identified. The majority of these problems are of an institutional nature, caused by a lack of training, methodologies, information, planning and other aspects which result in poor or nonexistant institutionalized marketing services. The lack of institutionalized services in extension (marketing), information, organized transport, facilitating infrastructure and others has a debilitating effect upon the growers, the intermediaries and the other participants in the marketing chain. Likewise the improvement of institutionalized marketing services should have a positive impact upon these same participants.

It is for this reason that it is recommended that any attempt to improve the marketing system in Grenada be concentrated on the improvement of marketing services within the MOA and the MNIB. The strategies for realizing this are presented in Chapter VII.

VI MARKET POTENTIAL

It is necessary to view improvements in the marketing system in relation to the potential market for Grenadian fruits and vegetables. Market requirements and opportunities are reviewed in the following sections in terms of the internal market and the potential for exports to both intra-regional and extra-regional markets .

6.1 Internal Markets

The market in Grenada for domestically grown food crops is expected to expand substantially under the policies of the new Government. Import substitution policies to decrease the food import bill together with nutrition policies to increase consumption are expected. These will both expand the domestic production requirements. Thus, in looking at Grenada's small population and low incomes one must also focus on the present production structure of the food crop sector, the present levels of food crop imports and bear in mind the policies of the Government.

The domestic consumption in relation to production for four categories of produce is set out in the table below.

TABLE: 6 ESTIMATED DOMESTIC PRODUCTION AND CONSUMPTION FROM LOCAL PRODUCTION OF ROOT CROPS, YELLOW CROPS, GREEN VEGETABLES AND CITRUS FOR 1975, IN METRIC TONS.

TYPE PRODUCE	PRODUCTION	CONSUMPTION	% OF DOMESTIC PRODUCTION CONSUMED
Root Crops	1143	1116	97.6
Yellow Vegetables	403.7	398.7	98.7
Green Vegetables	662	620	93.6
Citrus	4783	4551	95.1

As the table indicates, most of what is produced is consumed domestically. Given the efforts to increase domestic production it is necessary to work simultaneously on expanding both the internal and external market. The internal market potential will be determined largely in the areas of policy affecting nutrition, import substitution, agro-industrial development, produce quality and marketing.

Improving the health of the nation through improved nutrition is an important part of the present government's policy. The expansion of yellow vegetable production is planned to satisfy needs in this area.

Estimates of quantities required in the expansion programme of the various groups of food crops can be found in the "Agricultural Sector Plan of Grenada, 1977 - 1981" (Max Ifill, 1977).

It is expected that domestic consumption of carrots and pumpkins will increase as a part of this programme. The increased domestic consumption of green vegetables (cabbage, lettuce) is also to be promoted for nutrition purposes.

In the area of import substitution root crops and fruits will figure importantly. The main root crops - yam, eddoes, tannia and sweet potatoes - are substitutes for white potatoes which are imported in signififant quantities. In 1978 it is estimated that 865,365 lbs. of potatoes were imported to Grenada. In the area of fruits domestic processing will expand the local market. The Produce Chemist Laboratory is establishing a food processing industry as a commercial operation. The equipment is now being installed and the main fruits required initially will be - citrus, mango, soursop and guava. Estimates of the quantities desired were not available. At present there also exist domestic supply gaps for cabbages and carrots during parts of the year which are filled by imports.

The quality of the products produced will also determine the expansion of the internal market. Both supermarkets and the tourist sector indicate that greater amounts of produce can be channelled through these outlets if the product is of a sufficiently high standard. Cauliflower production is to be

expanded primarly to satisfy the tourist market.

Improvements in the distribution of products domestically is also required. In the Agricultural Sector Plan for Grenada 1977 - 1981 Ifill cites an example where there was a shortage of green vegetables in some areas while they were rotting in the fields in another area. The market for fresh produce therefore might be expanded through increase knowledge of production points and demand points and sorting out the mechanics and economics of tying them together. However, it must be kept in mind that the market for fresh produce is very limited. Although there may be a very large price difference between the north end of the island and the southern part the quantity demanded may be so small (1-200 lbs.) that it becomes uneconomical to transport the produce between the 2 points.

6.2 Intra-Regional

6.2.1 Present Situation

Trinidad and Barbados represent the major import markets for fruits and vegetables within the Caribbean region. These markets are mainly supplied by inter-island schooners and as a result data identifying the trade flows is incomplete. Estimates from a number of sources are summarised in Table 7.

From the available figures it is indicated that Grenada (fruit) and St. Vincent (fruit, root crops, carrots) are the main suppliers of the Trinidad market. In the case of Barbados, the major sources of supply are Dominica (bananas, citrus, plantain), St. Lucia (mangoes, bananas, plantains) and St. Vincent (sweet potatoes, dasheens and eddoes).

Other significant import markets in the region are the French West Indies (Martinique and Guadeloupe), US Virgin Isles and the Netherland Antilles. Exports to the French West Indies are mainly supplied at present from Dominica and St. Lucia which are very close to the French islands. Shipments from within the region to the Netherland Antilles are mainly from Trinidad.

TABLE: 7 ESTIMATED IMPORTS OF SELECTED FRUITS AND VEGETABLES BY TRINIDAD AND BARBADOS, 1978 (Metric Tons)

Type Produce	Importer	
	Trinidad	Barbados
VEGETABLES		
Cabbages	n.a.	36
Carrots	2,666[1/]	16
Pumpkins	n.a.	29
Sweet pepper	n.a.	3
Tomatoes	2	157[1/]
TOTAL	2,668	241
ROOTS		
Eddoes & Dasheen	1,520	-
Sweet Potatoes	1,330	3
Yams	550	1
TOTAL	3,400	4
FRUIT		
Avocadoes	600	32
Grapefruit	n.a.	742
Limes	n.a.	34
Mangoes	700	228
Oranges	n.a.	821
Pineapples	n.a.	46
Plantain	245	534
TOTAL	1,545	2,437

1/ Mainly supplied from extra - regional sources

The main flow of exports within the region is shown in Figure 13.

6.2.2 Grenada's share

Grenada's major exports within the Caribbean are the regular shipments of produce to Trinidad on the inter-island schooners from St. George's and Grenville. This is a well established trade conducted by traffickers who often harvest the produce and then travel by ship or air to the Trinidad market.

The Ministry of Agriculture collects data on the volume of this trade and estimates for 1978, 1979 and 1980 are shown in Table 8. The main items are fruit crops although smaller quantities of ground provisions are exported periodically. It is estimated that in recent years exports to Trinidad have been on the order of 2 million lbs. annually valued at over EC$1.0 million.

6.2.3 Prospects

The consumption of fruit, vegetables and root crops within the Caribbean region is forecast to increase at an annual rate of around 2 percent in the period to the mid - 1980's. This increase in requirements should provide a favourable environment for an increase in exports from Grenada. Export potential could also be improved further if part of the present imports of temperate commodities, e.g., apples and pears from extra-regional sources could be substituted by produce from within the region. However, market preferences for temperate fruits and various processed fruits are firmly entrenched and the potential for replacing these with tropical fruit may be strictly limited unless import restrictions are utilised.

Despite these reservations, additional market opportunities should develop within the region. An estimate of the market potential in the major markets in the region is shown in Table 9 and provides

FIGURE 13

MAJOR EXPORT FLOWS OF FRUITS & VEGETABLES IN EASTERN CARIBBEAN

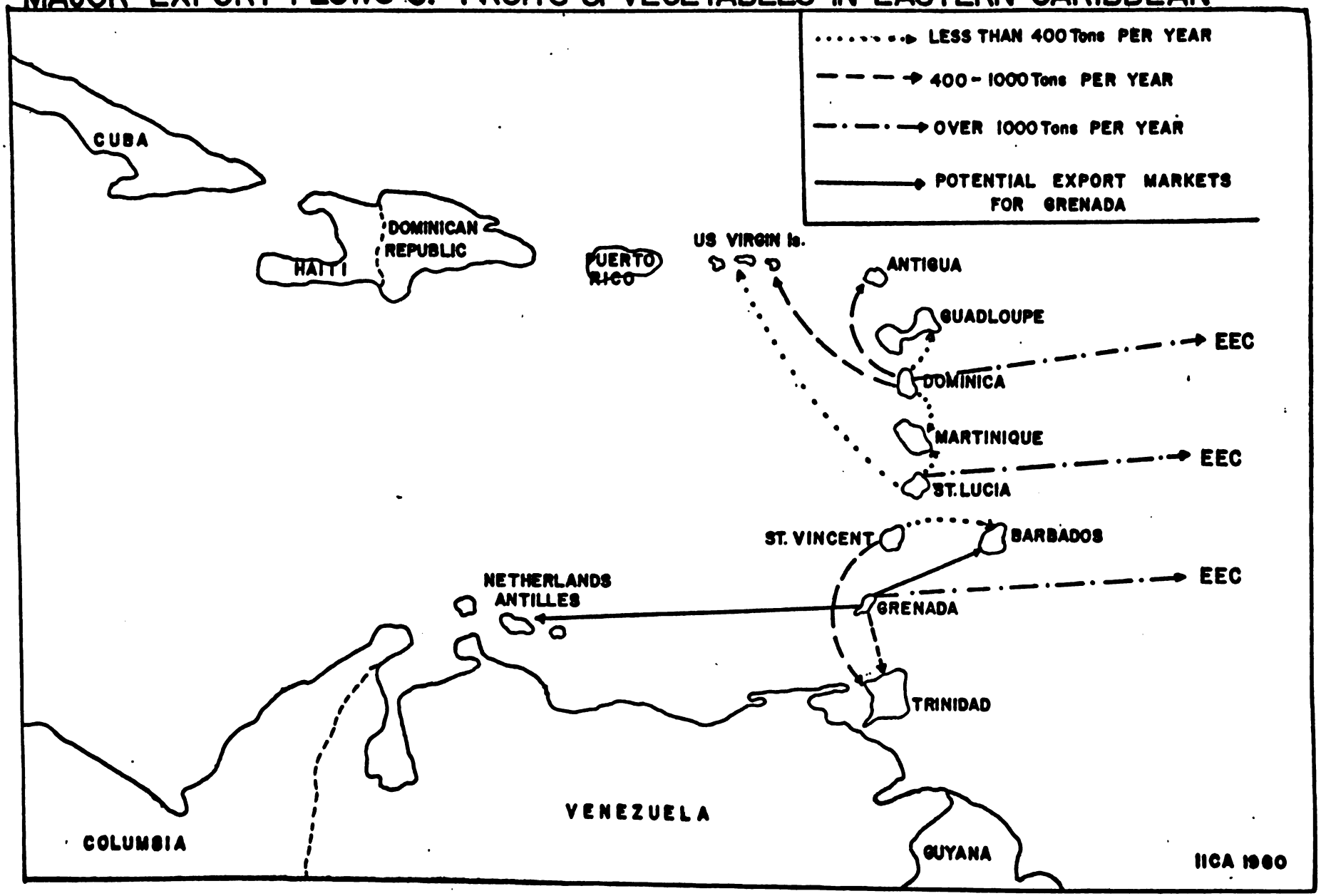


TABLE: 8 ESTIMATED VOLUME OF EXPORTS OF SELECTED FRUIT AND VEGETABLE FROM GRENADA TO TRINIDAD, 1978, 1979, 1980 (000 lbs)

Type Produce	1978	1979	1980 (forecast)
Fruit			
Avocado	578	250	250
Soursop	286	474	440
Golden apple	976	162	170
Sapodilla	64	278	250
Sugar apple	161	108	120
Mangoes	44	212	150
Others	n.a.	100	120
Vegetables			
Plantains	157	198	100

Source: Ministry of Agriculture.

