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Proceedings

Workshop on



# FORMULATION OF PROGRAMMES FOR TECHNOLOGICAL DEVELOPMENT OF AGRICULTURE IN GRENADA

St. George's, Grenada  
May 17, 1988

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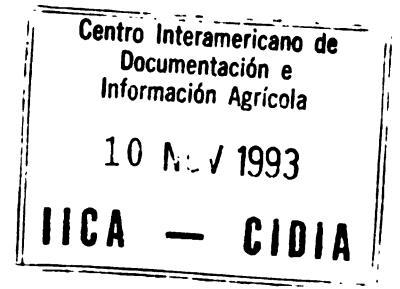
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# PROCEEDINGS

Workshop on



## FORMULATION OF PROGRAMMES FOR TECHNOLOGICAL DEVELOPMENT OF AGRICULTURE IN GRENADA

St. George's, Grenada  
May 17, 1988

Edited by

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# ACRONYMS

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<b>ARCDP</b>	<b>Agricultural Rehabilitation and Crop Diversification Project</b>
<b>AVRDC</b>	<b>Asian Vegetable Research and Development Centre</b>
<b>BDD</b>	<b>British Development Division</b>
<b>BSCBS</b>	<b>Barbados Sugar Cane Breeding Station</b>
<b>CAEP</b>	<b>Caribbean Agricultural Extension Project</b>
<b>CARDATS</b>	<b>Caribbean Agricultural Rural Development, Advisory and Training Service</b>
<b>CARDI</b>	<b>Caribbean Agricultural Research and Development Institute</b>
<b>CATIE</b>	<b>Tropical Agricultural Research and Training Centre</b>
<b>CDB</b>	<b>Caribbean Development Bank</b>
<b>CEPLAC</b>	<b>Cocoa Research and Development Centre (Bahia/Brazil)</b>
<b>CIAT</b>	<b>International Centre for Tropical Agriculture</b>
<b>CIDA</b>	<b>Canadian International Development Agency</b>
<b>CIMMYT</b>	<b>International Centre for the Improvement of Corn and Wheat</b>
<b>CIP</b>	<b>International Centre for Potato</b>
<b>CTO</b>	<b>Chief Technical Officer</b>
<b>DOA</b>	<b>Department of Agriculture</b>
<b>EDF</b>	<b>European Development Fund</b>
<b>EEC</b>	<b>European Economic Community</b>
<b>EMBRAPA</b>	<b>Brazilian Enterprise for Agricultural Research</b>
<b>FAC</b>	<b>French Fund for Aid and Cooperation</b>
<b>FAO</b>	<b>Food and Agriculture Organisation of United Nations</b>
<b>FTM</b>	<b>French Technical Mission</b>
<b>GBCS</b>	<b>Grenada Banana Cooperative Society</b>
<b>GCA</b>	<b>Grenada Cocoa Association</b>

<b>GCNA</b>	<b>Grenada Cooperative Nutmeg Association</b>
<b>GDB</b>	<b>Grenada Development Bank</b>
<b>GFNC</b>	<b>Grenada Food and Nutrition Council</b>
<b>HIAMP</b>	<b>High Impact Agricultural Marketing and Production</b>
<b>HIVOS</b>	<b>Humanistic Institute for Cooperation with Developing Countries</b>
<b>IADB</b>	<b>Inter-American Development Bank</b>
<b>IDA</b>	<b>International Development Agency (World Bank)</b>
<b>IDC</b>	<b>Industrial Development Corporation</b>
<b>IFAD</b>	<b>International Fund for Agricultural Development (Rome/Italy)</b>
<b>IICA</b>	<b>Inter-American Institute for Cooperation on Agriculture</b>
<b>INRA</b>	<b>National Institute of Agronomic Research (Guadeloupe/FWI)</b>
<b>MFC</b>	<b>Model Farms Corporation</b>
<b>MNIB</b>	<b>Marketing and National Importing Board</b>
<b>MOA</b>	<b>Ministry of Agriculture</b>
<b>MSCMS</b>	<b>Minor Spices Cooperative Marketing Society Ltd.</b>
<b>NAAC</b>	<b>National Agriculture Advisory Council</b>
<b>NARES</b>	<b>National Agriculture Research/Extension Sub-system</b>
<b>NGO</b>	<b>Non-Government Organisation</b>
<b>R &amp; D</b>	<b>Research and Development</b>
<b>SAT</b>	<b>Sub-team on Agricultural Technology</b>
<b>TAT</b>	<b>Team on Agricultural Technology</b>
<b>TDP</b>	<b>Technological Development Programme</b>
<b>TV</b>	<b>Television</b>
<b>UNDP</b>	<b>United Nations Development Programme</b>
<b>USAID</b>	<b>United States Agency for International Development</b>
<b>UWI</b>	<b>The University of the West Indies</b>
<b>WB</b>	<b>World Bank</b>
<b>WINBAN</b>	<b>Windward Islands Banana Growers' Association</b>

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# INTRODUCTION

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This document outlines the presentations, decisions and conclusions of a one-day workshop on the Formulation of the Technological Development Programmes of the MOA, for crops and livestock.

Compiled by IICA, the document was prepared from a number of papers presented by Senior Planning and Technical Officers of the Ministry of Agriculture and two IICA Staffers.

This methodology was chosen to ensure that the document should represent the thinking of the Ministry of Agriculture and that it would be informed by Government's policy consideration. In a word, that it would be essentially an MOA document.

