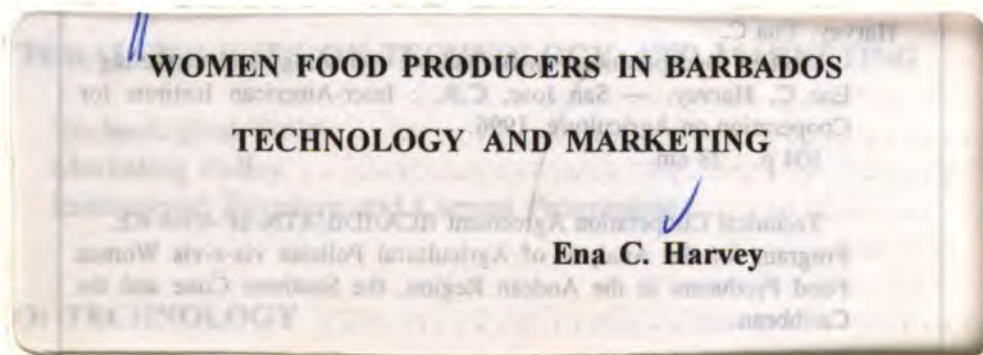


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INTER-AMERICAN INSTITUTE FOR COOPERATION
ON AGRICULTURE

INTER-AMERICAN DEVELOPMENT BANK

Program for the Analysis of Agricultural Policies
vis-a-vis Women Food Producers
in the Andean Region, the Southern Cone
and the Caribbean



TECHNICAL COOPERATION AGREEMENT IICA/IDB/ATN-SF-4064-RE

AREA OF CONCENTRATION IV
SUSTAINABLE RURAL DEVELOPMENT



TECHNICAL COOPERATION AGREEMENT IICA/BID/ATN-SF-4064-RE

**PROGRAM FOR THE ANALYSIS OF AGRICULTURAL POLICIES
VIS-A-VIS WOMEN FOOD PRODUCERS IN THE
ANDEAN REGION, THE SOUTHERN CONE AND THE CARIBBEAN**

// **WOMEN FOOD PRODUCERS IN BARBADOS**
TECHNOLOGY AND MARKETING

✓
Ena C. Harvey

AREA OF CONCENTRATION IV
SUSTAINABLE RURAL DEVELOPMENT

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ABBREVIATIONS AND ACRONYMS

| | |
|----------------|---|
| ACTCO | Agricultural Commodity Trading Company |
| BADC | Barbados Agricultural Development Corporation |
| BADMC | Barbados Agricultural Development and Marketing Company |
| BARNACS | Barbados National Association of Cooperative Societies |
| BAS | Barbados Agricultural Society |
| BASIS | Barbados Agricultural Statistical Information Service |
| BMC | Barbados Marketing Corporation |
| CARDATS | Caribbean Agricultural and Rural Development Advisory and Training Service |
| CARDI | Caribbean Agricultural Research and Development Institute |
| EPU | Export Packaging Unit |
| FAO | Food and Agriculture Organisation of the United Nations |
| GOB | Government of Barbados |
| IPM | Integrated Pest Management |
| MAFF | Ministry of Agriculture, Food and Fisheries |
| NTB | National Training Board |
| NCST | National Council of Science and Technology |
| NDFB | National Development Foundation of Barbados |
| SFMP | Small Farmers Marketing Project |
| VOCA | Volunteers in Overseas Cooperative Assistance |
| WAND | Women and Development |
| WID | Women in Development |

Currency Equivalent

US\$1.00 = BDS\$2.00

PREFACE

The Program for the Analysis of Agricultural Policies vis-a-vis Women Food Producers in the Andean Region, the Southern Cone and the Caribbean, executed by the Inter-American Institute for Cooperation on Agriculture (IICA) and financed by the Inter-American Development Bank (IDB) under Technical Cooperation Agreement ATN/SF-4064-RE, is the second phase of a program which included 18 countries in Latin American and the Caribbean: Barbados, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay and Venezuela.

The first phase of the Program was implemented in 1992-1993 in six countries in Central America, under the auspices of the Council of Central American Ministers of Agriculture. The second phase was carried out by request of the First Ladies during their Summit Meeting on the Economic Advancement of Rural Women, held in Geneva, Switzerland, in February 1992.

