



FIRST REGIONAL OECS VEGETABLE DEVELOPMENT PROJECTS WORKSHOP

July 4 - 6, 1990
St. John's, Antigua and Barbuda

PROCEEDINGS

IICA
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90/002

Agricultural Diversification Coordinating Unit (ADCU)
French Mission for Cooperation (FMC)
Inter-American Institute for Cooperation on Agriculture (IICA)
Ministry of Agriculture Antigua and Barbuda (MOAA)

WHAT IS IICA?

The Inter-American Institute for Cooperation on Agriculture (IICA) is the specialised agency for agriculture of the inter-American system. The Institute was founded on October 7, 1942, when the Council of Directors of the Pan American Union approved the creation of the Inter-American Institute of Agricultural Sciences.

IICA was founded as an institution for agricultural research and graduate training in tropical agriculture. In response to changing needs in the hemisphere, the Institute gradually evolved into an agency for technical cooperation and institutional strengthening in the field of agriculture. These changes were officially recognised through the ratification of a new Convention on December 8, 1980. The Institute's purposes under the new Convention are to encourage, facilitate and support cooperation among its thirty one Member States, so as to better promote agricultural development and rural well-being.

With its broader and more flexible mandate and a new structure to facilitate direct participation by the Member States in activities of the Inter-American Board of Agriculture and the Executive Committee, the Institute now has a geographic reach that allows it to respond to needs for technical cooperation in all of its Member States.

The contributions provided by the Member States and the ties IICA maintains with its twelve Permanent Observer Countries and numerous international organisations provide the Institute with channels to direct its human and financial resources in support of agricultural development throughout the Americas.

The 1987-1991 Medium Term Plan, the policy document that sets IICA's priorities, stresses the reactivation of the agricultural sector as the key to economic growth. In support of this policy, the Institute is placing special emphasis on the support and promotion of actions to modernise agricultural technology and strengthen the processes of regional and subregional integration.

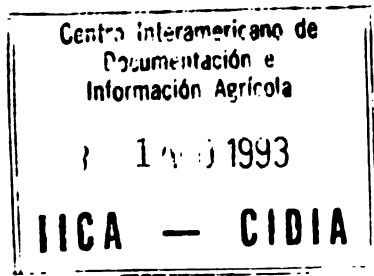
In order to attain these goals, the Institute is concentrating its actions on the following five programmes: Agricultural Policy and Planning; Technology Generation and Transfer; Organization and Management for Rural Development; Marketing and Agro-industry; and Animal Health and Plant Protection.

These fields of action reflect the needs and priorities established by the Member States and delimit the areas in which IICA concentrates its efforts and technical capacity. They are the focus of IICA's human and financial allocations and shape its relationship with other international organisations.

The Member States of IICA are: Antigua and Barbuda, Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominica, the Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, the United States of America, Uruguay and Venezuela.

The Permanent Observer Countries of IICA are: The Arab Republic of Egypt, Austria, Belgium, the Federal Republic of Germany, France, Israel, Italy, Japan, Netherlands, Portugal, the Republic of Korea and Spain.

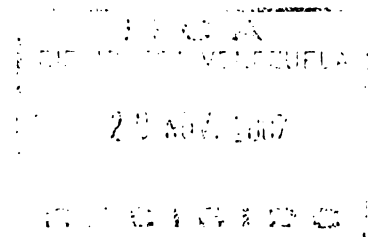




IICA



IICA-CIDIA



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Compiled by:
Antonio M. Pinchinat

IICA OFFICE IN ANTIGUA AND BARBUDA

LIST OF ACRONYMS AND ABBREVIATIONS

AAI	Assistant Agricultural Instructor
ADB	Agricultural Development Bank
ADCU	Agricultural Diversification Coordinating Unit
AREP	Agricultural Research and Extension Project
AVT	Agricultural Venture Trust
BDD	British Development Division
CARDI	Caribbean Agricultural Research and Development Institute
CATCO	Caribbean Agricultural Trading Company Ltd.
CATM	Chinese Agricultural Technical Mission
CDB	Caribbean Development Bank
CFDC	Caribbean Farmers Development Company
CIDA	Canadian International Development Agency
CIRAD	Centre for International Cooperation in Agricultural Research for Development
CRAAG	Centre for Agronomic Research Antilles-Guyane
CTA	Centre for Agricultural and Rural Cooperation
EAS	Economic Affairs Secretariat
ECCEB	Eastern Caribbean Central Bank
ECLAC	Economic Commission for Latin America and the Caribbean
EEC	European Economic Community
ECSEDA	Eastern Caribbean States Export Development Agency
FAO	Food and Agriculture Organisation of United Nations
FMC	French Mission for Cooperation
FO	Farmer Organisation
GIS	Government Information Service
HIAMP	High Impact Agricultural Marketing and Production
IICA	Inter-American Institute for Cooperation on Agriculture
IFAD	International Fund for Agricultural Development (Italy)
INRA	National Institute of Agronomic Research (Guadeloupe)
IRAT	Tropical Agronomic and Horticultural Research Institute (France)
IRD	Integrated Rural Development Project
MB	Marketing Board
MOA	Ministry of Agriculture
MOAA	Ministry of Agriculture Antigua and Barbuda
MOAD	Ministry of Agriculture Commonwealth of Dominica
MOAG	Ministry of Agriculture Grenada
MOAL	Ministry of Agriculture Saint Lucia
MOASVG	Ministry of Agriculture St. Vincent and the Grenadines
NAAC	National Agricultural Advisory Council
NDB	National Development Bank
NDF	National Development Foundation
NGO	Non-Government Organisation
OAS	Organisation of American States
OECS	Organisation of Eastern Caribbean States
PCB	Pesticides Control Board
ROC	Republic of China (Taiwan)

SAPISE Society for the Development of the Irrigated Perimeter of the South
East (Martinique)
SFAD Small Farmer Agricultural Development Project
SLMB Saint Lucia Marketing Board
TREDU Training Research and Extension Development Unit
TROPRO Tropical Produce Support Project
UNDP United Nations Development Programme
USAID United States Agency for International Development
USVI United States Virgin Islands
UWI University of the West Indies
WINBAN Windward Islands Banana Growers' Association

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	C. George		
	A. M. Pinchinat (Secretary)		
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1. INTRODUCTION
Antonio M. Pinchinat
Organising Committee Secretary

1. INTRODUCTION

1. THE PROBLEM

The Organisation of Eastern Caribbean States has been spending its scarce foreign exchange to pay for imports of vegetable commodities which could be produced locally, at reasonable costs. Local, regional or international market opportunities are often lost due to insufficient quantities or sub-standard quality of those vegetables currently produced in the sub-region. These constraints, linked to erratic production/ marketing planning, technological weaknesses and inadequate support services have hampered production/marketing development of vegetables as projected in national agricultural diversification programmes.

2. WORKSHOP OBJECTIVES

The Workshop's major objectives were to:

- 2.1 Review technological and non-technological constraints, including organisational and managerial issues, to vegetable production/marketing development in the OECS.
- 2.2 Assess the current state of public and private sector support to vegetable production/marketing development, especially regarding policy setting, technology development and transfer, and the provision of general services, including the organisation of farmers.

- 2.3 Identify regional priority areas for technical and financial cooperation in the production and marketing of selected vegetables which meet both current and prospective demands.

3. WORKSHOP OUTPUTS

The Workshop was aimed at achieving the following main results:

- 3.1 Improved understanding of political, organisational, managerial, technological and non-technological constraints to the development of vegetable production/marketing in the sub-region.
- 3.2 Joint recommendations to address the constraints.
- 3.3 Establishment of sustainable regional cooperation networks to facilitate the application of the recommendations.

4. OECS TARGET BENEFICIARIES

Principal target beneficiaries of the results of the Workshop were identified as follows:

- 4.1 Farmers
 - 1) Organised
 - 2) Individual

- 4.2 Ministry of Agriculture Professionals**
- 1) National Vegetable Development Programme Coordinators and Project Leaders (Research/Extension)
 - 2) Marketing specialists

4.3 Cooperating Entities

Organisations, agencies or enterprises involved in supporting politically, technically or financially, vegetable production/marketing development in the OECS.

5. INVITED PARTICIPANTS

Official invitations to participate in the Workshop were sent by the Permanent Secretary in the Ministry of Agriculture of Antigua and Barbuda to the following groups:

5.1 Farmer Organisations

- 5.1.1 Antigua and Barbuda
- 5.1.2 Dominica
- 5.1.3 Grenada
- 5.1.4 Saint Lucia
- 5.1.5 St. Vincent and the Grenadines
- 5.1.6 Others

5.2 Ministries of Agriculture

- 5.2.1 Antigua and Barbuda
- 5.2.2 British Virgin Islands
- 5.2.3 Dominica
- 5.2.4 Grenada
- 5.2.5 Montserrat
- 5.2.6 St. Kitts and Nevis
- 5.2.7 Saint Lucia
- 5.2.8 St. Vincent and the Grenadines

5.3 International, Regional, Bilateral and National, Public and Private Cooperating Entities

- 5.3.1 United Nations Development Programme/Food and Agriculture Organisation
- 5.3.2 International Fund for Agricultural Development
 - 1) Dominica Integrated Rural Development Project
 - 2) Saint Lucia Small Farmer Agricultural Development Project
- 5.3.3 Inter-American Institute for Cooperation on Agriculture
 - 1) Farmer Organisation Project
 - 2) OECS Office Representation
 - 3) Organisation and Management of Technology Generation and Transfer Project
 - 4) Plant Protection Project
- 5.3.4 United States Agency for International Development/Agricultural Venture Trust
- 5.3.5 Caribbean Agriculture Research and Development Institute
- 5.3.6 University of the West Indies
- 5.3.7 OECS Agricultural Diversification Coordinating Unit
- 5.3.8 Caribbean Farmers Development Company

- 5.3.9 Chinese Agricultural Technical Mission (Taiwan)
- 1) St. Kitts and Nevis
 - 2) St. Vincent and the Grenadines
- 5.3.10 French Mission for Cooperation
- 1) INRA/CRAAG (Guadeloupe)
 - 2) IRAT/CIRAD (Martinique)
 - 3) Rural Development Projects Regional Co-ordination (Saint Lucia)
 - 4) SAPISE/Irrigation (Martinique)
 - 5) TREDU Cooperants (Grenada, Saint Lucia, and St. Vincent and the Grenadines)
- 5.3.11 Marketing Agencies
- 1) The Antigua Central Marketing Corporation
 - 2) Caribbean Agricultural Trading Company
 - 3) Dominica Export Import Agency
 - 4) Grenada Marketing and National Importing Board
 - 5) Saint Lucia Marketing Board

Organising Committee representing the following four Sponsoring Institutions:

- 1) ADCU : C. Bully
- 2) FMC : P. Dierickx
- 3) IICA : A. M. Pinchinat
(Secretary)
- 4) MOAA : F. Henry
(Chairperson)

The Committee's Secretariat was based at the IICA office, Saint Lucia. It produced this Proceedings document, from original drafts as submitted by authors, with some minor editorial corrections on form before printing.

6. SPONSORING INSTITUTIONS

The Workshop was technically and financially sponsored by the following institutions:

- 6.1 ADCU
- 6.2 FMC
- 6.3 IICA (Co-host)
- 6.4 MOAA (Host)

7. ORGANISING COMMITTEE

The Workshop was planned and managed by an inter-institutional

2. TECHNICAL PROGRAMME

WEDNESDAY, JULY 4 1990

1. **OPENING CEREMONY**

- MOAA, F Henry*

0830 : 0835	1.1	MOAA (F. Henry)
0835 : 0840	1.2	ADCU (C. Bully)
0840 : 0845	1.3	FMC (P. Dierickx)
0845 : 0850	1.4	IICA (F.C. Alexander)
0850 : 0900	1.5	MOAA (Hon. Minister for Agriculture, Antigua and Barbuda, Hilroy Humphreys)

0900 : 0915 Change Over

2. **REGIONAL OVERVIEW**

- CARDI, J Ross*

0915 : 0945	2.1	IRAT/CIRAD (P. Daly)
0945 : 1015	2.2	INRA/CRAAG (G. Anais)
1015 : 1045	2.3	CARDI (F. Chandler)
1045 : 1100	Break	
1100 : 1115	2.4	USAID/AGRIDEV (A. Azinkot)
1115 : 1130	2.5	SFAD/St Lucia (S. Best)
1130 : 1145	2.6	IFAD/Dominica (A. Stephenson)
1145 : 1200	2.7	IICA (J. La Gra)
1200 : 1215	2.8	SAPISE (B. Cadic)
1215 : 1230	2.9	Discussions
1230 : 1330	Lunch	
1330 : 1400	2.10	ROC (Ben S.P. Lin/D.F. Yen)
1400 : 1430	2.11	AVT (D. Boyce)
1430 : 1500	2.12	CATCO (L. Rose)
1500 : 1530	2.13	ADCU (C. Bully)
1530 : 1545	Break	
1545 : 1700	2.14	Discussions
1700 : 1715	Break	

WEDNESDAY JULY 4 1990 - continued

- 1715 : 1900 Brainstorming on Production/Marketing by three Work Groups:
- GROUP 1. Farmer Organisation (J. La Gra)
GROUP 2. Technology Generation and Transfer (R. O'Neale)
GROUP 3. Marketing (A. Satney)

THURSDAY, JULY 5

3. COUNTRY REPORTS

- UWI (S.C. Barker)*

- 0830 : 0845 3.1 Antigua and Barbuda (R. George)
0845 : 0900 3.2 Dominica (W. Magloire)
0900 : 0915 3.3 Grenada (R. O'Neale)
0915 : 0930 3.4 Saint Lucia (G. James)
0930 : 0945 3.5 St. Vincent and
 the Grenadines (A. Cain)
0945 : 1100 3.6 Others (FMC/Dominica, FMC/Saint
 Lucia, MOA/St. Kitts and Nevis,
 MOA/Montserrat, MOA British Virgin
 Islands)

1100 : 1115 Break

4. IDENTIFICATION AND PRIORITIZATION OF PRODUCTION /MARKETING CONSTRAINTS BY COUNTRY

- ADCU (C. Bully)*

- 1115 : 1230 Discussions
1230 : 1330 Lunch

5. WORK GROUPS SESSIONS**

- IICA (A.M. Pinchinat)*

- 1330 : 1600 5.1 Regional Work Programme
1600 : 1700 5.2 Regional Networking Scheme
1700 Adjourn

FRIDAY, JULY 6 1990

6. FIELD TRIP

- MOAA (C. Samuel)*

0800	6.1	Leave Hotel
0830 : 0915	6.2	Vincent Sterling's Farm at Bethesda -Irrigation Farming
0930 : 1000	6.3	Diamond's Irrigation Project - People's Republic of China Mission
1010 : 1100	6.4	Winston Luke at Sanderson's - Rainfed Farming
1100 : 1130		Refreshments
1130 : 1200	6.5	Greencastle Agriculture Station
1215 : 1300	6.6	Marketing Facilities
1300 : 1400		Lunch

7. RECOMMENDATIONS

- MOAA (F Henry)*

1400 : 1500	7.1	Group Report Presentations
1500 : 1600	7.2	Discussion of Recommendations from Group Reports

8. CLOSING SESSION

- MOAG (R. O'Neale)*

1600 : 1610	8.1	Vote of Thanks (Farmers' Representative)
1610 : 1630	8.2	Conclusions and Closing Remarks (F. Henry)

* Session Chairperson

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1. Farmer Organisation
2. Technology Generation and Transfer
3. Marketing

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4. SUMMARY OF WORKSHOP RECOMMENDATIONS

Subcommittee:

- G. Alcee
- E. Flood
- C. George
- A. M. Pinchinat
- J. Rickards

At the Recommendations Plenary Session, Workshop participants agreed on the appointment of a small (five person) inter-institutional/inter-disciplinary Recommendations Sub-committee drawn from those present at that session to harmonize and condense the separate Group Recommendations Reports.

The Sub-committee comprised:

- George Alcee
MOAL, Marketing,
(Member)
- Effery J Flood
SLMB, Marketing (Member)
- Calistus George
Sunshine Harvest
Cooperative, Saint
Lucia, Farmer
Organisation (Member)
- Antonio M Pinchinat
IICA, Technology
Generation and Transfer,
(Secretary)
- Josephine Rickards,
Sunshine Harvest
Cooperative, Saint
Lucia, Farmer
Organisation (Member)

The Sub-committee carried out its task in close collaboration and consultation with the Workshop Organising Committee. After analyzing the three sets of Workgroup Recommendations, the recommendations Sub-committee summarised the Workshop recommendations as follows: by problem area, key constraints, responsible institutions and resource entities

The problems fell into three main categories;

1. Services
2. Technology Development and Transfer
3. Policy

PROBLEM 1. - SERVICES

CONSTRAINT	RECOMMENDATIONS	RESPONSIBLE INSTITUTION Resource Entities
1.1 Lack of adequate and suitable transportation within the region and from the region to extra-regional markets	1.1.1 Study the economic/technical feasibility of assigning new island shipping vessels and international air cargo space for extra-regional marketing	CFDC CATCO, GEEST, MB, USAID, ADCU, AVT, Commercial Airlines, Entrepreneurs
	1.1.2 Request AVT to coordinate with CFDC in developing a project to finance refrigerated vessels	
1.2 Insufficient access of farmers to proper packaging materials	1.2.1 Conduct inventory of needs and alternative sources/costs of packaging materials	CFDC ADCU, CATCO, FO, EXCEDA, MB, Exporters, Producers and Marketers of Packing Materials
	1.2.2 Coordinate purchase and distribution of packaging	
	1.2.3 Establish effective labelling of packages	
1.3 Inadequate and untimely information for decision making on supply of produce and marketing opportunities	1.3.1 Develop production information system on crops to forecast	ADCU CFDC, FO, MOA, CATCO, MB,
	1.3.2 Publish export/imports statistics of produce to monitor and assist diversification efforts in each country	EXCEDA, CARDI, IICA, Statistics
	1.3.3 Develop and disseminate market information	

CONSTRAINT	RECOMMENDATIONS	RESPONSIBLE INSTITUTION Resource Entities
1.4 Difficulty encountered by farmers in obtaining payment for produce sold	1.4.1 Identify reliable importers 1.4.2 Establish relations with reliable exporters and/or importers 1.4.3 Promote and develop use of export marketing fund for trial shipment	CFDC ADCU, CATCO, EXCEDA, MOA, MB, Exporters/Importers Associations, Banks
1.5 Insufficient equipment to facilitate production	1.5.1 Develop projects for small equipment schemes in each island (e.g. based upon MOA Saint Lucia "Small Equipment Project Model)	CFDC ADCU, MOA, FO, UWI, IICA, FAO, NDF, CARDI, Donors, Banks
1.6 Inadequate and uneconomic access of farmers to irrigation water	1.6.1 Carry out inventory of irrigation needs: provide technical assistance in formulation of irrigation projects and seek financial assistance for execution of projects	ADCU CFDC, MOA, UWI, CARDI, FO, IICA, Donors, French Mission, Chinese Missions
1.7 Insufficient engineering services	1.7.1 Provide adequate and efficient engineering services on a timely basis to facilitate vegetable production through; <ul style="list-style-type: none"> - better planning of services - proper maintenance of equipment - keeping adequate supply of spare parts - training of engineers, technicians, equipment operators - and storekeepers 	CFDC MOA, ADCU, CARDI, UWI NDF, FAO, FO,

CONSTRAINT	RECOMMENDATIONS	RESPONSIBLE INSTITUTION Resource Entities
1.8 Poor mechanisms for training/ educating of farmers in business organisation and marketing skills	1.8.1 Assess needs of FO, design training programme, identify access human and financial resources and implement training	CFDC NDF, CARDI, UWI, IICA, ADCU, IRAT, INRA, CATCO, MB, MOA, Donors
1.9 Laxed marketing certification system for vegetable export	1.9.1 Improve or establish certifi- cation system in each country for export marketing to look after phyto-sanitary and quality standards by implementing valid quality standard require ments for export	ADCU MOA, CFDC, CARDI, UWI, IICA, PCB, Marketing Agencies, Exporters, Standard Offices

PROBLEM 2. - TECHNOLOGY DEVELOPMENT AND TRANSFER

CONSTRAINT	RECOMMENDATIONS	RESPONSIBLE INSTITUTION Resource Entities
2.1 Poor production management	2.1.1 Train farmers on farm management and environmental protection	CFDC UWI, INRA, IRAT, ACDU,
	2.1.2 Promote and train extension personnel/farmers in farm record keeping	MOA, MDF, IICA, WINBAN, CARDI, French Mission, Chinese Missions
	2.1.3 Improve integration efforts of CARDI, WINBAN, UWI, IICA, MOA, the French Mission and Chinese Missions through cooperation in conducting demonstration plots, field visits, seminars, workshops, video presentations and other farmer training events	
	2.1.4 Programme and implement extension personnel/farmer training on improved (sustainable) cultural practices (especially integrated pest management, irrigation, harvesting and safe use of pesticides) especially through:	
	2.1.5 disseminate technological materials (fact sheets, audio-visuals, tech packs)	

CONSTRAINT	RECOMMENDATIONS	RESPONSIBLE INSTITUTION Resource Entities
2.2 High level of postharvest losses	2.2.1 Introduce field packing where feasible and increase farmer access to field crates for harvesting	CFDC AVT, FO, NDF, MOA, CARDI, UWI, IICA, French Mission CATCO, INRA, IRAT, ACDU,
	2.2.2 Train farmers in proper time/ methods of harvesting crops	Chinese Missions
	2.3.3 For those crops which need to be stored: 1. determine proper storage techniques and facilities 2. study economic feasibility of storage 3. design storage facilities 4. formulate and implement storage projects	
	2.2.4 Identify potential for agro-processing (semi-processing); carry out feasibility study of cottage (small scale) processing ventures	
	2.2.5 Train farmers and helpers in proper methods of postharvest handling, including washing, grading, packaging, stacking and farm-to-market transport techniques	
2.3 Scarcity, unreliability, unproductivity and high cost of labour	2.3.1 Encourage and support farmers to mechanize where economically and environmentally feasible; improve farm management systems and train workers	CFDC MOA, FO, CARDI, UWI, IICA, ADCU, Donors

CONSTRAINT	RECOMMENDATIONS	RESPONSIBLE INSTITUTION Resource Entities
2.4 Inadequate diagnostic/testing support (pests, plants, soils, water)	<p>2.4.1 Put in place mechanisms to improve utilization of existing regional Laboratories</p> <p>2.4.2 Improve local laboratory capabilities in OECS Member Countries (e.g. a simple testing laboratory in each country)</p> <p>2.4.3 Improve diagnostic capability through</p> <ol style="list-style-type: none"> 1. compiling directory of resource institutions and personnel 2. establishment of systems to transfer <ol style="list-style-type: none"> i. samples ii. results 	<p>IICA</p> <p>UWI, USVI, INRA, IRAT, FAO, MOA, ADCU, UPR, WINBAN, CARDI</p>
2.5 Inadequate flow of information from Research/Extension Organisations to farmers and of feedback mechanisms from the farmers to those organisations	<p>2.5.1 Assign Extension Officers to farmer organisations (e.g. as done in Saint Lucia with Sunshine Harvest and STAFCO-OP structure extension systems to respond to real needs of farmers</p> <p>2.5.2 Introduce task force approach (inter-institutional action) production/marketing management</p>	<p>CFDC</p> <p>ADCU, CATCO, MB, FO, MOA, CARDI, IICA, UWI, Chinese Missions, French Mission</p>

CONSTRAINT	RECOMMENDATIONS	RESPONSIBLE INSTITUTION Resource Entities
2.6 Weak communication system in the Ministries of Agriculture	2.6.1 Improve communication capability of existing MOA Communication Units, especially through: <ol style="list-style-type: none"> 1. upgrading equipment and tools (videos, slides, fact sheets and the like) 2. staff training 	ADCU MOA, UWI, CARDI, IICA, FAO, CFDC, CTA, Chinese Mission, French Mission
2.7 Weak technology transfer systems	2.7.1 Increase efficacy and efficiency of existing Extension Services, through improvement in: <ol style="list-style-type: none"> 1. recruitment and training 2. transportation 3. tools and equipment 4. greater access of extension service to media (TV, radio, newspapers) 5. clearly defined work programmes of extension service, based on diagnosis 	ADCU MOA, CFDC, CARDI, IICA, FAO, FO, ECLAC, Farmers
2.8 Weak research/extension linkages	2.8.1 Strengthen and develop the functional relationships between all Research/Extension Agencies operating in the OECS and in Martinique and Guadeloupe in the area of vegetable production, through joint: <ul style="list-style-type: none"> - planning - implementation - monitoring, and - evaluation of activities 	IICA MOA, CARDI, INRA, IRAT, French Mission, Chinese Missions

CONSTRAINT	RECOMMENDATIONS	RESPONSIBLE INSTITUTION Resource Entities
2.9 Weak technical production/ marketing linkages	2.9.1 Functionally strengthen the technical relationships between production and marketing agencies, through the setting up of national task forces for: <ol style="list-style-type: none"> 1. joint planning and monitoring of production /marketing 2. establishment of demonstration plots 3. organisation and holding of regular joint meetings (workshops), and 4. joint organisation and holding field days 	IICA ADCU, FO, INRA, IRAT, UWI MOA, CARDI, CFDC, Donors, Farmers, French Mission, Chinese Missions, Marketing Agencies