The major thrust of the work is its focus on the basic problem of the rational allocation of scarce resources within the Agricultural Sector. Thus, the core of the document is the section which identifies some seven programmes and within these, ranks a number of sub-programmes, according to specific criteria.

The other sections put the programmes into policy focus or into context of existing programmes. Thus, a brief overview of Government policy and programme is presented. Similarly, certain essential decisions and institutional changes are identified.

The work does not by any means provide all the answers, nor was it intended to do so. It does, however, provide a starting point for the final effective programming of the sector. It will be of immediate use to the Ministry of Agriculture by informing the project identification/planning system. It will also be useful as a guide to the development of the Ministry's Extension Plan and would aid the Ministry's plan to rationalise its present organisation.

Alphonsus Antoine  
Agricultural Adviser

October 26 1988

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# EXECUTIVE SUMMARY

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Agriculture being the backbone of Grenada's economy, the Ministry of Agriculture is committed towards ensuring optimum utilization of the sector's resources in support of Government's agricultural policy of import substitution and export enhancement. The workshop's major objective was to formulate technological development programmes consonant with such policy. The workshop also sought to highlight the agricultural sector's institutional framework and technology policy as necessary pre-requisites for programme formulation.

Implementation of Government's agricultural policy is adversely affected by the limited amount of financial resources allocated to the agricultural sector. This emphasizes the need for programme prioritization to ensure that available resources are assigned to priority programmes. Praedial larceny and the limited capability of the Marketing and National Importing Board were identified as major constraints to agricultural policy implementation.

If not effectively coordinated, activities of local and external support institutions are likely to result in duplication of efforts and consequential wastage of resources. The importance of developing programmes with clearly stated goals and well defined institutional responsibilities cannot be over-stressed. Moreover, establishment of an institutional communications channel between MOA and support institutions is vital as a feedback mechanism for policy setting and research/extension planning and management. The Head of the Agricultural Planning Unit as well as the leaders of Research, Extension and Marketing should be adequately qualified, competent and committed.

Effective programme formulation by MOA entails coordination not only among support agencies but also, more importantly, among its Research, Extension and Marketing divisions whose individual programmes should be complementary. Overall coordination could be effected through establishment of a multi/interdisciplinary team capable of respectively advising on policy matters and identifying and formulating/developing technological development programmes and projects for the agricultural sector.

Representing the workshop's major output, seven technological development programmes were formulated as follows:

1. Livestock
2. Non-traditional export fruit and exotic crops
3. Ground provisions and plantains
4. Grain and legume crops
5. Cut-flower and ornamentals
6. Vegetable crops
7. Traditional export crops.

The Editors

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# I. PROGRAMME

## **1. PRESENTATIONS**

- 1.1 **Government's Policy and Outlook on Agriculture (A .Antoine)**
- 1.2 **Institutional Framework for Programme Development (M. Noel)**
- 1.3 **Strengthening Agricultural Technology Generation and Transfer (C. Joseph)**
- 1.4 **Agricultural Technology Development Scheme (A. M. Pinchinat)**
- 1.5 **Grenada's Current Agricultural Extension Programme (O. Campbell)**
- 1.6 **Grenada's Current Agricultural Research Programme (C. Winsborrow)**

## **2. WORK GROUP SESSIONS**

- 2.1 **Crop Based Programmes**
- 2.2 **Livestock Based Programmes**

## II. PARTICIPANTS

**1. Ministry of Agriculture (MOA)**

1.1 P. Steele - Permanent Secretary

1.2 A. Antoine - Agricultural Planning Adviser

1.3 M. Noel - Planning Officer

1.4 E. Peters - Agricultural Engineer (Chairperson)

1.5 C. Winsborrow - Agricultural Officer

1.6 O. Campbell - Chief Extension Officer

1.7 S. Joseph - Deputy Chief Extension Officer

1.8 N. Burris - Agricultural Assistant

1.9 R. O'Neal - Agronomist

1.10 B. Nyack - Veterinarian

1.11 K. Rush - Livestock Officer

**2. Inter-American Institute for Cooperation on Agriculture (IICA)**

2.1 A. Pinchinat - Regional Specialist in Technology Generation and Transfer

2.2 C. Joseph - Agronomist



### **III. PRESENTATIONS**

### **3.1 Government's Policy and Outlook on Agriculture** (A. Antoine)

#### **3.1.1 Agricultural Policy**

**Agricultural Policy defined as: The framework of rules or principles (set by Government) within which planning, production and marketing are expected to take place and the overall objectives and goals set by the government are expected to be met by the agricultural sector.**

**The role of agriculture must be analysed to determine the extent to which Government has used that role as a basis for establishing its policy. The two basic roles of agriculture are:**

- 1) Food supply, and**
- 2) Foreign exchange earnings and savings.**

**Government's policy is designed to develop domestic agriculture in order to feed the nation and the tourists and thus save much needed foreign exchange. However, Government is also seeking to expand export agriculture so as to gain additional foreign exchange to adequately finance its public sector investment programme.**

**Government considers food security very important, but has not yet decided whether the priority for economic growth is on "foreign exchange earnings" or "foreign exchange savings."**

**There is a number of gaps in government's agricultural policy, especially in terms of translating policy to action.**

**Effective policy implementation depends on the amount of money Government is prepared to put in the sector. There must be consistency between policy and action. The problem probably lies with the manner in which the Ministry of Finance is structured, and the apparent weakness of the MOA in terms of its ability to press for funds to implement vital programmes. Resource allocation within the MOA is also a problem. MOA has not prioritized its projects, and has failed to actively involve the private sector in its activities.**

#### **3.1.2 Programmes**

##### **3.1.2.1 *Definition***

**There is no clear distinction between "programmes" and "projects." A programme may be considered as "a project with an indefinite life" or "a series of related projects designed to fulfill a definite end."**

##### **3.1.2.2 *Design***

**Agricultural sector programmes must be designed to satisfy policy objectives.**

### 3.1.2.3 *Monitoring and Evaluation*

The Ministry of Agriculture has fallen short with respect to programme monitoring and evaluation.