TABLE: 9 ESTIMATED MARKET POTENTIAL FOR EXPORTS OF FRUITS AND VETETABLES TO MAJOR INTRA-REGIONAL MARKETS, (Tons)

COUNTRY	FRUIT(1)	VEGETABLES(2)	ROOTS (3)
TRINIDAD	3,320	2,230	1,930
BARBADOS	420		
FR. WEST INDIES	110	640	
NETH. ANTILLES	1,640	740	150
VIRGIN ISLANDS	910		190

Source: Small Farmer Production and Marketing Systems Study, Berger International Inc., 1978

1. Excludes citrus
2. Excludes onions
3. Excludes white potatoes

an indication of possible areas for expansion in exports from Grenada.

Prospects in the individual markets can be considered in more detail as follows:

6.2.3.1 Trinidad

Grenada is already a leading supplier of fresh tropical fruit to the large Trinidad market. If improved handling, packaging and shipping facilities to reduce losses and improve quality can be developed, Grenada's strong position in this market can be maintained and even increased. In the absence of improvements however, the tendency for increased importation of temperate fruits will be accentuated and the share of the market for tropical fruits further diminished.

Improved quality will also permit increased sales to supermarkets, hotels and restaurants (both in Trinidad and Grenada which will represent an increasing proportion of total fruit sales in the future.

Trinidad's imports of root crops are currently largely supplied from St. Vincent. Consideration should be given to increasing Grenada's share of this market, particularly in the first quarter of the year when supplies are readily available.

6.2.3.2 Barbados

The main import requirements in Barbados is likely to continue to be citrus and other fruits. Although government policy in Barbados is to increase self-sufficiency in the fruit and vegetable sector, it is considered unlikely that fruit production will increase sufficently to match the increasing demand. As a result, substantial quantities of citrus fruit and juices as well as other fruits and plantains are likely to continue to be imported.

At present Dominica and St. Lucia supply the major part of import requirements for fruits via the inter-island schooner trade. Quality is often poor and losses in transit quite high. If suitable transport can be found, there are good opportunities for increased sales of high quality citrus, mangoes, avocadoes, and other fruit from Grenada in the Barbados market. The tourist industry in Barbados is frequently faced with inadequate supplies of fresh fruit and similarly supermarkets are also providing additional outlets for quality produce.

6.2.3.3 Netherland Antilles

Import requirements in the Netherland Antilles will expand significantly in future years. The demand will be for produce of a high quality and available on a regular basis. The market can be exploited by Grenada if regular and reliable shipping becomes available. In its absence, the market will continue to be supplied via Trinidad.

6.2.3.4 French West Indies

It is likely that the import requirements of Martinique and Guaduloupe will continue to be supplied from neighbouring St. Lucia and Dominica.

6.2.3.5 Other Regional Markets

The potential of Puerto Rico and U.S. Virgin Islands as a market for Grenadian fruits and vegetables is limited mainly because of the close proximity of the Dominican Republic, which is a very large and competitive exporter of fruit and vegetables to these and other markets. Venezuela is relatively self-sufficient in fresh produce and its imports tend to be mainly of deciduous fruit and processed products

6.3 Extra-Regional

The main extra-regional markets for Grenadian fruit and vegetables are the European Economic Community (EEC), U.S.A. and Canada. The requirements and prospects in each of these markets is outlined below:

6.3.1 European Economic Community (primarily U.K.)

The EEC represents the largest import market in the world for fruit and vegetables. Large quantities of tropical products are imported all year round, particularly citrus, citrus juice and bananas.

The EEC imports from a large variety of sources. Citrus and tropical fruits are obtained from the Mediterranean region and Africa while the Far East is the leading supplier of root crops. Most of the exotic vegetables are obtained from within Europe. Bananas are supplied from Central and South America as well as from Africa and the Caribbean.

Exports from the Caribbean represent a very small part of total imports by the Community but significant quantities of both fruits and vegetables are shipped to U.K.. This reflects in part the region's economic and social ties with the U.K., the large immigrant population and the preferential terms of access provided under the African, Caribbean and Pacific (ACP) agreement. Besides bananas, grapefruit (Dominica), plantains (St. Vincent), lime and grapefruit juice (Dominica), dasheens, eddoes and sweet potatoes (St. Vincent) have been the main exports from the Eastern Caribbean to the U.K. in recent years.

In addition to bananas, Grenada has exported a number of products to the U.K. in the past with the volume of exports being of the order of 400 tons annually. Currently, eggplants and mangoes are being shipped via the Geest Line. In recent years, requests have been received for regular shipments of ginger, pumpkin, tannia, breadfruit, sweet potatoes and dasheen.

6.3.1.1 Prospects:

Recent surveys by Geest and others of the U.K. market have identified market opportunities for exports from the region for the following exotic fruits and vegetables:

Fruits	Vegetables
Mangoes	Augergines (Eggplant)
Pineapples	Green beans
Breadfruit	Okra
Limes	Capsicum (Sweet pepper)
Grapefruit	Yams
Guava	Sweet potatoes
Pawpaw	Eddoes, dasheen

While there is an expanding market for these products in the E.E.C. particularly in the U.K., it must be recognized that trading conditions are very competitive. Because of the large number of countries supplying the U.K. market, it is imperative that produce from Grenada should be competitively priced and of good quality. In addition, the timing of shipments to the E.E.C. is extremely important. When local production of some of the items is plentiful, prices are low. The out-of-season period, when supplies from competing sources are reduced, normally extends from December to March. Prospects for sales at remunerative prices are more favourable at that time.

6.3.2 U.S.A.

The U.S.A. market for fruits and vegetables is very large, but since the U.S.A. is also a major producer and exporter, the roll played by imports is not very great. Imports of fresh citrus are relatively small but significant quantities of juice are imported. Similarly substantital quantities of off-season fresh vegetables and tropical fruit are imported. Mexico is the major supplier of these fresh fruit and

vegetables imports together with Central and South American.

The main Caribbean supplier to the U.S. A. market are Bahamas, Haiti, Dominican Republic and Jamaica but the combined volume shipped from these countries is small when compared to Mexico which enjoys access by road to the U.S.A. The major products exported by Jamaica are fresh citrus (ortaniques), mamalade and guava jelly, fruit juices, preserved mangoes and fresh yams.

6.3.2.1 Prospects:

Penetration of the U.S.S. market for many tropical and out-of-season products depends on the timing of shipments to fill gaps in the supply pattern within the U.S. "Open market periods are designated by the U.S.A. authorities when continental supplies are not generally available. This usually occurs as imports from Mexico decline and before Florida supplies enter the market.

Market opportunities for produce from Grenada and other countries in the Caribbean include:

All Year round	Seasonal
	(Open Season in brackets)
Grapefruit (red)	Green Beans (Mar-April)
Limes	Cucembers (Mar-mid April)
Papaya	Eggplant (Feb-June)
Pineapple	Okra (Mar-May)
Root Crops	Peppers (mid Mar-May)
Breadfruit	Avocadoes (Jan-mid Mar)
	Mangoes (Oct-April)

The major problems facing Grenadian producers in entering the U.S.A. market are shipping and competitive pricing. Regular and reliable transportation to the U.S.A. is not readily available and Grenada faces a competitive disadvantage in relation to other countries in the region in that it is further away. Studies have also suggested that the major barriers to exporting significant

quantities to the U.S.A. are on the supply side. Current costs of production for most products in the Caribbean are high in comparison with costs in Florida, Mexico and Central America. Although there is agreement that potential exists for exports to the U.S.A., attentions will need to be paid to production costs, grading, packing and transportation to ensure that deliveries can be made at competitive prices and on a regular basis.

6.3.3 Canada

Canada imports over 300,000 tons of citrus fruit annually, 15,000 tons of tropical fruit, 600,000 tons of out-of season vegetables (mainly lettuce and tomatoes) and 7,000 tons of root crops each year. The majority of these imports are supplied from the U.S.A. and Mexico

Although the Canadian market is smaller than the U.S.A. or E.E.C. markets, total imports from the Caribbean are in between those exported to the two larger markets. This reflects the Commonwealth system of preferential tariffs and the relatively larger number of West Indian immigrants with tropical food preferences in Canada.

Exports of fruit and vegetable products from the region to Canada have been of the order of 5,000 tons in recent years. The most important suppliers have been Jamaica (citrus fruit, citrus juice, ackee, yams) and Trinidad (citrus juice, mangoes, dasheen, eddoes). There are around 25 West Indian wholesale and retail companies which handle this trade via New York.

6.3.3.1 Prospects:

Since the U.S.A. supplies the major part of Canadian requirements in the off-season, Caribbean exports have in effect to compete with U.S.A. exports to the market. Requirements for increased sales to Canada are therefore essentially the same as with the U.S.A.

The products for which there is a potential market are also similar although the "open period when competition is less severe is generally longer in Canada (February-May).

Particular opportunities have been identified for mangoes, marmalade, exotic fruits and fruit juices, fresh pumpkins and root crops (for the immigrant community).

6.4 Strategy

In addition to the prospect of increased requirements for fruits and vegetables in the domestic market, potential increases of exports have been identified in a number of overseas markets. Within the Caribbean region, prospects for increased sales in Trinidad, Barbados and the Netherlands Antilles would seem to be the most favourable. Of the extra - regional markets, continued shipments to the U.K. would seem to be the most promising outlet.

In view of the high cost involved in developing new markets and the likelihood that resources for this purpose will remain in short supply, it would seem advisable that efforts be concentrated on a limited number of export markets. Priority should be given to existing markets i.e. Trinidad and U.K. and to potential markets within the region offering the best prospects i.e. Barbados and Netherlands Antilles. At present it would appear that Grenadian exports are likely to face strong competition in becoming established in North America, the French West Indies and the U. S. Virgin Islands.

The key factor in increasing export sales will be the improvement of the quality of Grenadian produce. In addition to advances on the production side, this will entail improved harvesting methods, handling, grading, packaging and transportation.

The return on such technical improvements is likely to be high. In the future, the increase in demand for quality produce is likely to be

substantial reflecting the increased share of total sales made through supermarkets, hotels and restaurants. These outlets require a regular supply of produce of consistent quality and are willing to pay premium prices if their specifications can be met.

A number of indirect benefits will also arise by placing emphasis on the marketing of produce of improved quality. These include:

a) The expanding tourism industry in Grenada will have available a more reliable supply of local fuits and vegetables for visitors.

b) When the new international Airport is completed improved cargo services will be available for exporting produce by air. It will be only quality produce sold at premium prices which will be able to justify the increased freight costs involved in air shipment. This may well open up the U.S.A. and Canadian markets to Grenadian produce.

VII. DEVELOPMENTAL STRATEGY AND PROJECT PROFILES

Thus far we have identified and discussed the principal marketing problems for fruits and vegetables from preharvest to final distribution. Many of these problems are of a technological nature, others are institutional and still others stem from socio/economic causes. Table 10 presents a summary of the diverse problems identified in relation to the commodity group affected. Once the basic problems and the diverse factors causing the problems are identified it is then a relatively straight foreward process to identify and outline solutions. These solutions can often be expressed in terms of projects and programmes. Table 10 identifies the type of strategies required for specific problem solutions. These strategies, once outlined, can be integrated into developmental projects

7.1 Strategies

As was pointed out at the beginning of this report, an interdisciplinary approach is necessary to satisfactorily identify the marketing systems problems. Likewise an interdisciplinary approach is required to solve these problems. In carrying out a developmental programme to solve the problems outlined herein will require the expertise of many disciplines, including: postharvest technologist, agricultural economist, educators, agronomists, entomologist, extentionist, anthropologist and perhaps others. These diverse specialists must work in an integrated fashion to solve institutional problems as well as the problems occuring along the marketing channal. The four areas or strategies in which this expertise will be involved are; training, investigation, technical assistance and capital investment. The relationship between the marketing problems and these strategies are summarized in Table 10.