PROBLEM 3. - POLICY

CONSTRAINT	RECOMMENDATIONS	RESPONSIBLE INSTITUTION Resource Entities
3.1 Insufficient concessions and incentives to vegetable production/marketing development	3.1.1 Provide fiscal incentives to farmers to acquire inputs and equipment	ADCU CFDC, MB, UWI, CARDI, FO, NDF, Banks, MOA and other
	3.1.2 Provide duty free concessions to farmers on equipment and inputs	Ministries, Farmers,
	3.1.3 Protect local markets for selected vegetables through import restrictions	
	3.1.4 Extend tax concessions where needed to vegetable exporters on: equipment, planting materials, packaging material vehicles, where such concessions are still lacking	
3.2 Insufficient marketing infra-structures	3.2.1 Support marketing boards and the private sector in making investments in marketing infrastructure facilities, by providing greater incentives and better services and tapping funds from financing agencies	ADCU CIDA, BDD, EEC, USAID, NDF, UNDP, CDB, Chinese Missions, French Mission, Commercial Banks, Other Donors
3.3 High pricing, unavailability and poor distribution system of farm inputs (chemicals, seeds, tools and others)	3.3.1 Give one organisation the responsibility for cooperative bulk purchasing distribution of farm inputs	CFDC NDF, CARDI, ADCU, PCB, FO, Marketing Agencies, Importers of Farm Inputs,
	3.3.2 Improve planning of needs for farm inputs	MOA, Other Ministries Donors, Commercial Input
	3.3.3 Improve management/organisation of farm input distribution systems	Suppliers

CONSTRAINT	RECOMMENDATIONS	RESPONSIBLE INSTITUTION Resource Entities
	3.3.4 Ensure timely availability of recommended inputs in adequate quantities at reasonable costs	
	3.3.5 Improve linkages between technologists and importers/suppliers of inputs	
	3.3.6 Provide duty free concessions on farm input imports	
3.4 Insufficient access to credit for production and marketing	3.4.1 Develop non-traditional credit mechanisms based on successful models (e.g. NRDF/Saint Lucia, Credit unions, FO)	CFDC ADCU, MOA, AVT, MDF, NGO, ECCB, Credit Unions, Banks, Donors
	3.4.2 Establish crop liens for vegetable farmers	
	3.4.3 Expand Export Finance Guarantee schemes to include financing for export of vegetables	
3.5 Unavailability of vegetable crop insurance	3.5.1 Study feasibility of crop insurance for vegetables and promote establishment of insurance schemes, if feasible	ADCU CFDC, CARDI, MDF, MOA, FO, UWI, Banks, Farmers, Legal System, Insurance Companies
3.6 Excessive economic losses due to praedial larceny and animal damage	3.6.1 Lobby to enforce current or restructured laws and increase penalties to offenders	CFDC FO, ADCU, MOA, CARDI, IICA, UWI, Legal System
3.7 Inadequate farmer access to suitable land, under reasonable terms, for vegetable production	3.7.1 Promote direct lobbying by farmers	CFDC ADCU, MOA, CARDI, IICA, FO, Legal Systems, Donor Agencies, UWI
	3.7.2 Promote direct participation of FO in setting policy and strategy for land distribution in development schemes	

CONSTRAINT		RECOMMENDATIONS		RESPONSIBLE INSTITUTION Resource Entities
3.8	Insufficient feeder roads into vegetable production regions	3.8.1	Prioritize production areas, lobby governments, promote self-help construction projects and develop road maintenance programmes	CFDC MOA, FAO/UNDP, ADCU, FO, Donors, Farmers, Public Works and other Ministries
3.9	Slowness of bureaucratic structures in the legislation of farmer organisations	3.9.1	Restructure and/or enact coop laws and assess other forms of legal organisations	CFDC MOA, ADCU, IICA, UWI, FO, Coop Departments, Legal System
		3.9.2	Promote more active participation of Coop Departments in needs assessment and in the training of FO in group dynamics	
		3.9.3	Lobby Government to provide more support to Coop Departments	
3.10	Insufficient consumption of vegetables	3.10.1	Promote greater local demand, emphasizing nutritional and health values of vegetables	ADCU GIS, CFDC, OAS, IICA, FO, MOA, CARDI, UWI, MB, News Media (radio, TV, Newspapers), Farmers, Ministries of Education, Ministry of Health
3.11	Government Policy/Planning on production/marketing process undertaken without active participation of farmers, leading to poor production/marketing policies and plans which farmers do not support	3.11.1	Promote direct lobbying by farmers and establish national inter-institutional coordinating mechanisms (committees) in each country to assess and guide Production/marketing policies	CFDC FO, MOA, MB, ADCU, IICA, NAAC, UWI, CARDI, Banks, Other Ministries, Coop. Departments

5. FORMATION OF OECS VEGETABLE DEVELOPMENT PROJECTS NETWORK

1. LIST OF PROJECT TEAM LEADERS BY COUNTRY

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Jerome C. Thomas
Department of Agriculture
La Guerite
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Winston Magloire
c/o Division of Agriculture
Botanical Gardens
Roseau
COMMONWEALTH OF DOMINICA

Tel: (809) 44 82401 Ext 413

Gillian A. James
Extension Division
Ministry of Agriculture
Castries
SAINT LUCIA

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Ronald C. O'Neale
Ministry of Agriculture
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GRENADA

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Ashley R. Cain
Ministry of Agriculture
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Kingstown
ST. VINCENT AND THE GRENADINES

Tel: 45 61410/61021

45 61111 Ext 318/311

Eugene D. Skerritt
c/o Department of Agriculture
Plymouth
MONTSERRAT

Tel: (809) 491 2348

Samuel O. Powell
Department of Agriculture
Charlestown
NEVIS

Tel: (809) 469 5521 Ext 2088

2. SUMMARY OF MAIN VEGETABLE CROPS TARGETED BY COUNTRY AND SPECIFIC PURPOSE

COUNTRY	WHITE POTATO	ONION	HOT PEPPER	CABBAGE	TOMATO	CARROT	CAULIFLOWER BROCCOLI	EGGPLANT	LETTUCE	ZUCCHINI SQUASH	SPINACH	SWEET PEPPER
ANTIGUA AND BARBUDA		I	X	I	I		I					
DOMINICA												
GRENADA			X			I		X				
SAINT LUCIA			X	I	I	I			I			
ST. KITTS/NEVIS	X	I		I	I	I						I
MONTERRAT	I	I		I			I					
BRITISH VIRGIN ISLANDS									I	I	I	
ST. VINCENT AND THE GRENADINES*				I	I	I						

I - denotes import substitution/domestic market

X - denotes production focus on export

* - broad focus but crops shown are the main ones grown

3. PROBLEMS IN VEGETABLE PRODUCTION IN WHICH INRA/IRAT CAN ASSIST OECS SUB-REGION

- 3.1 **Environmental constraints** CARDI should also participate.
- 3.2 **Disease and pest management constraints, including nematode damage** This workshop should not have too many participants
- 3.3 **Varietal problems/poor crop adaptation** 4.5 **INRA/IRAT will organise a varietal trials network involving the various Ministries of Agriculture.**
- 3.4 **Inadequate irrigation** 4.6 **A newsletter will be published by INRA/IRAT once a year on work done in vegetables.**
4. **SPECIFIC ACTIONS PROPOSED TO ADDRESS PROBLEMS**
- 4.1 **INRA/IRAT will provide information on varieties/pest and disease problems/solutions to vegetable "Project Leaders" of the different islands.** 4.7 **Each vegetable Project Leader will submit a yearly report to the Network Coordinator on local activities in vegetable production. Information in these reports will be communicated to the relevant parties.**
- 4.2 **INRA/IRAT will host visits of Ministry of Agriculture (MOA) personnel to their facilities as deemed necessary.** This activity will begin by the first week of August 1990.
- 4.3 **INRA/IRAT will facilitate/host training of personnel from the different Ministries of Agriculture in disciplines such as entomology and others as deemed necessary by Project Leaders.** 4.8 **Ronald O'Neale, Ministry of Agriculture/Grenada has been appointed Coordinator of this Network.**
- 4.4 **INRA/IRAT will organize a workshop on varietal selection and screening of vegetables by December 1990 (in Martinique/Guadeloupe or Saint Lucia) for vegetable Project Leaders in the different islands.** 4.9 **A desk or similar mechanism should be set up by ADCU through which information can be channelled from the Network to Network Participants and relevant institutions including Farmer Organisations. Meanwhile, information will be channelled through Ronald O'Neale, Ministry of Agriculture/Grenada and sent to other Project Leaders.**

6. OPENING CEREMONY

6.1 CHAIRMAN'S REMARKS

F. Henry

The Honourable Hilroy Humphreys, Minister of Agriculture, Fisheries, Lands and Housing; Mr Collin Bully, Programme Coordinator, Head of the OECS Agriculture Diversification Coordinating Unit; Mr Philippe Dierickx, French Technical Cooperation Mission; Dr Franz Alexander, Inter-American Institute for Cooperation on Agriculture (IICA) in Antigua and Barbuda, Dominica, Grenada, Saint Lucia and St. Vincent and the Grenadines; Heads of sponsoring organisations; visiting participants; local participants; Representatives of the Press; invited guests; ladies and gentlemen, Good morning to you all and welcome to the Barrymore Hotel. This workshop which is jointly hosted by the Ministry of Agriculture and IICA is sponsored by a number of organisations operating in the OECS Region. We are particularly delighted to have our French connection in the Leewards and look forward to working with INRA and IRAT.

We in Antigua are delighted that this workshop could be held here in the year declared by the CARICOM Secretariat as the year of food production. This workshop comes when some 18 per cent of our total imports and somewhere in the order of EC\$130,000,000 is spent on food imports. This, at a time when there is a growing and positive effort to redress the problems of food deficit and food security and concentrate efforts on self-sufficiency in selected food items for which we possess some advantages in production.

This workshop is considered timely since it comes less than a year after tangible efforts have been demonstrated by the OECS in launching its diversification efforts which not only target exports, but which place the needed emphasis on import substitution to save scarce foreign exchange as well as earn the foreign exchange where possible.

Vegetable production is an appropriate subgroup of food production to tackle at this time for several reasons:

1. Vegetable production is the subgroup least traded in the region despite considerable potentials to expand it.
2. Surplus produce from outside the region is imported into the area at considerable cost.
3. The increasing emphasis on a light diet, low in calories and low-fat foods, coupled with the population increase (associated with tourist inflow), the effect of rising income on food consumption as well as an increased consciousness of the nutritional requirements and health education all make vegetable consumption one of the fastest growing of the food groups.
4. Technological transfer possibilities in both production and marketing of vegetables make it one of those groups where, with proper management,

considerable expansion of production can take place within a short period. This expansion can take place even though large acreages of land need not be devoted to production.

5. The introduction of new cultivars, expansion of irrigation facilities and other technological developments, have made it possible to expand the production of vegetables to almost year-round, removing the long entrenched idea that the production of vegetables must be limited to the cool season.

6. While vegetable production creates the possibility for expanding exported high priced crops, the need for high quality and safe foods makes it necessary that the highest standards of production be established and maintained. In this regard, coordinated, collaborative and cooperative efforts which constitute the objective and output of this workshop must be given high priority for the region to optimize its return for efforts.

This system of networking established in the region more than a decade ago has done much to allow technology transfer within the region. This workshop, I am sure, will strengthen the system of networking and allow the limited resources available for technology generation and transfer to be used effectively.

In welcoming you all to this workshop, I must express the hope that you find time to see a little of Antigua.

[Faint, illegible text]

6.2 ADDRESS BY ADCU

C. Bully

This workshop will be dealing with the problems of lack of regional food security, import substitution and also regional exportation of vegetables. We have had exports of vegetables such as carrots, to Trinidad from St. Vincent and Grenada and to Barbados.

We must be mindful that our formula for diversification has to address both the question of generation of export earnings as well as the receiving of earnings (the outflows we may have as a result of the imports).

The workshop should address the issues relevant to vegetable production such as the technologies we are going to pursue as well as the targets we are going to set ourselves.

We must address the issues of the appropriate technology for our eco-system and our farmers. I hope we can develop the type of commodity profile in vegetables that the OECS needs to pursue as a sub-region and that individual countries will be able to modify to suit their individual agricultural diversification programmes.

We must develop our expertise as far as technological transfer is concerned.



6.3 ADDRESS BY FMC

P. Dierickx

Mr. Chairman, Honourable Minister of Agriculture, Ladies and gentlemen, I am the Regional Coordinator of Rural Development Projects for the French Mission for Cooperation in the OECS States. I would like, first of all, to thank the Ministry of Agriculture of Antigua and Barbuda for hosting this workshop. The French Mission for Cooperation in the Lesser Antilles is pleased to be involved with the MOA of Antigua and Barbuda, IICA, ADCU, CATCO and others, in the organisation of this first regional workshop on vegetable development projects.

The idea of this workshop came from the successful organisation of a workshop last year related to the development of the region's agriculture. This led to the decision by IICA and the French Mission to propose that a similar type of workshop be set up for vegetable projects.

In addition to the financial involvement of the FMC, technical inputs will be brought about through the participation of the French Research Institutes based in the neighbouring French territories:

- o INRA - Institut National de la Recherche Agronomique. Based in Guadeloupe and represented here by its President, Dr. Guy Anais;
- o IRAT/CIRAD - Institut de la Recherche Agronomique tropicale, Centre de Co-operation Internationale en Recherche Agronomique

pour le Developpement, based in Martinique and represented here by its Regional Manager, Dr. Patrick Daly;

- o SAPISE - Societe d'Amenagement du Perimetre Irrigue du Sud-Est. An irrigation Project, based in Martinique, represented here by its Manager, Mr. Bernard Cadic;
- o Technical Assistants and local counterparts from three of our cooperation projects; namely, Grenada, Saint Lucia and St. Vincent, each of them having a vegetable development component.

We believe that import substitution in the field of vegetable production is an important matter, especially as a new area for high value added production for farmers.

Three important points however, must be kept in mind:

1. Import substitution projects usually themselves generate some imports. This is especially true in our island economies. Furthermore, the more advanced the technology that is used, the more imports will be generated.
2. From the national economy standpoint, we must keep in mind the economic weight of this production. In Saint Lucia, for example, the total

amount of substituable vegetable imports is around EC\$1.5 million. As a comparison, a 10% drop in the banana price in Europe would lead to a reduction of EC\$30 million in foreign exchange revenue. This figure represents twenty times the value of the total substituable vegetable imports.

3. Since the local market is limited and competition on the extra-regional market is difficult for this type of fresh produce, planning of production is a necessity. Zoning of land should be encouraged, to allow for intense vegetable cultivation in the most suitable areas. There is also a need for certain policy measures such as low interest credit for selected types of productive investment in certain areas.

6.4 ADDRESS BY IICA

F. C. Alexander

It is my privilege and my pleasure to be here in my capacity as Representative for the Inter-American Institute for Cooperation on Agriculture. On behalf of the Institute I welcome you all to the first workshop held in the OECS for Vegetable Projects Development.

The Institute wishes to underline the importance it attaches to such a workshop following the policies enunciated by the Ministries of Agriculture in support of Agricultural Diversification and the very obvious role vegetable production could play in import substitution and export marketing.

The presence of the Honourable Minister of Agriculture, Fisheries, Lands and Housing, bears testimony to that conviction. We wish him to know how pleased we are that he has taken time to bring a message to us today.

As a Veterinarian, I might have been interested in the by-products of this workshop as valuable small animal feeding which must not be forgotten, but I wish you to know that I have become very much more interested in vegetable production since Hurricane Hugo. The Government of Antigua and Barbuda requested IICA's support in the aftermath of their agricultural damage and replacement seeds were an acceptable way to go. The Institute proposed however, that Farmers might accept more than just free seeds. The opportunity was there for technological improvement and instruction, monitoring and demonstration which was agreed to come under the core project being

defined by the Ministry of Agriculture.

We were pleased that the Institute responded positively to Antigua and Barbuda's request particularly since some financial strain was being experienced at that time. The seeds have been provided, a technical committee formed, core farmers selected and some allocated funds granted in support. These funds were extended from the end of 1989 into the current year, not usually an acceptable procedure for the Institute. This workshop will, I think, provide added impetus to the fruition of these proposed actions.

Mr Chairman I would like to commend the effort for this workshop on Vegetable Development Projects in the OECS. It is not only timely in its support of the Agricultural Diversification strategy of the OECS but has been able moreover, to illustrate the cooperation and collaboration of various agencies and institutions not in duplication of their efforts but in pooling resources for the common goal.

IICA's Project for Technology Generation and Transfer under the responsibility of Dr Pinchinat has been pleased to work closely with the Ministry of Agriculture in its sponsorship of this workshop and its eagerness in providing the laborious groundwork to make such a workshop useful and worthwhile. I would like to pay a particular tribute to you Mr. Chairman for your sterling leadership not only in your efforts here but also in the work you continually do for Antigua and Barbuda.

I am pleased to record the integrative support of IICA's other projects, "Strengthening of Farmer Organisations" and "Plant Protection Capabilities". Their respective heads of project, Mr. Jerry La Gra and Mr. Urban Martin, are also here. All these projects link to form part of IICA's PLANALC, the programme approved by the Ministers of Agriculture of the Hemisphere for the modernisation and revitalisation of agriculture. Here in the Caribbean, the projects of PLANALC are in full support of the Agricultural Diversification Programme of the OECS and the Caribbean Community Programme for Agricultural Development. Next week, the Coordinating Committee for PLANALC will meet in Barbados. Both Dr. Antonio M. Pinchinat and Jerry La Gra have agreed to serve on that Committee.

I wish to acknowledge the generous help and praise-worthy support received from CARDI and the French Technical Mission represented here by Mr. Philippe Dierickx; from Mr Anais of INRA in Guadeloupe established through a Letter of Agreement with IICA and further collaboration with the Vegetable Research Institute in Martinique (IRAT), represented by Monsieur Daly.

As has become well known in the OECS, the Republic of China - TAIWAN, who are renowned in vegetable production, has provided technicians to demonstrate the feasibility of growing new commodities. When their assistance in this field was requested, the response of the ROC was immediate and positive. I wish to publicly thank his Excellency the Ambassador in Grenada, and Mr. Gary Lin, Charge d'Affaires in Saint Lucia for their swift response in providing the participation of Professor Yen and Mr. Lin at this workshop and I hope

their contribution will be well appreciated.

The General Manager of CATCO, Mr. Leroy Rose, is not only here with us today himself, but has shown his support in the sponsorship of twelve participants which further illustrates the high regard and expectations which this workshop should produce. The workshop will also receive inputs from the Agricultural Venture Trust of USAID and Messrs Boyce and Sobers are here to define mechanisms for accessing funds for the development of vegetables in the region.

Numerous agencies and institutions have contributed generously of their time, personnel and funds, not least of all, the Agricultural Diversification Coordinating Unit, represented by Mr. Collin Bully who has welcomed the initiative and supported the arrangements for this and other symposia.

All of you here today, and the participants from the core projects of your Ministries of Agriculture, have been most supportive and eager to contribute to make this workshop achieve the objectives which have promoted such resounding enthusiasm. I wish to thank you all for your participation and to wish you all every success.

6.5 FEATURE ADDRESS

H. Humphreys
Honourable Minister of Agriculture
for Antigua and Barbuda

Ladies and Gentlemen, I am pleased that I could be with you this morning at this, the First Regional OECS Vegetable Development Project Workshop. As is normally the case, much significance is attached to the initial effort of most endeavours, and this workshop is no exception.

Clearly though, the significance of a workshop of this nature cannot only be in its claim of being the first. Much more fundamental reasons make this workshop extremely important. It is my intention this morning to briefly look at some of these major reasons, as well as to offer some of my thoughts on the issue of a programme for vegetable development.

My first area of concern is the fact that it has taken us a sub-region such an extremely long time to focus on vegetables. By its very nature, a focus on vegetables implies that we are at last prepared to emphasize a (local food) production orientation, that will among other things, ensure that we can provide a major part of our own food consumption.

This is a major shift, in our conceptualisation of priority objectives within the subregion. In the past, we were all convinced that the only way to go, in terms of agricultural production, was the supply of commodities for export, and in turn using the earnings to buy food for our population. The developments in Europe, especially the formation of a single market by 1992, have clearly provided signals that even the blind can see,

indicating that this practice might not in the not-too-distant future be economically viable, at least in its traditional form.

The major point I want to bring out is that this workshop can be regarded as part of our desperate attempt to get alternative production in place because of the imminent crisis situation that the entry of the European Market will bring to bear, not only on our agricultural sector, but on the entire economic wellbeing of our subregion. In this context, the issues and proceedings of this meeting should be carried out with the gravity of our situation in mind. We must, at all times, be conscious that the quality of our work here and the effort we put into implementing the decisions afterwards, could very well play a pivotal role in our economic survival in the future.

Some time ago, a noted Caribbean scholar in outlining his double convergence strategy for development pointed out the importance of emphasising production systems that would ensure our exports are "outgrowths of our local demand". With such an orientation in our production system, not only would we be able to provide food for our population, but at the same time, through exports of these commodities, earn foreign exchange as well.

It is obvious that this strategy, at least in our agricultural production, will have to become the

dominant one. Since, even within the traditional agricultural export sector, continued viability will depend increasingly only on the development of new products that utilise primary crops. These new products, at least those already identified, have shown great local as well as export potential. In simple language, we need, as a subregion, to identify both primary and industrial agricultural commodities that have good local demand potential as well as good export opportunities.

I feel that focusing on vegetable production is a step that is consistent with the approach I have just outlined. The challenge of meeting demand within the region, especially the temporal component of the demand structure in the context of our concentrated production season, will on its own be a major challenge. In addition, the exploitation of niche export markets which at most times, due to our limited local production capabilities, appear to us as huge markets, will themselves constitute another major challenge.

These challenges are ones that we must face and overcome, since our economic survival might no doubt very well depend on how successful we are in our efforts.

The Organisers of this workshop have outlined the major critical issues in the prospectus that must be dealt with for successful implementation of a Vegetable Development Programme. The issues of technology, management, government policy, especially local incentive regimes, and trade policies as they relate to the agricultural sector, infrastructure, marketing and information exchange systems are all critical areas. A systematic approach to solving the problems relating to them must be developed.

I have every confidence, that this workshop will successfully identify the problems within our agricultural sectors that are presently inhibiting vegetable development and come up with plans to deal with them. I would though like to take some time in emphasising the point, that as important as the issues under consideration at this workshop are, their resolution will only mean that a quarter of the battle is won. The acid test will be the development and implementation of an action programme that will turn our objectives into a reality.

Being part of the sub-region and a participant in many regional and sub-regional meetings, I know that our major weakness is in the area of implementation and follow-up. While this is really beyond the scope of this workshop, the development of models through which the implementation of action programmes and specific projects can be carried out should also be foremost in our minds.

Drawing on the experience of Antigua and Barbuda, and specifically the Onion Programme, it is clear that specific programmes must be designed for every targeted vegetable. I know that this approach is contrary to the more popular one, where a unified vegetable programme cutting across several crops is developed and implemented as one unified approach. However, from our experience in Antigua and Barbuda, while this approach can be justified by economies of scale, due to commonality of activities across several vegetable crops and will bring some benefits, it does not lead to the rapid and major incremental effect that specifically targeted crop programmes achieve.

In Antigua the commercial onion farmers were identified and concentrated attention and other

programme benefits, including technological information, delivered through hands on contact with technology transfer agents. This resulted in Antigua and Barbuda being able to supply onions for local consumption for eight months, as well as carry out a small export trade. A target has been set for this production season which, if achieved, will see Antigua and Barbuda being fully self sufficient and exporting half a million pounds of onions to our sister islands in the sub-region.

I am suggesting therefore, that a focused approach is needed if dramatic results are required. Broad programmes might take too long, especially in the context of the threat posed to our traditional agricultural sector. We need to prioritize vegetable crops according to their potential for the local, subregional and niche export markets, and put in place the type of technological capabilities and policy environment we need to successfully implement each crop programme. Further, in an effort to avoid stretching ourselves too thin, we should implement only a couple of crop programmes at a time and ensure they are fully developed and satisfactorily meeting our targets, before shifting our attention to other crops. In this way we will be able to give them the concentrated attention needed for dramatic results.

The last comment I would like to make has to do with the composition of the delegates attending the workshop. From the prospectus, I know and I see that not only are Government personnel invited but also farmers organisations and funding agencies. This is good since all the major actors are present at this meeting, ensuring that the varied perspectives will lead to workable proposals that by virtue of

their participation the donors will look favourably at in terms of provision of some of the resources. I trust that most of the resources mobilized in this vegetable development effort, will be directed towards and thus have direct impact on field activities. For it is only when our efforts are manifested in visible production and marketing that we can truly say our efforts have borne fruits. This time gentlemen, let the reports and plans that are generated be active reports and active files. There are already too many fine reports and records of proceedings with little impact at the farm level. This time our very economic survival might be determined by our success and the success of similar exercises in the livestock and fisheries sector as well as workshops that focus on development of new products utilising the primary production of our traditional agricultural sector.

With these few words, I would like to extend a word of welcome to all visitors to Antigua and Barbuda. I hope you enjoy your staff. I would also like to thank the organisers and sponsors of this workshop; IICA, OECS Agriculture Diversification Coordinating Unit, the French Cooperation Mission and our own Ministry of Agriculture here in Antigua for putting on this workshop.

Finally, a special word of welcome to the representatives of the various funding agencies who are present. We look forward to your continuing support and cooperation. I therefore take great pleasure in declaring the working session of this workshop formally open.

7. REGIONAL OVERVIEW

7.1 IRAT/CIRAD

Varietal Selection in Market Gardening for Tropical Humid Lowlands (Caribbean Islands)

P. Daly

1. PREAMBLE

One of the main constraints limiting the development of market gardening in the humid tropics is varietal adaptation.

Supplying the market gardener with a good variety, or recommending one to him, solves a third of his technical problems:

The criteria for choosing a good variety are:

- o adaptation to the climate
- o resistance to sickness
- o fulfilling the qualitative market requirements
- o productivity

These criteria are more or less important from one species to the next. Therefore the order of their priority changes.