### 3.1.3 Government Policy Decisions

#### 3.1.3.1 *Employment*

Agriculture must be the sector to generate most employment.

#### 3.1.3.2 *Agro-industries*

The agricultural sector must contribute to raw material supply for the industrial sector.

#### 3.1.3.3 *Farm and Worker Productivity*

Agriculture must be the cradle for promoting the development of good management and good work ethics.

#### 3.1.3.4 *Economic Implications*

Agriculture is the backbone of the economy. If agriculture is not developed, then the country will be doomed to eternal poverty.

### 3.1.4 Bottlenecks Requiring Policy Decision

#### 3.1.4.1 *Praedial Larceny and Animal Damage*

A task force is probably needed to investigate the problem and offer workable solutions.

#### 3.1.4.2 *Lack of Incentives to Attract the Best Qualified People into Farming*

Government can use its land reform programme to attract skilled, qualified and willing people into agriculture. Since funding for these people may be a problem, Government may wish to create a special fund within the Industrial Development Corporation to support young farmers who should be encouraged into high-tech agriculture.

#### 3.1.4.3 *Ineffectiveness of the Marketing and National Importing Board*

The MNIB should be gradually privatised. Government should not be involved in activities which the private sector can efficiently undertake. It must instead use its institutions to provide back-up services to the private sector for the marketing of Grenada's agricultural produce.

## 3.2 Institutional Framework for Programme Development (M. Noel)

### 3.2.1 National Institutions

#### 3.2.1.1 *Department of Agriculture*

##### 3.2.1.1.1 Structure

DOA comprises five divisions:

- 1) Extension
- 2) Agronomics
- 3) Veterinary and Livestock
- 4) Agro-Services
- 5) Agro-Industry.

##### 3.2.1.1.2 Role

- (1) **The Extension Division** is mainly responsible for the acquisition, interpretation and dissemination of agricultural information for the purpose of farm and farm family development. It also undertakes farmer training activities.
- (2) **The Agronomic Division** is responsible for:
  - 1) soil and water conservation;
  - 2) introduction, testing and propagation of desirable crop cultivars;
  - 3) investigation of crops (especially vegetable and food cultivation practices); and
  - 4) crop pest and disease control.
- (3) **Veterinary and Livestock Division** is responsible for animal health and livestock development.
- (4) **Agro-Services Division** provides assistance to farmers and groups of farmers in the areas of farm mechanization and farm roads rehabilitation and maintenance.
- (5) **Agro-Industry Division** provides technical support to agro-industrial enterprises. This support includes training, product development, chemical and microbiological analyses, and other related activities.

#### 3.2.1.2 *Grenada Banana Cooperative Society*

##### 3.2.1.2.1 Structure

GBCS is a statutory body governed by a committee of management to which the Society's general manager is responsible. The Society's accounts are handled by a qualified accountant who reports to the general manager. Also reporting to the general manager are the respective heads of the Extension and Operations Divisions.

### 3.2.1.2.2 Role

- 1) Export marketing of Grenada's bananas.
- 2) Importation and distribution (sale) of farm inputs to GBCS members.
- 3) Provision of technical support, through the Society's Extension Service, to GBCS members.
- 4) Banana disease control.

### 3.2.1.3 *Grenada Cooperative Nutmeg Association*

#### 3.2.1.3.1 Structure

GCNA is a Statutory Body governed by a Board of Directors. There is a General Manager and a Secretary at Head Office. Managers of the Association's three Processing Stations report to the General Manager. Many nutmeg Receiving Stations are operated throughout the island. A clerk is responsible for each Receiving Station.

#### 3.2.1.3.2 Role

- 1) Export marketing of Grenada's nutmeg and mace.
- 2) Importation and distribution (sale) of fertilizers to GCNA members.

### 3.2.1.4 *Grenada Cocoa Association*

#### 3.2.1.4.1 Structure

GCA is a Statutory Body governed by a Board of Directors to which the General Manager reports. The Association operates three fermentaries (Processing Stations) each headed by a Manager who reports to the General Manager.

#### 3.2.1.4.2 Role

- 1) Export marketing of Grenada's cocoa.
- 2) Importation and distribution (sale) of fertilizers to GCA members.
- 3) Cocoa pest and disease control.

### 3.2.1.5 *Minor Spices Cooperative Marketing Society Ltd.*

#### 3.2.1.5.1 Structure

The Society is controlled by a Management Committee. It is administered by a Secretary/Manager who reports to the Management Committee.

#### 3.2.1.5.2 Role

Export marketing of all locally produced spices, except nutmeg and mace.