This document is one of three reports per country which present the technical results from the four areas of Program research, as well as the recommendations and preliminary action proposals related to women food producers. The three documents are:

***Assessment and Policies.** Assesses the participation of women in the agricultural sector and their contribution as food producers on small-scale farms, and presents an analysis of the agricultural policy and program environment and its effects on rural women.*

***Technology and Marketing.** Analyses the technology utilized on small farms and by women in food production processes, and the role of women in the processing and marketing of farm food production; agricultural technology and marketing policies and programs and their effects on rural women are also examined.*

***National Summary.** Drawing from the above two reports, this document synthesizes the major findings and research results, and presents the principal policy, program, and project proposals.*

Other activities carried out under this Program included the elaboration of regional comparative documents; the formulation of policy proposals and other actions in conjunction with the ministries of agriculture, the Offices of the First Ladies, and other public and private organizations involved in agricultural and rural development; national and regional seminars to present and discuss Program recommendations; and the publishing and distribution of the final results.

I. INTRODUCTION

A. Background

Throughout the history of Barbados, women have played a significant role in the production, processing and marketing of food commodities. In the early 17th century, when agricultural production was dominated by sugar cane, female slaves worked alongside men in the "Great Gang" digging cane holes, carrying manure, planting canes and provisions, trashing, cutting, feeding the mill and tying canes and tops during the cane cropping season. Women were fully incorporated into the agricultural labour force, performing the same labour as men, to the extent that their agriculturally productive roles in the canefields took priority over biological and social reproductive activities.

By the end of the eighteenth century, slaves were allotted small house plots (generally no more than 15 square yards), which could not be profitably planted in cane, and on which they planted fruits, vegetables and root crops, and raised small animal stock. These "house plots" provided the slaves with a slightly improved economic status *as it allowed them to improve their diets, to own and possess property in a system that defined them as property, and it allowed them time to travel, and attempt to "normalize" their social lives as much as possible under the generally restrictive circumstances* (Beckles 1991).

According to the 1989 Agricultural Census, there are currently 6714 holdings operated by women throughout the eleven parishes of Barbados. (See Table I.1). The distribution of holdings by parish is shown in Figure I.1. Holdings generally lie within the size range of 0.1 to 3.0 ha (Table I.2), and are owned and operated by women who produce vegetables (including snap beans, cabbage, carrot, cauliflower, christophene, cucumber, eggplant, lettuce, okra, peppers, pumpkin, and tomato), root crops (sweet potato, eddoe, yam, cassava), fruits, livestock (pigs, sheep, cattle, and rabbits), and poultry. On 88% of these holdings, the commodities are produced for commercial sale.

Seventy-two percent (72%) of female farmers are 45 years and older. The greatest percentage of farmers lies within the age range of 35-65 years, with a relatively equal percentage of holders within the three age ranges of 25-35, 45-55 and 55-65 years. Thirty-three percent (33%) of holders are 65 years and older. These statistics have serious implications for the future involvement of women in farming. Within the last two decades, the economy of the island has been oriented towards the tourism and manufacturing industries (with data processing and information technology industries assuming significance within the last decade). The high demand for female labour in these industries, coupled with the attraction of expanded educational opportunities, security, prestige, mobility and higher salaries offered by these two sectors, makes it highly likely that younger women will not opt to enter the agricultural sector. Moreover, many women food producers actively discourage their children from farming, hoping for "*something better*" for them.

In the area of processing, the cottage industry and micro-enterprise food processing sector is dominated by women. The food products comprise largely high-acid foods such as wet minced seasoning, pickles, syrups, sauces, gravy browning, jams, jellies and preserves, traditional local

confectionery and baked goods, fruit pieces preserved in syrup, juices, fruit wines, rum creams and beverage mixes. Many of these items are sold by women directly to supermarkets, mini-marts and auto-marts.

In the area of marketing, it was slave women who, from the beginning, dominated the huckstering business in Barbados. They stamped their mark so indelibly upon this activity that it is associated with them even today. They sold their produce -yams, sweet potatoes, eddoes, Guinea and Indian corn, various fruits and berries, nuts, cakes, bundles of firewood and cane, livestock and poultry- in designated huckster markets and street markets. Trading was normally conducted on Sundays. However, with the event of The Sunday and Marriage Act, Sunday market was banned and Saturday became the big market day until the present time (Beckles 1989). Money obtained in the Sunday market assisted the women in obtaining supplementary food, clothing and household items.