7.1.1. Training

One of the highest priority strategies will be for training nationals in diverse areas of marketing, including: preharvest aspects, postharvest technologies and institutionalized marketing services. Training will be oriented towards the higher, middle and lower level personnel of the MNIB and middle/lower level personnel of the MOA. The types of training will include the following:

TABLE: 10 SUMMARY OF IDENTIFIED PROBLEMS BY PRODUCT GROUP AND DEVELOPMENT STRATEGIES

PROBLEMS	COMMODITY GROUP				STRATEGIES				
						Training			
	Fruit	Leaf Vegetables	Fruit Vegetables	Root and Bulbs	Investigation	Extension MOA/MNIB	Management Administration	Technical Assistance	Capital Investment
1. PREHARVEST PROBLEMS									
1.1 Lack of production planning		X	X		X	X	X		
1.2 Poor cultural practice	X	X	X			X			
1.3 Lack of irrigation		X	X	X					X
1.4 Lack of development and availability of improved varieties		X	X		X				
1.5 Lack of plant pathology facilities	X	X	X	X	X		X	X	X
2. HARVEST PROBLEMS									
2.1 Availability and use of tools	X			X	X	X			
2.2 Mechanical damage	X	X	X	X	X	X		X	
2.3 Incorrect harvest time	X		X		X	X		X	
2.4 Lack of field containers	X	X	X			X			X
3. SELECTION/PACKAGING PROBLEMS									
3.1 Poor selection	X	X	X			X			
3.2 Lack of collection and packing facilities	X	X	X	X	X	X	X	X	X
3.3 Lack of suitable marketing containers	X	X	X	X	X	X	X	X	X
3.4 Overpacking in containers	X	X	X	X	X	X		X	
4. STORAGE PROBLEMS									
4.1 Poor management of stores	X	X	X	X		X	X		
4.2 Lack of facilities	X	X	X	X	X		X	X	X

Note: Continued on next page.

PROBLEMS	COMMODITY GROUP				STRATEGIES			
						Training		
	Fruit	Leaf Vegetables	Fruit Vegetables	Root and Bulbs	Investigation	Extension MOA/MNIB	Management Administration	Technical Assitance
5. TRANSPORT PROBLEMS								
5.1 Poor handling	X	X	X	X	X	X		
5.2 Inadequate schooner wharf facilities	X						X	X
5.3 Unsuitable conditions on schooner	X						X	X
5.4 Variable shipping time	X							
5.5 No facilities at airport	X	X	X	X				X
6. QUALITY CONTROL PROBLEMS								
6.1 Lack of information on market requirements	X	X	X	X	X	X	X	X
6.2 Poor quality control procedures	X	X	X	X	X	X	X	X
7. DISTRIBUTION PROBLEMS								
7.1 Lack of cover St. George's market	X	X	X	X				
7.2 Lack of quantity and quality for tourist industry	X	X	X	X			X	
7.3 Lack of demand information	X	X	X	X	X		X	
8. INSTITUTIONAL PROBLEMS								
8.1 Lack of trained personnel	X	X	X	X	X	X	X	X
8.2 Lack of information					X	X	X	X
8.3 Lack of resources								
9. PLANNING PROBLEMS								
9.1 Lack of production cost data	X	X	X	X	X		X	X
9.2 Lack of price information	X	X	X	X	X		X	X
9.3 Lack of projects	X	X	X	X	X		X	X
9.4 Lack of coordination for project financing	X	X	X	X				X

7.1.1.1 Workshops/seminars

Workshops and seminars with a duration of from 1/2 to 2 days will be organized to discuss specific priority topics within the MOA and the MNIB. These events will be programmed as deemed necessary and to coincide with visits of visiting marketing/production specialists from regional and international organizations.

7.1.1.2 On-the-job Training

Target Group: MNIB operational and field personnel

Objective: To train middle and lower level staff in improved product handling through demostration, assistance and on the spot discussion.

Location: The principle locations for this on-the-job training will be:

- the MNIB produce packing stations
- the MNIB buying depots
- the MNIB prepacking department
- Agro Industry Division

It is anticipated that this on-the-job training would coincide with some of MNIB'S development programmes, e.g., the up-grading of produce packing stations, the operation of their export industry to UK and their developments in produce retailing. This would provide an opportunity to ensure that existing marketing methods are improved as well as developing new systems.

Implementation: Outside Technical Assistance should be sought when necessary to provide this on-the-job training and, if possible, the programme broadened to include ad hoc advise and guidance to the private sector. Duration should be 6 weeks minimum and, depending on scheduling, could inter-link with the more formalised training programme.

7.1.1.3 Formal course on Fruit, Vegetable and Root Crop Technology

Target Group: Extension Service (MOA) Operational and field personnel, MNIB/Agro Industries Division.

Objective: To strengthen the local institutions capability in technical aspects of Fruit, Vegetable and Root Crop Marketing. It is anticipated that through the strengthening of these institutions that programmes will be developed to transfer the appropriate technologies to farmers and the private sector participants in the marketing chain. Brief awareness and "participation" programmes should be set up to run alongside the proposed programmes for the latter categories. A brief 1-2 programme could also be included for students at the Mirabeau Farm School. The following outline is provided for guidance:

Programme

Part I: Harvesting and Field handling (4 days)

Lecture: 2 days
- Crop characteristics of Fruits, Vegetables and Root Crops.
- Preharvest factors which affect postharvest quality.
- Field hygiene.
- Harvesting techniques.
- Identification of product maturity.
- Use of field containers.
- Use of field shade.
- Rural Storage.

Application: 2 days
- Evaluation of mechanical damage during harvesting.
- Ripening trials to illustrate effect of harvesting imature fruits.
- Plant pathology problems in fruit and vegetable storage.
- Temperature management.

Part II: Product Preparation (3 days)

Lecture: 2 days
- Principles of quality control and produce selection.
- Preparation of produce for market.
- The operations of a small packing station.
- Postharvest treatments.

Application: 1 day
- Demonstration of effects of poor packaging.
- Product selection/packaging demonstrations.

Part III: Storage (3 days)

Lecture: 2 days
- Storage of fruits, vegetables and root crops.
- Constraints on storage.
- Store management.
- Onion drying storage.
- Store hygiene.

Application: 1 day
- Evaluation of storage life of a number of commodities at ambient and under refrigeration .

PART IV: Retail Handling (1-1/2 days)

Lecture: 1 day
- Management of produce at retail level.
- Stock control.
- Pre-packaging.

Application: 1/2 day
- Demonstration of the effects of holding produce in various pre-packs at ambient.

PART V: Quality Control (3-1/2 days)

Lecture: 1-1/2 days
- Quality assessment methods.
- Evaluation of CARICOM standards.
- Quality requirements of local, intra-and extra-regional markets

Application: 2 days
- Quality assessment methods.

PART VI: Field Visits (5 days)

Throughout the programme visits within Grenada should be made to various operations along the marketing chain, e.g., harvesting, packaging, sea freight export, supermarkets and hotels to discuss on-the-spot requirements and problems faced.

PART VII: Study Project (5 days)

Each participant should be given a specific commodity and during the period of the course should collect and collate all information available on technical aspects of handling that commodity in Grenada for discussion on completion of the course.

SUMMARY OF TIME ALLOCATED (Estimated only)

LECTURES	- 8-1/2
APPLICATION	- 6-1/2
VISITS	- 3
STUDY PROJECT	- 3
TOTAL	21 days

Implementation: Outside Technical Assitance personnel will be required to teach the greater proportion of this programme although it would be anticipated that MOA/MNIB would participate in the course preparation, teaching and field applications. Ideally a programme such as this should be run over a 3 month period to allow participants to work and learn at the same time and conduct their special projects over a realistic period. The spread of the programme would depend on coordination with and availability of outside teaching personnel.

7.1.1.4 Reciprocal training:

Target: Management and senior technical staff of MNIB and MOA.

Objective: To gain wider experience in a number of aspects related to market technology of Fruits, Vegetables and Root Crops.

Training: The training would comprise study tours in the region for selected senior staff (MNIB and MOA). These visits would not only be to observe but to collect and collate data and information required by some of the investigations listed in section 7.1.2.

Areas to be included in these visits are:

a) Examination of pre-packing alternatives and perishables management through a working attachment with one of the larger supermarket groups in the regions. (4-6 weeks).

b) Visit to major retail outlets, supermarkets, hotels and others to determine the quality requirements for produce exported from Grenada to Trinidad. To examine the outturn of produce shipped under existing transport and handling conditions (3 weeks).

c) An attachment to a successful public or private horticultural export operation supplying either the UK or USA market. (4 weeks).

d) Linked to the investigation identified in production and postharvest pathology-an attachment to the anticipated cooperating agency. (Time period depending on experience of local staff).

7.1.2 Investigation

Proper decision making is a function of the proper use of available and correct information. To develope the marketing subsector considerable new information from primary sources must be collected.

Based on the problems summarised in Table 10 the need for the following short or medium term specific investigations have been

identified. Excluded from this list are those studies which link directly to the feasibility studies for capital investment projects; packing stations, improved sea transportation and market containers as this type study is included within the project profiles.

Pre-harvest studies:

1. To conduct a detailed evaluation of fruit and vegetable crop production and in view of the present and future local and export market demand identify a programme for production planning to meet the annual needs.

2. Continue varietal trial investigations. Priority areas for evaluation should be to identify varieties with a high level of disease resistance (e.g. bacterial wilt eggplants/potatoes) and the testing of varieties which have characteristics required by external markets. The programme should also continue to evaluate a range of onion varieties and in particular to identify an onion variety suitable for production in Grenada and also showing the characteristics of a good inherent storage life.

3. To conduct a survey of the major production diseases and disorders of fruits, vegetables and root crops produced in Grenada and to identify preharvest and postharvest control procedures. To set up a collaborative programme with a regional or international plant pathology unit for the provision of assistance with on-going problem identification and solution in this field.

4. Conduct a detailed cost of production study for all major fruits, vegetables and root crops produced in each agricultural district by small/medium scale growers.

Harvest Studies:

5. To develop and test low technology harvesting tools for fruits including pickers, clippers and harvest bags.

6. To identify the correct stage of maturity of all major fruits produced in Grenada including both those for export and local markets. This study would include observational studies on the storage life of the fruits under ambient and chill storage conditions; attempts should also be made to identify optimum ripening conditions.

Selection and Packaging Study:

7. Conduct an in-depth study, on an area basis, of product movements to local and export markets. Identify the need to set up low cost roadside pick-up points for the existing industry.

Storage:

8. Evaluate the market demand for artificially ripened bananas in Grenada and Trinidad. Conduct a feasibility study on the establishment of banana ripening facilities both in Grenada and Trinidad.

Transport Study:

9. Conduct an evaluation of the extent of mechanical damage occuring along the present marketing chain from the point of harvest to retail purchase. Identify the cause and possible solutions.

Quality Control Studies:

10. Conduct an in-depth study of the requirements of variety, quality, pack and presentation for fruits and vegetables which have market potential in Trinidad at both the supermarket and small retail outlet.

11. Identify the quality requirements of fruits and vegetables for the local market, institutions, hotels and cruise ships.

12. Obtain information on EEC quality specifications and market requirements for those commodities with market potential in the UK.

13. Investigate the feasibility of establishing a quality control service for the inspection of horticultural commodities.

Distribution Studies:

14. Conduct a market survey at both local and intra-regional level to identify the demand for fruits, vegetables and root crops. At the intra-regional level consideration should be given to the potential for air freight export operations from Grenada.

15. Establish a public price information service for the major commodities marketed through municipal markets and exported.

These studies should be carried out as part of an organized and integrated effort to develop the marketing subsector (see Section 7.2.1).

7.1.3 Technical Cooperation

Considerable technical cooperation will be required to execute the training and investigation programmes outlined above. Additionally, technical cooperation will be needed in specific areas such as:

- an evaluation of needs for plant pathology facilities.
- design of proper containers.
- design of improved wharf and schooner holds.
- quality control.
- market and price information system
- market planning, project preparation and others.

It is felt that technical assitance is not needed on a continous basis but should be provided in specific areas and at specific points in time.

Any programme to provide technical assistance should be flexible so as to provide the required expertise on shortterm notice and in such a way that the expert can participate in training and investigation and perhaps other areas at the same time. A project profile outlining technical assistance needs is presented in 7.2.1.