### **3.2.1.6 *Marketing and National Importing Board***

#### **3.2.1.6.1 Structure**

MNIB is a Statutory Body controlled by a government-appointed Board of Directors. There is a General Manager who reports to the Board. There is also a Deputy General Manager and a number of Divisional Managers all of whom report to the General Manager.

#### **3.2.1.6.2 Role**

- 1) Purchasing and handling of fresh fruits, vegetables and roots;
- 2) Export of fresh agricultural produce;
- 3) Importation and sale of selected basic consumer commodities.

### **3.2.1.7 *Grenada Development Bank***

#### **3.2.1.7.1 Structure**

GDB is run by a government-appointed Board of Directors to which the Bank's Manager is responsible. There are seven Agricultural Credit Officers and two Industrial Credit Officers. A Senior Loans Administration Officer reports directly to the Manager.

#### **3.2.1.7.2 Role**

- 1) Processing and distribution of loans;
- 2) Project supervision and appraisal.

### **3.2.1.8 *Model Farms Corporation***

#### **3.2.1.8.1 Structure**

MFC is governed by a Board of Directors. The General Manager is the chief executive of the Corporation. He has responsibility over the Corporation's Secretary and Financial Comptroller.

#### **3.2.1.8.2 Role**

- 1) Establishment of viable small farm units (model farms);
- 2) Maintenance, management and control of all state farms prior to their being sub-divided and distributed.

### **3.2.2 External Agencies**

#### **3.2.2.1 *British Development Division***

Funds local forestry projects.

#### **3.2.2.2 *Canadian International Development Agency***

Provides funding for the Cocoa Rehabilitation Project.

**3.2.2.3 *Caribbean Development Bank***

**Provides credit for the Model Farms Corporation Project**

**3.2.2.4 *European Economic Community***

**Funds the Moko Eradication Project. It also funds (partially) the reconstruction/ expansion of the Mirabeau Agriculture Training School.**

**3.2.2.5 *Food and Agricultural Organization***

**Funds two regional projects:**

- 1) Prevention of food losses through rodent control (headquartered in Grenada);**
- 2) Reduction of postharvest losses of fruits and vegetables entering inter-island trade (headquartered in Barbados)**

**FAO also funds a national Forestry Project and executes the Grenada Model Farms Project funded partially by UNDP. Additionally, it provides "project support" in the following areas:**

- 1) Agricultural Planning**
- 2) Agro-processing**
- 3) Fruit Crop Development**
- 4) Marketing**

**and gives material and training assistance to the Mirabeau Agricultural Training School.**

**3.2.2.6 *United Nations Development Programme***

**UNDP funds the Grenada Model Farms Project which is executed by FAO. It also provides "project support" to Grenada's Forestry Development Project.**

**3.2.2.7 *French Technical Mission***

**Funds the following activities**

- 1) Pineapple multiplication**
- 2) Livestock de-worming**
- 3) Establishment of livestock stud centres.**

**3.2.2.8 *United States Agency for International Development***

**USAID provides technical assistance to the Grenada Marketing and National Importing Board, and finances the HIAMP project. USAID also funds the Grenada Fruit Fly (Extension) Project.**

**3.2.2.9 *Inter-American Institute for Cooperation on Agriculture***

**IICA provides technical assistance to MOA in four of its five programme areas, through projects in the following programmes:**

- 1) Agriculture Policy Analysis and Planning;**
- 2) Technology Generation and Transfer;**

- 3) Organization and Management for Rural Development; and
- 4) Animal Health and Plant Protection.

3.2.2.10 *Caribbean Agricultural Research and Development Institute*

CARDI undertakes research and development activities on behalf of MOA. The areas covered include:

- 1) Forage (*Leucaena* and Guinea Grass) production;
- 2) Crop (pigeon pea and root crops) variety evaluation; and
- 3) Production of corn planting material.

Operating within CARDI is the Caribbean Agricultural Rural Development, Advisory and Training Service which provides technical assistance to small farmers, for growing and marketing their products.

3.2.2.11 *The University of the West Indies*

CAEP is responsible for training extension professionals in extension methodology. It also provides physical support facilities to MOA's extension staff.

3.2.2.12 *Windward Islands Banana Growers' Association*

WINBAN provides Grenada's banana industry with technical support in production/marketing based on its research and development programmes carried out at the WINBAN R&D Centre in St. Lucia.

3.2.2.13 *International Development Agency*

IDA funds the Agricultural Rehabilitation and Crop Diversification Project.

3.2.2.14 *Humanistic Institute for Cooperation with Developing Countries*

HIVOS provides partial funding for the expansion of the Mirabeau Agricultural Training School.

3.2.2.15 *Government of France*

The Government of France provides funding for the construction of the Mardigras Farmer Training Centre; also funds the Agricultural Marketing cooperatives.



### **3.3 Strengthening Agricultural Technology Generation and Transfer (C .Joseph)**

#### **3.3.1 Definitions**

Agricultural Technology refers to the scientific knowledge and techniques related to agriculture. It is generated through

- 1) validation research: conducted on farms in order to verify the validity of a particular technology, under farmers' real agro-ecological and socio-economic conditions;
- 2) adaptive research: undertaken to modify a technology to suit conditions different from those under which the technology was originally developed;
- 3) creative research: pursued to develop a new technology aimed at solving a particular problem, based on available techniques and scientific knowledge.