Today, it is estimated that women in Barbados market approximately 70% of the food produced. Until recently, female hucksters or hawkers were responsible for the marketing of almost all of the fruit and vegetables produced by small farmers. Nowadays, more and more women farmers are opting to market their produce themselves. In addition, there has been a gender shift in that an increasing number of young men are now very active in the huckster trade.

The technologies used in the production, processing and marketing of food in Barbados have to be viewed within the overall context of rural and infrastructural development in the country. In Barbados, there is no well-defined demarcation between what is rural and what is urban. The size and flat topography of the country, its social and economic development, and the structure of the economy, all contribute to the virtual absence of an urban/rural dichotomy.

Barbados is relatively well supplied with public transportation systems, electricity, water, telephone and other services throughout its eleven parishes. As such, the availability of water, or access to technologies and production inputs are not limiting factors to the farmers' use of technology. The high utilisation of transport and communication networks serve to ensure that "rural" areas can easily access all of the services available to "urban" areas.

Despite the small size of the holdings operated by women farmers, the level of technology applied in the production of crops and livestock is relatively sophisticated. This is due largely to the high degree of mechanization applied in plantation systems and its trickle-down effect to small farmers, as well as to government-run programmes that offer subsidised rates for mechanized operations. Although women food producers still use "traditional" tools such as the hoe, fork, rake and hose, a large percentage of them have their plots mechanically prepared and their crops established by direct-seeding with mechanical planters. In addition, many female farmers use state-of-the-art irrigation technology in the form of trickle irrigation systems, and have their root crops harvested mechanically by contracted diggers.

For those women food producers who are engaged in on-farm processing, technologies used focus mainly on simple postharvest technologies such as washing, sorting, bundling and bagging of harvested crops. Commercial agro-processing is largely restricted to production of minced wet seasoning, pepper sauces, poultry processing and packaging of chilled birds and parts, and shelling (mechanised), packing and freezing of pigeon peas.

Despite the small size of the agricultural holdings and modest incomes reported, the contribution made by women food producers to food production and food distribution throughout the country, as well as to employment, income generation and foreign exchange savings, cannot be ignored. It should be noted that in the majority of cases, women operate these small plots on a part-time basis, with little formal technical training in production, processing or marketing (See Table I.4). Part-time farming has special significance in terms of its social aspects. The additional income derived is an important source of supplementary finance which reduces dependence on government. There exists, therefore, significant untapped potential in the women food producers of Barbados.

Table I.1. Total number of agricultural holdings operated* by females reported by parish and size of holding.

| Size of holding | Total area (ha) | Area by parish (ha) | | | | | | | | | | | |
|----------------------|-----------------|---------------------|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--|
| | | St. Michael | Christ Church | St. George | St. Philip | St. John | St. James | St. Thomas | St. Joseph | St. Andrew | St. Peter | St. Lucy | |
| Landless (<0.025 ha) | 1800 | 577 | 268 | 79 | 137 | 92 | 202 | 56 | 117 | 81 | 71 | 120 | |
| 0.025-0.1 ha | 2079 | 383 | 427 | 219 | 183 | 181 | 123 | 175 | 85 | 89 | 115 | 99 | |
| 0.1 - 0.2 ha | 1216 | 96 | 155 | 157 | 189 | 119 | 117 | 83 | 73 | 51 | 86 | 90 | |
| 0.2 - 0.5 ha | 1251 | 101 | 159 | 172 | 210 | 109 | 61 | 92 | 77 | 81 | 82 | 107 | |
| 0.5 - 1.0 ha | 244 | 13 | 33 | 22 | 45 | 11 | 18 | 11 | 18 | 36 | 7 | 30 | |
| 1.0 - 2.0 ha | 82 | 3 | 13 | 6 | 17 | 6 | 3 | 2 | 9 | 8 | 3 | 12 | |
| 2.0 - 3.0 ha | 25 | 1 | 6 | 3 | . | 1 | 3 | . | 9 | 3 | 1 | 5 | |
| 3.0 - 4.0 ha | 4 | . | . | 1 | 1 | . | 1 | . | . | 1 | . | . | |
| 4.0 - 5.0 ha | 1 | 1 | . | . | . | . | . | . | . | . | . | . | |
| 5.0 - 10.0 ha | 6 | . | . | 1 | . | 1 | . | . | . | 1 | . | 3 | |
| 10.0-20.0 ha | 4 | 1 | . | . | . | . | . | 1 | 1 | 1 | . | . | |
| 20.0-50.0 ha | 1 | . | . | . | . | . | 1 | . | . | . | . | . | |
| 200 - 500 ha | 1 | . | . | . | . | . | . | . | . | . | 1 | . | |
| Total | 6714 | 1176 | 1061 | 660 | 782 | 520 | 529 | 420 | 382 | 352 | 366 | 466 | |