2. THE CUCURBITACEAE

2.1 The Melon

This species comes from the Asiatic zone that stretches between India and the South of the USSR. It is suited to high temperatures and to dry air. Under the islands' climatic conditions, the dry regions (Barbados, Grande Terre, Antigua, Southern Martinique, Southern Saint Lucia) are thus the most favourable.

The varieties are selected mainly depending on the markets and their quality requirements: netted melons for the USA; the green flesh type for England; Charentais cantaloup for France.

The former are best adapted to our local conditions. They are above all chosen for their resistance to disease and for their transportability: Chilton and Hy Mark are known for these features. Galia and Aogen yield good results but are not particularly disease resistant.

The Charentais cantaloup is most susceptible to climatic conditions, particularly to physiological fruit cracking. The currently recommended varieties are Alpha, Diamex and Savor.

2.2 The Cucumber

The species' growth threshold temperature is around 15°C. Its growth reaches an optimum at relative air humidities ranging from 80% to 95%. It is thus well suited to West Indian climatic conditions. The prickly short stocky fruit type is the best suited one. Either the pure strain (Poinsett) or the normal flowering (monoic) F1 hybrid or the gynocic F1 hybrid (mixing 5% to 10% of monoic pollinator seeds) can be grown.

The following varieties are found: Gemini, Cherokee, Calypso, Victory, Triumph, Triple mech and Sweet

slice, and among the gherkins: Pixie. The selection criterion may be the shape or the colour, but for the producer, it will mainly be resistance to disease (oidium, mildew) and CMV (cucumber mosaic virus) and angular leaf spot tolerance.

The parthenocarpic greenhouse varieties are not recommended because even the slightest contact with pollinating insects caused the fruits to be deformed through irregular pollination.

2.3 The Winter Squash

This term covers a number of botanical species, not all of which are well suited to tropical temperatures. Their optimum temperature varies from one species to the next. The *Cucurbita moschata* is the best suited because of its high optimum temperature. The varieties of this species are not very susceptible to viruses or other diseases. The hybrid variety Phoenix sold by KNOWN YOU SEED (Taiwan) yields very good results.

3. THE CRUCIFEROUS PLANTS

Within this family, the *Brassica* genus (such as cabbage and turnip), is the most commonly grown.

Brassica oleracea, the Capitata variety, is the most sought-after (a cabbage with a well rounded heart). Of Central European origin, this species does not resist heat well. It prefers low temperatures of about 10 to 15°C. In the West Indies the cool period is thus the most favourable, especially at higher altitudes. In these regions, European varieties, such as Copenhagen Market or Acre d'Or, yield fair results. Extending these crops beyond these regions and this

short time period is now possible thanks to the hybrids introduced on the market by the Japanese seed merchants: KK Cross, Ky Cross, Africa Cross, YR Summer 50, Mascotte, Fabula, Fortuna, Conquistador and Autumn Hero.

One of the selection criteria is their resistance to black rot *Xanthomonas campestris* and to *Erwinia carotovora*. This head rot occurs above all when temperatures rise in May-June and when rainfall and moisture increase.

4. MARKET GARDEN SOLANACEOUS CROPS (grown for their fruit)

4.1 The Eggplant

This species is well suited to high temperatures. It is thought to have come from India from where it spread and developed into different types according to the regions. The early varieties came from the northern edge of the cultivation zone is group, Zebrina is well worthwhile.

The group called the American type includes late, robust, long cycle varieties. Among them, Florida Market and Pompane Market, are suitable, and can be used in bacterial wilt-free regions.

The selection criterion of a good adaptable variety remains its resistance to sicknesses: bacterial wilt, fruit phomopsis and anthracnosis. The Kalenda variety (INRA IRAT) is currently recommended, but its resistance to bacterial wilt is less than desirable.

4.2 The Sweet Pepper

The first selection criterion for this species is its bacterial wilt

resistance in humid regions with acid soil. The only known resistant variety is Narval.

In nearly contamination-free regions or plots, Yolo Wonder can be recommended for its hardiness.

Currently, in under-shelter, soil-less culture, a number of varieties are being studied for their large fruit productivity: Tenno (NUNHEMS); Ludo (TEZIER); Wonder Bell (TAKII); DRAGO (CAILLARD), Majister (TEZIER) and ZERTO (NUNHEMS).

4.3 The Tomato

The species, in great demand throughout the entire region, is among those that present the biggest adaptation problems. The choice of a variety should take into account a number of factors:

- o humidity and heat adaptation
- o resistance to sicknesses, *Pseudomonas solanacearum*, nematodes, *fusarium*, *cladosporiosis*, *alternaria*, *stemphylium*
- o fruit cracking and apical spot resistance
- o fruit size and firmness, transportability.

Caraibo is the variety currently recommended for in-soil growth, during the rainy season and in a region contaminated by *Pseudomonas solanacearum*. During the cool season, other varieties such as Capitan and King Kong are worthwhile, but less resistant than Caraibo.

A few varieties can be used with a good chance of success in-soil and in a *Pseudomonas*-free zone, during the cool season: Duke, Calypso,

Castle hy 101, Tropic, Floradel.

In under-shelter hydroponics, Carmello, 72-40, can produce up to 10-15 kg per sq. m. during the cool season and 6-8 kg during the hot season.

4.4 The Lettuce

This species of Mediterranean origin dislikes high temperatures. These conditions induce seed dormancy 30°C on the ground, and cause tip burn and bolting. In addition, the leaves' fragility makes them susceptible to rain damage.

The choice of varieties is mainly based on their behaviour with respect to climatic conditions. The growing techniques aims at artificially creating, as far as possible, the desired air and soil mediums.

Depending on the artificial environment, the choice of varieties will be more or less limited:

- o in-soil, the varieties of the large curled leaf type yield the best results: Mignonette, Minetto, Naples cabbage, Great Lakes
- o during the more favourable season (December-March) and at higher altitudes this selection may extend to the "fatty" types: Sucrine, Madrilene and Kagraner Sommer
- o under shelter and in soil-less culture, fragile varieties can be grown: Noran and Ostinata

4.5 The Carrot

This species is grown spontaneously in Europe. In tropical regions, it can be grown in all seasons, but

only at higher altitudes. It produces variable results according to the season. In flat open country, it only yields worthwhile results during the cool season, when the average temperature is less than 25oC. The yield may then vary from 10 to 20 metric tonnes per 2.5 acres.

The varieties are chosen first for their suitability to high temperatures, but also for their resistance to blight, a frequent fungal disease in humid regions.

The varieties yielding the best results stem from the mid-long Nantaise and Chantenay groups. Recent hybrids produced in Japan produce a better yield: New Kuroda, Kuronan Ideal, a Chinese variety, is also rather productive.

Between 10 and 15o, the Granex type varieties (Yellow Granex, Dessex) are better for longer days, whereas other varieties such as Texas Early, Grano 502, swell during twelve-hour days nearing the equator. But these varieties do not keep well, only one or two months, because they are rather poor in dry matter.

Certain varieties of African origin, Violet de Galmi, Blanc de Soumarana, Red Kano keep better. Recent trials have shown that bulbing of the Israeli hybrids, Galil, Nissan; American hybrids: Golden, Texstar; or Brazilian hybrids: Pera IPA 1-2-3, is good during the dry season.

4.6 The Onion

This is a photo-periodic species, sensitive to daylength and to temperature. Most varieties grown at high latitudes (30 to 40o) do not swell their bulbs during short days lasting less than 14 hours. The Jaune de Valence keeps keeps producing in regions between 15 and 20o latitude.

7.2 INRA/CRAAG

Plant Breeding: A contribution to alleviate constraints on Vegetable Production in the Caribbean

G. Anais

1. SUMMARY

For a long time the lack of suitable varieties was a serious constraint on vegetable production in the Caribbean. A first step in solving the problem is screening and testing of existing varieties. In many cases however, it is necessary to develop breeding programmes to obtain adequate material. The objective of these programmes is to alleviate the main constraints involved with climatic adaptation, disease and pests resistance and quality.

We present here some aspects of 20 years of breeding vegetables at INRA-Antilles Guyane in Guadeloupe. The main crops concerned are tomato *Lycopersicon esculentum*, pepper *Capsicum annuum*, melon *Cucumis melo*, onion *Allium cepa*, and beans *Paseolus vulgaris*.

2. INTRODUCTION

For some time now, the lack of varieties adapted to the humid tropics climate and resistant to diseases and pests has been identified as a major problem in vegetable production in tropical areas.

To support the crop diversification policy in the French Antilles, a research programme was developed in 1970, at the plant breeding station of INRA (French National Institute for Agronomic Research), in association with CIRAD-IRAT. The objective of this programme was to

obtain vegetable varieties suited for production in the Caribbean.

Crops were chosen according to their potential for export to temperate markets during the winter, or for their economic importance on the local market. Research was mainly concerned with: tomato, onion, cucumber and beans for the local market, and aubergine, sweet pepper and muskmelon for the export market. We have attempted to adapt the breeding methods to optimize the limited resources available locally.

3. PROBLEMS INVOLVED IN VEGETABLE PRODUCTION DEVELOPMENT

3.1 Climatic Adaptation

Some prevalent characteristics of the climate encountered in the Caribbean are: (Table 1.)

- o High year round temperature with little variation between day and night;
- o Important solar radiation (15 to 25 mega-joules/m²/day);
- o Relatively short daylength (11 to 13 hours);
- o Irregular rainfall pattern with very high intensity rains and pluviometry;
- o High relative humidity;
- o Regular and constant trade winds.

TABLE 1. METEOROLOGICAL DATA SAINT FRANCOIS 1965 - 1984

Month	Temperature		Day Night Rainfall		Solar Radiation MJ/m ²	Solar Duration 1/10 hour
	Mini	Maxi	Difference	mm		
January	21,73	27,74	6,01	61,88	19,99	73,76
February	21,51	27,77	6,26	38,56	19,08	77,78
March	21,78	28,11	6,33	43,09	21,27	77,16
April	22,52	28,74	6,22	83,21	21,76	77,74
May	23,59	29,32	5,73	109,17	20,69	71,95
June	24,38	29,95	5,57	78,08	20,83	73,01
July	24,51	30,12	5,61	114,08	21,05	74,84
August	24,41	30,24	5,83	112,36	21,31	77,37
September	23,91	29,98	6,07	146,41	19,96	70,16
October	23,64	29,82	6,18	157,35	18,33	69,79
November	22,99	29,07	6,08	153,07	16,52	72,05
December	22,11	28,14	6,03	117,05	15,27	67,58

Under these conditions almost all modern vegetable varieties resulting from breeding in temperate climates will be submitted to a certain amount of stress. The result being low productivity or sometimes total sterility; poor quality of the yields due to cracking, rotting, poor conservation etc.

3.2 Diseases and Pests Resistance

The climatic conditions affecting production are favourable to a wide range of diseases and pests. The most important of these is Southern Bacterial Wilt caused by *Pseudomonas solanacearum* which severely affects plants of the *solanaceae* family: aubergine, tomato and sweet peppers. We also had to deal with *Xanthosomas vesicatoria*. Fungal diseases are important but in most conditions we do not have many problems with viruses.

Concerning animal pests, nematodes cause serious problems, mainly the root knot nematode *Meloidogyne incognita*. Leaf miners and spider mites also occur in many situations.

All of these diseases and pests are serious drawbacks to vegetable production and very often disease resistance is the only satisfactory means of control.

4. BREEDING AS AN ANSWER TO THE LACK OF SUITABLE VARIETIES

The first step in developing a programme for increasing vegetable production is generally varietal and phyto-techny trials.

I will not dwell on the varietal testing here since this is the subject of the paper presented by my colleague P. Daly of IRAT/CIRAD. I would only stress that if some introduced varieties have given good results, the varietal breeding has been done in many cases under conditions so far removed from our own that there is still a need for on-site breeding.

4.1 Breeding for Climatic Adaptation

Climatic adaptation is a very

complex process that includes productivity and quality. What can finally be considered an adapted variety is one that has high productivity and a quality of product that suits the consumer.

4.1.1 Breeding for Heat Tolerance in Tomato and Sweet Pepper

The greatest problems concerning adaptation were encountered in tomatoes. Unfavourable effects of hot nights and small differences between night and day temperatures are well known. Optimum night temperature for fruitset is around 17 C, and disturbances occur, starting at 21 C, that can lead to total sterility (ABDALLA A.A. and VERDERK K., 1968, BESHIR A., AHMADI E.L., STEVENS M.A., 1979, STEVENS M.A., 1981).

With a difference between the night and day temperatures of less than 6 C plants will etiolate. We must also mention losses in dry matter due to night respiration, having in mind that we have relatively long (11 to 13 hours) and hot (25°C) nights.

We will now examine the different steps of our breeding programme.

4.1.1.1 Screening of Breeding Material

We have screened both local material of the species *Lycopersicon esculentum cerasiforme* (locally known as "Tomadose"), and introduced lines. The first introductions, made in 1969, were very extensive. They included genotypes described as setting fruit under adverse conditions (GRAHAM T.O. 1966) and commercial varieties originating from temperate, sub-tropical and tropical countries. Observations based on fruitset and yield, have confirmed the good adaptation of tropical varieties and also of those with cold setting ability (Table 2).

Table 2. FRUITSETTING OF TOMATO LINES DURING THE WARM SEASON IN GUADELOUPE, FRENCH ANTILLES

LINES	% FRUITSET
AC 1394	94
PI 114 969	91
PI 203 232	79
P1 110 597	72
PI 114 968	71
KL1	70
SUB ARTIC PLENTY	67
SUB ARTIC MAXI	65
NAGCARLANG	64
SUMMERTIME	63
PLACERO CARCAMAN	62
PLACERO ESCARLATA	61
PLACERO LOBULADO	53
DIVISORIA	50
SEVERIANIN	47
PLACERO ENANO	46
CHICO III	43
VIET NAM 8	42
NOVA 3	38
SUMMERTIME IMPROVED	25
NEMATEX	25
CAMPBELL 28	16
TROPI RED	16
MONTERREY	12
CALYPSO	12
NOVA 2	10
FLORA DADE	1

In this latter group the most outstanding cultivar over several years was Summertime which surpassed cultivars such as Swift, Coldset, Porter, Nagcarlang and Fireball. Varieties of temperate origin had poor fruitset, the worst being the European greenhouse varieties.

Further screening was based solely on heat tolerant material obtained from plant breeders working on that subject, among them; CUETO (Cuba), T.P. HERNANDEZ (Louisiana), P.W. LEEPER (Texas), M.A. STEVENS (California), R.L. VILLAREAL (Philippines and AVRDC Taiwan), all of which I take the opportunity to thank here. Some of the lines included pathonocarpia (gene pat 2) from the variety "Severianin" (USSR).

4.1.1.2 Breeding for new varieties

Although all heat tolerant lines were small fruited lines, there is no linkage between hotset ability and fruit size. This enabled us to aim for large fruited cultivars with good heat tolerance.

In the first step of our programme we used the pedigree method with crosses between small fruited heat tolerant lines and Florida commercial varieties which possessed large fruits, disease resistances and quality. With the increase in the number of introductions we switched to a recurrent selection, alternating one generation of selection with two generations of crossing followed by a modified single seed descent.

The best results were obtained with crosses including Summertime, Saladette and BL 6807. According to M.A. STEVENS and co-workers (1979) this was due to greater dehiscible pollen production (Saladette) and carbohydrate translocation (BL

6807). We did not have outstanding results with Malioutka 1011 and/or Nagcarlang, nor with parthenocarp. This seems to indicate that we have no problem with gametes viability. Concerning sweet peppers we followed the same approach but there are less problems with heat tolerance in this species so that results were attained more rapidly (F. KAAAN and G. ANAIS, 1977).

4.1.2 Breeding Melons for High Rainfall Tolerance

Tropical rains cause fruit cracking and affect the postharvest keeping quality by lowering dry matter content. This is a serious problem, particularly with the cantaloup melon of the Charentais type exported to the French Market during the winter season. Prices are in fact set according to fruit quality (sugar content and appearance). The American type of cantaloupe generally has good resistance to cracking and high sugar content but the netted rind makes it unattractive to the French consumer.

The aim of our programme therefore, was to release melon cultivars that combine the resistance to fruit cracking of the American type cantaloupe and the organoleptic characteristics and appearance of the French "Canteloup Charentais". The commercial objective being exportation, emphasis was also placed on keeping quality for long distance shipping.

Following crosses between "Cantaloup Charentais" and the cantaloupe cultivar "Perlita" we have released a line with small fruits, resistant to cracking that keeps well over 15 days and so can be shipped easily. This line used in combination with "Cantaloup Charentais" or Cantaloupe lines, produced F1 Hybrids (G. ANAIS and F. KAAAN, 1978).

4.1.3 Breeding Onions for Adaptation to Short Days

Onions are consumed extensively in the tropics, but there is very little production in our region. Two main problems encountered in this crop are adaptation to short daylength and post harvest storage ability.

There is a range of short day onion cultivars but at the time none had the long storage life known in long day onions. Our objective was to breed short day onions with good postharvest keeping ability. We have found a cultivar introduced from the Niger region of West Africa, "Violet de Galmi", which under our growing conditions is indifferent to daylength. This means that bulbing is conditioned by physiological maturity (i.e. number of leaves) and not by the photoperiodic threshold, so that this cultivar can be grown year round.

Crosses made with long day, long keeping cultivars have shown dominance of this character which enables us consider producing F1 hybrids from indifferent and long day cultivars (G. ANAIS and B. SCHWEISGUTH, 1978).

Following the crosses between Violet de Galmi and two long day populations, one cytoplasmic male sterile and its quasi isogenic maintainer, we have released two populations with the required characteristics of adaptation to short days, yellow colour and good storage ability.

4.2. Breeding for Disease and Pest Resistance

4.2.1 Breeding for resistance to Southern Bacterial Wilt caused by *Pseudomonas solanacearum* in

Eggplants, Tomatoes and Sweet Peppers.

Southern Bacterial Wilt is one of the worst diseases of solanaceous crops in the tropics. This parasite *Pseudomonas solanacearum* described a century ago (E.F. SMITH 1896) is a severe threat and can completely destroy susceptible crops in a very short time.

4.2.1.1 Eggplants, (*Solanum melongena*)

Breeding resistance to Southern Bacterial Wilt was initiated jointly by IRAT (CIRAD) and INRA (P. DALY and F. KAAAN). This crop is destined for exportation on the European market (October to June).

The first steps were made with an F1 hybrid between "Florida Market" and a resistant line introduced by IRAT from Ceylon (SMI64). This hybrid showing insufficient colour. Further breeding was carried on leading to the release of F1 Hybrid Kalenda, which is extensively grown in the French Antilles (Guadeloupe, Martinique).

Under severe conditions of infestation by *Pseudomonas solanacearum*, Kalenda is not sufficiently resistant. Further breeding is being carried out using new introductions (China, Turkey, Japan) and interspecific crosses with *solanum aethiopicum* and *solanum torvum* (HEBERT Y. 1985).

This programme is now conducted by G. ANO.

4.2.1.2 Tomatoes

Different sources of resistance to *P. solanacearum* have been studied by B. DIGAT, F. KAAAN and C.M. MESSIAEN. Three cultivars them have a high level of resistance: CRA 66, PI 126 408 and Hawaii 7996 (B. DIGAT 1967,

B. DIGAT and M. DERIEUX 1968, F. KAAAN, M. BERAMIS and C.M. MESSIAEN 1969, F. KAAAN, 1970). Of these three, CRA 66 has been used extensively and its resistance confirmed widely in the tropical zone. Several lines have been released, one of which, "CARAIBO", is grown commercially. Hawaii 7996 has also been used to some extent but at the moment no commercial line has been released, this line also shows some level of resistance to *Xanthomonas* (G. ANAIS, 1986).

4.2.1.3 Sweet Peppers

Breeding for resistance to *P. solanacearum* in sweet peppers was made easier by the fact that resistance was found in a commercial population of a Spanish pepper "Largo Valenciano". Work was carried out to obtain resistant lines, one of which was released under the name of "Narval". Southern Bacterial Wilt is no longer a problem with this species (F. KAAAN and G. ANAIS, 1977).

4.2.2 Breeding for Resistance to *Xanthomonas vesicatoria* in Sweet Pepper

The source of resistance by hypersensitivity described by A. COOK in Florida is not effective in our conditions. We are using a non-specific resistance found by F. KAAAN in introductions from Malaysia. We also found resistance in doubled haploid lines from a cross between Yolo Wonder and an Indian introduction (F. KAAAN and G. ANAIS, 1977).

4.2.3 Breeding for Resistance to Fungal Diseases

4.2.3.1 Tomato

We are breeding for resistance to *Fusarium oxysporum* sp. *Lycopersici* (races 0 and 1). *Stemphylium solani*

(grey leaf spot), *cladosporium* leaf mould (*Fulvia fulva*). All of our lines carry resistance to *Fusarium* and *Stemphylium*.

4.2.3.2 Melon

Three diseases threaten melons in our area, Powdery mildew (*Erisiphe cichoracearum*), Downey mildew (*Pseudoperonospora cubensis*), and Gummy stem blight (*Mycosphaerella citrullina*). We have introduced resistance to these parasites in the cantaloup, charentais type, using the American canteloupe (Georgia 47, Perlita and Chilton) as a source of resistance (G. ANAIS and F. KAAAN, 1978).

4.2.4 Breeding for Resistances to Root-knot Nematodes (*Meloidogyne incognita*)

4.2.4.1 Tomatoes

This is a serious pest in the tropics where it causes damage to many vegetable crops. We have introduced the gene Mi in lines resistant to *Pseudomonas solanacearum*. We have also introduced the linkat Mi/F2 (KERR, Ontario). Breeding is done by inoculation of *Meloidogyne* eggs (SASSER 1984) the method used is back crossing (C.M. MESSIAEN, H. LATERROT and F. KAAAN, 1978).

4.2.4.2 Beans

Resistance to *Meloidogyne* was also bred into beans using "Manoa wonder" as resistant source. This programme was continued by C.M. MESSIAEN from 1981.

4.3 Varietal Releases

Our breeding work has resulted in the release of a number of varieties with characteristics suited to growing in the humid tropics.

Tomato: CARAIBO - A heat tolerant cultivar that can be grown during the hot humid season. It is resistant to Southern Bacterial Wilt (*Pseudomonas solanacearum*), *Fusarium* (0 and 1) and *Stemphylium* (grey leaf spot). A determinate medium fruited variety.

Pepper: NARVAL - Large Spanish type. Heat tolerant, resistant to Southern Bacterial Wilt. Tolerant to *Xanthomonas vesicatoria*.

Melon: PERLICHA - Resistant to cracking good shipping ability. Resistant to Powdery and Downy mildew. F1 hybrids with resistance to Powdery mildew, Downy mildew, Gummy stem blight and watermelon mosaic virus (WMV1).
origin.

Onions:

Population INRA-AG N 1 Male sterile
Population INRA-AG N 2 Maintainer

Short day types, good keeping ability (6 months). Yellow skin.

5. CONCLUSIONS

Breeding new varieties is a long term effort. The work started in 1970 is just beginning to produce results. At the time of starting there was very little work being done in the area of breeding vegetables for the hot humid tropics.

There are now several teams with whom we can exchange experiences and breeding materials. The creation of AVRDC was of major importance for this topic. Our greatest breakthrough however, is in the area of resistance to *Pseudomonas solanacearum*. The varieties that we have released have a very high level of resistance to this parasite, which has proven to be effective in

many countries both in the Caribbean Region and elsewhere.

Screening a range of introduced resistant varieties has shown that the resistance of some varieties of foreign origin does not hold good for our conditions. This is the case with Rodade (totally susceptible) and some AVRDC accessions. The reason for this is that the strains of bacteria that we have in Guadeloupe and Martinique are among the most virulent in the world (PRIOR, personal). Breeding in Guadeloupe therefore, should ensure worldwide resistance. International cooperation will be welcome to test this hypothesis further.

Limited resources have obliged us to make priorities in our breeding programme and place emphasis on the crops of major economic importance in the Caribbean. Nevertheless, the experience acquired here can still serve the needs of the third world. We must however, be conscious that it is not possible to satisfy those needs with the efforts of just a small team of plant breeders.

Obviously international cooperation is a must and I greatly appreciate that this meeting provided the opportunity to reinforce this type of collaboration.

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7.3 CARDI

CARDI's Vegetable Programme

F. Chandler

The OECS Agricultural Diversification Programme and the Regional Action Plan of the Caribbean Community for Agricultural Development were two of the major policy instruments used in formulating the 1990-91 CARDI Work Programme.

CARDI's Vegetable Programme forms part of the broader Crop Production and Technology Adaptation and Transfer Programmes.

The Crop Production Programme embraces component research on both new and traditional commodities and provides components for the technological packages which are tested in the Technology Adaptation and Transfer Programme (TAT). The TAT programme in turn receives feedback on production problems which become the basis of new research. The Technology Adaptation and Transfer activities therefore bridge the gap between research and the farmer.

Networking is a principal strategy used in the implementation of CARDI's Work Programme as a whole. The approach includes technical collaboration and information exchange.

The general objective of the Vegetable Sub-Programme is to increase regional self-sufficiency in vegetables by improved production and productivity as well as to stimulate intra- and extra-regional trade in selected vegetables.

This is achieved mainly by means of

the following strategies:

- o Evaluation and preservation of genetic resources
- o Production and distribution of planting material
- o Integrated pest management
- o Postharvest technology

In recent years, major crops in CARDI's programme have been cabbage, cauliflower, broccoli, tomato, carrot, onion, lettuce, cantaloupe, christophene, watermelon, hot pepper and, to lesser degree, herbs.

Work on individual crops has included selection of varieties suitable to local climatic conditions. In tomatoes and the Brassicas in particular, emphasis has been placed on selecting varieties which will perform well during a hot, wet season. With cabbage, varieties are also selected on the basis of resistance/tolerance to Black Rot disease.