Agricultural technology is transferred effectively only when adopted by its intended users (farmers).

Extension, credit and marketing are the main tools used for the transfer of agricultural technology.

#### **3.3.2 Major Considerations**

##### **3.3.2.1 *Agricultural Technology Policy***

Based on Government's agricultural policy, the MOA must develop a general plan of action aimed at generating and transferring technologies required for successful implementation of the agricultural policy. This plan of action must indicate the programmes (crops and livestock) for which technologies need to be developed, and must also specify institutional responsibilities for technology generation and transfer. All technology generation and transfer activities should occur within the framework of the programmes in consonance with the agricultural policy. The foregoing clauses together constitute an Agricultural Technology Policy which is vital towards the strengthening of agricultural technology generation and transfer.

To be effective, the agricultural technology policy must include a number of clearly defined objectives and set goals, to be achieved through programmes.

A monitoring system must be established to ensure that the various institutions carry out their assigned responsibilities to achieve the set goals. This requires the definition of complementary roles for both the public and private sectors.

##### **3.3.2.2 *Linkages***

There must be an established institutional communications channel between the MOA and the support institution (local or external) for policy setting and research/extension, planning and management. There must also be mechanisms for operational coordination between research and extension and between the National Agricultural Technology Development System and the marketing and

**sectoral planning structures. This implies strong leadership roles in the areas of agricultural planning, research, extension and marketing. MOA's Planning Unit should facilitate the necessary coordination mechanism.**

**Establishment of a working team on Agricultural Technology headed by the Chief Technical Officer and comprising the leaders of research, extension, marketing and planning, can represent a most important linkage among MOA's functional components related to technology generation and transfer.**

**On an ongoing basis, policy makers must be kept informed of MOA's achievements, through its technology generation and transfer activities. This is likely to ensure strong political support for those activities and could result in increased budgetary allocations towards MOA's research and development activities.**

### 3.4 **Agricultural Technology Development Scheme (A. M. Pinchinat)**

#### 3.4.1 **Why Pursue the Technological Development of the Farming System?**

Agricultural Technology Development Policy (for Crops and Livestock) in Grenada should be framed so as to achieve the following results:

##### 3.4.1.1 *Outputs*

- 1) More productivity (yield) and better produce quality (for consumer satisfaction);
- 2) Lower relative cost of production and higher market competitiveness;
- 3) Stronger and sustained consumer demand (for secured markets and increased production);
- 4) Higher relative profits for farmers and dealers (traffickers, exporters);
- 5) Multiplier effect on lucrative employment;
- 6) Increased demand of technology by farmer (to dynamize the sector by repeating this cycle).

##### 3.4.1.2 *Effect*

Achievement of agricultural sector goals of enhanced export for greater foreign exchange earnings and reduced imports for greater foreign exchange savings and food security.

##### 3.4.1.3 *Impact*

- 1) Improved economy;
- 2) Increased well-being of the population;
- 3) Strengthening of socio-political stability.

##### 3.4.1.4 *Consequence*

Satisfaction of policy-makers (hopefully leading to more financial support to NARES for sustained agricultural technology development).

#### 3.4.2 **Who are the Players?**

The major direct participants in the process of technological development of agriculture are the following:

##### 3.4.2.1 *Motivated Producers*

Through

- 1) Secure markets;
- 2) Attractive prices;
- 3) Visible/satisfactory profits;

- 4) Continuous cash flow from production;
- 5) Participation in accrued/extra profits;
- 6) Easy access to services and physical infrastructure (credit, roads, technical support and the like);
- 7) Product security in the field.

#### 3.4.2.2 *Effective Extension Agents*

Through

- 1) Institutional capability and capacity to deliver to farmers technological advances (better cultivars/breeds, improved/larger quantities of agricultural inputs, improved production management techniques, modernized cultural practices and tools for farming as a profitable business);
- 2) Availability of validated technological information and materials (seed/ semen, agrochemicals, machinery), suited to specific farming system needs;
- 3) Improved methodology and means to deliver technical services to farmers (including farmer organization for production/marketing and effective/ efficient training programme/facilities for young/old farmers, using tools such as video, hand-outs and illustrated manuals, radio, TV and reciprocal farmer visits);
- 4) Participation/leadership in validation of technology (together with farmers and research service personnel).

#### 3.4.2.3 *Committed Research Personnel Responsible for:*

- 1) Technical assistance to extension and farmers in the validation and transfer of known technology;
- 2) Introduction and adaptation of available technology into the country;
- 3) Generation of currently unavailable technology for the particular needs of the local farming systems (especially through networking with other research/development and higher education institutions).

#### 3.4.3 How do we get Organized for Pursuing the Technological Development of the Farming Systems?

The relevant institutions for agricultural technology development in the country must play clear and complementary roles by discharging specific responsibilities as follows:

##### 3.4.3.1 *MOA/Extension/Research/Marketing/Planning Set-up*

- 1) Prioritize crop/livestock commodities for direct MOA research/extension support action, especially for those which are not covered by commodity bodies or large scale commercial ventures.

- 2) Provide technological support such as:
  - a) Extension of validated technology;
  - b) Validation of proposed technology (with CARDI/CARDATS, FAC, BDD);
  - c) Adaptation of potential technology (with CARDI, BDD);
  - d) Generation of unavailable technology (through networking with CARDI, BDD, CIAT, CIP, CIMMYT, AVRDC, AVRDC, CATIE, INRA, BSCBS, EMBRAPA, CEPLAC, UWI);
  - e) Training of farmers (with the assistance of CARDI/CARDATS, FAC, UWI, WINBAN).
- 3) Assume coordination/leadership/monitoring/evaluation of the NATDS.