Source: 1989 Agricultural Census, Barbados

* A farm operator is defined in the Census as the person directing the day-to-day operations of the holding. The operator could be the owner, tenant, or lessee of the holding, or could be employed as a manager by the owner, tenant or lessee to be responsible for the day-to-day operations of the holding.

Table I.2. Total area of agricultural holdings operated by females reported by parish and size of holding.

| Size of holding | Total Area (ha) | Area by parish (ha) | | | | | | | | | | | | |
|----------------------|-----------------|---------------------|---------------|------------|------------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|
| | | St. Michael | Christ Church | St. George | St. Philip | St. John | St. James | St. Thomas | St. Joseph | St. Andrew | St. Peter | St. Lucy | | |
| Landless (<0.025 ha) | 8 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0.025-0.1 ha | 94 | 17 | 19 | 10 | 9 | 9 | 5 | 8 | 4 | 4 | 4 | 4 | 5 | 4 |
| 0.1 - 0.2 ha | 128 | 10 | 17 | 17 | 20 | 12 | 12 | 9 | 8 | 9 | 5 | 8 | 9 | 10 |
| 0.2 - 0.5 ha | 341 | 28 | 45 | 47 | 54 | 28 | 16 | 24 | 20 | 26 | 26 | 20 | 22 | 31 |
| 0.5 - 1.0 ha | 166 | 9 | 23 | 15 | 30 | 7 | 13 | 7 | 12 | 26 | 26 | 12 | 4 | 20 |
| 1.0 - 2.0 ha | 111 | 4 | 16 | 8 | 24 | 10 | 4 | 2 | 12 | 11 | 11 | 12 | 3 | 17 |
| 2.0 - 3.0 ha | 59 | 3 | 14 | 7 | . | 2 | 7 | . | 5 | 7 | 7 | 5 | 2 | 11 |
| 3.0 - 4.0 ha | 14 | . | . | 4 | 3 | . | 3 | . | . | 4 | . | . | . | . |
| 4.0 - 5.0 ha | 5 | 5 | . | . | . | . | . | . | . | . | . | . | . | . |
| 5.0 - 10.0 ha | 38 | . | . | 8 | . | 6 | . | . | . | . | 6 | . | . | 17 |
| 10.0-20.0 ha | 53 | 11 | . | . | . | . | . | 12 | 16 | 13 | . | . | . | . |
| 20.0-50.0 ha | 28 | . | . | . | . | . | 28 | . | . | . | . | . | . | . |
| 200 - 500 ha | 263 | . | . | . | . | . | . | . | . | . | . | . | 263 | . |
| Total | 1309 | 9 | 135 | 116 | 140 | 75 | 89 | 62 | 79 | 103 | 309 | 111 | 111 | 111 |

* Source: 1989 Agricultural Census, Barbados.