7.1.4 Capital Investment

Throughout the study of the marketing system it became obvious that many of the bottlenecks or principal problems were caused by the lack of capital investment. This is the case with: a) rural packing sheds which are in very poor condition or non-existant and lack minimum equipment, b) wharf facilities which are ad hoc and inadequate for the needs of the traffickers, c) Schooners which have not made the necessary investments to minimize intransit risks, and d) the non-existance of a local crate factory. With very low levels of capital investment the internal/external marketing system could be substantially improved.

7.2 Project Profiles

In an attempt to satisfy the most obvious needs of the marketing system four project profiles have been prepared. The first can be considered an umbrella project which integrates the three strategies of training, investigation and technical assistance. The remaining 3 projects concentrate on specific capital investment projects. Other capital investment projects which were identified (Table 10) but for which project profiles have <u>not</u> been prepared include:

- irrigation facilities
- plant pathology facilites
- airport storage facilites
- cover in the main plaza of St. George's market

7.2.1 Institutional Strengthening of the Marketing Subsector

1. Name of Project: Institutional Strengthening of the Marketing Subsector.
2. Executing Government Agency: Ministry of Agriculture and the Marketing and National Importing Board.
3. Total Estimated Cost: US$98,150
4. External Financing Required: US$85,150
5. Potential Assisting Institutions:
   IICA
   CARDATS
6. Justification:

   A. Problem identification:

The Marketing and National Importing Board (MNIB) of Grenada is a newly organized government institution making a serious attempt to improve the traditional marketing system. It is understaffed with new personnel with little or no experience in marketing and almost no available information on the internal/external marketing systems and how they work. The Ministry of Agriculture (MOA) has defined as one of its strategies that of increasing the local production of basic fruits, vegetables and ground provision with the objective of reducing imports and increasing local consumption and non-traditional exports of locally grown food. Additionally it is giving emphasis to agro-industry for which an adequate supply of raw materials is not assured. The MOA is also understaffed and has no personnel with marketing activities, with the exception of the Division of Statistics which collects miscelaneous market information but does no analysis or dissemination of the data. Extentionists have received no recent training in agricultural crop handling and/or marketing.

In summary it can be said that the diverse sector institutions are initiating a campaign to increase agricultural production for internal and external consumption without developing

the necessary facilitating services which will help assure that the produce reaches its destination in the best possible condition.

B. Factors which cause the problem:

- Neither the MOA nor the MNIB have training programmes for their respective staffs in postharvest technologies or marketing.
- Neither the MOA nor the MNIB have carried out research on the marketing systems.
- There are no postharvest specialists on fresh produce handling in Grenada.
- There are no institutionalized marketing services in Grenada.

7. Project Description

A. Nature of the project:

This is a technical cooperation project oriented towards the strengthening of the principal marketing institutions through training, investigation and technical assistance.

B. Description of the project:

Technical cooperation will be provided to the two principal marketing institutions within the agricultural sector, namely, the Ministry of Agriculture and the Marketing and National Importing Board.

Ministry of Agriculture:

Within the MOA activities will be developed to support the planning function (Statistics section) in the identification and realization of marketing studies necessary for planning purposes and the development of a market information service. Secondly, training activities will be carried out with the Extension Service and the Farmer Training Division (Farm School) to provide the necessary inputs for strengthening the field of expertise of MOA personnel in agriculture marketing

and product handling. Thirdly, co-ordination and technical assistance will be provided to the Forestry Division and the Produce and Food Chemist unit to identify and prepare projects related to food marketing (e.g. crate factory, collection depots).

Marketing and National Import Board:

The MNIB has marketing activities in the importation of basic items (rice, sugar, cement), the export of non-traditional crops (eggplant, mangoes, sweet pepper) and the domestic marketing of fresh produce. It has only recently been re-organized and is the process of acquiring and renovating new storage and retailing facilities. The MNIB is being called upon by government institutions, private sector organizations and small farmers to assist in the marketing of fresh produce, all of which is placing considerable pressure upon this institution for services.

Assistance will be given MNIB in the development of its marketing services through a program of training in product management and handling, investigation in priority areas and technical assistance to solve specific technological and marketing problems. IICA will also assist MNIB in project identification and preparation as well as in the identification and promotion of possible sources of financing for project implementation.

C. Objectives:

The general objective of this project is to improve and strengthen the internal marketing system for fresh produce, the specific objectives are as follows:

1. Train MNIB and MOA personnel in improved methods of fresh produce handling and marketing extension techniques.

2. Train MNIB and MOA personnel in methods of marketing research.

3. Carry out investigative research on priority areas of the internal marketing system.

4. Provide short-term technical assistance in training, investigation and project preparation.

5. Assist in the identification, preparation and execution of specific capital investment projects related to agricultural marketing.

6. Coordinate with other IICA Offices in the Development of marketing activities in the Caribbean.

D. Goals:

The goals of this project may be summarized as follows:

1. Train 10 agricultural instructors from the MOA and 5 marketing specialists from MNIB in improved methods of handling fresh produce.

2. Executive a training program consisting of the following activities:

   - 4 regional marketing seminars/workshops
   - 1 shortcourse on research techniques and methodologies.
   - 2 shortcourses on fresh produce handling
   - 3 visits to neighbouring countries to view marketing and produce handling proceedures.

3. Undertake and publish 10 diagnostic studies for selected fresh produce commodities including preharvest and postharvest activities.

4. Organize and implement a national agricultural market information service.

5. Prepare from 1 to 5 agricultural marketing development projects.

E. Beneficiaries:

The direct beneficiaries will be MOA and MNIB who will benefit with improved staff and general institution strengthening. With improved production/marketing services being offered through these institutions both producers and consumer will benefit indirectly.

F. Project location:

The project will be located either in the MOA or MNIB in St. George's or perhaps in both institutions

G. Technical aspects:

The technical staff will include the national project coordinator who will be a full-time IICA employee (economist or agronomist). He will be responsible for project supervision and coordination and will play an active role in the execution of all activities. Under the project coordinator will be a representative of the MOA and another from the MNIB. These two specialists (marketing or planning or extension) will have the responsabilities of coordination, evaluation and reprogramming of the Marketing Project activities in regards to their respective institutions. Each will be an employee of their respective institution but will receive a complementary salary from the Project to compensate for the additional work required. An additional technical staff of six MOA agricultural Instructors (farm school graduates) will be employed by the Project for training, research and investigation. Of these, 4 will be trained and stationed in the 4 extension districts as "fresh produce handling specialists"

They will work with and train the extensionists in their respective districts in fresh produce handling and supervise the packaging and marketing of fruits to Trinidad and non-traditional exports. The remaining two Agricultural Instructors will be located in St. Geoges's. One will work with the MOA Planning Division in research and market information systems while the second will work directly with MNIB as liaison with the 4 MOA fresh produce handling specialists. He will be responsible for coordinating the planning for non-traditional exports, including production planning and marketing. He will also help coordinate marketing activities between MNIB and MOA for domestic consumption, including the tourist industry.

The administrative staff will include one executive secretary for the duration of the Project, as well as one driver.

This project has a very intensive training element. Some of the training will be of a formal nature (seminars/short courses) and some will be on-the-job training. Most of the training will be in-country but some short observations visits will be made to neighbouring countries. In the realization of the training program foreign technical expertise will be required, including: a marketing specialist, an economic anthropologist, a production agronomist or economist, a marketing technologist, a price information specialist and a project specialist. All of this expertise will be shorterm, programmed as needed and oriented to provide an indepth interdisciplinary approach to problem solution.

8. Project Planning:

A. Preparation:

This project profile with very little additional effort can be turned into a final project which may be

financed by the Simon Bolivar Fund, administered by IICA.

B. Implementation:

This project should be developed and organized during the final months of 1980 and commence operations no later than January 1981.

C. Control:

The control of this project should be the joint responsability of MOA, MNIB and the financing institution.

D. Evaluation:

The project should undergo an extensive evaluation one year after commencement.

9. Project Costs:

Cost components and financing: (US$)

ITEMS	Financed by		Total	
	Local Sources	External Sources 1/	Amount	%
Capital Expenditures		12,450	12,450	13
National personnel	8,000	30,300	38,300	39
International personnel		26,200	26,200	27
Operating costs	5,000	16,200	21,200	21
Total	13,000	85,150	98,150	100

1/ See details of these costs in Table 11.

10. Project Considerations

A. Inter program dependance:

This umbrella project will provide the technical assistance required for the necessary training and investigation in marketing. It will also provide support services for the capital investments projects presented in this report. It is important to understand that none of the marketing projects identified can stand alone. They are all interdependent upon one another and must be executed in an integrated and coordinated manner.

B. Institutional interdependence:

This project will benefit both MOA and MNIB but only to the degree that there is active participation and support of this project by both institutions.

C. Technological implications:

This project is very dynamic and will require active coordination and implementaion. The 12 month period programmed for execution is sufficient to reach the goals but only with good programming and use of human resources and adequate administrative support. The selection of the project coordinator and support personnel must be done with a great deal of caution. The success or failure of the project will depend greatly upon the project coordinator.

D. Economic implications:

The economic implications will be felt over the medium-run as improved marketing techniques spread throughout the system as a result of training and capital investment project implementation.

11. Project programming:

ITEMS	PROPOSED		ACTUAL	
	Commenced	Terminated	Commenced	Terminated
A. Project profile	4-10-80	6-10-80	4-10-80	6-10-80
B. Feasibility Study	NOT NECESSARY			
C. Project preparation	11-80	11-80		
D. Promotion of financing	12-80	12-80		
E. Implementation	1-81	12-81		
F. Control	1-81	12-81		
G. Evaluation	12-81	1-82		

TABLE: 11 DETAILS OF NEEDS FOR EXTERNAL FINANCING

ITEMS	UNITS	UNIT COST EC$	UNIT COST US$	TOTAL COST US$		%
NATIONAL PERSONNEL:						
Project Coordinator	12 Mths	1,750	654	$7,848		
MOA Coordinator	12 Mths	916	341	4,092		
MNIB Coordinator	12 Mths	916	341	4,092		
6 Agricultural Instructors	72 Mths	347	129	9,288		
Sub-total	108 Mths			25,320		
Secretary	12 Mths	806	300	3,600		
Driver	12 Mths	309	115	1,380		
Sub-total	24 Mths			4,980		
Sub-total National Personnel					30,300	36%
OPERATING COSTS:						
Consultants:						
Marketing specialist	1 Mth		4,000	4,000		
Marketing technologist	2 Mths		4,000	8,000		
Production economist	1 Mth		3,600	3,600		
Economic Anthropologist	2 Mths		2,600	2,600		
Price Inf. Specialist	1 Mth		4,000	4,000		
Project specialist	1 Mth		4,000	4,000		
Sub-total Consultants	6-1/2 Mths			26,200		31%
Other operating:						
Vehicle operation/m	12 Mths	1,344	500	6,000		
Office material	12 Mths	269	100	1,200		
Publications	10 Mths	538	200	2,000		
Training tours	8 Persons	1,344	500	4,000		
Incountry training		2,688	1,000	1,000		
Miscellaneous		5,376	2,000	2,000		
Sub-total Others				16,200		19%
Total Operating Costs					42,400	
EQUIPMENT:						
Typewriter	1	4,032	1,500	1,500		
Desk calculators	2	269	100	200		
Hand calculators	10	67	25	250		
Misc. Office equipment		1,344	500	500		
Jeep	1	21,504	8,000	8,000		
Motorcycles	4	1,344	500	2,000		
Sub-Total Equipment					12,450	14%
GRAND TOTAL					85,150	100%

* Consultant costs include fees, perdiem and travel.

7.2.2. Improved Packing Station:

1. Name of Project: Pilot Project for Establishing three Packing Stations.

2. Executing Government Agency: Marketing and National Importing Board, Ministry of Finance, Trade, Industry and Planning.