#### 3.4.3.2 *Government-dependent Research/Development and Higher Education Institutions (CARDI/CARDATS, UWI)*

Assist the MOA in:

- 1) Validation, introduction and adaptation of available technology;
- 2) Generation of unavailable technology.

#### 3.4.3.3. *The Local Private Sector*

##### 3.4.3.3.1 Commodity Bodies (Banana, Nutmeg, Minor Spices, Cocoa and similar associations/societies or boards)

- 1) Provide extension services and agricultural inputs to farmers;
- 2) Conduct or support validation of technology;
- 3) Finance technology generation and adaptation (through CARDI, UWI, WINBAN, BSCBS, CATIE);
- 4) Participate with MOA in training of extension personnel and farmers.

##### 3.4.3.2.2 Non-Governmental Organisations and Banking Institutions (Local Farmer Organizations, External NGO, Banks)

- 1) Provide technical guidance, technological inputs and credit to farmers;
- 2) Teach farm management techniques to farmers;
- 3) Facilitate and fund farmer horizontal/reciprocal cooperation.

#### 3.4.3.4 *External Agencies*

Provide technical and financial support to NATDS.

#### 3.4.4 What are the Basic Operational Structures Needed for Action?

##### 3.4.4.1 *National Agricultural Advisory Council*

###### 3.4.4.1.1 Function

Advise the Minister of Agriculture on definition of sectoral policies.

#### 3.4.4.1.2 Composition

##### 1) Titular Participants

Representative of each of the most relevant national institutions for the development of the agricultural sector, comprising both private and public sector, led by MOA.

##### 2) Observers

- a) Technical Cooperation Agencies (IICA, CARDI, UWI, BDD, FAO); and
- b) Donor Agencies (CIDA, USAID, UNDP, FAC, IFAD, CDB, IADB, WB, EEC/EDF).

#### 3.4.4.2 *MOA Team on Agricultural Technology*

##### 3.4.4.2.1 Function

- 1) Set agricultural technology development policy and research/extension priorities;
- 2) Define and formulate crop/livestock development programmes;
- 3) Coordinate, lead, monitor, and evaluate NATDS programmes, projects and activities;
- 4) Promote and support participation of NATDS in regional and extra-regional network systems.

##### 3.4.4.2.2 Composition

- 1) CTO (Chairperson)
- 2) Planning Head
- 3) Marketing Leader
- 4) Extension Leader
- 5) Research Leader
- 6) Inter-Institutional Liaison Officer (Secretariat)
- 7) Advisory resource persons (one or two)

#### 3.4.4.3 *MOA Sub-team on Agricultural Technology*

##### 3.4.4.3.1 Function

To assume responsibility for the preparation of programme documents and the definition and formulation of projects within established programmes by TAT including identification of institutional responsibility for the implementation of projects.

##### 3.4.4.3.2 Composition

- 1) Extension Leaders (MOA, Commodity Board);
- 2) Research Leaders (MOA, CARDI, FAC, Commodity Boards);
- 3) Farmer Representatives (by commodity groups);
- 4) Consumer Representatives (Hotels, Restaurants, Consumer Associations, others);

- 5) **Marketing set-up Representatives (Supermarkets, Marketing Board, Traffickers, Association of Exporters, others).**

#### **3.4.4.4 *NARES Professionals in Participating Institutions***

##### **3.4.4.4.1 Function**

- 1) **Discharge assigned responsibility by competent authority, as requested by MOA, assuming needed resources and administrative backing are provided;**
- 2) **Account for NATDS performance through the monitoring an evaluation system established by the MOA.**

##### **3.4.4.4.2 Composition**

- 1) **Public/Government Dependent Institution professional staff;**
- 2) **Private/non government-Dependent Sector Personnel;**
- 3) **Cooperating External Agency Technical Staff.**

### **3.5 Current Agricultural Extension Programme (O. Campbell)**

#### **3.5.1 Constraints to Current Extension Programme**

##### **3.5.1.1 *Non Technological***

- 1) Deficient farm access road system;
- 2) Farm labour shortage;
- 3) Praedial larceny;
- 4) Livestock damage to crops;
- 5) Lack of coordination among the various divisions of the MOA;
- 6) Inadequate price and credit incentives to farmers;
- 7) Unsatisfactory extension staff working conditions;
- 8) Lack of farmers' organizations related to the non-traditional export crops.

##### **3.5.1.2 *Technological***

- 1) Inaccessibility of technological information to farmers and extension staff;
- 2) Lack of marketing intelligence information;
- 3) Shortage of planting material of desired cultivars.

#### **3.5.2 Programme Objectives**

- 1) To increase production and productivity of selected agricultural crops and livestock;
- 2) To promote increased consumption of locally produced foods such as fresh vegetables and fruits, thereby creating an expanded domestic market;
- 3) To raise the level of management skills among farmers, backyard gardeners and 4-H members;
- 4) To improve the professional skills of extension personnel to provide better service to the farming community;
- 5) To encourage farmers' participation in MOA's Agricultural Diversification Programme;
- 6) To encourage young people into agriculture.