With onions, emphasis is being placed on varieties which will bulb under short day conditions and store well at ambient temperatures. The extension of the production season is another aspect being investigated with reasonable success in Barbados in particular, where CARDI is collaborating with other institutions in the multi-disciplinary National Onion Development Programme. The variety Special 38 was selected in 1987 on the basis of yield which has been as

high as 20 tonnes/acre under commercial conditions. The variety Grandstand was selected during the last three years for its high yield and good storability. Yields as high as 16 tonnes/acre were achieved commercially with this variety during the last season.

In addition, improved postharvest handling systems are being developed in Barbados and Montserrat.

Preliminary investigations into solar drying of onions have been carried out on a reasonably large scale in Barbados and on a smaller scale in Montserrat.

Over the years, eggplant has become an important export crop. However, a number of problems exist which have constrained the further development of the export trade. "Greening" and "scabbing" symptoms on fruit which make the crop unattractive to growers have resulted in extremely high rejection rates. Yields of over 50,000 per acre have been obtained commercially in Barbados but, in some cases, rejection rates have been as high as 50%.

Preliminary investigations by CARDI in Barbados indicate that the problem is not varietal and is not caused by common, mechanically transmitted viruses, thrips, mites or potash deficiency. However, since this problem needs to be investigated further, a detailed study is planned for 1990-1993.

Promising results were obtained in early eggplant trials in Antigua where the tech-pack developed in Barbados was tested with and without mulching. Under the dry conditions of Antigua, mulching appeared beneficial.

Under the Technology Adaptation and Transfer Programme which is the driving force of CARDI's programme system, relevant production systems

are being developed for selected crops. These tech-packs are validated on-farm. Farmers are then encouraged to adapt them into their commercial production and marketing operations.

Effective collaboration with farmers, the private sector and extension agents in the National Agricultural Systems, contributes to the realisation of the objectives.

The supply of planting material from the correct cultivars is an important part of any production programme, particularly if crops are to be exported. The major crop being worked on here is hot pepper, where the Scotch Bonnet variety is being promoted. Clean seed is being produced and distributed to growers, and improved production and marketing systems are being tested in Antigua, Dominica, Montserrat and Saint Lucia. In Grenada, a pilot project for the export of hot pepper has been set up, with CARDATS farms being the core farms in the project. Credit is being arranged for the acquisition of inputs, and production and harvesting is being scheduled and monitored.

Pest management is another important aspect of crop production. The major group of crops being researched in this area is the Brassicas where the diamond back moth has proven to be a major constraint. An Integrated Pest Management approach is being used in preference to purely biological or chemical control methods. In Barbados efforts are being made to select insecticide resistant strains of parasites to be used in combination with insecticides which are effective against the diamond back moth. Validation of methods to control diamond back moth in cabbage on four farms in Antigua confirmed that Thuricide gave consistently good results. The use of environmentally safe, biological

insecticides like Nomolt, is being investigated with some success in St. Kitts.

The Integrated Pest Management Projects are supported by mass breeding of parasites and predators in laboratories in Barbados and Jamaica.

An accurate diagnosis of disease problems is necessary if quality crops are to be produced. In view of this, a Plant Pathology Diagnostic Unit is being set up in Dominica.

Nematodes are an important pest of carrots. Management of the nematode by inter-cropping with chives and cabbage has been investigated in St. Vincent. The cabbage/carrot combination carried greatest returns, while the chive/carrot combination proved the most effective for nematode control.

Weed control is another major constraint to vegetable production in the region, particularly in countries which cannot rotate with sugar cane. Onions are particularly susceptible to competition from weeds. An integrated system for weed control in onions is being developed in Montserrat and St. Kitts. Some pre-emergent herbicide work has also been done in Barbados.

In addition, a Handbook on Weed Control for Caribbean Farmers is being prepared to cover a large number of vegetable and other crops. Two fact sheets and 15 technical bulletins have been completed. An economic analysis of weed management systems defined in the OECS was completed for vegetable based production systems in Saint Lucia, and a training course in weed science has been developed. A book on weeds has been completed in cooperation with INRA.

An efficient fertiliser programme is important for the production of high yields of good quality vegetable crops. Fertiliser research using inorganic NPK fertilisers as well as pen manure and biogas slurry on the lettuce-cabbage-carrot vegetable rotation system is being carried out in Dominica. The biogas slurry gave encouraging results especially in the dry season. Response of onions to various levels of fertiliser is being investigated in St. Kitts.

Irrigation is essential for year-round production of crops. It is particularly important for export crops where continuity of supply, high yields and good quality are absolutely necessary if the Caribbean is to succeed on the very competitive extra-regional markets. Construction and maintenance of farm ponds, damming of rivers and development of irrigation and fertigation systems is being covered in Grenada, Montserrat, Saint Lucia, Antigua, St. Vincent and St. Kitts and Nevis. Training in irrigation is also being covered in these countries.

Soil conservation is an extremely important factor to be considered, particularly if there is to be continuous cropping with vegetables which do not protect the soil surface. This is receiving attention in Dominica, Saint Lucia and St. Vincent.

Training is an important component of the Irrigation and Soil Conservation Projects. Twenty machinery operators, 150 farmers and 13 extension officers benefitted from training programmes in seed bed and field preparation, machinery operation and care, soil conservation, and maintenance of irrigation systems.

To complement the work being done on the production of the individual crops, a number of supporting activities are being carried out which are common to all the crops. These include the implementation of farm management systems and credit schemes in Antigua and Dominica. CARDI is collaborating with CATCO and private suppliers in a regional input procurement system. Drip irrigation systems have been supplied to growers under this scheme.

Efficient marketing and reduction of postharvest losses are important components of any enterprise. CARDI is supplying marketing support by means of trade arrangements and training programmes in the OECS Countries. Farmers' Wholesale Centres are being set up in St. Vincent and Saint Lucia. A market survey of vegetables and other crops at the farm gate, supermarkets, local markets, hotels and export channels is being done in St. Kitts. Technologies and farm models relating to the OECS Agricultural Diversification Project are also being evaluated, and tech-packs are being developed for non-traditional crops for the export and hotel industries.

The economic aspect of vegetable production is also being addressed. Cost structure information has been collected for existing technologies for eggplant, tomato, sweet pepper, cabbage, carrot, squash, okra, hot pepper and onion.

Existing technologies have been compared with potential alternatives in the following areas:

- o Traditional vs. new methods for diamond back moth control in cabbage;

- o Returns and costs associated with existing and new tomato varieties including risk analysis of the varieties;
- o Comparison of three new water conservation techniques with farm practice;
- o New eggplant production systems for the export market compared with the traditional system;
- o Weed control systems for onion production.

In the area of Communications and Group Dynamics, CARDI is providing support by means of farmer training and exchange programmes as well as on-farm demonstrations in the OECS States.

Two special items included in the 1990-91 programme to support the vegetable programme are the development of training and communications materials in Saint Lucia and the establishment of research and training centres in Saint Lucia and St. Vincent.

In developing its vegetable programme, CARDI has held discussions with Ministries of Agriculture to review results of past work and identify and define new topics for study. This has ensured that the proposed CARDI activities meet member governments' priorities and regional needs.

7.4 USAID

Bethesda Irrigation Project - Antigua

A. Azenkot

1. INTRODUCTION

A Memorandum of Understanding was signed on July 1985 between the Government of Antigua and Barbuda acting through the Ministry of Agriculture, Lands and Fisheries (MALF) and the Division for International Cooperation (MASHAV) acting through the Agricultural Development Company (AGRIDEV), Israeli State Enterprise, and the Agency for International Development (AID) acting through its Regional Development Office/Caribbean (RDO/C).

The present report summarises the assignments accomplished from August 1985 to April 1990 in the Bethesda Project and other private farm units in Antigua. The Project was sponsored and funded by the USAID and MASHAV (Israel).

2. CONSTRAINTS

The activities and effort involved in developing the farm units, e.g. expanding the size of the farm, increasing the number of crops produced at the same time, selecting a proper irrigation system and agricultural equipment, were guided by the constraints in agricultural production.

The major constraints involved in vegetable production that the farmers had to overcome were:

- o **Water** - Antigua has a long dry season (9 months) during which the evapo-transpiration

exceeds the rainfall (Appendix 1). Even during the wet season, the amount and the pattern of the rainfall is insufficient for most of the vegetable crops, and an additional water supply could increase yields.

- o **Labour** - The manpower in agriculture is scarce and expensive. Most of the labour comes from other islands.
- o **Farm** - The arable land was divided into very small units, as a result, farm size could not justify full time occupation in agricultural production.
- o **Experience** - The farmers were inexperienced in the handling of modern agricultural equipment and managing large units of vegetable production.
- o **Finance** - There were no subsidies or other means of financial support for the acquirement of agricultural equipment.
- o **Production** - The vegetable production fell short of meeting the local demand, and to a lesser extent during the wet season. Certain types of vegetable were entirely imported - such as onions.

3. THE OBJECTIVES

The following main objectives were:

- o to increase the yield of all vegetable crops by implementing any available technology such as the use of agricultural equipment and application of fertilisers and herbicides;
- o to increase crop size, and ultimately the farm itself to a size that could justify acquiring a tractor and suitable agricultural implements;
- o to expand the vegetable production to year round, and
- o to diversify the production to substitute import products, such as onions, and to explore regional markets for this commodity.

4. THE HIGHLIGHT OF THE ACTIVITIES

Progress and increase in vegetable production could not be accomplished without the restoration of the irrigation system in Bethesda Project and the expansion of the irrigated fields outside the Project. The guidelines in the expansion of the irrigated fields were; the initial cost of the irrigation systems, the topography of the fields, and introduction of a proper technology to make year round production on a large scale possible.

The most significant achievements are as follows:

- o Onion production increased rapidly in Antigua, from almost 3 acres in 1988 to 55 acres at the beginning of

1990. It is expected that in 1990, the onion production will meet local demand. A small quantity of dry onions was exported to St. Kitts and Nevis and to Anguilla to learn the mechanism and the reaction of the system.

Apart from the rapid expansion of onion fields, the maximum yield has increased steadily from 15,000 lb/acre in 1988 to over 50,000 lb/acre in 1990. One farmer, (Goodwin) is successfully cultivating over 10 acres of onion as well as other crops.

- o The irrigation system in the Bethesda Project has been restored of and vegetable production revived.
- o Irrigation systems (drip and sprinkler) have been installed on about 300 acres of arable land. Farmers have been trained to use and maintain these two systems efficiently.
- o Nine modern farms have been established outside Bethesda Project with almost all the required agricultural equipment.
- o The application of fertilisers and chemicals was increased considerably.
- o The capability of the crop production in the entire irrigated and rainfed fields was able to meet almost all the demands for vegetables of the kinds that the Antiguan climate and soil could produce.

7.5 IFAD/DOMINICA

Integrated Rural Development Project

A. J. Stephenson

The Integrated Rural Development Project (IRDP) in Dominica area is specific in respect to Agricultural Development on the two former estates of Geneva in the South and Castle Bruce in the East, but is national in scope in respect of its credit facilities.

On the two former estates, approximately 1930 acres of land has been distributed to 650 farmers - Geneva 730 acres to 370 farmers and Castle Bruce 1200 acres to 280 farmers.

The broad objective of the Project is to assist the newly settled farmers who have recently gained ownership to their lands to increase their productivity and income.

The Project is implemented by the Division of Agriculture through a Project Implementation Unit consisting of a Project Coordinator and four Rural Development Officers (RODs). One Officer on each Settlement is responsible for Extension and Credit and the other for Marketing.

The Project provides for the following:

- 1) Development of the Grand Bay Agricultural Centre and the Castle Bruce Service Centre to provide inputs, planting material, improved animal stock, improved technology and training for the farmers.

- 2) Construction and rehabilitation of twenty-four (24) miles of farm access roads.
- 3) Construction and maintenance of two (2) Agricultural Collection, Grading and Packing Centres.
- 4) Delivery and supervision of farm development credit.
- 5) Development of farm plans.
- 6) Farmer and staff training.

The Project's strategy is to work initially very closely with a few selected farmers, using crops with good market potential (e.g. smooth christophene, hot peppers, white potatoes and ginger), to improve the technological package of these crops in an effort to increase production and productivity.

A progress report on the ginger root project at the Geneva Settlement illustrates this strategy. (Appendix 1).

**INTEGRATED RURAL DEVELOPMENT PROJECT,
DIVISION OF AGRICULTURE BOTANICAL GARDENS**

PROGRESS REPORT ON GINGER ROOT PROJECT GENEVA SETTLEMENT - MAY 30, 1990

Ginger production in the Geneva Settlement can be said to be one of the single most important farm activities second only to bananas.

In the first commercial production season of 1987/88, only ten (10) farmers participated in the program. Only about one (1) acre of ginger was cultivated among them, and only 10,000 lb of ginger, or one third (1/3) of that year's production, was marketable.

In the 1988/89 season thirty-four (34) farmers cultivated approximately 4.5 acres of ginger of which 34,186 lb or two thirds (2/3) of the total production was marketable. Farmers received approximately \$28,000 for their crop that year.

The 1989/90 ginger seasons has just ended and ginger production has significantly improved both in quantity and quality.

Ninety (9) farmers participated in the programme this last season. Nine (9) acres of ginger was cultivated. Farmers sold approximately 127,362 lb of ginger through IRDP.

Of the above quantity, 65,910 lb of first grade ginger and 42,510 lb of second grade were exported by CATCO to Europe, while 5,160 lb were exported by the Dominica Hucksters Association (DHA), Renauld Blaize and others.

The remaining 13,782 lb did not reach the required export standards and were used for local consumption and as planting material for the coming season. Geneva farmers received a total of approximately \$90,000 for ginger sold through the Project plus a bonus payment in excess of \$7,000.

Given the encouraging yields, the excellent quality, the guaranteed price and market which now exists for ginger, many more farmers are expected to participate in the project while existing participants are expected to increase their acreages.

For the 1990/91 season it is anticipated that in excess of 125 farmers in the Geneva Settlement alone will cultivate approximately 15 acres of ginger producing approximately 120 tonnes of marketable ginger of which 75% is expected to be sold to CATCO. The balance will be sold to DHA, Renauld Blaize and other exporters.

It is hoped that the Geneva ginger farmers group now formed will gradually take over control of its members' ginger business. IRDP is gradually relinquishing its responsibility in that area.

7.6 IICA

Caribbean Farmers Development Company Limited (CFDC) History and Organisational Structure

J. La Gra

1. BACKGROUND

In March 1986, the Organisation for Rural Development (ORD) convened a meeting of farmer organisations in St. Vincent to discuss the problems of production and marketing of agricultural commodities produced by small farmers. About the same time the Inter-American Institute for Cooperation on Agriculture (IICA) carried out a comprehensive study of the fruit sub-sector in the Windward Islands, giving particular attention to the needs of farmer organisations.

In December 1986, IICA sponsored a meeting of representatives from ORD (St. Vincent), Farm-to-Market (Dominica) and the Saint Lucia Association of Farmers Cooperatives (STAFCO-OP) to discuss the feasibility of joint marketing of agricultural produce within the region. This meeting concluded that joint marketing between farmer organisations was both desirable and feasible and should be initiated as a pilot project.

In January of 1988, IICA, in collaboration with the respective Ministries of Agriculture, initiated the four year project "Strengthening of Farmer Organisations in the OECS." The IICA project has four basic components:

- 1) Generation of decision making information;
- 2) Project identification/formulation/

design of strategies;

- 3) Selective training to overcome specific constraints;
- 4) Inter-island exchange of information and experiences.

On March 7-8, 1988, the first meeting of what was to become the Inter-Island Steering Committee of Farmer Organisations (ISCFO) was held in Dominica. Out of this conference came the call for a short-term, action oriented, plan which would serve as the pilot phase for a longer term, more comprehensive, joint marketing venture. During this meeting, attended by representatives of farmer organisations from the four Windward Islands, decisions were taken to establish a Steering Committee to design and follow up on joint production/marketing activities.

Soon after the meeting in Dominica, a technical committee prepared the "Inter-Island Joint Marketing Project" which was submitted to the Canada Fund by the ISCFO (via STAFCO-OP) in April 1988. In early 1989, the Canada Fund approved and disbursed EC\$100,000 to STAFCO-OP who agreed to administer the fund on behalf of ISCFO.

Between March 1988 and March 1990, the ISCFO met seven times, in different islands, to monitor and evaluate on-going actions and to plan new production and marketing initiatives.

On May 10, 1990, the ISCFO was legally registered as "The Caribbean Farmers Development Company Limited," incorporated under the Companies Act in Saint Lucia.

2. RATIONALE FOR JOINT MARKETING

Farmer organisations feel strongly that the production of crops and livestock should be based on market opportunities and that farmers must play an active role in the identification and exploitation of these opportunities. In group discussion in Dominica in March 1988, representatives of numerous OECS farmer organisations agreed on the following points:

1. Agriculture is a traditional and continuing source of economic activity within the sub-region and the backbone of this sector is the small farmer;
2. Production and marketing strategies should be closely integrated and based upon market potential;
3. Joint activities should be undertaken which enhance the capabilities of the people of the sub-region to produce and market produce for the sub-region;
4. Active farmer participation in the definition of priorities of production and marketing for export is a key to ensuring successful production/ marketing programmes;
5. Joint agricultural marketing through farmer organisations is complimentary to national and OECS initiatives towards diversification;

6. Joint marketing activities will contribute to crop diversification and vice versa;
7. With the spectre of the removal of preferential treatment for Windward Islands Bananas in 1992, farmer organisations must play a more active role in the search for sustainable production/ marketing opportunities;
8. Jointly, farmer organisations can maintain a greater degree of control over the production, shipping and marketing of their produce;
9. Farmer organisations participating in the CFDC have voiced their support and demonstrated their commitment to the concept of joint marketing.

3. CFDC STRUCTURE, OBJECTIVES AND RESOURCES

3.1 Members

Members of CFDC shall be farmer organisations in the individual States of the Commonwealth Caribbean engaged in the production, trading, or marketing of agricultural produce and/or farm inputs and implements.

3.2 Board of Directors

The business of CFDC shall be managed by a Board of Directors directors appointed by organisations of each of the Member States. Where the State has one organization it shall appoint one director; where it has more than one organisation, or an umbrella organisation with more than three hundred farmers, it shall appoint two directors.

3.3 Staffing

The Board of Directors shall appoint a General Manager, or a General Manager/Secretary or a Secretary and a Financial Controller. Other staff will be appointed as required and resources permit.

3.4 Meetings

Regular meetings of the Board of Directors will be held every six months. The company shall in each year hold a annual general meeting of all members. The Secretariat may call special meetings from time to time as determined necessary to conduct company business.

3.5 Objectives

The objectives for which the company has been established are:-

- a) To develop in those Commonwealth Caribbean States where members reside, viable and self-reliant farmer organisations capable of engaging in activities and executing programmes aimed at reducing the imbalance of agricultural commodity trade among and between the Commonwealth Caribbean States and other countries;
- b) To concentrate on the identification and implementation of projects and actions which will impact favourably on the reduction of food imports from sources other than the Commonwealth Caribbean and to increase agricultural export from the States of the Commonwealth Caribbean to other countries.

3.6 Resources

In addition to its staff, technical assistance will be provided to the CFDC from Peace Corps Volunteers stationed in the Member States and short term consultants provided by the IICA project to strengthen farmer organisations.

Funding for the execution of CFDC sponsored activities comes from several sources including IICA, Canadian Cooperative Association, Canada Fund, Canadian Small Project Implementation Facility, Inter-American Foundation, Caribbean Association of Industry and Commerce and others.

4. ACHIEVEMENTS

Within a period of approximately two years (March 1988-May 1990) the ISCFO/CFDC has made considerable progress. The highlights of these achievements to date are listed below:

- o The Caribbean Farmers Development Company, Ltd. (CFDC), representing 14 farmer organisations from 6 islands, was developed during 1988-89 (ISCFO) and registered in Saint Lucia on May 10, 1990.
- o A project for inter-island trade was funded (EC\$118,000) by Canada Fund and executed in 1989;
- o Fourteen shipments of fresh produce from farmer organisations in Saint Lucia and Dominica to farmer organisations in Antigua and Barbados were made successfully by members of CFDC (ISCFO) in 1989;

- The CFDC has been selected to sit on the Management Committee of the OECS Agricultural Diversification Coordinating Unit (ADCU);
- Funding (EC\$268,000) was provided by the Canadian Cooperative Association to identify and formulate development projects and to determine needs for training to strengthen farmer organisations;
- Project for the establishment of a slaughterhouse in Saint Lucia, to be operated by STAFCO-OP, was prepared and approved for funding (EC\$593,000) by CIDA - SPIF;
- Project for the development of marketing infrastructure for the Cooperative Farmers Association, Antigua, was prepared and has been funded (EC\$56,000) by Inter-American Foundation;
- Project for the expansion of marketing infrastructure of the Barbados Agricultural Society was formulated and has been approved for funding (EC\$80,400) by Inter-American Foundation;
- Project for the expansion of marketing infrastructure for Productive Farmers Union, Grenada, was formulated and approved for funding (EC\$67,000) by Inter-American Foundation;
- Project for the development of marketing infrastructure for Sunshine Harvest Farmers Cooperative, Saint Lucia, was formulated and approved for funding (EC\$67,000) by Inter-American Foundation;
- Project for the institutionalisation of the Caribbean Farmers Development Company Ltd. was formulated and has been approved for funding (EC\$134,000) by Inter-American Foundation and IICA;
- A regional newspaper "Focus on Integrated Rural Development" has been created with funding (EC\$150,000) provided by the Canadian Cooperative Association and IICA. Eight (8) issues have been published and distributed to date (3,000 copies each issue);
- Market opportunity studies have been undertaken in Barbados, Antigua, Miami and Toronto;
- North American market opportunities for organically grown produce have been evaluated;
- A series of documents have been published, providing baseline information on farmer organisations in Antigua, Dominica, Saint Lucia, Grenada and St. Vincent;
- A strategy has been elaborated for the development of the livestock industry in Grenada;
- Databases have been prepared for monitoring egg production, broilers and pork in Saint Lucia, import substitution crops in Saint Lucia and the collection and analysis of on-farm decision making information in St. Vincent (ORD); these databases have been put in operation and are presently being tested;

- o A regional information network (Fax machines and Focus newspaper) has been initiated to facilitate communication between farmer organisations in the different islands;

The achievements indicated above are the result of close cooperation and coordination between the respective Ministries of Agriculture and a diversity of regional and international development organisations including: Canadian Cooperative Association, Inter-American Foundation, IICA, SPIF, Peace Corps, Canada Fund, OECS-ADCU, and others.

5. FUTURE

The development of CFDC is well on its way to achieving its objectives. By involving the farmers themselves in the decision making process, and in the identification and design of solutions, it is expected that CFDC will contribute greatly to the achievement of national goals in respect to both import substitution and export development of non-traditional commodities. However, it is recognised that neither farmers nor farmer organisations can, by themselves, have much impact on rural development - the ultimate goal. The solution lies in a joint effort between farmers, farmer organisations, public sector institutions, private sector entrepreneurs and regional and international support organisations.

One of the strategies to obtain development resources has been to use CFDC to bridge the gap between funding agencies/NGOs and primary societies. This has led to an increase in the flow of resources directly to the primary societies.

Emphasis has been given to the development of managerial and self-sustaining potential by assisting in the improvement of the marketing capabilities of the farmer organisations. Efforts in these two areas will continue in the future.

At the present time a number of projects are in the design stage. These include a two year training effort to develop middle management training skills; trial commercial shipments to extra-regional markets, and the supply of seeds and farm inputs to member organisations.

7.7 ROC/ST. KITTS AND NEVIS

Vegetable Production in St. Kitts and Nevis

D. F. Yeng

1. INTRODUCTION

The islands of Saint Kitts and Nevis are located in the Northern part of the Leeward Islands sub-region of the Eastern Caribbean. They have a total area of 269 square kilometers (176 for St Kitts and 93 for Nevis).

The climate of these two islands is pleasant with an average temperature of 79 degrees F, and an average annual rainfall of 55 inches.

The total population for both islands is approximately 45,000 of which 36,000 reside on St. Kitts and 9,000 on Nevis.

The economic development of this country is based on agriculture with sugar-cane the main crop on St. Kitts, and cotton and coconut the major crops on Nevis. The non-sugar agriculture in St. Kitts and Nevis is limited, thus production figures are not easily available. The non-sugar farming population has been estimated at 900 farmers who generally cultivate marginal lands at a subsistence level

2. VEGETABLE PRODUCTION

According to past records, vegetable production in St. Kitts and Nevis, totalled about 500 tons (1,100 lb) per annum. However, it is estimated that the monthly and yearly demands of vegetables are as shown in Table 1.

At a conservative estimate, yearly demand of all types is 2,640,000

pounds (equivalent to 1,200 tons). To supply the population, the insufficiency has been covered through importation.

During the past years, the government of St. Kitts and Nevis has placed increasing emphasis on Agricultural Diversification. In response to this, the Department of Agriculture has intensified its efforts to increase vegetable production by local farmers to meet the domestic consumption.

3. PROMOTING VEGETABLE PRODUCTION

A Proposal to Promote Vegetable Production has been mapped out by the Food Production Office. The expected outputs of the implementation of the proposal are:

1. Establishment of ten farmers on land (10 acres each) with long-term leases.
2. Coordination of farmer production through phasing of farmers planting to minimise gluts and shortages.
3. Collection of information on volumes and timing of production to aid crop forecasting.
4. Provision of market intelligence and recommendation for import restriction.