3. Total Estimated Costs: US$108,878

4. External Financing Required: US$ 78,878

5. Potential Assisting Institutions:
   Tropical Products Institute London
   CARDATS

6. Justification:

   A. Problem identification:

   It is the intention of the Government of Grenada to expand and develop its export industry of fresh fruits and vegetables to intra-and-regional markets and to improve the internal marketing of these commodities. At present there exists no product packing stations or collection centers, either public or private, adequate to facilitate the expansion and rationalisation of this industry.

   The facilities operated by MNIB on three of the State Farms are entirely inadequate for fruit and vegetable crop preparation and packaging.

   B. Factors which cause the problem:

   - Lack of awareness of product preparation, selection, quality and packaging requirements of intra-and extra regional trade.
   - Lack of confidence in the market.

- Fragmentation of fruit, vegetable and root crop marketing-locally, intra and extra-regional.
- Poor infrastructural facilities during all stages of the intra-regional marketing chain, i.e., shipping, wharf facilities; investment therefore in collection points or packing sheds has not previously been justified.

7. Project Description:

A. Nature of the project:

This is a pilot project to install minimal facilities for collection and packaging offresh produce and train local personnel in its operation. It will also determine the feasibility of installing similar facilities in other locations.

B. Description of the project:

The project is designed to upgrade the three existing packing stations; La Sagesse, Paradise and Bocage as a pilot Scheme for improved product handling and quality control. It will serve to evaluate the need for additional packing stations and/or produce collection centers in Grenada and to identify the location, design and operation of additional centres. It will also be used to train packing station personnel in management, packing station operations and quality control of fruits, vegetables and root crops designed for local and export markets.

C. Objectives:

The objective is to improve the quality and selection of fruits, vegetables and root crops marketed locally, intra- and extra-regionally.

D. Goals:

The goals of this project are:

- To establish three small scale, low technology produce packing stations as a pilot scheme to improve the quality and selection of fruits, vegetables and root crops.
- To train MNIB and MOA staff in all aspects of packing station operation and quality control.
- To identify other locations for the installation of similar type facilities.

E. Beneficiaries:

The direct beneficiaries are the growers and the MNIB through improved export quality, and increased demand with subsequent increased revenue. Indirect beneficiaries will include the consumers through improved product quality and the Government of Grenada through increased revenue on export earnings.

F. Project locations:

The three locations identified for physical installation are the following State Farm: La Sagesse; Paradise; Bocage. These are already in operation as produce collection and packing facilities, used by MNIB, however they do not meet even minimal requirements.

G. Technical aspects:

The sheds available on the 3 estates are barely adequate for the protecion of produce during preparation and packaging. Ideally these sheds should be reconstructed on the same or alternative sites within the Estates.

The essential component to the upgrading of the packing stations is however the procurement of simple low technology, multipurpose packing station equipment.

An equipment list, designs for simple grading and selection tables and a recommended packing station layout are given in Appendix 5. It is essential that studies be carried out to evaluate the need for treatment of certain fruits and vegetables with postharvest fungicide and the correct method of application developed.

8. Project Planning.

A. Preparation:

It will be necessary to engage one external consultant to (a) assist with establishment of packing stations (b) to train local personnel.

B. Implementation:

The construction of the packing stations can begin as soon as financing becomes available.

C. Control:

The control of the operational use of these 3 centres should be maintained by MNIB and MOA staff with periodic checks from outside consultants.

D. Evaluation:

It will be necessary to evaluate the use and operation of the pilot facilities and make a decision as to whether other centres should be initiated.

9. Project Costs:

Cost components and financing: (US$)

ITEMS	Financed by		Total	
	Local Sources	External Sources	Amount	%
Capital Expenditure	-	70,878[4/]	70,878	65
National personnel[1/]	20,000		20,000	19
International personnel[2/]	-	8,000	8,000	7
Operating costs[3/]	10,000	-	10,000	9
Total	30,000	78,878	108,878	100

1/ One coordinator (MNIB) 3 packing shed managers (MNIB/MOA) plus packers (one year)

2/ Project design and training

3/ Transport, containers, etc.

4/ See breakdown of these costs in Table 12.

10. Project Considerations:

A. Inter-program dependance:

The establishment of improved packing station and produce collection facilities is one part of improving the marketing infrastructure for fruits and vegetables. Early establishment of these centres as a pilot project and training centre within the context of related projects is advantageous. A consultant employed to facilitate the operation could also participate in other projects, e.g., formal and informal training.

B. Institutional interdependence:

These centres should be operated by MNIB with the supply of produce obtained from State Farms, Cooperative farms and private growers, close collaboration is required with the State Farms Corporation (when formed),NACDA and MOA Extension Services to ensure supply. CARDATS should be kept fully informed of developments.

C. Technological implications:

The equipment recommended is low technology and is designed to facilitate operations; it cannot take the place of good management and efficient organisation of operations.

D. Economic implications:

- Employment will be increased through increased production and the employment of packers at the rural level.
- Increased economic returns will be obtained on export crops.
- Continuity of supply and quality to the national market will be improved which will stimulate new demand from the tourist industry.

11. Project Programming.

ITEMS	PROPOSED		ACTUAL	
	Commenced	Terminated	Commenced	Terminated
A. Project Profile	4-10-80	6-10-80	4-10-80	6-10-80
B. Feasibility Study	11-80	12-80		
C. Project preparation	12-80	12-80		
D. Promotion of financing	1-81	1-81		
E. Implementation	2-81	5-81		
F. Control	2-81	2-82		
G. Evaluation	2-82	2-82		

TABLE: 12 A MULTI-PURPOSE VEGETABLE PACKING STATION

Budget Cost

ITEMS		Cost US$
1. Building approx. dimensions 72' x 33' (2,376 ft^2)		
US$6.00 ft.^{2})		14,256.00
	Subt-total	14,256.00
2. Plant Equipment		
2.1 Washing Tank (x1)		60.00
2.2 Fungicide Tank (x1)		60.00
2.3 Draining Area (x1)		40.00
2.4 Scales - platform scale (x1)		400.00
- pan scale (x1)		200.00
2.5 Size grading Tables (x4)		240.00
2.6 Triming TAbles (x4)		160.00
2.7 Rolley Conveyor (x1)		300.00
2.8 Bagging Unit (x4)		80.00
2.9 Trolleys (x6)		120.00
2.10 Field containers (x300)		2,400.00
	Sub-total	4,060.00
3. Office Equipment		
3.1 Tables (x1)		50.00
3.2 Chair (x2)		60.00
3.3 Cabinet (x1)		150.00
3.4 Safe (x1)		50.00
	Sub-total	310.00

4.	**Transport Equipment**		
	5 ton truck to serve 3 stations	Sub-total	15,000.00
5.	**Technical assistance:**		
	Final Project design and training (2mths.)		8,000.00
6.	**Summary of Project Costs:**		
	7.1 Capital Expenditure		
	Packing Stations x 3		US$ 42,768.00
	Equipment (plant + Office)x3		13,110.00
	Transport Equipment x 1		15,000.00
		Sub-total	70,878.00
	7.2 Technical Assitance		8,000.00
		Grand Total	$78,878.00

8. **Notes:**

- Technical Assistance requirements may include final project design as well as training of personnel in plant operation. The Technical assistance component must be closely integrated with the other marketing projects.
- Operating costs for the three packing centres will be covered by MNIB.
- See Appendix 5 of this report for details on the packing station layout and use of equipment.

7.2.3 Improved Market Containers

1. Name of Project: Local Production of Market Containers.

2. Executing Government Agency: MINISTRY OF AGRICULTURE, TOURISM, LANDS FORESTRY AND FISHERIES

3. Total Estimated Cost: Phase I: US4,000

   PhaseII: Dependent upon feasibility study

4. External Financing Required: US4,000

   Phase I: US$4,000
   Phase II: Dependent upon feasibility study

5. Potential Assisting Institutions:
   IICA, TPI, CIDA: All of these have laboratory facilities for examining characteristics of local woods.

   FAO/UNDP can provide expertise for designing sawmill facilities.

6. Justification:

   A. Problem identification:

   Containers suitable for the transport of fruits, vegetable and root crops are not readily available in Grenada for use on the local, intra-regional or extra-regional markets.

   The use of the existing containers creates the following problems:

   - a high level of mechanical damage with subsequent reduction in market quality and value.

- high variation of container size and type prevents a uniform product with eye appeal reaching the retail level.
- Variability in size prevents systematic and careful handling and storage during transport.

B. Factors which cause the problem:

- Lack of readily available local material due to the lack of sawmill for cutting lumber.
- Lack of studies on material availability, constraints and cost of production of alternative containers.
- Lack of designs of alternative wood crates and baskets.
- Lack of awareness of what is required on the intra- and extra-regional markets.

7. Project Description:

A. Nature of Project:

To conduct a feasibility study on the establishment of a local wood box and basket making industry in Grenada; if feasible to establish that industry

B. Description of the Project:

PHASE I This phase of the project is designed to:

- identify packaging requirements for the local, intra- and extra-regional markets.
- consider locally available materials and container designs.
- conduct a feasibility study for the establishment of a wood box industry and a basket industry.

PHASE II

If the establishment of either or both of these industries is justified then Phase II will:

- conduct a design study, identify and select capital equipment, and
- assist in equipment procurement, establishment and training of personnel.

C. Objetives:

To establish a local container industry to service the demands of the local and export trade in fruit, vegetable and root crop marketing.

D. Goals: The goals of this project are the following:

- To conduct the feasibility study on the establishment of a wood box making industry and basket industry.
- To establish these industries.
- To train local staff.

E. Beneficiaries: The beneficiaries are:

The exporter who will benefit through increased return from reductions in loss and improved product quality and the shipper who will benefit through ease of handling and stowage of a more uniform pack. Indirectly the Producer will benefit through an improved and expanding market as will the Consumer through the availability of higher quality produce.

F. Project location:

GRENADA - Location to be identified in feasibility study

G. Technical aspects:

A wide range of timber types are available in Grenada. Tests should be carried out as part of the feasibility study to identify the most suitable woods for box construction.

The principle constraints on the timber industry at present are lack of saw mill equipment and poor feeder roads.

Efforts should be made to re-design the traditional basket to reduce the unit weight and improve product quantity

8. Project planning

A. Preparation:

It will be necessary to employ a consultant to conduct a feasibility study into the establishment of a box making industry and basket industry. This consultancy will require approximately 4 weeks. If the results are positive the same consultant should prepare the project to establish the industry.

B. Implementation:

Depends on outcome of 8 A.

C. Control:

Ibid.

D. Evaluation

Ibid.

9. Project Costs*

Cost components and financing: (US$)

ITEMS	Financed by		Total	
	Local Sources	External Sources	Amount	%
Capital expenditure				
National personnel				
International personnel		4,000	4,000	100
Operating costs				
TOTAL		4,000	4,000	100

* Costing on feasibility study only
Additional costing is dependent upon feasibility study.

10. Project Considerations:

A. The need to improve the containers used for local and export marketing is only one part of an integrated programme for the improvement of horticultural crop marketing in Grenada. Many changes such as improved quality control procedures, improved sea transportation etc. cannot effectively be under taken until modifications to the containers are adopted. It is imperative therefore, that this project receives high priority within the context of overall development.

B. Institutional interdependece:

The Forestry Department of the MOA would be the principle counterpart unit, however, close collaboration should be established with MNIB and other departments in the MOA who have interests in horticultural crop marketing. CARDATS should be kept informed of developments.

C. Technological implications:

- The consultant should visit the principle export market (Trinidad) and the fibre board container supplier in St. Lucia.

D. Economic implications: The establishment of a local container industry will:

- Provide employment at rural and urban level.
- Improve economic returns on export crops.
- Reduce food losses in national and international marketing.

11. Project Programming

ITEMS	Proposed		Actual	
	Commenced	Terminated	Commenced	Terminated
A. Project Profile	4-10-80	6-10-80	4-10-80	6-10-80
B. Feasibility Study	1-81	2-81	____	____
C. Project preparation	2-81	2-81	____	____
D. Promotion of financing	3-81	3-81	____	____
E. Implementation	4-81	7-81	____	____
F. Control	4-81	4-82	____	____
G. Evaluation	4-82	4-82	____	____

7.2.4 Improved Sea Transportation

1. Name of Project: Improved Sea Transportation

2. Executing Government Agency: Marketing and National Importing Board, Ministry of Finance, Trade, Industry and Planning.