#### **3.5.3 Programme Strategy**

- 1) Identification of lucrative markets for framers' produce;
- 2) Improvement in the quality of crop produce for export using appropriate harvesting, grading and packaging techniques;
- 3) Repairing farm roads through self-help projects involving farmers;



- 4) Helping farmers to become organized;
- 5) Providing farmers with adequate quantities of high quality planting materials of desired cultivars and promoting the use of recommended cultural practices;
- 6) Coordinating activities of all Extension Services in the Country;
- 7) Working along with regional and international agricultural agencies;
- 8) Training extension agents in Farm Planning techniques;
- 9) Encouraging farmers to accept and implement farm planning and management techniques.

### 3.5.4 Major Programme Elements

#### 3.5.4.1 *Food Production*

##### 3.5.4.1.1 Food crops (for domestic use and export)

Improve and expand production of tannia, sweet potato, yam, ginger and breadfruit.

##### 3.5.4.1.2 Green and yellow vegetables (for domestic and tourist consumption)

Expand production to satisfy local demand.

#### 3.5.4.2 *Major crops*

##### 3.5.4.2.1 Cocoa, nutmeg and banana

Resuscitate old fields.

##### 3.5.4.2.2 Avocado, mango, golden apple, sour sop, sugar apple and paw paw

Expand existing acreages.

##### 3.5.4.2.3 Cut flowers and ornamentals

Improve and expand commercial production.

#### 3.5.4.3 *Sugar Cane*

Encourage production of sugar for industrial use.

#### 3.5.4.4 *Livestock Promotion*

Improve genetic stock, and encourage livestock producers to satisfy local demand for milk, meat and eggs.

#### 3.5.4.5 *Farmers Education*

#### 3.5.4.6 *Training*

##### 3.5.4.6.1 For extension staff

### 3.5.4.6.2 For farmers

### 3.5.5 Planned Activities

- 1) Farm visits
- 2) Organized field tours
- 3) Organizing farmers' groups
- 4) Liaising with marketing institutions
- 5) Inservice training for extension staff
- 6) Soil conservation
- 7) Farm management
- 8) Farm plan preparation
- 9) Field demonstrations
- 10) Monitoring crop pests and diseases
- 11) Assisting farmers to prepare for crop competition

### 3.5.6 Institutions Supporting MOA's Extension Programme

#### 3.5.6.1 *CARDI*

It provides extension agents with requested information on problems encountered in the field. Extension agents participate in CARDI'S on-farm trials. Also, through CARDATS, it provides technical support to extension agents by its subject-matter specialists.

#### 3.5.6.2 *FAO*

It responds to some of the training needs of extension agents.

#### 3.5.6.3 *FTM*

The mission provides material and technical support to the extension service. It also assists extension agents in organizing small farmers.

#### 3.5.6.4 *GBCS*

It provides relevant resource personnel for extension training activities.

#### 3.5.6.5 *GFNC*

It assists the MOA in demonstration activities.

#### 3.5.6.6 *IICA*

It provides technical support to the MOA

#### 3.5.6.7 *UWI*

Through its Caribbean Agricultural Extension Project provides technical and material support to the Extension Service system.

### 3.6 **Current Agricultural Research Programme (C. Winsborrow)**

#### 3.6.1 **Major Participating Research Institutions**

- 1) MOA;
- 2) CARDI;
- 3) WINBAN; and
- 4) FTM.

#### 3.6.2 **Areas Researched**

##### 3.6.2.1 *By MOA*

- 1) Fruit crops (mango, soursop, avocado, guava)
- 2) Sugar Cane
- 3) Cocoa (through Cocoa Rehabilitation Project)
- 4) Vegetables, (carrot, cabbage, cauliflower, broccoli, tomato, musk melon, garlic, pumpkin)
- 5) Roots (sweet potato, yam)
- 6) Cut-flowers (ginger lily)

##### 3.6.2.2 *By CARDI*

- 1) Cassava
- 2) Pigeon pea
- 3) Carrot
- 4) Aroids (tannia, dasheen and eddo)
- 5) Cropping systems
- 6) Corn
- 7) Sweet potato
- 8) Legumes (red kidney bean, black-eye bean, African red bean, French bean)
- 9) Pests and diseases in cocoa and nutmeg
- 10) Livestock protein energy sources.

##### 3.6.2.3 *By WINBAN*

Pesticides (banana).

##### 3.6.2.4 *By FTM*

Pineapple.

#### 3.6.3 **Research Achievements**

##### 3.6.3.1 *By MOA*

- 1) New fruit crop varieties introduced (mango, avocado, guava);

- 2) New sugar cane varieties introduced and tested;
- 3) New cocoa hybrids introduced from Turrialba;
- 4) Nutrient requirement of cocoa determined, and traditional cocoa fertilizer (N.P.K. – 12:8:24) replaced by new type (N.P.K. – 16:16:16);
- 5) Vegetable crop varieties (5 of carrot, 2 of cauliflower, 2 of musk melon, 7 of tomato, 4 of cabbage and 1 each of garlic and broccoli) introduced and tested;
- 6) Negative effect of shade on rate of flowering of ginger lily established;
- 7) Local pumpkin "varieties" selected for taste, yield and seed production.