Table 1. DEMAND OF VEGETABLES IN ST. KITTS AND NEVIS

Vegetable Type	Demand in lbs	
	Monthly	Yearly
white potato	80,000	960,000
onion	40,000	480,000
beans	20,000	240,000
tomato	16,000	192,000
cabbage	15,000	180,000
pumpkin	10,000	120,000
cucumber	10,000	120,000
carrots	10,000	120,000
eggplant	4,000	48,000
sweet pepper	4,000	48,000
miscellaneous	21,000	252,000
Total	220,000	2,640,000

4. FUTURE DEVELOPMENT

Future development in vegetable production appears promising, although some constraints and difficulties will be encountered in the implementation of self-sufficiency targets. The government organisations and institutions will team up with all feasible support possibilities to overcome or eliminate every obstacle.

Because of the importance of the non-sugar agricultural diversification programme, the Agricultural Technical Mission of the Republic of China (Taiwan) is willing to provide all possible assistance toward its achievement.

7.8 ROC/ST. VINCENT AND THE GRENADINES

Vegetable Production Project of the Agricultural Technical Mission of the Republic of China in St. Vincent and the Grenadines

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S. P. Lin

1. INTRODUCTION

The Agricultural Technical Mission of the Republic of China (CATM) commenced work in St. Vincent and the Grenadines in October 1982. The Mission has contributed to the islands' agricultural development through various projects such as vegetable production, fresh water prawn culture, a swine production programme, upland rice and crops production programme, and bamboo craft training programme. During the following eight year period, the benefits of these projects have spread throughout St. Vincent and the Grenadines.

The Mission has carried out vegetable programmes at the 8 acre demonstration farm at Pembroke in collaboration with the Ministry of Agriculture, Industry and Labour in St. Vincent and the Grenadines.

2. OVERVIEW OF VEGETABLE PRODUCTION IN ST. VINCENT AND THE GRENADINES

A wide variety of vegetable crops, for both local consumption and export, have been cultivated in St. Vincent and the Grenadines. Based on the estimated production figures, it would appear that vegetable production systems in St. Vincent and the Grenadines are characterised by low productivity. Because of the food consumption pattern, the quantity of vegetables consumed is very low among Vincentian families.

Since the production problem and the marketing limit, many vegetable farmers quickly diverted to banana production for export during the early 1980's. Since then, vegetable production activities have declined to the extent that St Vincent no longer exports vegetables, but instead imports substantial quantities of the very vegetable commodities it once exported.

The 1985/86 Agricultural Census list a total of 4,162 vegetable farms of which the average size is 1.12 acres (Table 1). Over 17 kinds of vegetables are grown, with cabbage, tomato, carrot, cucumber, and sweet pepper accounting for the largest areas planted.

St. Vincent is a hilly country with 75% of the land on slopes in excess of 20 degrees. Such slopes are unsuitable for intensive vegetable production activities. In general, most of the soils are fertile and of volcanic origin. St. Vincent and the Grenadines have a tropical, marine climate. Annual mean maximum temperature reaches 31 degrees C while the annual mean minimum temperature descends to 24 degrees C. Relative humidity averages 70-75%. Rainfall ranges from 1,500mm near the coast to 3,500 mm per annum in the central mountains. There is a distinct wet season from May to November during which 70% of the total rainfall is received and a dry season (December-April) when rainfall is relatively low.

Table 1: NUMBER OF HOLDINGS AND AREA OF VEGETABLE CROP HARVESTED (in acres)

CROP	NO. OF HOLDING	AREA HARVESTED
Cabbage	1,086	1.393.28
Tomato	1,222	1,267.46
Carrot	528	663.02
Cucumber	368	443.00
Sweet Pepper	330	381.14
Pumpkin	152	126.98
Eggplant	96	124.82
Onion	80	79.82
Watermelon	32	65.82
Hot Pepper	76	60.98
Lettuce	62	27.58
Christophene	40	18.48
Cauliflower	40	15.14
Zucchini	2	8.00
Beet	28	3.22
Raddish	16	1.06
Melon	4	0.02
TOTALS	4,162	4,679.82

Source: St Vincent and the Grenadines Agricultural Census 1985/1986,
Promissional date

The climatic and soil conditions in St. Vincent and the Grenadines allow for heavy vegetable production. In addition to the domestic demand, there is a substantial and growing export market.

Major constraints of vegetable production in St. Vincent and the Grenadines are as follows:

- o Unavailability of suitable varieties;
- o Deficiency in farmers' skills;
- o Pest injury;
- o Poor post harvest technology, training and facilities;
- o Disorganised marketing system;
- o Inadequate support from the government.

3. VEGETABLE PRODUCTION PROGRAMME OF CATM IN ST. VINCENT AND THE GRENADINES

3.1 Varietal Improvement

The objective of this project was to improve the vegetable production by varietal collection and varietal testing.

Most of the vegetable seeds have been introduced from temperate countries such as the United States and Europe by the St. Vincent Marketing Corporation and the Organisation for Rural Development. They are not well adapted to a hot climate or to tropical diseases.

Since 1982, the CATM has introduced a number of new vegetable crops for trial under local conditions. These crops include asparagus, leek, Chinese kale, pak-choi, Chinese cabbage, Chinese amaranth, water spinach, bunching onion, Chinese

chive, bitter melon, wax gourd, vegetable sponge, bottle gourd, long bean, sweet corn, mushroom and mung bean. Although some of them have adapted well to local conditions, and have been accepted by the local market, they are still not popular among local farmers and consumers. Some crops appear to have good export potential, others could be produced primarily for tourist consumption locally and regionally. Due to the different food consumption patterns of Vincentian and Orientals, some of the introduced vegetables are not consumed by most Vincentian families. Farmers are hesitant to produce these crops because of possible marketing problems.

To improve yield and quantity, the CATM have introduced new improved varieties both pollinated and hybrid. The CATM do their own location testing. Some good varieties of cabbage (KK Cross), tomato (Hsin-hui) carrot (Brasilia and Farmers Improved Large (Five Inch) broccoli (Farmer Early), and Onion (Gladalan Brown) have proven to be of high adaptability to local conditions. Seeds of these cultivars have been imported in small quantities by the Mission. Their availability is therefore restricted.

3.2 Vegetable Seedling Production Programme

The objective of this programme was to promote vegetable production through providing farmers with good quality, healthy vegetable seedlings.

Farmers encountered problems in producing good quality vegetable seedlings during the hot, rainy season. Limited quantities of vegetable seedlings are produced by the bag system and sold by the

Government nursery at Dumbarton. Due to excessively thick stands, resulting in spindly seedlings, survival rate after transplanting is always low.

The Mission set up a nursery at Orange Hill in September 1989, to carry out vegetable seedling production. This will most likely facilitate vegetable production, since seedlings are to be distributed free of charge to farmers.

Up to May 1990, 36,638 cabbage seedlings, 55,244 tomato, 4,443 sweet pepper, 10,605 onion, 9,164 chive, and 1,937 eggplant, together totalling 116,805 seedlings were produced and distributed free of charge to 400 farmers. These farmers are dispersed as follows: Owia 4, Sandy Bay 56, Orange Hill 203, Georgetown 89, Overland 34, and Leeward Side 64.

To ensure the success of this project, the Ministry of Agriculture has asked the Mission to provide the necessary technical assistance to agricultural stations at Georgetown and Dumbarton for vegetable seedling production.

3.3 Establishment of Suitable Field Technologies

The objective of this programme was to increase total output and productivity through suitable technology and the upgrading of farming skills.

From our observation of vegetable production in St. Vincent and the Grenadines, it was clear that many farmers do not understand the correct cultivation techniques. The land preparation activities are in most cases, manually undertaken with the aid of the cutlass, fork and hoe. Low level of organic matter on

the land, inadequate use of fertiliser and pesticides, manual weeding and poor post harvesting of vegetables lead to low yields and poor quality produce.

The Mission introduced small power tillers and cultivators to improve and facilitate the land preparation and cultivation activities. There is increasing use of organic matter such as chicken manure, pen manure, and compost, to improve soil fertility. The automatic sprayer and high pressure sprayer are also in use to facilitate better control of pests. Improvement of cultural practices such as mulching, banking, topping, lateral budding, pruning, trellis system and crop rotation system, have been carried out at the farm to demonstrate the results and to exchange information with the farmers. Also established were the irrigation systems to demonstrate and encourage irrigated vegetable production during the drier season for more even vegetable production.

4. MAJOR CONSTRAINTS IN VEGETABLE PRODUCTION IN ST VINCENT AND THE GRENADINES

The main constraints to efficient production of vegetables in St. Vincent and the Grenadines are:

- o Poor marketing for fresh vegetables;
- o Lack of adequate research programmes to develop new improved varieties adapted to local needs;
- o Lack of farming skills and suitable technology;
- o Lack of transportation system which prevented the smooth flow quantity and quality to the market;

- o Disorganised marketing system;
- o Inadequate support from the Government;

5. CONCLUSION

The CATM have been promoting vegetable production in St. Vincent and the Grenadines since 1982. The performance of the vegetable subsector however, continues to be unsatisfactory. There are many constraints involved in developing this subsector, the most important of which are the marketing problems, and the farmers hesitancy to produce these vegetable crops.

Cooperation and communication between the CATM and extension systems of MAIL are too limited for effective technology transfer. These two entities have often developed separately and operate inadequately, thus hindering the flow of information to the farmer. Also, once farmers have adopted a profitable, mono-cropping system (bananas), it is difficult and time consuming to change to a vegetable cropping system.

Vegetables are cash crops which can be produced in 1-2 months to 3-4 months. Many can be harvested continually, providing a consistent source of cash income. Vegetables constitute an economical source of vitamins, protein, and minerals for lower income earners who cannot afford meat and meat products. As the standard of living rises, higher quality vegetables will be more and more in demand.

Not only will the domestic demand be increased, but vegetables will also have a good regional and non-regional export potential. Stability in production and good quality products are required. If production, transportation, post harvest handling and marketing of vegetables can be properly managed, vegetable production will become of very great economic importance.

7.9 AVT

Venture Capital for OECS and Barbados Agribusiness
Funded by USAID under the HIAMP Project

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D. Boyce

1. BACKGROUND

The Agriculture Venture Trust (AVT), is a non-profit organisation registered under the Charities Act of Barbados to take equity positions in new or expanding agri-business ventures in Barbados, the OECS and the British Virgin Islands. Funding for the Trust is provided entirely by USAID.

Six Trustees now constitute the Board of Trustees, and by the end of August, a seventh trustee will be appointed. Four of the these trustees will be citizens of the OECS Countries and a fifth has spent much of his work life in the OECS. Two of the potential seven trustees are private sector businessmen, two are lawyers, two are accountants and finance professionals and one is an agriculturalist. This structure of the Board of Trustees is designed to ensure that adequate business, finance, accounting, and legal considerations are given to the agriculturally oriented projects for which investments are sought, both when the investment is being considered, and after the investment has been made. All the Trustees are very experienced persons who have distinguished themselves in the region in their respective fields of endeavour.

The headquarters and field offices of the project are now fully staff by West Indians or permanent residents of the West Indies.

2. AVT'S MISSION

The mission of the Trust is to use equity risk capital to develop successful agri-businesses which either earn foreign exchange themselves or reduce the net national usage of foreign exchange.

Agriculture, agro-processing, agricultural infra-structure, agricultural marketing, mariculture, fishing and fish processing all qualify as subsectors in which the AVT may invest.

3. FORMS OF INVESTMENT

Investment by the AVT takes the form of purchasing shares in new or expanding companies or of making a quasi-equity redeemable capital contribution for expansion by farmer organisations. At present, investments may range from US\$ 20,000 - US\$ 500,000 and must represent not more than 49% of the equity of the investee company or the project being pursued by the farmers' organisation. The target initial share of equity is normally around 30% with an initial investment size of not more than US\$ 350,000. This allows the Trust to inject further amounts of capital into the new business if the business needs such injections. Experience so far indicates that many of the businesses will need more capital than originally estimated.

4. RETURN ON AVT INVESTMENT

Wherever possible, the Trust does not charge any fixed return on the investments it makes or, in most cases, require any security on assets financed by funds from the Trust or any other funds. Any return made by the Trust will depend solely on the success of the project. The Trust therefore shares equally in the risk of the project along with the other investors.

Between the fifth and tenth year of operation, after the Trust has made its investment, the Trust will sell its shares in the companies to the other shareholders, or seek to recover the quasi-equity capital contributions it has made to farmers' organisations. Hopefully, for most of the period during which the Trust is an investor in the project, the venture will have been profitable and paid some dividends.

Dividend payments are not however a requirement, although they would be welcomed if the company had sufficient cash flow to make such payments. If the venture has been profitable, and expects to continue being profitable, the Trust would expect to receive more for its investment than it originally paid. Such capital appreciation is required in order to compensate the Trust for the risk it takes and to provide income for the Trust.

Dividends, return of capital, and capital gains received by the AVT will go into a revolving fund to enable the Trust to continue operating and making further investments.

5. CONDITIONS OF INVESTMENT

Because the Trust's return of capital and investment income depends solely on the success of the

ventures, the Trust requires (via its equity investment agreement with the other investors) that certain target financial ratios be met. Certain accounting and other information must be prepared and distributed, and directors be elected to represent the interest of the Trust on the board of directors or in the management of the new ventures. Finally the Trust reserve the right to sell its shares in an investment to whoever will buy them if the venture is going terribly wrong or to find its own management for the venture so that it may succeed and yield acceptable rates of return to all the investors involved.

The Trust firmly believes that good rates of return on investments are absolutely necessary if people are to venture into agricultural diversification, and that good and all-round management are a precondition for high rates return.

6. HOW THE TRUST WILL ACCESS YOUR PROJECT

Interested investors may approach the HIAMP Project Officer in Dominica, Grenada, Saint Lucia or St. Vincent or contact the Chief of Party or the AVT's Executive Director in Barbados.

To decide on an equity infusion the AVT will first review a brief proposal describing the project and then conduct a complete assessment of the client's credit-worthiness and business performance. If the AVT agrees to consider an investment in a company or grower association, the investor must work closely with the resident Project Officer to develop a business plan or feasibility study of his project. This plan will be evaluated by the Trust and a final investment decision made on the client's project.

7. EQUITY FOR NEW PROJECTS

Investors and the Trust will put US\$17.4 million of equity in 21 new projects. As of April 30 the Trust has committed US\$ 6.08 million of its \$12 million Equity Fund to 21 ventures in seven Eastern Caribbean countries. Because the AVT's investment is approximately 35% of total equity in the projects in which the AVT invests, AVT's contribution is representative of approximately US\$ 17.4 million of total owners capital going into new projects. These ventures also access commercial and development bank loans almost equal to their total capital. This further increases the total level of investment in agri-business and agro-processing initiated by the AVT to almost five times the AVT's contribution.

So far, the Trust has financed and implemented bold new initiatives in crop production and product manufacturing. The Trust has rescued firms in non-traditional export agri-businesses and provided quasi-equity investments to small farmers. The AVT has encouraged more development and commercial bank lending, conversion of shareholders debt and new shareholder equity interventions and it has forged linkages between the agriculture and tourism sectors.

8. SMALL FARMERS/INVESTORS GET FAIR SHARE OF INVESTMENT

Over 37 per cent of the AVT's approved funds will go to five grower association (small farmer) programmes and nine very small companies. Investment and industry profiles by Country and Productive Sector are highlighted in Table 1.

Table 1.

AVT'S INVESTMENT PORTFOLIO

A. INVESTMENT PROFILE

Country	No	Value (US\$'000)	%
Antigua	1	60	1
Barbados	3	991	16
Dominica	5	1,290	21
Grenada	4	631	10
St. Kitts	2	770	13
St. Lucia	4	1,375	23
St. Vincent	3	958	16
Totals	22	6,075	100

B. INDUSTRY PROFILE

Sector	No.	Value (US\$'000)	%
Transport	1	500	8
Agriculture	9	2,638	43
Livestock	2	341	5
Agro-Proc.	7	1,707	28
Fishing	1	100	2
Ag. Mktg.	2	789	13
Totals	22	6,075	100

9. PASSION FRUIT: NEW CROP NEW EXPORT IN DOMINICA

HIAMP's efforts have been especially successful in Dominica where the programme has virtually created a passion fruit production and processing industry that now involves over 170 small farmers. Despite Hurricane Hugo, farmers will harvest over 2 million lb of fruit from 200 acres in 1990. When reaped, the fresh fruit, processed pulp and juice will generate annual export earning of almost EC\$ 2.0 million. Later this year a second phase will be launched with 100 farmers to expand acreage by a further 125 acres. The programme will be replicated in St. Vincent where some small farmers are keen to substitute banana production with a new cash crop.

Other investments are beginning to show promising results. These include an Antiguan black pineapple farm, an ornamental and potted plant export venture in Saint Lucia, a pork processing facility in Grenada and an aloe vera farm and processing plant in Dominica.

10. SMALL PROJECTS STARTED WITH HIAMP GRANTS

In addition to the AVT's Investment Fund, HIAMP has helped farmers and processors to launch 73 pilot projects through its US\$ 500,000 Commercialisation Grant Fund. This Fund is used to finance trials of up to US\$ 10,000 per project. To apply for funding, recipients must approach HIAMP Project Officers for help in putting together a brief description and budget for funding consideration by HIAMP. At least one third of HIAMP's grants have led to successful initiatives in cut flower production, ginger root cultivation, tissue culture research, produce handling, greenhouse nurseries, food

processing and hot pepper cultivation.

11. AGRICULTURAL AGENCIES AND MINISTRIES GET HIAMP GRANTS

Some HIAMP grants have been awarded to other agencies such as CARDI, IICA, CATCO, Producer Associations and Agricultural Stations. In this way HIAMP trials are integrated into the system of development assistance which exists in the Caribbean region.

12. CONTACT ADDRESSES

Comments and enquiries should be addressed to The Executive Director, The Agricultural Venture Trust, or to Chief of Party, HIAMP Project, 5 Golf View Terrace, Rockley, Christ Church, Barbados Tel: (809) 435 8990 FAX: (809) 435 8995 or to:

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7.10 CATCO

Marketing Perspectives and Responsibilities in Agricultural Diversification

L. Rose

1. INTRODUCTION

Marketing is surrounded by mystique, with definitions varying from "corporate planning" to "preparation of a media schedule for advertising". However, according to current academic practice, marketing is defined as "the business activities associated with the flow of goods and services from production to consumption".

The marketing of agricultural produce begins on the farm or in a forum such as this gathering here today. It meets specific or perceived demands and is completed with the sales of fresh or processed products to the consumer. Agricultural marketing also includes the supply of seeds, fertilisers and other inputs for production to farmers.

2. PLANNING FOR AGRICULTURAL MARKETING

If marketing is to fulfil its role of stimulating and extending development, specific enterprises must be responsible for finding local and foreign buyers for the many varieties and qualities of fruits and vegetables produced in the region. Ideally, the enterprise should have sufficient investment capital to pay farmers for purchases and shippers and carriers for their services without making them wait until the proceeds of sales are received. In most cases this would be many weeks at the best or even

not at all! In extra regional marketing these enterprises must be able to match the competence of similar exporters from other countries who are competing in the same limited market place.

A marketing enterprise should not be seen only as a linkage between the farmer and the consumer reacting to a situation of supply and demand. The enterprise itself has an important role to play in stimulating output and consumption. It should help to create new demands for farmers produce by constantly improving presentation and delivery. It should also guide farmers towards new production opportunities and the improvement of existing practices where necessary. Its functions are needed therefore, to stimulate economic activities and development.

With few notable exceptions, the significance of marketing and in particular agricultural marketing has always been underplayed in the region at a considerable cost to economic development. National and regional agricultural planning seems to be always targeted on production assuming that once a crop is planted some means will be found to dispose of it at the end of the day. Unfortunately this, leads to disposal without profit and sometimes the most economical way out for the farmer.

Planning for agricultural marketing must be market driven, aimed particularly at extra regional markets and primarily at a wider

section of consumers than the currently popular "Niche Markets" Tropical agricultural produce is for everybody and should not be aimed extra-regionally at immigrant populations (niche markets) but to everyone. Let the population as a whole, appreciate that our products are limitless in their dietary and nutritional values and applications. Where does CATCO fit into this overall picture?

3. THE ORIGINAL CATCO CONCEPT

3.1 The Original Corporate goals of CATCO

The original goals of CATCO were:

1. To reduce the Region's food imports;
2. To provide agricultural trade information;
3. To be financially viable.

3.2 CATCO's Business Strategy:

Catco's business strategy was:

1. To substitute regionally produce fruits and vegetables for extra-regionally produced items being imported to meet existing local demands.
2. To expand intra-regional demands by delivering higher quality fruits and vegetables at lower prices.
3. To increase the quantity and number of regional food products which are exported to existing and new extra-regional markets.

No details are available on how the higher quality, lower-priced

products would be produced. The supply of agricultural inputs was identified as a subsidiary trading activity.

The original USAID Project Paper projected a net profit of BDS\$ 2.66 million by the end of year 4 (1986-87), and an internal rate of return of 20.6%.

With such highly profitable projections, grant financing was under 10% of the total costs and was linked to specific sub-projects. The remaining costs were financed by equity and commercial loans (4-11%).

4. IMPLEMENTATION PROBLEMS

In retrospect, the fundamental flow in the CATCO concept was to underestimate the development work necessary to achieve the company's commercial objectives. There is almost no reference to this in the original project document. In practice, there is such a wide disparity between the normal performance of Caribbean growers and the expectations of buyers, that all of CATCO's trading activities have to be supported by developmental assistance in various forms.

Since its inception, CATCO has lost money at an alarming rate. One of the major reasons for this was the lack of grant funds available to finance development. The only readily available capital was the USAID loan. However, in order to draw this down it was necessary for CATCO to trade. It therefore seems, in retrospect, that management was forced to trade at all costs simply to finance the continued existence of the company. Profitability was of secondary importance, since the condition of the loan draw down did not relate to it.

5. CURRENT AND FUTURE PRODUCTS

Over the last few years CATCO has test-marketed more than 50 products. This has provided the necessary experience to narrow down the product range to 10 main groups. The current mix of fresh produce allows for year-round sales and a satisfactory spread of risk between high-value/low volume crops and high volume/low value commodities.

Current marketing strategy has four main components:

1. Improvement in quality and continuity of traditional crops such as yam, breadfruit, eddoe and ginger for export to markets overseas;
2. Market promotion of traditional crops with crossover potential into non-traditional market sectors, such as mango, pumpkin and plantain;
3. Achievement of a small market share with non-traditional export crops such as melon, papaya, cucumber, hot peppers, passion fruit, egg plant, anthrove, bilumbi, okra among others;
4. Development of highly specialized, high value, niche products for localized ethnic populations in Europe and North America.

Inputs trading has become more important, particularly in the supply of seed and horticultural equipment for contracted export growers. Several sole agency arrangements have been negotiated which provide risk-free income as well as providing growers with necessary equipment and inputs at competitive prices.

It is anticipated that intra-regional trading will increase significantly in the future. The major crops traded regionally are bananas and plantains for which demand is limited. There are possibilities for import substitution of onions and white potato, both are imported in large quantities. This will require long-term development work and cooperation particularly at governmental levels.

6. CATCO'S SUPPLIERS

CATCO handles produce from most Member States of CARICOM. Barbados and Trinidad have both supplied a fair amount by volume of the products traded over the past few years. This has been due to the availability of air transportation to Europe, superior infra-structure and the presence of CATCO's Head Office in Barbados and the CFC Head Office in Trinidad.

Since 1986-1987, the OECS States have become increasingly significant suppliers to CATCO and over the next year or are targeted to become its major supplier of fruits and vegetables.

CATCO's total product volume has been supplied by cooperatives and other associations of mainly small-scale growers. These include the South East District Plantain Associations (SEDPA) in Dominica, the Organisation for Rural Development (ORD) in St. Vincent and the Productive Farmer's Union (PFU) in Grenada.

CATCO would like to develop further export agency agreements with national marketing boards and has initiated programmes to upgrade the management of their procurement and post harvest handling systems.

7. MARKETS

Markets, in order of current importance, are the United Kingdom, Holland (including the rest of Europe), Regional, Canada and the USA.

Europe has been the main target market in recent years. It offers higher prices than North America and also a more favourable exchange rate.

A panel of distributors has been developed in Europe which allows penetration of both ethnic and supermarket sectors for all of the crops available for export.

Training of growers, packers and organisations has become a continuous activity for CATCO. Because of CATCO's unique experience of trading in different sectors of various overseas markets, coupled with its mandate to share that information with other organisations and businesses, staff are called upon for almost every training event, seminar or workshop held in the region that relates to fresh produce.

To this end CATCO is pleased with the OECS/USAID funded TROPRO project - which has mandated CATCO to oversee and manage two important modules within that project. These are the Post Harvest Handling module and Market Information Systems module.

Provision is made for seminars, workshops and site visits as well as for training and information gathering and dissemination. The approach to this exercise will be that specific workshops will be scheduled in different OECS Member States to coincide with crops in season. The first of these workshops will be held in Grenada in July

1990, and will focus on mango - post harvest handling.

Participants will be invited from St. Vincent - a similar workshop will then be held in Saint Lucia on the same subject with participants from Dominica and the Leeward Islands will be invited. Dominica is targeted for giving plant and root. Other workshops for specified crops will be held throughout the region and it is planned that by the end of the exercise each country will have hosted at least one of these seminars and workshops.

Within the project, there are funds for technical support to facilitate improvement of packaging technology and increase the understanding and use of refrigerated sea transport.

Under the Marketing Information Systems module, technical and other marketing information and opportunities will be provided to producers and exporters through the establishment of a computerised data base and publication and distribution of technical analyses and market contacts information. Training in the use of this highly technical element will be provided under the project. Already plans are in an advanced stage of preparation for a two days workshop aimed primarily at exporters, to be held in Saint Lucia on July 23/24 1990.

We are grateful to IICA and to the Minister of Agriculture in Antigua and Barbuda for inviting us to this particular workshop which coincides with our plans. We therefore took this opportunity to invite participants from most of the OECS States who have an interest in vegetable production and marketing. CATCO sees this as a sector of farming that has huge potential for regional and extra-regional marketing.