3. Total Estimated Cost: US$12,800

4. External Financing Required: US$10,800

5. Potential Assisting Institutions:

   Regional technological institutions or extra-regional such as Tropical Products Institute, London
   CARDATS and IICA

6. Justification:

   A. Problem identification:

   The facilities for loading of fruits, vegetables and root crops (mainly fruits) destined for intra-regional markets are inadequate. The produce is exposed to the adverse prevailing weather conditions, i.e., direct sun and rain, to the detriment of product quality.

   The conditions within the holds of schooners transporting produce to intra-regional markets are unsuitable for the carriage of these highly perishable export commodities.

   B. Factors which cause the problem:

   - There is a lack of space on the Carenage for handling and loading of produce onto the schooners, which may have prevented the construction of a permanent shelter.

- The schooners are not designed for transporting perishable produce.

- There exists an inability, (and hence acceptance of product loss), on the part of the traffickers to implement change on the schooners.

- There is a lack of awareness of the need for improved product quality in the intra-regional trade.

7. Project Description:

A. Nature of the project:

The purpose of this project is to provide temporary facilities to protect perishable produce during preparation and loading and to improve the schooner transport facilities for intra-regional trade.

B. Description of the Project:

This project will provide materials for the installation of temporary cover on the Carenage, St. George's and the wharf, Grenville, to protect produce during preparation and prior to loading (export days only). It will also permit the evaluation and modification of the holds of schooners regularly transporting perishable produce to Trinidad through the provision of insulation and the introduction of wind fans. It will be necessary to conduct a comprehensive study on sea freight transport limitations, using the schooners, and evaluate the proposed modifications. Lastly, the project will finance an evaluation of the requirements for handling and storage facilities within the proposed schooner wharf redevelopment programme for use by MNIB and the private sector (feasibility study).

C. Objectives:

To provide a limited amount of infrastructure and develop technical innovations to improve the export quality of produce, particularly fruits, destined for the intra-regional markets.

D. Goals: The goals of this project are the following:

- To insulate the engine rooms from the fresh produce storage area on six sloops plying the fresh produce trade between Grenada and Trinidad.
- To introduce a wind fan for storage space ventilation on at least one sloop.
- Build temporary and portable shelters on 2 wharfs.
- To ensure that adequate provision is made in the Port Redevelopment Program for the export trade of the future.

E. Beneficiaries:

The beneficiaries will include the exporter (trafficker and MNIB) through increased export earnings as well as the producers through expansion of the market potential for their crops.

Themarket expansion and improvement of product quality on these export markets is to the benefit of the industry on the whole and the national economy.

F. Project location:

1. The provision of temporary shelter:
   (a) on the Carenage, St. George's
   (b) on the wharf, Grenville

2. Vessel adpatation - on the major vessels transporting perishable produce from Grenada to intra-regional markets.

G. Technical aspects:

The principle limitation concerning the installation of temporary low cost cover at the export locations is the lack of space on the Carenage at St. George's. With the conjestion which occurs on export days the installation of a low-cost cover--a metal pole supporting a tarpaulin--is unlikely to exaggerate the problem and may even concentrate the operation into a more defined area.

The owners of the Schooners are understandably likely to be reluctant to accept any changes in design of the holds of their vessels. However, the modifications proposed are minimal, they include the installation of a sheet of insulating material between the engine room and the hold, and the installation of a single duct the depth of the hold with a fan attachment.

Comprehensive studies should be made to investigate stowage patterns, ducting and fan positioning. Temperature monitoring equipment is required to support these investigations.

It is unlikely that the proposed new schooner wharf will commerce operation before early 1983.

8. Project planning:

A. Preparation:

It will be necessary to determine the final design for the wharf coverage and the schooner adaptations and obtain the necessary financing.

B. Implementation:

The provision of facilities and the implementation of applied technology should commence as soon as possible.

C. Control:

Supervision of the project will be carried out by MNIB and MOA in conjuction with CARDATS and IICA technical assistance.

D. Evaulation:

The efficiency of the modification to the schooner holds and the wharf coverage will be evaluated as the systems are developed. It is anticipated that if successful the modifications will be generally adopted.

9. Project Costs:

Cost components and financing: (US$)

ITEMS	Financed by		Total	
	Local Sources	External[1/] Sources	Amount	%
Capital expenditure		7,600	7,600	59
National personnel	2,000		2,000	16
International personnel		2,000	2,000	16
Operating costs		1,200	1,200	9
TOTAL	2,000	10,800	12,800	100%

1/ See breakdown of cost items external source in Table 13.

10. Project Considerations:

A. Inter program dependence:

The project is not dependent on any other specific programme however, as one phase of the marketing chain, developments in this area should be integrated with developments in packaging, evaluation of markets, etc.

B. Institutional interdependence:

It will be necessary for the MNIB or the MOA to assign personnel to supervise and coordinate project implementation and to evaluate the results.

C. Technological implications:

The innovations proposed are low technology, low cost and can be adopted more widely if successful.

D. Economic implications:

Any technical change which can potentially increase the foreign exchange earning capability of Grenada has significant economic implications to Grenada.

11. Project Programming.

		Proposed		Actual	
	ITEMS	Commenced	Terminated	Commenced	Terminated
A.	Project Profile	4-10-80	6-10-80	4-10-80	6-10-80
B.	Feasibility study	NOT REQUIRED			N/A
C.	Project preparation	1-81	1-81		
D.	Promotion of financing	2-81	2-81		
E.	Implementation	3-81	3-81		
F.	Control	3-81	12-81		
G.	Evaluation	11-81	12-81		

TABLE: 13 IMPROVED SEA TRANSPORTATION

Budget Cost (external sources)

		Cost US$
(a)	Capital Expenditure	
1.	Wharf Facilities at St. George's and Grenville Tarpaulin, poles	4,000.00
2.	Adaptation of vessels x 6	
2.1	Insulation	1,800.00
2.2	Fan and wood ducting	1,200.00
3.	Equipment for Temperature Monitoring	600.00
	Sub-total	7,600.00
	Operating costs	
B.	Transport Trials to Trinidad x 20 Fare + subsistance	1,200.00
	Sub-total	1,200.00
C.	Feasibility Study	
	Evaluation of product handling facilities at schooner wharf (2 weeks) within the proposed port redevelopment programme (Consultant)	2,000.00
	Sub-total	2,000.00
	Grand-Total	10,800.00

APPENDIXES

APPENDIX 1

NOTES ON REFRIGERATED STORAGE

Only produce which cannot effectively be held at ambient, which justifies the cost of refrigeration and requires holding as an integral part of the marketing system should be held under refrigeration.

A guide to the optimum storage temperatures for selected fresh produce is given in Table 1. When capacity is limited it is preferable to store produce for which recommended temperatures are 35° F or 45° F at 55° F rather than viceversa. Some fruits and vegetables when held at temperatures below 50° F to 55° F develop chill injury; they break down, shrivel, rot or blacken. Such produce does not ripen normally on removal from the store and has a low market quality.

Good store management is essential. Produce should be stacked on racks or pallets to allow adequate circulation of the store air. The room, store containers and the pallets must be kept clean. The control of turnover should be controlled by date labelling and arranging stacking in such a manner as to permit the removal of the oldest produce first. Any products which begin to show signs of deterioration should be removed immediately.

TABLE 1 : APPROXIMATE OPTIMUM STORAGE TEMPERATURES FOR FRESH FRUITS AND VEGETABLES

55° F	45° F	35° F
(1) Avocado	Eggplant	Carrot
(1) Mango	Sweet pepper	Cabbage
(1) Papaya	Okra	Lettuce
(1) Breadfruit	(2) Potato (white)	Beans
(1) Custard apple	(2) Orange	(2) Onions
(1) Soursop		
(1) Banana		
(1) Plantain		
(2) Limes		
(2) Grapefruit		
(1) Tomato		
Pumpkin		

(1) These fruit produce ethylene and store rooms should be well ventilated.

(2) These items can taint other produce and should preferably be stored separately.

APPRENDIX 2

NOTES ON ONION STORAGE

The principal varieties which have been tested for production under the growing conditions of Grenada are Texas Early Grano (TEG), Texas Early Yellow Grano (TEYG), Tropic Brown, Tropicana F, and Red Creole (Stewart I.W. 1977). In particular the first two listed varieties have poor keeping qualities even when handled under ideal conditions.

Harvesting

When good bulbing occurs as the bulb reaches maturity, the necks begin to soften and the tops fall. The optimum lifting time is when at least 50% of the tops have fallen, however in Grenada the lifting time is likely to be determined by the weather.

Under dry harvest conditions the crop can remain in the field without harm until the tops are completely dry. Depending on risks of wet weather and problems of praedial larceny the bulbs can be lifted and left in the field to dry further. Under wet weather conditions once the tops have fallen the bulbs should be lifted to avoid rotting soon after harvest.

Drying

If the bulbs cannot be adequately dried in the field then they must be dried either on mesh racks in shallow layers or in bulk under forced air ventilation . Under the condition of high relative humidity prevailing in Grenada, it is likely that a forced air drying system combined with a heater unit will be essential for effective drying prior to storage.

For successful onion storage two different rates of air flow will be required for the drying and storage periods. The fan selected must be capable of delivering 100 ft^3/min per ton against back pressure of 1.5" water guage.

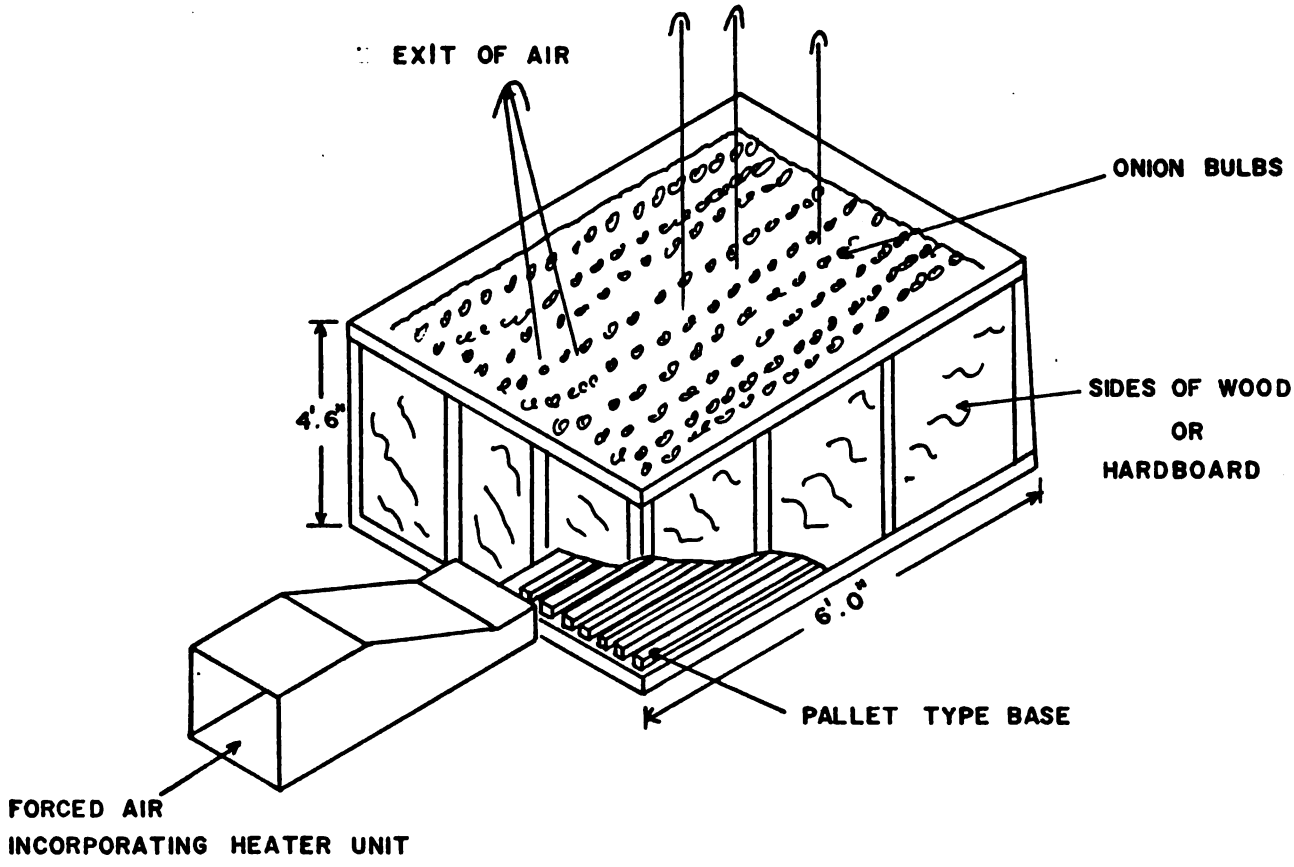
A correctly selected fan will also be capable of delivering at 250 ft^3 /min. per ton, when the load is only partial.