#### 3.6.3.2 By *CARDI*

- 1) Cassava germplasm bank established;
- 2) Imported cassava varieties evaluated; high-yielding varieties multiplied and distributed to farmers;
- 3) Pigeon pea germplasm bank established;
- 4) A "superior type" of pigeon pea selected and popularised among small farmers;
- 5) Technological package for carrot production developed (on-farm and on-station evaluation on going);
- 6) Technological package for tannia developed in relation to two local selections (Marble and John Swift);
- 7) Most economical cropping systems identified: corn/sweet potato; carrot/chive; legume/tannia;
- 8) Most productive corn variety identified: yellow opaque prism, population 61 and population 66;
- 9) Sweet potato germplasm bank established;
- 10) Causal agent of nutmeg wilt disease identified as *Rosellinia pepo*;
- 11) *Leucaena* and guinea grass varieties introduced and established in various locations for performance evaluation.

#### 3.6.3.3 By *WINBAN*

New herbicides, fungicides, insecticides and nematocides introduced. This has resulted in more effective banana pests and disease control which has impacted positively on overall crop yields and, in particular, marketable yields.

#### 3.6.3.4 By *FTM*

- 1) Three pineapple varieties (smooth Cayenne, Queen and Antigua Black) introduced;
- 2) Pineapple multiplication.

## IV. GROUP REPORTS

The Workshop Group proposed seven Technological Development Programmes for the MOA, with programme components tentatively grouped and ranked, objectives defined and responsibilities identified.

#### 4.1 Technological Development Programmes and Component Groups

##### 4.1.1 Livestock (TDP-1)

Group	Commodity	Group	Commodity
1	Swine (porcine)	4	Sheep (ovine)
2	Silage		Goat (capine)
	Hay	5	Cattle (bovine)
3	By-product feeds		
	Poultry		

##### 4.1.2 Non-Traditional and Exotic Export Fruit Crops (TDP-2)

Group	Commodity	Group	Commodity
1	Pineapple	5	Breadfruit
	Pawpaw		
	Passion Fruit	6	Lime
2	Mango		Golden apple
			Sugar apple
3	Avocado	7	Carambola
	Soursop		Tamarind
4	Sorrel		
	Sapodilla		

##### 4.1.3 Ground Provisions and Plantains (TDP-3)

Group	Commodity	Group	Commodity
1	Yam	2	Cassava
	Tannia		Plantain
	Sweet potato		Dasheen
	Eddo		

4.1.4 Grain and Legume Crops (TDP-4)

Group	Commodity	Group	Commodity
1	Peanut	2	Pigeon pea Corn Dry bean Sesame

4.1.5 Cut-flowers and Ornaments (TDP-5)

Group	Commodity	Group	Commodity
1	Ginger lily Heliconia Foliage plants	2	Anthurim

4.1.6 Vegetable Crops (TDP-6)

Group	Commodity	Group	Commodity
1	Carrot Tomato Pumpkin Cabbage Eggplant Hot pepper Watermelon Salad bean Christophene	2	Zuchini
		3	Cauliflower Broccoli Muskmelon

4.1.7 Traditional Export Crops (TDP-7)

Group	Commodity	Group	Commodity
1	Nutmeg Minor spices Coconut	2	Cocoa Banana Sugar cane

## **4.2 Programme Objectives**

Objectives of the seven Technological Development Programmes must relate to export enhancement and/or import reduction.

### **4.2.1 Export Enhancement**

Of the seven programmes, four (TDPs – 2, 3, 5 and 7) are heavily export oriented. For these programmes, emphasis will be placed on:

- 1) timely production of large quantities of top quality produce at minimum costs; and
- 2) Securing traditional markets and finding additional and more lucrative ones.

### **4.2.2 Import Reduction**

The remaining TDPs (1, 4 and 6) are geared primarily towards satisfying local consumption needs, including those of the growing tourist sector. Successful implementation of these programmes will result in considerable foreign exchange savings.

## **4.3 Responsibility for Programmes**

MOA will continue to have overall responsibility for all programmes. However, direct responsibility for programmes' implementation is assigned to MOA as well as other locally based institutions.

### **4.3.1 Direct Responsibility of MOA**

MOA will have total direct responsibility for implementing six programmes (TDPs - 1 to 6).

### **4.3.2 Direct Responsibility of "Other Institutions"**

Within TDP-7, formation of a Coconut Growers' Association with responsibility for the coconut industry is being considered by MOA through the ARCDP. The other components within the Traditional Export Crops Programme are already the responsibility of the respective Commodity Associations.



## V. RECOMMENDATIONS

- 5.1 **There should be clear policy decisions on:**
- 1) **Praedial larceny;**
  - 2) **Incentives to attract qualified, skilled and committed youths into farming;**
  - 3) **The Marketing and National Importing Board.**
- 5.2 **The Department of Agriculture should be functionally reorganized based on suggestions included in the joint MOA/IICA National Agricultural Technology Development System draft report.**
- 5.3 **MOA'S Technology Development Programmes should provide the framework within which all external support agencies must operate. Local technical operations of those agencies should be adequately monitored.**
- 5.4 **MOA'S Technology Generation and Transfer Activities should be designed to produce short-term (measurable) results to be communicated to Policy Makers on a regular basis.**
- 5.5 **Livestock Development Activities should be an important component of the Extension Division's Work Programme.**
- 5.6 **Capabilities of Existing Commodity Associations must be strengthened, and formation of new ones should be actively encouraged and promoted.**



FECHA DE DEVOLUCION			

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