To conclude this brief summary of CATCO's role in the region I would like to stress that CATCO must not be seen as a competitor to exporters but as a facilitator and a collaborator with all farmers, agencies associated with agriculture exports. It is my belief that we can do a lot better for the region as a whole if we collaborate and share information particularly in the areas of export pricing for the extra-regional markets. Then the beneficiaries will be the region as a whole and particularly the farmers. We must not forget that they are the group have to depend on for the outputs that we so much want to see improved.

7. CONCLUSIONS

When CATCO was set up, the degree to which trading would have to be supported by development activities was not appreciated.

There is no other organisation or business that can now rival CATCO's network of linkages between growers, throughout the region, or its knowledge of the needs of all the main overseas markets niches available to growers.

Since 1985 CATCO's trading and business performance has improved significantly. The company now has sufficient trading skills and existing core business to be self-financing as long as its developmental activities are funded separately.

8. COUNTRY REPORTS

8.1 ANTIGUA AND BARBUDA

R. George

1. VEGETABLE DEVELOPMENT PROJECT ACTIVITIES 1985 -1990

1.1 Technological Developments

1.1.1 Extension Officers and farmers are trained continuously in vegetable production and marketing. This includes overseas study tours to neighbouring islands to observe vegetable production and various local and overseas workshops organised by the Ministry of Agriculture.

1.1.2 Develop and validate technological options where technology is made available to farmers. Improved and more suitable cultivars of crops introduced, tested and validated developing a national tech-pack.

1.1.3 Collect, process and transfer market information to farmers. In this respect, market information processed and transferred to farmers. The Ministry of Agriculture has set up a Market Intelligence Unit, PROMIS which aids farmers in production and marketing planning.

1.1.4 Develop cooperative action among Divisions in the Ministry of Agriculture to provide a better network of service to farmers. This allows the Extension Division to work closely with Agricultural Specialists from other Divisions of the Ministry.

1.1.5 Identify and formulate investment projects to improve support service facilities for vegetable producers. The Ministry of Agriculture with the assistance of the Food and Agricultural Organisation undertook the Sanderson irrigation project to improve year round production of vegetable crops.

1.2 General Objectives

1.2.1 Increase production to satisfy local demand, reduce importation and increase export of selected vegetables.

1.3 Specific Objective

1.3.1 To improve the efficiency and effectiveness of vegetable production/marketing systems in Antigua.

2. MAIN ACHIEVEMENTS

2.1 Vegetable Production

Vegetable crops are grown throughout Antigua. However, the major growing areas are in the North Central and South Central Districts. Onion production has been one of the biggest successes in vegetable production in Antigua. Production is now sufficient for local demand and a regional export market is being explored.

Among the vegetable crops cultivated in Antigua, those with significant economic potential, are set out in Table 1. in order of priority:

Vegetable supply/demand data are limited. However, indications are that in 1985, the estimated demand for all vegetables exceeded production as shown in Table 2.

While there is still plenty of room for import substitution, Antigua and Barbuda produce a high proportion of vegetables for local consumption. Eventually, Government hopes to achieve total self-sufficiency in vegetables and to increase vegetable exports of selected crops.

3. MAIN PROBLEMS

3.1 Non-technological

- o Local drought condition - scarcity of water during the dry season;
- o Inadequate marketing system;
- o Low price paid for produce by marketing agency;
- o High cost of inputs;
- o Inadequate support service for preparation of land;
- o Praedial larceny;
- o Damage by stray animals;
- o Inadequate supply of suitable fertilisers and other chemicals;
- o Inadequate Extension structure;
- o Inadequate Agricultural Stations facilities;
- o Absence of a reliable source

of good quality seeds of suitable varieties;

- o Insufficient and ineffectively organised farmers groups;
- o Shortage of labour.

3.2 Technological

3.2.1 Pre-production

- o Poor land preparation;
- o Inadequate information on cost of production;
- o Lack of suitable varieties;
- o Inadequate pre-planting treatments;
- o Poor seed quality and poor seedling quality;
- o Lack of programme planning - resulting in gluts and scarcity;
- o Inadequate record keeping on the crop.

3.2.2 Production to Harvest

- o Inadequate pest, disease and weed control;
- o Poor field sanitation;
- o Inappropriate fertiliser use;
- o Inappropriate rate of application and types of pesticides;
- o Insufficient farmer training in crop management;
- o Inadequate irrigation facilities during the dry season.

Table 1. CROPS OF SIGNIFICANT ECONOMIC IMPORTANCE IN ANTIGUA AND BARBUDA

CROP	ECONOMIC POTENTIAL
Onion	Import substitution
Tomato	Import substitution
Carrot	Import substitution
Melon	Export
Pumpkin	Import substitution/export
Cabbage	Import substitution
Broccoli	Tourism industry
Cauliflower	Tourism industry
Cucumbers	Exports
Sweet Peppers	Import substitution/export

Table 2. VEGETABLE PRODUCTION AND DEMAND IN ANTIGUA AND BARBUDA (1985)

COMMODITIES	PRODUCTION (1b)	DEMAND (est.) 1b)
Cabbage	258,000	337,500
Carrot	300,000	491,300
Cucumber	723,000	855,100
Eggplant	340,000	286,700
Hot Pepper	19,800	39,000
Okra	131,900	187,000
Onion	50,000	300,000
Sweet Pepper	60,000	234,000
Tomato	331,000	1,150,000

3.2.3 Post Harvest

- o Inadequate farmer training in post harvest handling and storage;
- o Inadequate storage facilities;
- o Too little attention being paid to quality and product presentation;
- o Poor grading practices;
- o Weak linkage between market information source and the farmer.

4 DIRECT CAUSE OF PROBLEMS

4.1. Pre-production

- 4.1.1 Vegetable seeds are available mainly from Central Marketing Corporation where periodic unavailability and the limited range of cultivars and pesticides formations affected most vegetable producers.
- 4.1.2 Seed treatment facilities are located at Dunbars, a location which most farmers find inconvenient. The facilities are therefore grossly under-utilized while many farmers suffer from a number of seed-borne diseases, especially black rot in cabbage.

4.2 Production

- 4.2.1 Many vegetable producers have little or no contact with the Ministry of Agriculture. They therefore lack technical guidance and are unaware of improved vegetable production techniques.

4.2.2 Essential production inputs such as pesticides and fertilisers are very expensive.

4.2.3 The rainfall pattern is uneven with a short wet season from August to November during which half the annual rainfall occurs.

4.2.4 Proper drainage construction is generally lacking.

4.3 Marketing

4.3.1 The lack of Market Intelligence Information, results in tremendous losses to vegetable farmers who are not able to adequately plan the use of their scarce resources.

4.3.2 It is claimed by most vegetable producers that vegetable import licences are often issued during period of adequate local supply.

4.3.3 The Central Marketing Corporation lacks appropriate storage facilities.

5. DIRECT EFFECTS OF PROBLEMS

5.1 Pre-production

5.1.1 Untimely planting by farmers.

5.1.2 Unsatisfactory germination percentage.

5.1.3 Problems with land preparation because of the unavailability of farm machinery when needed.

5.1.4 Higher incident of seed-borne diseases.

5.2 Production

- 5.2.1 Farmers suffer losses as a result of improper use of fertilisers and pesticides.
- 5.2.2 High incident of pests and diseases.

6. AGRICULTURAL DEVELOPMENT STRATEGY 1990 - 1995

The ability of the Government to reach its national development goals is largely contingent on its success in creating linkages between relevant sectors and sub-sectors in the economy. Agriculture as a sector with potentially strong ties to tourism, agri-business, and export promotion, will necessarily play a pivotal role for development in the coming years.

6.1 Desirable Future Situation

- 6.1.1 Maintain a national price structure for farm inputs and products that will stimulate production, encourage efficiency, attract the capital and labour markets and displace the imported goods where possible.
- 6.1.2 Develop a secure leasing system for publicly owned farmland that will encourage farmers to use their own resources to build catchments and drill wells, while assuming some of the risks that are associated with ground water development.
- 6.1.3 Develop national credit and labour policies that recognise the special needs of farmers and agri-businesses.
- 6.1.4 Ensure that other sectoral policies do not unduly

discriminate against Agriculture.

6.2 Activities Necessary to Achieve Future Situation

- 6.2.1 Capture export market niches.
 - 6.2.2 Raise farmers' productivity and incomes.
 - 6.2.3 Promote the widest possible use of locally produced agricultural products for domestic consumption and in the tourist industry.
 - 6.2.4 Encourage the development of agri-business industries in support of inter-sectoral networking.
 - 6.2.5 Develop strategies to optimize use of the nation's water resources available to agriculture.
 - 6.2.6 Stimulate development of the family farm as a desirable instrument of growth.
 - 6.2.7 Conserve the productivity of agricultural land.
 - 6.2.8 Develop an appreciation for agricultural endeavours among young people as an alternative to other forms of employment and entrepreneurship.
- ### **6.3 Optimal Changes in Current Activities**
- 6.3.1 Intensive system of training for farmers and extension officers. As a result the desired and adequate training facilities and media must be implemented and modern technological developments must be prudently adapted.

- 6.3.2 Include more investment projects to cater for the infrastructure development of the Agricultural Sector.
- 6.3.3 Develop a data bank for the Agricultural Sector featuring all the latest trends in Agricultural Developments.
- 6.3.4 Devise a national agricultural policy for Antigua and Barbuda.

8.2 DOMINICA

W. Magloire

1. INTRODUCTION

Vegetables production in Dominica is predominated by small farmers cultivating 1/8 - 1/4 acre of vegetable crops at any one time. Major production areas include the Southern and Central agricultural districts. Crop rotation and inter-cropping arrangements make it difficult to accurately assess the acreage under vegetable production. However, upwards of 300 acres are cultivated in any one year.

2. MARKET SITUATIONS

Import restrictions for fresh vegetables are in place to encourage domestic consumption of vegetables locally. Unfortunately, vegetable production has been characterised by over-supply at some times and scarcity at others. Recently, it has been suggested that vegetable production has decreased in favour of bananas.

Whilst this shift in cropping patterns exists in selected areas, there are also indicators that suggest the contrary. For example, since 1987/1988 when the MOAD increased its seed supply to accommodate commercial produce, seed sales have more than tripled. Secondly, there has been an increase in the vegetable crop acreage being facilitated by the extension service, particularly in the northwest district and in land settlement schemes under the Integrated Rural Development Programme. Thirdly, external trade statistics show increases in exports of selected vegetables over the last

three years (1985-1987), as summarised in Table 1.

It is worth noting also that 33 acres of solanum potato was established in 1989 against 20 acres in 1988, even then, seed supply was a major constraint. Finally the increase in backyard vegetable producers being dealt with by the extension service is of significance and suggests a shift in consumption patterns towards vegetables.

3. CONSTRAINTS

The problems faced by vegetable producers in Dominica are by no means unique. They include difficulties in:

- o seedling production;
- o pest and disease management;
- o post harvest losses;
- o marketing;
- o irrigation/drainage;
- o seasonality of production.

4. MOAD 1990/1992 WORK PROGRAMME: VEGETABLES

It is against this background that the MOAD has developed its two year (1990 - 1992) work programme for vegetable production. The work programme targets emphasize the supply of traditional vegetables for domestic consumption whilst improving marketability of selected crops for export marketing (for

TABLE 1. VEGETABLE TRADE STATISTICS

Crop	Weight (Kg) by Year	
	1987	1985
Pumpkin	72,133	126,324
Watermelon	20,494	38,258
Abacious Vegetable	1,613	11,835
Ginger	9,275	33,082

example, melons, pumpkins, ginger). Traditional vegetables include cabbage, lettuce, carrots, beet, onion, shallot, chive, tomato, melon, cucumber, pumpkin, pepper, and ginger. Non-traditional types are broccoli, cauliflower, soyabean, christophene and canteloupe.

Activities have been outlined and a target of 100 acres set in a thrust to increase the production of hot peppers to meet the processing and fresh fruit market demand.

Activities have also been outlined for the production of smooth christophene and canteloupe for domestic and export markets.

MOAD provides vegetable producers with assistance in the following areas:

- o Procurement of seed material and chemical inputs;
- o Small equipment and tractor services;
- o Seedling production (especially hot peppers);
- o Extension and technology.

5. CARDI - RESEARCH, GENERATION AND VALIDATION OF TECHNOLOGY

A recent case in point is the very successful demonstration at Grand Savanne in the control of diamond back moth in cabbage.

DHA/CATCO/DEXIA - These institutions are actively involved in marketing vegetable products. The DHA has moved considerable quantities of vegetable produce intra-regionally, whilst CATCO has been very instrumental in marketing crops such as ginger, melons and pumpkins, extra regionally. PLENTY has been involved mainly in the production of soyabean for local processing. PLENTY has worked in collaboration with MOAD in cultivating soyabean as a rotation crop in vegetable production.

6. ROC - GENERATION AND VALIDATION TECHNOLOGY

A noteworthy achievement of the ROC is the development of the ginger tech-pac which was successfully

transferred to farmers through the extension service of the MOAD.

Considerable work has also been done by ROC in varietal trials and selections in crops such as cauliflower, broccoli, asparagus, tomatoes, cabbage, eggplant, pole bean, yam bean, and other leafy vegetables.

7. IICA TECHNICAL ASSISTANCE

IICA is involved in strengthening farmer organisations and the technology generation/transfer system.

8. CONCLUSION

In analysing the potential of the OECS in export vegetable marketing, there are some issues and problems that need be addressed:

- o Seedling production;
- o Organic farming and the increased demand for organically grown foods:
- o Pesticide/herbicide use implications re the consumer and the environment;
- o Technology transfer.

8.3 GRENADA/MOA AND TREDU

R. O'Neale
and J. P. Roby

1. INTRODUCTION

Vegetable production is practiced in Grenada on small farms ranging from 1/2 to 2 acres. In many cases the vegetable production enterprise forms part of a larger farm where other crops such as cocoa, bananas, nutmegs or root crops are cultivated.

In the low and middle rainfall areas, which receive approximately 50 - 80 inches (1280 - 2032 mm) of rainfall a year, vegetables are cultivated during the rainy season and in the higher rainfall areas during the early dry season. Production occurs under diverse topographical conditions.

2. ACTIVITIES IN VEGETABLE PRODUCTION

2.1 Agricultural Rehabilitation and Crop Diversification Project

This project which began in 1985, has a vegetable production component. As a result of the services of an Israeli Vegetable Specialist between 1986 - 1988, more productive, disease-resistant cultivars of tomatoes, watermelons, carrots, etc. and new crops such as cantaloupes were introduced. In addition, work was focused on extension training, improvement in such areas as nursery management, fertilisation practices and general cultural practices. This led to increases in yields, greater farmer confidence and increases in acreages under vegetable production.

2.2 Export Vegetable Development Project

This project which commenced in May 1989, is geared towards the production of hot peppers and eggplants for export. Between January to May 1990, a total of over 13,000 lb of hot peppers were exported by the Marketing and National Importing Board (MBIB) and Productive Farmers Union (PFU) to USA, UK, and Holland. Small quantities of eggplant have been exported to Holland by PFU.

Expansion of the hot pepper component is expected to occur during the 1990 - 1991 period, since more farmers are becoming interested, and export demand is in the order of at least 7,500 lb per week. Export of eggplants is also expected to increase during this period.

2.3 Carrot Import Substitution Project

Approximately 200,000 lb of carrots are imported annually. Under this project which commences in September 1990, 10.5 acres of carrots will be grown on fifteen farms between September 1990 to March 1991.

2.4 Paradise Model Farms

This estate has recently been divested into twelve six-acre farms by Government under the Grenada Model Farm Programme.

Because of the existence of modern irrigation facilities, good road network and possibility of mechanisation, this area holds great potential for improved vegetable production in the near future. The French Agricultural Mission is presently involved in the development of the farm plans for this area.

3. MARKETING

The MNIB which is the principal single purchaser of vegetables, makes organised pickups from various collection points and farmers' fields, and does wholesale and retail from its outlet in St. George's. Farmers also sell directly to hotels, restaurants and public markets. Where the farmer has his own transportation, sale to hotels and restaurants seem to be preferred because of the higher prices which are offered. The PFU is involved in export marketing of hot peppers and eggplants. All other vegetables are marketed locally.

4. PRODUCTION AND IMPORTATION OF VEGETABLES

4.1 Vegetable Production

Annual production of some of Grenada's main vegetable crops is shown in Table 1.

As a result of the ARCD Project and an upsurge in the tourist trade, there has been a general increase in the production of vegetables over the past five years.

There have also been significant quantities of widely used vegetables imported (Table 2), which has added to the high food import bill, and the loss of foreign exchange.

5. RESEARCH

CARDI has been involved in onion and carrot research and productive cultivars of carrots have been adopted by farmers. Interest in onion production however, still remains low.

Table 1 - PRODUCTION OF MAIN VEGETABLES

CROP	Year ('000 lb)				
	1984	1985	1986	1987	1988
Carrots	66.8	100.0	191.0	186.7	190.4
Cabbages	133.9	133.0	311.1	386.4	394.1
Sweet Pepper	25.4	29.0	30.4	31.5	31.8
Tomatoes	-	-	-	-	-
Lettuce	36.4	67.0	96.1	109.4	

SOURCE: MOA and Central Statistics Department

Table 2. IMPORTS OF SOME SELECTED ITEMS BY QUANTITY (Kg) AND VALUE (EC \$)

CROP	Year					
	1985		1986		1987	
	Quantity	Value	Quantity	Value	Quantity	Value
White Potatoes	661,964	576,084	747,759	802,373	914,951	1,119,606
Onions	325,463	336,420	368,444	424,325	380,294	539,327

The Ministry of Agriculture research effort is aimed mainly at identifying more productive and disease resistant cultivars of various vegetables.

6. CONSTRAINTS

In spite of what has been achieved, several constraints to increased vegetable production in Grenada still remain.

6.1 Non Technological Constraints

6.1.1 Untimely availability of farm inputs.

6.1.2 Farm labour shortage and shortage of skilled labour in vegetable production.

6.1.3 Weak linkage between production and marketing; poor flow of information.

6.1.4 Absence of farmer's organisation with focus on vegetable production.

6.1.5 Absence of adequate crop forecasting system within the Ministry of Agriculture.

6.1.6 Absence of regional vegetable marketing network to provide information on availability and scarcity of produce, and thus facilitate vegetable trading between the different states of the region.

6.1.7 Praedial larceny.

6.1.8 Difficulty faced by vegetable farmers, especially new ones, to obtain credit.

6.1.9 Lack of proper land utilisation policy.

6.2 Technological Constraints

6.2.1 Lack of adequate irrigation facilities. This results in scarcity of vegetables and high prices, especially during the months of April to August.

6.2.2 Weed control forms a significant part of the production cost. There is a need to examine non-traditional methods of weed control.

6.2.3 Pest and disease problems.

6.2.4 Lack of adequate cool storage facilities.

6.2.5 Poor post-harvest handling.

6.2.6 Inadequate public knowledge of means of preservation which will extend availability of vegetables to households.

8.4 ST LUCIA/MOA

Vegetable Development in Saint Lucia

G. James

1. INTRODUCTION

Vegetable production is becoming increasingly important in Saint Lucia both to feed the growing population and to satisfy the expanding tourist industry. At present the local supply does not always meet the demand with the result that large quantities of vegetables are imported annually (Table 1).

In addressing this situation the Ministry of Agriculture, Saint Lucia, included vegetable production as a major component of the Import Substitution Drive that commenced in 1986. Among the crops listed were: cabbage, carrot, lettuce, sweet pepper and tomato. These "import substitution crops" are now the focus of the Vegetable Development Project in Saint Lucia.

Table 1. IMPORTS OF SELECTED VEGETABLES BY QUANTITY (Tonnes) AND VALUE (\$'000 EC)

YEAR	CABBAGE		CARROT		LETTUCE		SWEET PEPPER		TOMATO	
	Qty.	Val.	Qty.	Val.	Qty	Val.	Qty.	Val.	Qty.	Val.
1986	23	38	64	135	0.4	10	6	19	37	154
1987	114	175	154	247	14	41	16	55	136	517
1988	131	184	217	368	21	53	20	69	133	556
1989	189	255	240	425	29	70	32	119	150	490

Source: Foreign Trade Report (St Lucia)

2. FACTORS AFFECTING VEGETABLE PRODUCTION

The production of vegetables in Saint Lucia is characterised by periods of glut during the early dry season, and periods of scarcity during the wet season. Most production takes place on small holdings averaging less than 0.1 hectares. A large percentage of these are located on steep slopes. Mixed cultivation is often practised with little consideration given to production planning with respect to market demands.

The main constraints to vegetable production on the island have been identified as:

- o the absence of a proper marketing system;
- o the unavailability of necessary inputs e.g. seeds, pesticides and fertilisers;
- o the unavailability of irrigation and tillage equipment;
- o pests and diseases;
- o poor cultural practices;
- o poor post harvest handling.

3. VEGETABLE PROJECT ACTIVITIES

The strategy employed to improve the quantity and quality of locally produced vegetables involves a coordinated approach of the combined Extension, Research, Marketing and Engineering Divisions of the Ministry of Agriculture. Other organisations involved as cooperants are the Inter-American Institute for Cooperation on Agriculture (IICA), the French Mission for Cooperation (FMC) and the Chinese Agricultural Mission (CAM).

Project activities undertaken during the first year of the Project were as follows:

- o development of fact sheets for farmers;
- o improvement of post harvest handling;
- o market development and support;
- o monitoring of input supplies;
- o crop protection;
- o farmer training.

3.1 Development of Fact Sheets

Fact sheets covering various aspects of vegetable production were developed for each of the five selected vegetables. Problems with respect to the printing have however, delayed the distribution of these fact sheets to farmers.

3.2 Post Harvest Handling

The quality of the vegetables supplied to the market by farmers is greatly affected by post harvest handling. Although technology on post harvest handling is available, many farmers are not adequately informed or have failed to adopt the recommended practices. In addition to the work carried out by the Extension Officers at the field level, two one-day workshops on post harvest handling were held for farmers during the first year of the Project.

3.3 Market Development and Support

In an attempt to overcome problems in production monitoring and increase the efficiency of data

analysis for import substitution, a computerised database programme was developed with the assistance of IICA. Officers have been trained in data collection and the exercise is expected to be in full operation by July 1990.

Attempts are being made to organise vegetable production at the national level, with special attention being given to wet season production. Five vegetable farmer organisations are working closely with the Ministry in this exercise. As an incentive to produce during the off-season, the Saint Lucia Marketing Board (SLMB) is offering farmers a guaranteed minimum price for the selected vegetables.

3.4 Monitoring of Input Supplies

The Vegetable Project seeks to determine farmers' input requirements and to monitor the availability of these inputs. Linkages have been established with the major input suppliers on the island and steps are being taken to improve the types of inputs available. The Ministry of Agriculture's Small Farmers' Agricultural Development Project (SFAD) is the main input supplier and provides inputs at reduced rates for farmer organisations.

3.5 Crop Protection

At present the Project is involved in diagnosis and control of the major pests and diseases of the selected vegetables. These include the diamond back moth (*Plutella xylostella*) in cabbage, and Bacterial Wilt (*Pseudomonas solanacearum*) in tomato. Emphasis is being placed on the development of integrated pest management strategies, particularly with the small farmer in mind.

3.6 Training of Farmers

Special attention has been given to the training of approximately 140 farmers involved in the commercial production of vegetables. Much of the training is done at the field level, but farmers are also encouraged to participate in formal training sessions conducted by resource persons.

4. A FUTURE LOOK AT VEGETABLE PRODUCTION

The quantities of locally produced vegetables purchased by leading marketing outlets have increased steadily since 1987, with the greatest increase occurring in 1989 (Table 2).

Table 2. TOTAL QUANTITY (Kg) OF SELECTED VEGETABLES PURCHASED BY LEADING MARKETING OUTLETS* 1987-1989

YEAR	CABBAGE	CARROT	LETTUCE	SWEET PEPPER	TOMATO
1987	19,669	6,303	9,951	4,572	22,155
1988	49,769	9,932	7,884	2,629	29,038
1989	62,953	20,843	12,306	6,432	65,983

Source: Annual Agricultural Statistical Digest
*Supermarkets, Hotels, SLMB

With the current thrust in agricultural diversification, it is expected that vegetable production will become increasingly important. The challenge in the 1990's will hence be the organisation of efficient production and marketing systems. Taking this into consideration, the activities undertaken in the future should address the following:

1. Strengthening of the link between producers and marketing agents.
2. Identification of other vegetables with market potential to help reduce glut during the early dry season, and/or identification of new markets for the surplus production of traditional vegetables.
3. Improvement on the type and quantity of inputs available to the farmer.
4. Training of farmers in all aspects of farm management, particularly record keeping.
5. Training of Extension Officers and farmers in integrated Pest Management (IPM).
6. Improvement in crop husbandry, particularly during the wet season.

8.5 ST. LUCIA/TREDU

The French Mission's Support to the Saint Lucian Vegetable Project

L.Colinet

1. INTRODUCTION

The French Mission for Cooperation began their first project in Saint Lucia in the rural development sector, in 1981. The Ministry of Agriculture, which considers the diversification and import substitution programme of great importance in its policy, requested that an area be chosen for the project in a region where there were only a small number of banana growers. Vegetable and root crops are the main components of the cropping system and the farms are small in size; less than 5 acres.

2. BACKGROUND OF ACTION UNDERTAKEN BY THE FRENCH MISSION IN THE SOUTH WESTERN REGION OF ST LUCIA 1981-1987 : RISE OF THE BELLE VUE FARMERS' COOPERATIVE

During the period 1981 to 1987, technical assistance concentrated on the study of the environment and the existing farming systems. With the help of the Extension Officers, the French Technical Assistants identified and set-up small development operations in villages emphasising the active participation of groups of farmers.