This delivery is necessary for the initial drying phase. In addition the fan should also be capable of operation at pressures up to 4 to 5" water guage. A heater should be incorporated into the system to raise the effective air temperature thereby reducing the relative humidity which should be maintained at around 70%.

Adequate ventilation with supplimentary heating will be required throughout the storage period. It should be noted that the TEG variety cannot be held at the depth of 5' which is recommended for many onion varieties due to its soft textured nature.

Figure 1 illustrates a shallow tray onion drier suitable fro drying small lots. The crop is loaded into the raised floor and dried by air passed from a fan connected to the duct. The bulbs may be removed by taking out one of the side panels. On-floor bulk drying systems can be installed in an existing building with the construction of the required main duct and with use of above ground laterals.

FIGURE I: SHALLOW TRAY ONIOM DRIER



APPROXIMATE CAPACITY 650 LBS.

APPENDIX 3

NOTES ON BANANA RIPENING

For good ripening it is necessary to harvest fruit at a uniform maturity. Bunches should be dehanded and the fruit treated with a fungicide either TBZ or "Benlate" before boxing.

A temperature control room operating in the range 55-70° F is needed. The room should be fairly air tight, and offer good air circulation. Green boxed banana fruit should be brought down to 58° F before ripening commences.

To initiate ripening the thermostat should be set to 62-64° F and ethylene gas introduced to a level of 1000 ppm. The room should be left unopened for 24 hours.

GREAT CARE should be taken in using ethylene gas. It is explosive if introduced in large quantities. Smoking should be prohibited in and around the banana ripening room at all times. The explosive limit is 3% and above of an ethylene and air mixture.

If ethylene is not available ripening can be initiated by raising the temperature to 68° F. The room must be gas tight and well filled for this method to be effective. After treating the fruit with ethylene or raising the temperature to 68° F for 24 hours, the fruit should be inspected regularly. When it begins to soften (it will still be green) the temperature should be reduced to 60° F and the room ventilated daily.

With experience it is possible to ripen fruit to a green/yellow stage in 4 to 5 days.

Using this method of ripening the fruit will attain a better colour, a firmer texture and a longer shelf life than fruit left to ripen at ambient.

APPENDIX 4

NAMES OF SOME MNIB PERSONNEL

General Manager	:	Milton Johns
Deputy Manager	:	Beverly Paris
Purchasing Manager	:	Kenneth Nedd
Import Manager	:	M. Nixon
Assistant Import Manager	:	C. Agustine
General Warehouse Manager	:	Louis Henry
Chief Accountant	:	E. Boyke
Assistant Accountant	:	Mr. Francis

APPENDIX 5

THE ESTABLISHMENT OF PRODUCE PACKING AND COLLECTION CENTRES

1. BASIC DESIGN FACTORS

The following points should be considered in the design of a produce packing station or collection centre:

a) The selection of the optimum location.

b) Ease of access for delivery and discharge.

c) All weather access roads.

d) The provision of a covered area with adequate space for the required operations.

e) An adequate water supply.

f) Roof extension at loading and unloading points to protect produce from prevailing weather.

g) Power for lighting evening and night operations.

h) Building design should allow good ventilation.

i) Office facilities.

j) Market container/field container holding area.

k) Easy to clean floor.

l) Balance

2. A MULTI-PURPOSE VEGETABLE PACKING STATION

The design, selection of equipment and its flexibility should be such as to meet the potential different packaging and treatment procedures required for the various vegetable types produced in Grenada together with meeting the requirements of the three markets:

a) Extra-regional

b) Intra-regional

c) Local

The following commodities which may be considered for the different markets may pass through a multipurpose vegetable packing station.

a) Export to United Kingdom (extra regional)

-eggplant

-Sweet pepper

-yam

-tannia

-christophene

-sweet potato

b) Export to Intra-Regional Markets e.g. Trinidad

By air -lettuce

-cucumber

-sweet pepper

By sea -cabbage

-carrot

-christophene

c) Local Market

-carrot

-cabbage

-cucumber

-lettuce

-christophene

-okra

-roots

For each commodity many of the following operations would be carried out in a packing station.

a) Intake weighing and recording

b) Sorting to remove rejects

c) Trimming

d) Washing

e) Treatment with post-harvest fungicide

f) Draining

g) Selection for quality

h) Selection for size

i) Packing into market container

j) Weighing

k) Labelling

l) Recording/checking output

As a general rule only certain root crop types e.g. carrots, should be washed. Leaf vegetables e.g. lettuce and cabbage, should be trimmed only. Tomato, eggplant, sweet pepper or cucumber lightly brushed or wiped. Root crops brushed or washed depending on the market outlet. Washing of produce can frequently adversely effect produce quality, shorten its shelf life and spread disease in particular bacteria. Where a fungicide treatment is essential due to an identified fungal problem then washing would be pre-requisite to the treatment.

In order to satisfy these varying needs, equipment selected should be simple, multipurpose and the layout highly flexible.

Figure 1 presents a possible layout for a multipurpose vegetable packing station. This could be constructed using a wood frame, tin roof and concrete floor. The office made of wood with windows (wiremesh) overlooking the incoming produce area and the vegetable selection line. The office should be lockable. The storage area for empty market containers should be weather proofed on outer walls, inner walls wire meshed and the area lockable.

The outer walls of the station could be constructed of wood to 3'6", wire mesh to roof and sliding or hinged doors made of wood or metal.

Equipment and siting is presented in Figure 1. Figure 2 illustrates the product flow of three commodities; lettuce, carrot and egg plant. Most equipment to carry out the operations listed above can be made of locally available materials; these are itemised below:

a) WASHING TANK (x1)

Constructed in brick/cement or tin, the inner surface must be smooth to prevent scratching or damage to the produce. Maximum tank depth 2'6" with outlet at base and easy access to inlet water supply.

b) FUNGICIDE TREATMENT (x1)

Further evaluation is necessary to confirm the necessity for a fungicidal treatment of eggplants and if required to design equipment which effectively carries out this process. In the plan an area is allocated for the process and the operation is based on the current soaking method however a douche or spray system may prove to be more suitable.

c) DRAINING AREA (x1)

This would comprise of a wood or metal frame, covered with a plastic mesh to facilitate drainage. The floor should be levelled to allow water to drain away from the centre of the packing station. Some root crops could as effectively be dried in piles, sacks on the floor.

d) SCALES (x2)

1 platform scale max. capacity 400 kg. (mobile)
1 top pan scale max. capacity 15 Kg. (mobile)

e) SIZE GRADING TABLES (x4)

A design of a size grading table is given in Figure 3. This may be constructed of wood and is designed to facilitate the sorting of mixed produce into different qualities or size grades. The operator starts adjacent to the mixed produce and passes items to one of the three pockets. The packer, with container resting on support, packs the selected items directly into the container. This avoids a situation where an operator has to make more than one decision; a factor which often leads to poor product selection.

f) PRODUCE SELECTION AND TRIMMING TABLES (x4)

These are ordinary tables constructed of wood and should have a smooth clean surface. Such tables if used efficiently can greatly facilitate produce selection and preparation. Produce should be delivered in field containers to one side of the table; the product is removed, trimmed, prepared, selected and passed over to the other side of the table where

a second operator packs the produce into the market container. This again avoids individual operators from having to make two or more decisions and separates out the "dirty" from the "clean" operations.

g) ROLLER CONVEYOR (x1)

Approximately 40' of roller conveyor, gravity feed for the carriage of filled containers (maximum weight 15 kg.) to the check weight section.

h) BAGGING UNIT (x4)

To facilitate the bagging of carrots etc. a wood frame approximately 1'6 x 1'6" with 4 hooks, 2 on each of opposing sides, supported on a frame approximately 2'6" from the ground. The top of the unfilled net is attached to the hooks, produce place in the net, when filled unhooked and removed from underneath the frame.

i) TROLLEYS (x6)

Produce once packed in fibre board boxes could be stacked on trolleys (3'6" x 3'6") made of wood or metal, with 3" wheels. This facilitates the movement of produce from the holding area to loading into the vehicle.

j) FIELD CONTAINERS (x300)

Consideration should be given to the procurement of field containers (plastic) designed for fruit and vegetable handling. These would be smaller in size than the black plastic box used by the banana industry, and have a high air ventilation capability.

k) OFFICE EQUIPMENT

1 table
2 chairs
1 cabinet
1 safe box

3. FRUIT PACKING STATION

The design criteria for a fruit packing station are the same as given in (1) above.

The following fruits are most likely to be handled through a fruit colletion centre:

-Mango
-Avocado
-Soursop
-Sapodilla
-Sugar apple
-Golden apple

Any packing station which is primarily designed for fruits may at times handle vegetable items and viceversa. Stations should therefore be multipurpose and as flexible as possible.

The facility described in (2) is suitable for fruit handling with the exception of the washing and fungicide treatment unit.

Of the above listed commodities only mango may require a post-harvest treatment, for the control of anthracnose spp.

The most effective (although not 100%) method of control is hot water treatment (5 mins. at 50° C 110° F) with 500 ppm benomyl. Cold water treatments generally give low anthracnose spp control.

Studies should therefore be carried out to confirm the effectiveness of the current practice of cold water treatment of mango.