Farmers were encountering great difficulties in obtaining farm inputs and marketing their produce. In 1984, with the assistance of the French Mission, nine farmers from the same village formed themselves into a group to solve their

problems. This group, the Belle Vue Farmers' Cooperative, constructed an input supply and set up a marketing department. Two major constraints to production were thereby eased. The number of members of the Belle Vue Farmers' Cooperative grew from the original nine to ninety (90).

2. FOCUSING ON VEGETABLE PRODUCTION. THE FRENCH MISSION EXPERIENCE IN ADAPTIVE RESEARCH : SUPPORT PROJECT OF THE TRAINING RESEARCH AND EXTENSION DEVELOPMENT UNIT (TREDU)

By the end of 1987, the French Mission had decided to focus on the problems of vegetable production and especially production of import substitution crops.

An agronomic and economic diagnosis was carried out in 1988 on the three major vegetable crops in the region, carrots, cabbages and tomatoes.

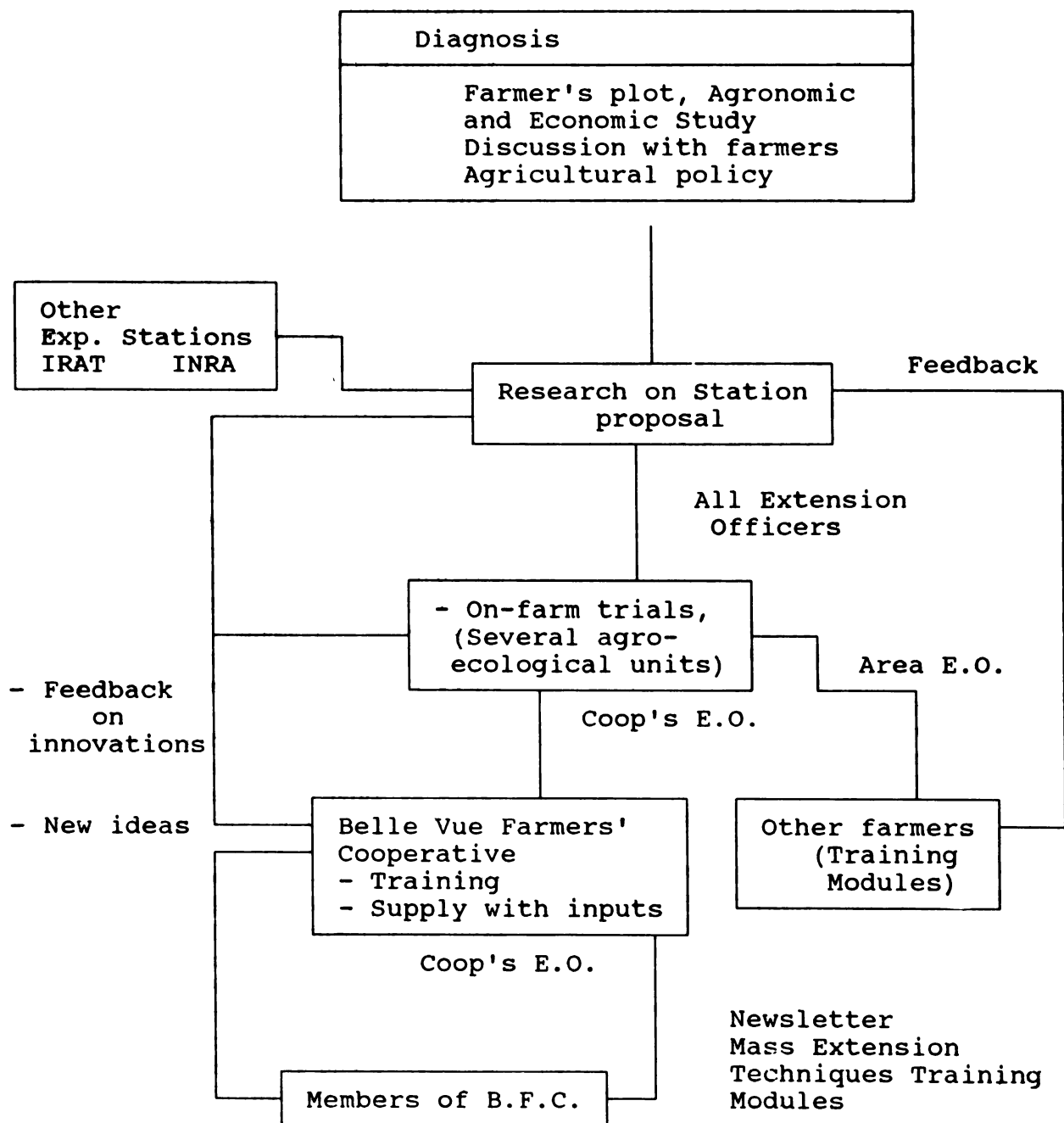
The objective of the diagnosis was to identify the principal constraints, the first step of an adaptive research pattern involving:

- o A small Research Station in the project area;
- o The Belle Vue Farmers' Cooperative;
- o The Extension Officers, and
- o Research Institutes (mainly IRAT).

The functioning of this system is shown in Figure 1.

FIGURE 1.

**THE FRENCH MISSION'S EXPERIENCE IN ADAPTIVE RESEARCH
TREDU's PROJECT**



When a problem is identified (either through diagnosis or farmer feedbacks), ideas and solutions are sought from Research Institutes. Recommendations are first tested on TREDU's Research Stations. If the proposals seem promising, they are then tested using on-farm trials.

The Belle Vue Farmers' Cooperative supplies the farmers with the necessary inputs and mass extension techniques are used. At that level, a second feedback takes place.

The presence of the cooperative is the main asset on which our adaptive research programme relies. It provides the inputs and an efficient information linkage e.g. the shopkeeper advertises new seed varieties and chemicals to the farmers and informs us of the farmers response, while the marketing officer gives us market information.

Some of the results of this system are:

1. The building of a seedling nursery to provide farmers with healthy seedlings.
2. The introduction of a chemical weed control in carrots.
3. The introduction of new varieties of carrots and tomatoes.

Other research proposals have been turned down by farmers, such as the use of tools to improve the seedbed in carrot production.

Some attempts were also made to plan production. Belle Vue Farmers' Cooperative subscribed to production contracts with their members.

Training was given to farmers especially in pest and disease control. With the collaboration of

IRAT, a coloured teksheet will be prepared on the control of pests and diseases.

3. ACTIONS PLANNED IN THE NEAR FUTURE : LINKAGES WITH THE NATIONAL VEGETABLE DEVELOPMENT PROJECT

The French Mission has been working in close collaboration with the Vegetable Project to reduce the vegetable import bill.

Although the vegetable cropping system can be improved through adaptive research, two major constraints remain:

1. The difficulty of production during the rainy season.
2. The difficulty of production during the heart of the dry season.

During the coming rainy season, tomato production will be tested under a tunnel greenhouse on the station. Should the results prove satisfactory, the French Mission could consider helping the younger small farmers buy their own greenhouse equipment.

TREDU will also lead a tentative irrigation project in the South of the island next December. Depending on the results, the irrigation of 50 acres of land could be undertaken during the coming years.

Because of the relatively small size of the local market, the passage from experimental production to a larger scale production could cause some problems. The French Mission's Project will therefore have to work with the Vegetable Project to assess the market and look for alternative areas of production.

8.6 ST. VINCENT AND THE GRENADINES/TREDU

Communication from the French Technical Mission in
St. Vincent and the Grenadines

D. Dominique

A brief assessment of some points which appear crucial to the development of vegetable production in St. Vincent and the Grenadines.

but very high diversity of results.

1. SOME DATA ON VEGETABLE PRODUCTION IN ST. VINCENT AND THE GRENADINES

1.2 Economics of Production

1.1 Production

From available data, the economics of vegetable production in St. Vincent and the Grenadines can be presented as follows:

The presentation by the Chinese Technical Mission (7.8 page 91) gave data from the St. Vincent and the Grenadines Agricultural Census of 1986. Although these data can effectively be presented, our own activities in St. Vincent and the Grenadines combined with other available data lead us to make corrections to these figures.

- o Production: 4 to 5 million lb.
- o Total retail value: 10 to 12 million EC\$, made up of:
 1. Imports of inputs: 1 - 1.2 million EC\$
 2. Farmers' added value: 3 - 3.6 million EC\$
 3. Marketing channels: 6 to 7.2 million EC\$

Taking into consideration all the available data at farm and marketing levels for St. Vincent and the Grenadines, we arrive at the following conclusions:

In terms of employment at farm level, we can estimate that the subsector employs 600 to 700 persons, or about 2% of the active population of St. Vincent and the Grenadines.

- o land devoted to vegetables: 500-800 acres;
- o Cropping intensity: 2 vegetable crops/year;
- o Main region: North Leeward: 200 acres;
- o Total production in 1989: 4-5 million lb;
- o Average yields (production/sown acres): 4000-5000 lb/acre on slope land,

Price distribution on a basket of vegetables: When a housewife buys a basket of vegetables (mixed according to quantities produced), the retail price she pays per lb is 2.50 EC\$ (1989 figure). This can be broken down as follows;

- o Imported inputs (seeds, chemicals, fertilisers): 0.20 - 0.25 EC\$

- o The farmer (labour plus profit): 0.75 - 0.80 EC\$
- o The marketing channel: 1.50 EC\$

1.3 Trade

1.3.1 External Trade

Figures for 1989, show the economy of St. Vincent and the Grenadines to have a positive balance in food import/export (data by A. CAIN):

Food exports: 148 million EC\$ (to be confirmed)

Food imports: 79 million EC\$

Export figures however, are mainly due to bananas and root crops. Exports of vegetables are insignificant (pumpkin, hot pepper) but imports are significant.

Section 54 of the 1989 statistics of the Ministry of Finance shows vegetable imports to the value of 2,552,327.00 EC\$ (fresh, chilled, frozen or simply dried).

1.3.2 Internal Trade

Because of the nature of the produce and the lack of export infrastructure, St. Vincent and the Grenadines do not export many vegetables. Outlets are limited to the internal domestic market, with very little consumption by the tourist industry.

Internal consumption of vegetables produced in St. Vincent and the Grenadines can be roughly estimated at 0.5 to 0.6 lb per person per week.

There is in fact only one significant market, in the capital Kingstown. Most of the vegetables produced reach here at the same time

and are negotiated at the lowest prices in the Windward Islands. Scarcity periods, due to natural constraints, are in fact quite limited. In an average year, they occur in November/December and during June.

2. MAIN PROBLEMS AREAS

2.1 Main Problems and Programme Conceptualization

The data already presented show two main constraints to the production of vegetables:

1. Constraints linked to the market and to putting produce onto the market.
2. Natural constraints, especially climate and topography.

Although other constraints do exist they are all, directly or indirectly, linked to one or the other of the above.

By this, we mean that all projects or programmes aimed at the development of this sector must be conceptualised in relation to these two main elements.

It is also clear that no specific action will be successful unless it is sufficiently dynamic to be considered part of a well defined policy and strategy;

Experiences in St. Vincent and the Grenadines show clearly that the principal actors of development (the farmers) are now directly involved at all levels of a programme.

2.2 Some Points for Reflexion

2.2.1 Credit and Price Policy.

As it is shown in St. Vincent and the Grenadines, credit and price policies must be linked.

The following figures have been extracted from rough data obtained from the Ministry of Agriculture, St. Vincent and the Grenadines:

- o increase of farm gate prices 1985-1989 (vegetables): + 1.90%
- o increase of retail margins 1985-1989 (vegetables): + 23%
- o increase of agricultural labour wages 1989: + 50%
- o increase of taxes rates on imports, Section 54: 0%

These data require no comment. They do perhaps need explanation but not by technicians. It is not surprising that farmers do not dare to ask for credit, except when the credit is included within a contract frame of production with a guaranteed market (bananas).

Vegetable farmers do not ask for credit because they know that they may find themselves unable to pay it back.

2.2.2 Imports Replacement or Substitution Policy

The problem of import substitution or replacement is not so much a total impossibility to produce what is imported, but rather a question of the costs involved in production.

The question of import substitution/replacement is not simple, it involves labour productivity, social factors, etc. which must be calculated or at least estimated.

If the government has a well defined policy for agricultural diversification this should be

communicated to those technicians working toward implementation of diversification programmes. They need this information if their projects are to be successful.

Without this cooperation, importation of onions, garlic, pigeon peas and other produce will never be reduced.

2.2.3 Restructuring, Organising the Production of Vegetables

From the sowing of the seed, the production of vegetables is organised on an individual basis: free-producers, free-sellers, free-etc, no contract, no inter-profession, no organisation.

With the natural constraints that occur, this leads to marked seasonality of production, with periods of glut, and periods of scarcity.

There is a need to:

- a) organise vegetable production through producer associations that are strong enough to be recognised and
- b) improve considerably the links between the parties.

Some export opportunities cannot be accessed however (i.e. pumpkins).

2.2.4 Research-Extension Services

We find here the same deficiencies, namely a lack of programmes and strategies and a lack of means.

3. CONCLUSION

Although many technical problems exist in the vegetable subsector of the agriculture of St. Vincent and the Grenadines, we have not

elaborated our involvement in this area.

The problems that need to be solved right now are more those policy, objectives, programme definition, delegation of responsibilities during programme implementation, laxity and lack of motivation.

8.7 ST. KITTS AND NEVIS

Vegetable Production in St. Kitts and Nevis

J. Thomas

1. INTRODUCTION

St. Kitts and Nevis are two small islands with a combined area of 103 square miles and a population of 45,000 people. The two islands form part of the Organisation of Eastern Caribbean States (OECS). The arable land is estimated at 30,000 acres and agriculture is dominated by sugar-cane on St. Kitts. Previously, cotton was the main agricultural activity on Nevis.

Although the two islands are only two miles apart at the nearest points, their agricultural histories have been quite different. The plantation system dominated agriculture in St. Kitts while a peasantry was developed on Nevis. Sugarcane production, still the main agricultural activity on St. Kitts, occupies 12,000 acres of the best agricultural land. The sugar industry is being managed by a State Company. On Nevis, cotton was grown by peasant farmers who also raised some livestock and grew vegetables and root crops.

Subsistence farming developed on St. Kitts in the plantation system. The subsistence farmers occupied small plots of marginal land, generally on steep slopes. Mainly root and tuber crops were produced, using low levels of technology.

2. VEGETABLE PRODUCTION TARGETS

During 1986, vegetable production for import substitution was identified as part of the

Government's agricultural diversification thrust. The target was to meet fifty per cent of the domestic demand by 1990. To this end, the Department of Agriculture developed a research and development programme to increase farmer production of selected vegetables (tomatoes, cabbages, sweet peppers, onions, carrots and white potatoes).

To achieve the target, an attempt was made to develop commercial farmers. Commercial farming is relatively new on St. Kitts-Nevis and intensive vegetable production developed during the second half of the last decade. A small number of full time farmers were identified in 1985 and production targets for tomatoes were established. The domestic demand was estimated and six farmers were allocated planting schedules. The aim was to achieve a continuous supply of vegetables during the first six months of the year. Vegetable production is mainly rainfed and consequently, the majority of farmers plant at the same time resulting in periods of surplus followed by periods of scarcity. Farmers involved in the tomato programme also increased their production of cabbages, sweet peppers and carrots. By this time, a small group of young farmers had begun farming commercially.

The programme has been relatively successful resulting in the development of at least 20 commercial farmers on St. Kitts with an average farm size of 10 acres. As a result of the success, an increasing number of part-time

vegetable farmers have developed and traditional root crop farmers are increasing their vegetable production. On Nevis, farm sizes are generally less than three acres and are therefore not large enough for full time commercial farming. Increased vegetable production however, has been recorded.

The estimated vegetable production for the first half of 1989 is shown below in Table 1. Total production from commercial farms during the first half of 1989 met the estimated domestic demand for tomatoes and white potatoes, 90 per cent of the demand for cabbages, 70 per cent of the demand for carrots, and 50 percent of the demand for sweet peppers.

However, because production is mainly rainfed and some crops are seasonal, availability of the crops was uneven during the first six months.

3. CROP FORECASTING

Vegetables are normally imported into St. Kitts and Nevis to meet the domestic requirements. Increased production therefore meant that locally produced vegetables would appear on the market together with imports, resulting in a surplus. Prices would subsequently fall and farmers would suffer losses and eventual frustration. To keep farmers losses at a minimum, a crop forecasting system was developed. The system was designed to forecast vegetable production on a monthly basis. The forecast production was then compared with the estimated domestic requirement so that a shortfall could be projected. Licences for vegetable imports were then issued only to meet the shortfall thus minimizing over-supply on the small domestic market. The crop forecasting mechanism has proven very successful.

Table 1. 1989 ESTIMATED PRODUCTION (000's lb) OF SELECTED VEGETABLES IN ST. KITTS AND NEVIS

	TOMATO	CABBAGE	CARROTS	W. POTATO	W. PEPPER
JAN	21,000	11,000	N/A	NIL	7,000
FEB	31,000	9,000	5,000	30,000	2,000
MAR	20,000	37,000	14,000	340,000	2,000
APR	15,000	19,000	25,500	150,000	900
MAY	26,000	13,000	10,000	100,000	1,500
JUNE	5,000	8,000	10,000	30,000	1,500
TOTALS	118,000	97,000	64,500	650,000	14,900
ESTIMATED DEMAND	108,000	108,000	90,000	600,000	30,000

4. WHITE POTATO

White potato production has been the most successful agricultural diversification activity to date. Up until 1985, St. Kitts-Nevis imported all of its white potato requirements which were estimated at 100,000 lb per month. In 1985, a white potato research and development programme was developed and the main target was to produce 600,000 lb by 1990. Production began on a small scale in the first year with 35,000 lb being produced on five acres. About 30 farmers were involved in the project. Average plot size was then less than 0.25 acres and yields were generally low.

Production and the number of farmers involved increased annually and in 1989, 650,000 lb were harvested. By this time, the number of farmers had increased to 100 and the average farm yield had more than doubled to 15,000 lb/ac. As a result of the success of this activity, 50,000 lbs were exported in 1990 and an export programme is now being developed with Antigua.

5. GOVERNMENT SUPPORT

Government provides incentives to support the agricultural diversification programme. These incentives include duty-free concessions on agricultural equipment and vegetable import restriction from extra-regional sources during periods of local production. The Department of Agriculture provides agricultural inputs which includes vegetable seeds, fertilisers and agro-chemicals. A machinery pool is maintained and this provides land preparation services. The Ministry provides technical advice through its Extension Service and develops technical packages with the support of the Caribbean Agricultural

Research and Development Institute (CARDI). Land is also provided for vegetable production.

6. CONSTRAINTS

Insecure land tenure appears to be the main constraint to increased vegetable production. The majority of farmers occupy Government owned land where only an annual rental is offered. However, Government intends to offer long term leases as part of its diversification programme. Vegetables are mainly grown under rainfed conditions and the absence of water for irrigation is a major constraint for consistent production.

A high incidence of pests and diseases particularly in cabbages severely affect quality. Productivity is also often affected by poor weed control practices. The small domestic market places significant limitations on increased production, since farmers can easily over supply the domestic market. The post harvest handling practices of the highly perishable vegetables leaves much to be desired. As a result, farmers can lose up to 40% of a good quality crop. Improved post harvest handling is critical if we are to benefit from the export markets.

7. CONCLUSION

St. Kitts and Nevis have tremendous potential for vegetable production. Small farmer production is currently meeting about half of the relatively small domestic demand and over supply is sometimes observed during the first half of the year. Once the production constraints are addressed and post harvest handling facilities are developed, vegetable exports can be targeted to the nearby islands of St. Maarten and Antigua.

8.8 BRITISH VIRGIN ISLANDS

Vegetable Production in the British Virgin Islands

J. Kumar

1. BACKGROUND

1.1 Geographical

The British Virgin Islands, is a British Colony situated 50 miles South East of Puerto Rico. The colony includes approximately 26 islands with a total land mass of 45 square miles. With the exception of Anegada, which is a coral formation and very flat, all the islands are hilly with rugged terrain. Estimated total population is 14,000 (10,000 on the main island of Tortola). Annual rainfall is estimated at 56 inches.

1.2 Economic

The economy of the BVI is mainly dependent on tourism. Approximately 250,000 tourists visit the islands each year. Much of the tourism is "water based". With provision, for several marinas and yacht charterers, the BVI is gaining recognition as one of the world's "yachting capitals". In the order of economic importance, off-shore banking takes the second position. In 1989, agriculture and fishing contributed just over 5% of GDP.

1.3 Agricultural

Historically, the BVI was the "bread basket" of the neighbouring US Virgin Islands. However, with the onset of tourism, agricultural activity declined rapidly. In 1988, the BVI government took a policy decision to reactivate agriculture

in the interest of a diversified economy. Agriculture is small farmer oriented, with holdings ranging from 0.5 - 15.00 acres. The main agricultural sub-sectors and their respective share of output is as follows:

1. Livestock (including poultry)
- 65%
2. Fruit crops and ornamental
- 20%
3. Vegetable and root crops
- 15%

2. AGRICULTURAL DEVELOPMENT CONSTRAINTS

2.1 Land

The main constraint for agricultural development is the lack of suitable land. With the onset of the tourism industry, which led to a construction boom, much of the agricultural land has been taken over by urban development. Agricultural holdings, which are now almost all on very steep slopes, are also badly eroded and very poor in terms of feasibility. Mechanization is almost impossible.

2.2 Water

The islands do not have any perennial sources of water. A few springs exist, but their yield is very low. Much of the domestic water comes from individual roof catchments and cisterns. Wells are

used by farmers, mainly for livestock. Much of the available production is rainfed.

2.3 Labour

Here again, the flourishing tourist industry is responsible for the shortage of agricultural labour. Labour is not only scarce but also expensive. The minimum wage is \$ 30.00 US/day.

2.4 Other Constraints

Other constraints for agricultural development are pests and disease on crops, lack of access roads, ageing agricultural population (average age of farmers is 60 years) and competition from imports.

3. GOVERNMENT SERVICES

3.1 Infrastructure Development

The Government of the BVI is now spending large sums of money for the most essential basic infrastructure. Much of this infrastructure development is in the form of construction of mini-dams and access roads. During the year 1989/90, 28 mini-dams and approximately five miles of access roads were constructed. Government also assists farmers in construction of farm infrastructure such as fences, sheep/poultry pens, terraces etc.

3.2 Technology Transfer

The Extension Division is very active in the transfer of technology. Several methods are used. The main forms of technology transfer are "on-farm demonstrations", farm training modules, field trials, and the use of leaflets, radio, and newspapers.

Technology transfer programmes are mainly oriented to the following:

1. Intensive production using high yielding varieties.
2. Pest and disease management.
3. Labour saving methodologies.
4. Soil and water conservation.

3.3 Support Services

The Department of Agriculture provides the following support services:

1. Production and supply of seedlings.
2. Land preparation.
3. Pest and disease control.
4. Subsidized farm inputs (seeds, fertilisers, chemicals and also building materials like fencing wire, posts etc).

4. VEGETABLE CROP DEVELOPMENT PROJECTS

The country imports approximately US\$2 million of fresh fruits and vegetables each year. As an import substitution measure, vegetable production is being encouraged. Vegetables identified for promotion are: tomato, eggplant, cucumber, squash, pumpkin, lettuce, spinach and herbs like parsley and thyme.

The three main projects designed and implemented for increase in vegetable production are:

1. Integrated Farming Systems
2. Backyard Gardening
3. Farm Resettlement

4.1 Integrated Farming Systems

Under this project a group of 25 farmers will be involved in intensive production practices, with vegetables being the main component. The aims of this project are as follows:

1. Market oriented production;
2. Close relationship between farmer, technician and retailers;
3. Utilization of improved technology;
4. Demonstration of the need for participation of all individuals from planning through production and marketing stages.

The management team of this project which comprises eight farmers, the Department of Agriculture staff, hoteliers and wholesale/retail merchants, meets regularly to coordinate production and marketing. Production from this project is generated mainly for hotels/restaurants and supermarkets.

4.2 Backyard Gardening

The insufficient supply of resources required for improved vegetable production, has freed the Department of Agriculture to develop backyard gardening. Under this project, interested backyard gardeners are assisted in the following aspects:

1. Design and construction of shade houses;
2. Garden layout plan and planting schedules;
3. Seeds, seedlings, fertiliser and chemicals;

4. Vegetable production tips, by means of leaflets.

A total of six backyard demonstration sites have been established to encourage backyard gardeners to produce vegetables.

4.3 Farm Resettlement

This project is being established to create a body of commercially oriented vegetable farmers. The main features of the project are as follows:

1. Fifty acres of class I land, belonging to the Government at the Agricultural Stations is sub-divided into 0.5 and 1.0 acre plots;
2. Farmers, interested in vegetable production are given these lands on annual lease;
3. All nursery infrastructure, such as irrigation, cold storage, grading and packaging facilities etc. are established for the use of these farmers;
4. Farmers follow a production plan oriented towards the local market demand at present, and later toward export to USVI;
5. Farmers receive assistance in the form of subsidized seeds, seedlings, chemicals, fertilisers and irrigation equipment.

5. CONCLUSION

In conclusion, it can be said that vegetable production in the BVI will be a profitable and thriving industry once again, within the next

two to three years. By the end of 1992, it is hoped that there will be at least 100 acres under intensive vegetable production.



8.9 MARTINIQUE

Irrigation Project in the South East of Martinique

B. Cadic

All over the South East of Martinique, an endemic dryness has taken a catastrophic turn between 1970 and 1977. This has considerably increased the structural problems characteristic of agricultural production in this Department of France (disappearance of sugar cane, mortality of cattle and an inability to produce vegetables).

One of the worst effects was an intensive emigration from the South East region, particularly of young people (two per cent per year).