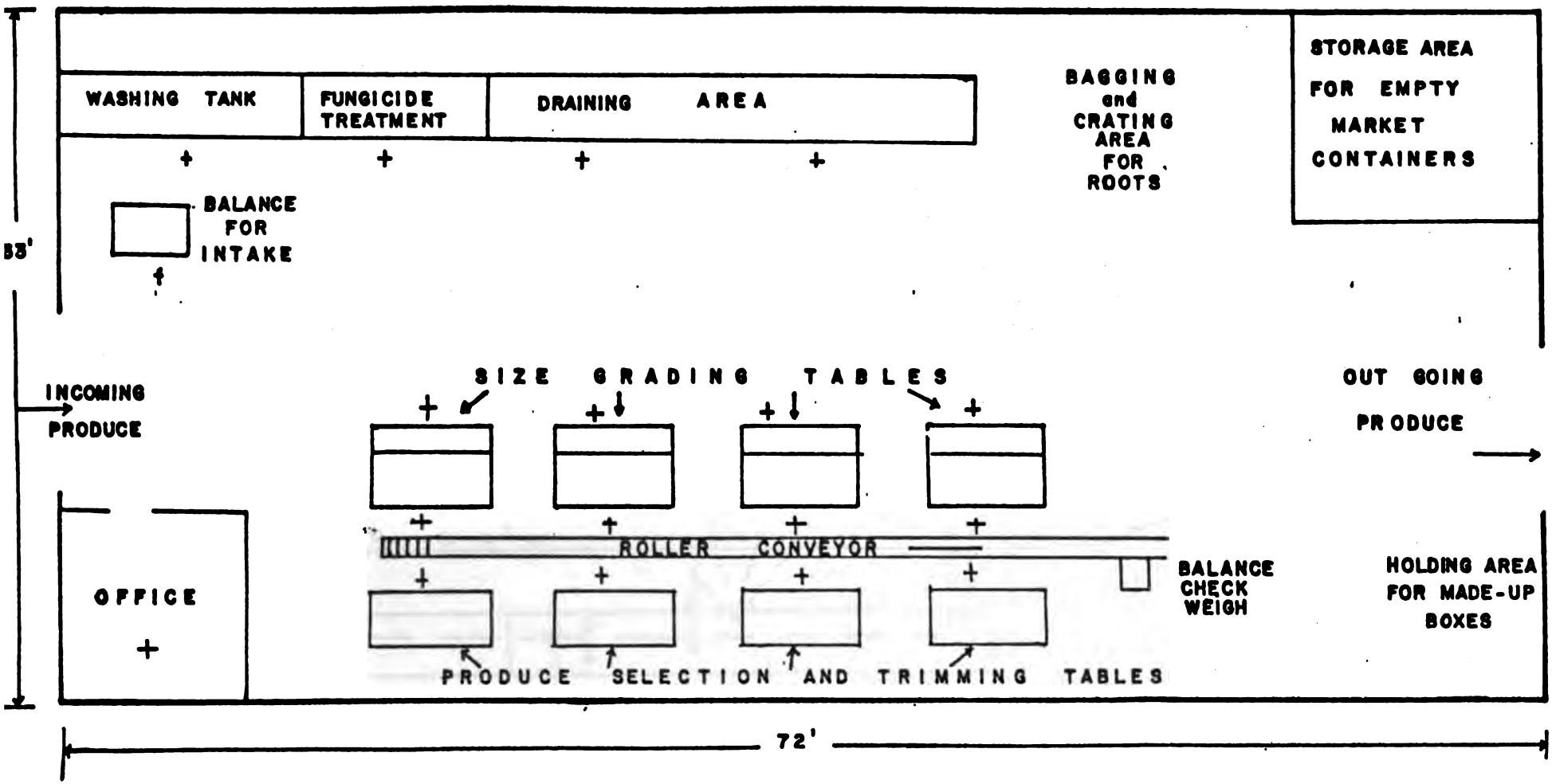
The equipment required for hot water treatment comprises metal loading buckets, metal tank, heating unit with thermostatic control (± 1°F) and a water circulator. The operator must be skilled, as periods in the hot water tank longer than recommended can cause severe adverse effects to fruit quality.

As a fruit packing station may be used for vegetables and therefore require washing tanks it is recommended that tanks similar to those in Figure 1 are included. These tanks could be used for the cold water treatment of mangoes until the results of a study have been obtained. The packing tables and grading tables are identical to those suggested for vegetable selection, size grading and packing of any of the above listed fruits.

FIGURE 1: POSSIBLE LAYOUT OF SMALL MULTIPURPOSE VEGETABLE PACKING STATION

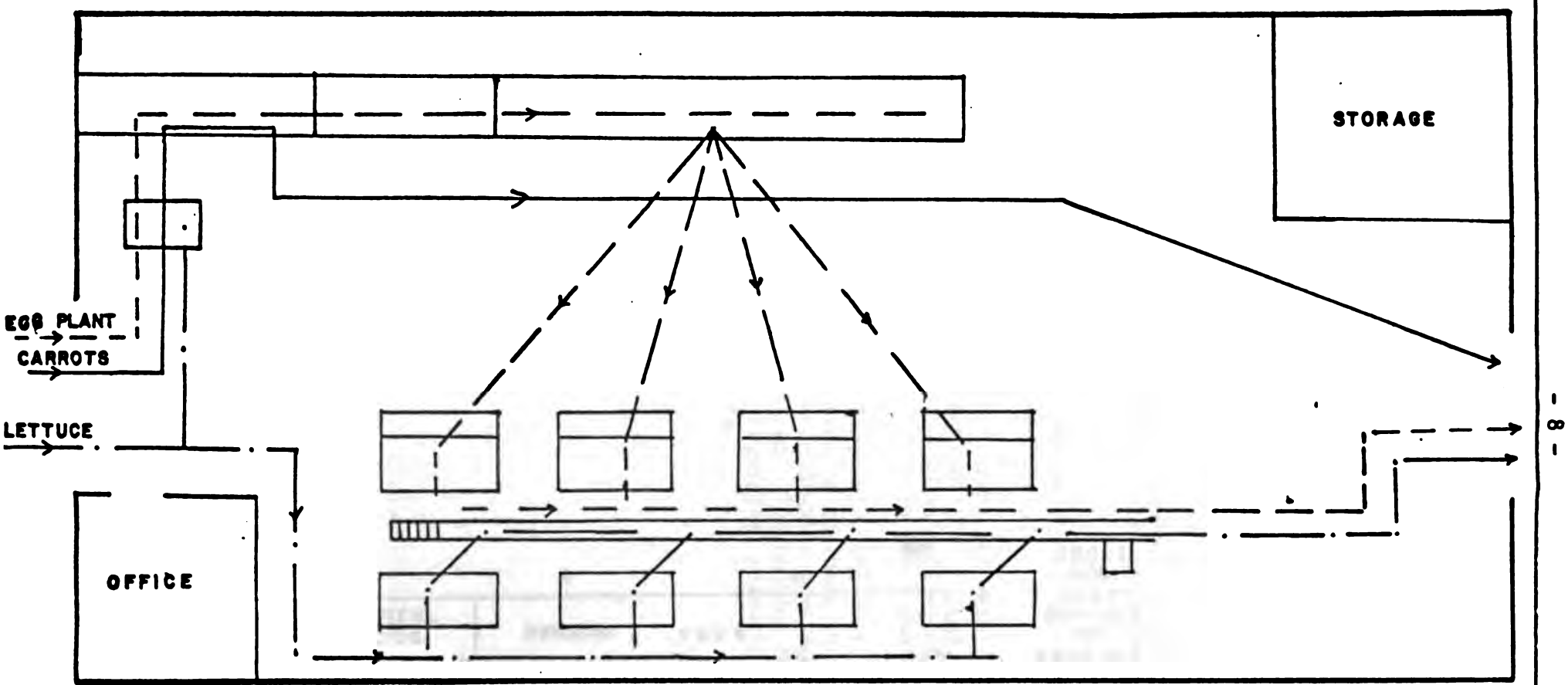
Key

+ = POSITION OF OPERATORS - NUMBER DEPENDING ON VOLUME THROUGH PUT



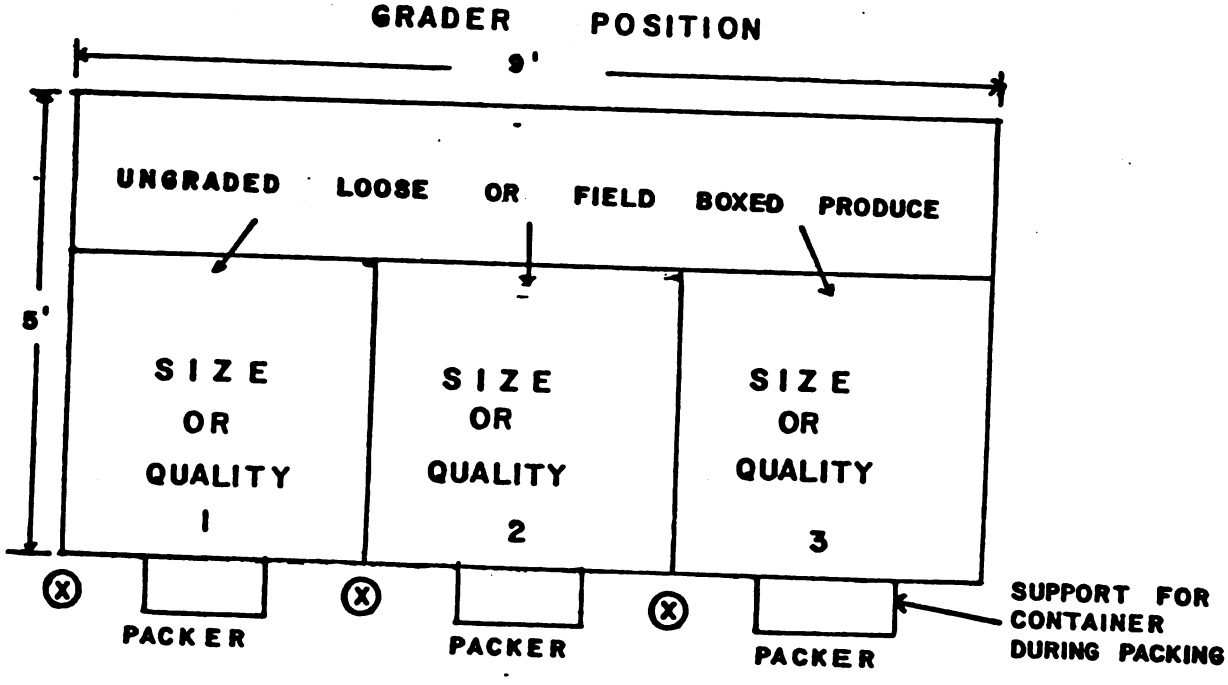
DIMENSIONS — Approximate Only

URE 2: PRODUCE FLOW OF THREE COMMODITIES THROUGH A MULTIPURPOSE PACKING STATION



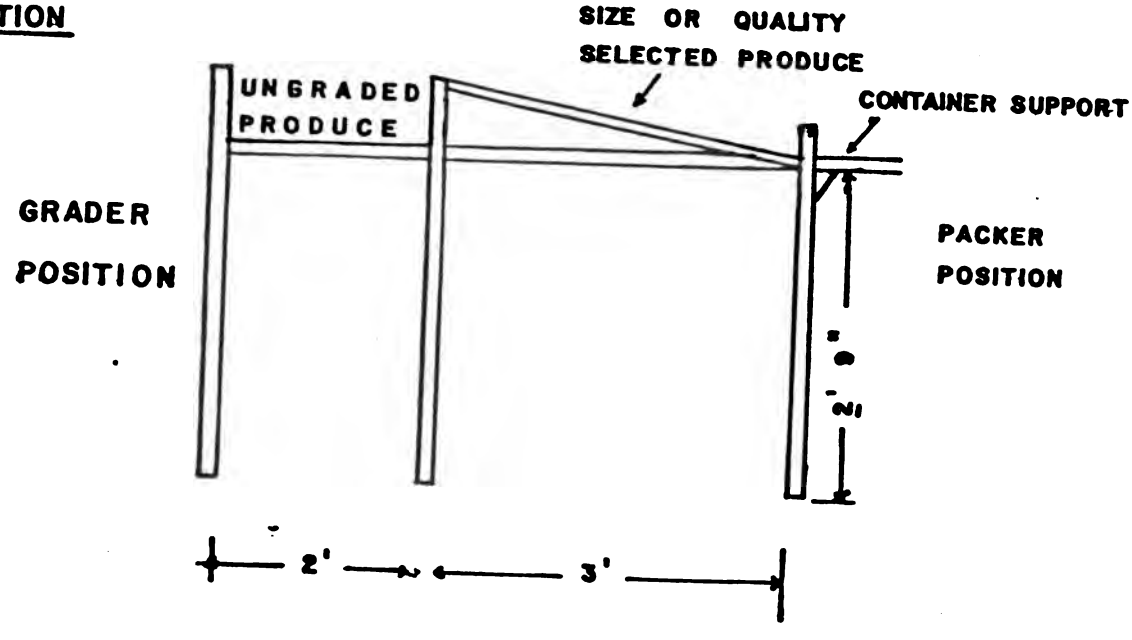
IGURE 3: DESIGN OF A SIMPLE SELECTION AND GRADING TABLE

PLAN



⊗ — STACK OF EMPTY CARTONS

CROSS SECTION



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