Seeing the economic potential of the area, only a high level of agricultural development could reverse the situation since this would give a thrust to other sectors of the economy. Such a development implied having control of the water supply in that area.

In 1980, irrigation of the South East region, covering 5,000 hectares, was achieved. The Department of Martinique has entrusted the Society for the Development of the Irrigated Perimeter of the South East (SAPISE) with this project. It is a joint economy Society specially founded to that end.

Shareholders of SAPISE are: The Department, the District, the Municipalities concerned and the professional organisations.

Today, the structures managed by the SAPISE represent an investment of about 240 million French Francs (about 40 million US\$) financed by

the Ministry of Agriculture, the Department, the District, the Investment Fund for the Overseas Department (FIDOM) and the European Development Fund (FED). The above-mentioned structures are as follows:

- o a water point on the river Lezarde with a maxiflow of 800 litres per second;
- o the dam of St Pierre Manzo with a capacity of 8 million cubic metres;
- o a pumping station which brings water to the irrigation points at a minimum pressure of 4 bars, the irrigation system being a sprinkling one;

Today, the main characteristics of the irrigated perimeter are:

1. number of subscribers - 350
2. irrigated area - 2200 hectares
3. equipped area - 3800 hectares

The irrigated area is divided into banana cultivation (36%), cattle breeding (44%), vegetable production and other crops (20%). To ensure the assistance and the organisation of the farmers, the SAPISE relies on:

- o the two technicians of the SAPISE;
- o the results of the experiments done on the experimental irrigated farm of SAINTE-ANNE (SECI) whose foundation dated back to 1972;

o organisations such as the IRAT (vegetables) and IRFA (trees and bananas), the House of Agriculture and other various professional organisations.

regard to irrigation (meteorological factors, irrigation doses, frequency of irrigations and various systems of irrigation).

Since 1972, the majority of vegetables have been tested with

The results of some of these tests are shown in Table 1. and Table 2.

Table 1. EXPERIMENTS ON FREQUENCY OF IRRIGATION ON TOMATOES

DOSE mm	MARKETABLE YIELD (ton/ha)	WASTE as % OF YIELD
5	27	43
15	36	33
25	33	34
35	31	35

The best dose is between 15 mm and 20 mm, which means irrigation every 3 or 4 days. It is better to space out the irrigation, as it favours development of the roots.

Table 2. EXPERIMENTS WITH NITRICFERTILISATION

Amount of N applied every 10 days (Kg/ha)	Yield (Kg/ha)	
	Brought by hand	In solution
10	31	43
20	40	55
30	52	66
40	53	64

Comparison of different doses of fertiliser, with a drip system. One is brought by hand and the other is brought by solution in the water. The best results are obtained by bringing the nitrogen with the water. Applications of more than 30 N (Kg/hectare of Nitrogen) every 10 days are unproductive.

8.10 SUMMARY DISCUSSION

C. Bully

-
- | | | | |
|-----|---|-----|--|
| 1. | ISSUES | | packaging |
| 1.1 | Preproduction | o | Cooling facilities - where and by when? |
| | o Land availability | o | Domestic redistribution |
| | o Suitability - zoning | | |
| | o Water availability | 1.4 | Regional Trade |
| | o Lesser arrangements | o | Transportation |
| | o Credit | o | Freeing of barriers |
| | o Availability of inputs and costs | o | Entry requirements |
| | o Market information | 1.5 | Extra Regional Trade |
| | o Targeting | o | Identification of crops and varieties |
| | o Linkages with tourism | o | Grades |
| 1.2 | Production | o | Standards |
| | o Research, transfer of technology and material costs and sources | o | Packaging |
| | o Focus of research | o | Phytosanitary certificate |
| | o Use of inputs, costs of inputs | o | Pesticide residues |
| | o High demand for pesticide, conflict with environmental issues | o | Opportunities for organics |
| | o Need for pesticide monitoring facilities | o | Transportation |
| | o Production forecasting | o | Promotion |
| 1.3 | Post Harvest | o | Niche marketing |
| | o Handling, grades standard, | 2. | STRATEGY TO ADDRESS MAJOR CONSTRAINTS |
| | | 2.1 | Commodity Approach |
| | | | There was a general consensus among |

the participants that proper identification of problems and solutions requires a commodity specific and inter-disciplinary approach. When analyzing commodity systems it is useful to divide the system into four parts:

1. **Preproduction:** policy, seed supply, information and planning.
2. **Production:** cultural practices, pests, irrigation and the like, up to harvest.
3. **Post Harvest:** harvest handling, cooling, transport.
4. **Marketing:** identification, information, demand, participants, transport and so on.

2.2 Market Led Approach

An analysis of a commodity system should begin by looking at the market. Four key aspects to be considered are:

1. **Quantity** of product available
2. **Quality** of the product
3. **Regularity** of supply
4. **Price**, considering both comparative and competitive advantages.

2.3 Farmer Led Approach

Since farmers are the principal actors in meeting the market demand, production/marketing programmes should be developed based on the farmers' needs for information, technical assistance, research, credit, mechanization, training and others.

2.4 Role of Government and Support Institutions

Relevant institutions, including MOAs, Marketing Boards, CARDI, CATCO, ADCU, ADBs, IICA, FAO, Chinese and French Missions and others should respond to real needs of farmers by providing the necessary facilitating services.

1980-1981

9. WORK GROUP REPORTS

9.1 GROUP I - FARMER ORGANISATION

PROBLEMS	RECOMMENDATIONS	RESPONSIBILITY
1. PRE-PRODUCTION		
1.1 Insufficient access to credit	1.1.1 Develop non-traditional credit mechanisms based on successful models e.g. MRDF/Saint Lucia Credit Unions, FO	ADCU/CFDC and other Umbrella organisations, such as MOA, Barclays, Credit Unions
1.2 Insufficient equipment to facilitate production and marketing	1.2.1 Develop projects (small equipment schemes) in each island to make appropriate technology available based upon MOA Saint Lucia Project Model	MOA, FOs, donors
1.3 High cost or unavailability of farm inputs (chemicals, seeds, plants)	1.3.1 Give one organisation the responsibility for bulk purchasing/distribution of farm inputs	Caribbean Farmer Development Company in cooperation with MOAs
1.4 Scarcity and high cost of	1.4.1 Encourage farmers/farmer organisation to mechanize where economically and environmentally feasible	MOA, FO, Donors

PROBLEMS	RECOMMENDATIONS	RESPONSIBILITY
1.5 Inadequate flow of information from MOA Research/Extension and organisations to farmers and feedback mechanisms from farmers to those organisations	<p>1.5.1 Conduct market opportunity studies for FO</p> <p>1.5.2 Assign Extension Officers to Farmer Organisations e.g. as in Saint Lucia. (Restructure Extension system to respond to real needs of farmers)</p> <p>1.5.3 Introduce task force approach (inter-institutional action)</p>	FO, MOA, CARDI, French, Chinese Mission, IICA
1.6 Government Policy/Planning, undertaken without active participation of farmers, leading to poor production/marketing policies and plans which farmers do not support	<p>1.6.1 Promote direct lobbying by farmers and FO</p> <p>1.6.2 Establish inter-institutional coordinating mechanisms (committees) in each country to determine production/marketing policies</p>	FO, MOA, MBs
1.7 Inadequate farmer access to suitable land under reasonable terms	<p>1.7.1 Promote direct lobbying by farmers and FO</p> <p>1.7.2 Promote participation of FO in land development scheme</p>	FO
1.8 Insufficient feeder roads into vegetable production regions	<p>1.8.1 Prioritize production areas</p> <p>1.8.2 Lobby Governments</p>	FO, MOA, Donors, Farmers

PROBLEMS	RECOMMENDATIONS	RESPONSIBILITY
1.9 Slowness of bureaucratic structure in the legislation of farmer organisations	1.8.3 Promote self-help projects 1.8.4 Develop maintenance programmes 1.9.1 Restructure and/or enact coop laws and assess other forms of legal organisations 1.9.2 Promote more active participation of Coop Departments in needs assessment/and in training of FO 1.9.3 Lobby Government to provide more support to Coop Departments	CFDC, COOP Departments, FO
1.10 Lack of adequate farmer representation in production/marketing process	1.10.1 Stimulate/promote more active participation of farmers in FO 1.10.2 Lobby Government to get national representation	FO, ADCU, MOA, CFDC
1.11 Inadequate and uneconomic access to (irrigation) water	1.11.1 Carry out inventory of needs 1.11.2 Provide technical assistance in project form 1.11.3 Seek financial assistance for execution	TROPRO, ADCU, CFDC, MOA, FO TROPRO, FO, Donors, MOA, ADCU

PROBLEMS	RECOMMENDATIONS	RESPONSIBILITY
1.5 Inadequate flow of information from MOA Research/Extension and organisations to farmers and feedback mechanisms from farmers to those organisations	<p>1.5.1 Conduct market opportunity studies for FO</p> <p>1.5.2 Assign Extension Officers to Farmer Organisations e.g. as in Saint Lucia. (Restructure Extension system to respond to real needs of farmers)</p> <p>1.5.3 Introduce task force approach (inter-institutional action)</p>	FO, MOA, CARDI, French, Chinese Mission, IICA
1.6 Government Policy/Planning, undertaken without active participation of farmers, leading to poor production/marketing policies and plans which farmers do not support	<p>1.6.1 Promote direct lobbying by farmers and FO</p> <p>1.6.2 Establish inter-institutional coordinating mechanisms (committees) in each country to determine production/marketing policies</p>	FO, MOA, MBS
1.7 Inadequate farmer access to suitable land under reasonable terms	<p>1.7.1 Promote direct lobbying by farmers and FO</p> <p>1.7.2 Promote participation of FO in land development scheme</p>	FO
1.8 Insufficient feeder roads into vegetable production regions	<p>1.8.1 Prioritize production areas</p> <p>1.8.2 Lobby Governments</p>	FO, MOA, Donors, Farmers

PROBLEMS

RECOMMENDATIONS

RESPONSIBILITY

1.9	Slowness of bureaucratic structure in the legislation of farmer organisations	1.9.1 Restructure and/or enact coop laws and assess other forms of legal organisations	CFDC, COOP Departments, FO
		1.9.2 Promote more active participation of Coop Departments in needs assessment/and in training of FO	
		1.9.3 Lobby Government to provide more support to Coop Departments	
1.10	Lack of adequate farmer representation in production/marketing process	1.10.1 Stimulate/promote more active participation of farmers in FO	FO, ADCU, MOA, CFDC
		1.10.2 Lobby Government to get national representation	
1.11	Inadequate and uneconomic access to (irrigation) water	1.11.1 Carry out inventory of needs	TROPRO, ADCU, CFDC, MOA, FO
		1.11.2 Provide technical assistance in project form	
		1.11.3 Seek financial assistance for execution	TROPRO, FO, Donors, MOA, ADCU

PROBLEMS	RECOMMENDATIONS	RESPONSIBILITY
1.12	Poor mechanisms for training/ education of farmers in record keeping, organisation, business management, production, post-harvest handling, marketing	Donors, NDFs, MOA, CFDC
	1.12.1 Assess needs of FO	
	1.12.2 Design training programme	
	1.12.3 Identify source of human and financial resources	
1.13	Insufficient incentives for agricultural development	CFDC
	1.13.1 Provide fiscal incentives to farmers	
	1.13.2 Provide duty free concessions to farmers	
	1.13.3 Protect markets for selected items	
2.	PRODUCTION	
2.1	Pest/disease outbreaks	Task force including FO, MOA, IICA, FAO
	2.1.1 Improve technological information generation and transfer	
	2.1.2 Promote integrated pest management	
	2.1.3 Conduct research on quarantine importance of pests and diseases e.g. Diamond Back Moth, White Fly and develop control measures	
2.2	High level of risk in vegetable production	
	2.2.1 Study feasibility of crop insurance for vegetables	
	2.2.2 Place wind breaks around vegetable plots	

PROBLEMS

RECOMMENDATIONS

RESPONSIBILITY

2.3	Poor distribution system for farm inputs within countries	2.3.1 Improve planning of needs for farm inputs	Farmers, FO, MOA, CARDI
2.4	Praedial larceny	2.3.2 Improve management/organisation systems through FO	FO, MOA
2.5	Animal damage	2.4.1 Lobby to enforce current or restructured laws and increase penalties	FO, CFDC, MOA, Legal systems
2.2.3	Improve crop husbandry e.g. molding, terracing, and other practices	2.2.4 Improve production/marketing planning	Farmers, FO, MOA, CARDI
2.2.4	Improve production/marketing	2.2.5 Develop irrigation system where economically feasible	
2.5.1	Lobby to enforce current or restructured laws and increase penalties	2.5.2 Zone agricultural areas	FO, MOA, CFDC
2.5.2	Zone agricultural areas	2.5.3 Fence and provide incentives for fencing	
2.5.3	Fence and provide incentives for fencing		

PROBLEMS	RECOMMENDATIONS	RESPONSIBILITY
2.6	Poor production management	MOA, MDF, IICA, CARDI, CFDC
	2.6.1 Train farmers on farm management	
	2.6.2 Promote farm record keeping	
	2.6.3 Improved integration of CARDI, CAEP, UMI, IICA, MOA, French Mission, Chinese Mission efforts (demonstration plots, field visits, videos)	
2.7	Improper cultural practices (chemicals, water, weeds, harvest)	Donors, CARDI, MOA, Others
	2.7.1 Provide and implement training programmes, through <ul style="list-style-type: none"> - crop specific workshops - farmer exchange - videos 	
	2.7.2 Produce/disseminate technological materials (fact sheets, audio-visuals)	
2.8	Unproductive/unreliable labour	MOA, FO
	2.8.1 Promote/support mechanization	
	2.8.2 Improve management systems	
	2.8.3 Train workers	
	2.8.4 Establish incentive programmes for labourers	

PROBLEMS

RECOMMENDATIONS

RESPONSIBILITY

2.9	Inadequate soil testing	2.9.1	Put in place mechanisms to utilize existing regional laboratories e.g. Puerto Rico, Dominican Republic, Trinidad and Tobago and others	MOA and sub-regional laboratories
		2.9.2	Improve local capabilities in OECS: simple testing in each country, one or two centres within the sub-region for more complex analyses	
3.	POSTHARVEST			
3.1	High level of postharvest losses	3.1.1	Increase farmer access to field crates for harvesting, through FO	ADCU, CFDC, AVT, CATCO
		3.1.2	Train farmers in proper time/methods of harvesting each crop	
		3.1.3	Introduce field packing where feasible	
		3.1.4	For those crops which can be stored: <ol style="list-style-type: none"> determine proper storage techniques and facilities 	

PROBLEMS

RECOMMENDATIONS

RESPONSIBILITY

	2.	study economic feasibility of storage	
	3.	design storage facilities	
	4.	implement storage projects through FOs	
	3.1.5	Identify potential for agroprocessing (semi-processing) and carry out feasibility study	
	3.1.6	Train farmers and drivers in proper methods of postharvest handling including washing, grading, packaging for farmers, as well as stacking and transport care for both farmers and drivers	
	3.1.7	Train farmers in safe use of chemicals and potential damage of insecticide residues	
4.	MARKETING		
4.1	Lack of adequate and suitable transportation within and outside the region	4.1.1 Study the economic/technical feasibility of new inter-island shipping vessels	CFDC

PROBLEMS	RECOMMENDATIONS	RESPONSIBILITY
<p>4.2 Insufficient access of farmers to proper packaging materials</p>	<p>4.1.2 Request AVT to coordinate with CFDC in developing a project to finance refrigerated vessels out of Trinidad or elsewhere</p> <p>4.1.3 TROPRO/CFDC projects should establish linkages to assure that farmer organisations benefit from transport component</p>	CFDC, CATCO, FO, Exporters, Exceda
	<p>4.2.1 Conduct inventory of alternative sources/costs of packaging materials</p>	
	<p>4.2.2 CFDC should coordinate purchase and distribution of packing materials</p>	
	<p>4.2.3 Conduct inventory of needs of farmer organisations for packaging materials</p>	
	<p>4.2.4 Establish effective labelling which identifies farmers/farmer organisations</p>	
<p>4.3 Inadequate information for decision making on supply of produce</p>	<p>4.3.1 Develop production information on crops to forecast supply, through farmer organisation</p>	CFDC, FO, MOA, ADCU, CATCO, MBS, Exporters, CARDI

PROBLEMS

RECOMMENDATIONS

RESPONSIBILITY

4.3.2	Publish export statistics to monitor diversification efforts in each country	
4.3.3	Develop/publish/disseminate market information	
4.3.4	Collect/disseminate import statistics to orient development of import substitution programmes	
4.3.5	Identify market opportunities within and outside of the region	
4.3.6	Train farmers in use of decision-making information	
4.4	Difficulty encountered by farmers in obtaining payment for produce sold	CFDC
4.4.1	Identify reliable importers in North America/Europe	
4.4.2	Establish partnership relations with established exporters and/or importers	
4.4.3	Promote and develop use of export marketing fund	

NOTE: Lead organization for follow-up and coordination of implementation of the above recommendations: CFDC

9.2 GROUP II - TECHNOLOGY GENERATION AND TRANSFER

1. TECHNICAL CONSTRAINTS TO VEGETABLE PRODUCTION

The following were identified as the most important technical constraints to vegetable production in the OECS States and the French Department of America (FDA). They are listed according to their priority rating:

1. Lack of support services
2. Weather/Environmental Factors
3. Weak linkage between production and marketing
4. Weak linkage between research and extension
5. Inappropriate cropping systems
6. Quality standard and post harvest technology

Other constraints mentioned were:

- o high incidence of pest, disease and weeds;
- o inadequate marketing systems;
- o poor location of holdings;
- o low adoption of new technologies.

2. STRATEGIES TO BE IMPLEMENTED IN ORDER TO ALLEVIATE THESE CONSTRAINTS

Strategies to be implemented in order to alleviate these constraints are detailed in the following table.

CONSTRAINTS	STRATEGY	RESOURCE
1. INADEQUATE SUPPORT SERVICES		
1.1 Extension	1.1.1 Increase efficiency of existing Extension Services, through <ul style="list-style-type: none"> - recruitment and training - improvement of transportation facilities - tools and equipment - access to media (TV and Radio) - clearly defined work programmes 	MOA
1.2 Communication/information	1.2.1 Improve communication capability of existing units: <ul style="list-style-type: none"> - equipment - staff training - systems to facilitate information transfer (video, slides etc) 	OECS Agricultural Desk, MOA, UWI
1.3 Credit	1.3.1 Make credit available for vegetable production more accessible to farmers	CDB, HIAMP (AVT), NDB, Equity/Commercial Banks, Government, NGOs

RESOURCE

STRATEGY

CONSTRAINTS

CONSTRAINTS	STRATEGY	RESOURCE
	1.3.2 Consider crop liens in relation to markets	
	1.3.3 Establish revolving fund	
1.4 Inputs	1.4.1 Ensure timely availability of recommended inputs in adequate quantities	MOA
	1.4.2 Improve linkage between exporters and suppliers	
	1.4.3 Provide duty free concessions	
	1.4.4 Provide/support co-operative purchasing (bulk at all levels)	
1.5 Diagnostic Services (pests, diseases, soils)	1.5.1 Improve diagnostic capability to enhance successful vegetable production (labs, personnel training	MOA, UJI, WINBAN, CARDI, IRAT/CIRAD, INRA
	- Produce directory of resource persons	
	- Establish systems to transfer	
	1. samples	
	2. results	
	1.5.2 Use existing facilities/services at UJI, WINBAN, and other institutions	

CONSTRAINTS	STRATEGY	RESOURCE
1.6 Engineering (land preparation)	1.6.1 Provide adequate equipment and efficient services on a timely basis to facilitate vegetable production: <ul style="list-style-type: none"> - planning - maintenance - spares - training 1.6.2 Encourage farmer ownership of needed equipment	CARDI
2. ADVERSE ENVIRONMENTAL FACTORS		
2.1 Lack of rainfall, excess rainfall, Topography	2.1.1 Provide means to manage adverse environmental factors in vegetable production, through: <ul style="list-style-type: none"> - Irrigation - Soil/Water Conservation and management - Drainage - Protected cultivation - Pesticide loading and environmental protection - Plant breeding and varietal selection 	INRA/FCM, CARDI, SAPISE MOAs, MOA/INRA FCM/IRAT/CIRAD UMI, MOA, CARDI, TROPRO, ROC
		INRA, IRAT, CIRAD, CARDI, ROC, UMI, FMC CARDI, MOA, INRA, IRAT/CIRAD, UMI, FMC

CONSTRAINTS	STRATEGY	RESOURCE
3. WEAK PRODUCTION/ MARKETING LINKAGES	3.1. Strengthen functional relationships between production and marketing agencies - Joint planning and monitoring - Regular meetings - Joint Field days and workshops	Farmers, Marketing Agencies - Extension, IICA, CARDI Farmers, Marketing Agencies - Extension, IICA, CARDI Farmers, Marketing Agencies - Extension, IICA, CARDI Farmers, Marketing Agencies - Extension, IICA, CARDI
4. WEAK RESEARCH/ EXTENSION LINKS	4.1 Strengthen and develop functional relationships between all Research and Extension Agencies operating in the OECS and French Department of America, in the area of vegetable production, through: - Joint Planning - Joint implementation - Joint monitoring	MOAs, CARDI, UMI, IICA, FMC, INRA, IRAT/CIRAD, ROC

RESOURCE

STRATEGY

CONSTRAINTS

5. INADEQUATE CROPPING SYSTEMS

- 5.1 Encourage vegetable production systems which take the following into consideration:
 - farmers's preference MOA
 - economic returns MOA
 - pest/disease control MOA
 - land fertility preservation (conservation) MOA
 - research in vegetable cropping systems CARDI, INRA, IRAT/CIRAD, FMC, UWI

6. INADEQUATE POST HARVEST HANDLING

- 6.1 Develop post harvest technology for the range of vegetable crops selected for the OECS & FDA and promote transfer of technology to those involved:
 - Varietal testing for storage ability CARDI, MOA & all other research agencies
 - Linkage between research and marketing agencies with regard to grades and standards MOA, Marketing Boards, and other relevant agencies

CONSTRAINTS	STRATEGY	RESOURCE
	- improvement of harvesting and handling methods	MOA
	- research on packaging for vegetables	CATCO
	- training of farmers, marketers, shippers, improvement of cold storage facilities	CATCO, TROPRO, MOA TROPRO

NOTE: It is recommended that the Organising Committee approach IICA for follow-up actions to implement the above recommendations.

9.3 GROUP III - MARKETING

1. APPROACH

A market-led approach is taken to address marketing constraints discussed throughout the Workshop, in the following areas:

1.1 Extra-Regional Markets

- Eggplant
- Hot Peppers
- Okra
- Smooth Christophene
- Water melons and cantaloupe
- Ginger

1.2 Regional Markets

- White Potato
- Onions
- Carrots
- Cabbages
- Sweet Peppers
- Tomato
- Cauliflower
- Broccoli
- Herbs

1.3 National Markets

1.3.1 Information on both Extra-Regional and Regional Markets

- Variety
- Market size - demand
- Grades, Standards
- Target farmers
- Packaging
- Trends
- Prices
- Importers
- Phyto-Sanitary Requirements
- Tariff/Trade Regulations
- Method of Payments

- Cost of Production
- Seasonality of Demand/Supply
- Production infrastructure

1.3.2 Transportation

- Type of transport
- Capacity
- Frequency
- Cost
- Agents
- Port Procedures
- Port Facilities

1.3.3 Infrastructure

- Collection System
- Selection
- Packaging
- Storage (Cool and Shade)

1.3.4 Marketing Organisation

- Farmer Organisations
- Marketing Boards
- Private Exporters
- Ministry of Agriculture and Trade
- CATCO
- GEEST
- Vendors
- Hucksters/Traffickers

1.3.5 Financing

- Conditions (Terms, Security, Overdraft)
- Foreign Exchange Considerations
- Insurance

2. RECOMMENDATIONS

- 2.1 Make appropriate technology available to farmers.

- 2.2 Develop Grades and Standards for each commodity.
- 2.3 Establish a market information system in each country.

Production and marketing concerns should be adequately linked with the ADCU to properly support the diversification drive.

- 2.4 Prioritise efforts on Extra-Regional markets and the Virgin Islands.
- 2.5 Promote greater local demand eg. increase local consumption
- 2.6 Encourage regional and extra-regional trade and put in place transport facilities and other resources needed for inter-regional trade (e.g. more appropriate shipping space).
- 2.7 The OECS Secretariat should request USAID to provide at least two C150 (Hercules) aircrafts and four-year operating cost for inter-island trade.

2.8 Improve Infrastructure:

Governments should facilitate marketing boards and the private sector in marketing investments, i.e. in infrastructure facilities, by providing incentives and services and tapping funds from agencies such as CDB, the French Mission for Cooperation, EEC, ROC, CIDA, UNDP, BDD and others.

- 2.9 Improve or establish a certification system in each country for export marketing, to look after phyto-sanitary and product quality by implementing valid quality standards, already recommended in the region.

- 2.10 Improve organisation of input supply.

- 2.11 Improve financing: the ECGB should expand its Export Finance guarantee scheme to include financing for export of vegetables.

- 2.12 Government should extend tax concessions to vegetable exporters on equipment, plants, packaging material and vehicles, where such concessions are still lacking.

3. RESPONSIBILITY FOR FOLLOW-UP

The above recommendations are to be presented to the OECS/EAS for communication to the OECS Governments, for their consideration for implementation. The EAS should follow-up on these recommendations and encourage their implementation, beginning October 1, 1990.

FECHA DE DEVOLUCION

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**IICA
PRRET-A2/LC-90-002**

Autor

**First regional OECS vegetable
development projects
workshop**

**Fecha
Devolución**

Nombre del solicitante

Develop Grades and Competency
for each competency.
Establish a series of
system for each competency
and any other...
with an appropriate...
to be used...
with...