Table I.3. Number of years operators/holdings in farming by size of holding and related area.

| Size of holding | Total holdings | | | | | | | |
|----------------------|-------------------|-------------|---------------|------------|-------------------|-------------|-------------|------------|
| | Less than 3 years | | 3 to 10 years | | 10 years and over | | | |
| | Number | Area (ha) | Number | Area (ha) | Number | Area (ha) | | |
| Landless (<0.025 ha) | 1653 | 8 | 484 | 2 | 631 | 3 | 538 | 3 |
| 0.025-0.1 ha | 1960 | 89 | 426 | 18 | 722 | 33 | 812 | 37 |
| 0.1 - 0.2 ha | 1168 | 123 | 181 | 19 | 353 | 37 | 634 | 67 |
| 0.2 - 0.5 ha | 1212 | 331 | 148 | 40 | 309 | 85 | 755 | 206 |
| 0.5 - 1.0 ha | 239 | 163 | 17 | 11 | 48 | 33 | 174 | 119 |
| 1.0 - 2.0 ha | 81 | 109 | 10 | 13 | 15 | 21 | 56* | 75 |
| 2.0 - 3.0 ha | 25 | 59 | 5 | 13 | 7 | 17 | 13 | 29 |
| 3.0 - 4.0 ha | 3 | 10 | . | . | 2 | 7 | 1 | 4 |
| 4.0 - 5.0 ha | 1 | 5 | . | . | 1 | 5 | . | . |
| 5.0 - 10.0 ha | 6 | 38 | . | . | 2 | 12 | 4 | 26 |
| 10.0-20.0 ha | 4 | 53 | 2 | 28 | . | . | 2 | 24 |
| 20.0-50.0 ha | 1 | 28 | . | . | . | . | 1 | 28 |
| 200 - 500 ha | 1 | 263 | . | . | . | . | 1 | 263 |
| Total | 6354 | 1279 | 1273 | 145 | 2090 | 2991 | 2991 | 881 |

* Source: 1989 Agricultural Census, Barbados.

Table I.4. Number of holders/managers with training in agriculture by parish.

| Parish | Total number holders/managers | | Specific training | |
|--------------|-------------------------------|-----------|-------------------|------------------|
| | Number | Number | With training | Without training |
| St. Michael | 1176 | 12 | 1164 | |
| Ch. Church | 1061 | 11 | 1050 | |
| St. George | 659 | 4 | 655 | |
| St. Philip | 782 | 2 | 780 | |
| St. John | 519 | 3 | 516 | |
| St. James | 529 | 2 | 527 | |
| St. Thomas | 419 | 2 | 417 | |
| St. Joseph | 382 | 3 | 379 | |
| St. Andrew | 352 | 5 | 347 | |
| St. Peter | 366 | 2 | 364 | |
| St. Lucy | 465 | 3 | 462 | |
| Total | 6710 | 49 | 6661 | |

* Source: 1989 Agricultural Census, Barbados.

B. Objectives

The general objective of the research is to draw up bases for orienting the policies and actions of the Barbados government, with a view to improving the living and working conditions of women food producers, and consequently, food security and the efficiency of the agricultural sector.

The specific objectives of the technology and marketing components of the research are to:

- identify and analyse the technologies used in food production, particularly those used by women
- on the basis of this analysis, recommend policies, institutional systems and possible programmes and projects that will provide rural women access to more advanced, but appropriate technology
- identify the characteristics of the processing and marketing of food products, and assess their effect on women producers
- assess the role of the woman in processing and marketing operations
- formulate recommendations regarding policies, institutional systems and possible programmes and projects

C. Approach and Methodology

The study combines a macro-perspective of the policy and institutional framework that conditions the participation of women in small-scale agricultural units, and a micro-perspective which emphasises how women are linked to production systems, and the principal limitations and constraints which they face as producers, marketers and processors of food.

The analysis moves from the general to the specific. At the macro-level, the study analyses agricultural production systems, the production-handling-marketing system, the agricultural policy framework, technology generation and transfer systems, and processing and marketing *vis-a-vis* women food producers. This analysis is largely based on secondary information available from population and agricultural censuses, technical and policy documents, reports, and from personnel in the various government ministries and institutions whose portfolio includes agriculture and women.

At the micro-level, specific information is provided on a selected group of women across the eleven parishes of Barbados (See Figure I.1). These women all spend at least fifty percent of their time on farming activity, and produce some or all of the following three selected commodities:

1. **Market garden vegetables (including snap beans, beets, cabbage, carrot, cauliflower, christophene, cucumber, eggplant, herbs, lettuce, okra, peppers, pumpkin, spinach, squash, and tomato)**
2. **Sweet potato**
3. **Livestock (including pigs, poultry, sheep, cattle, and rabbits)**

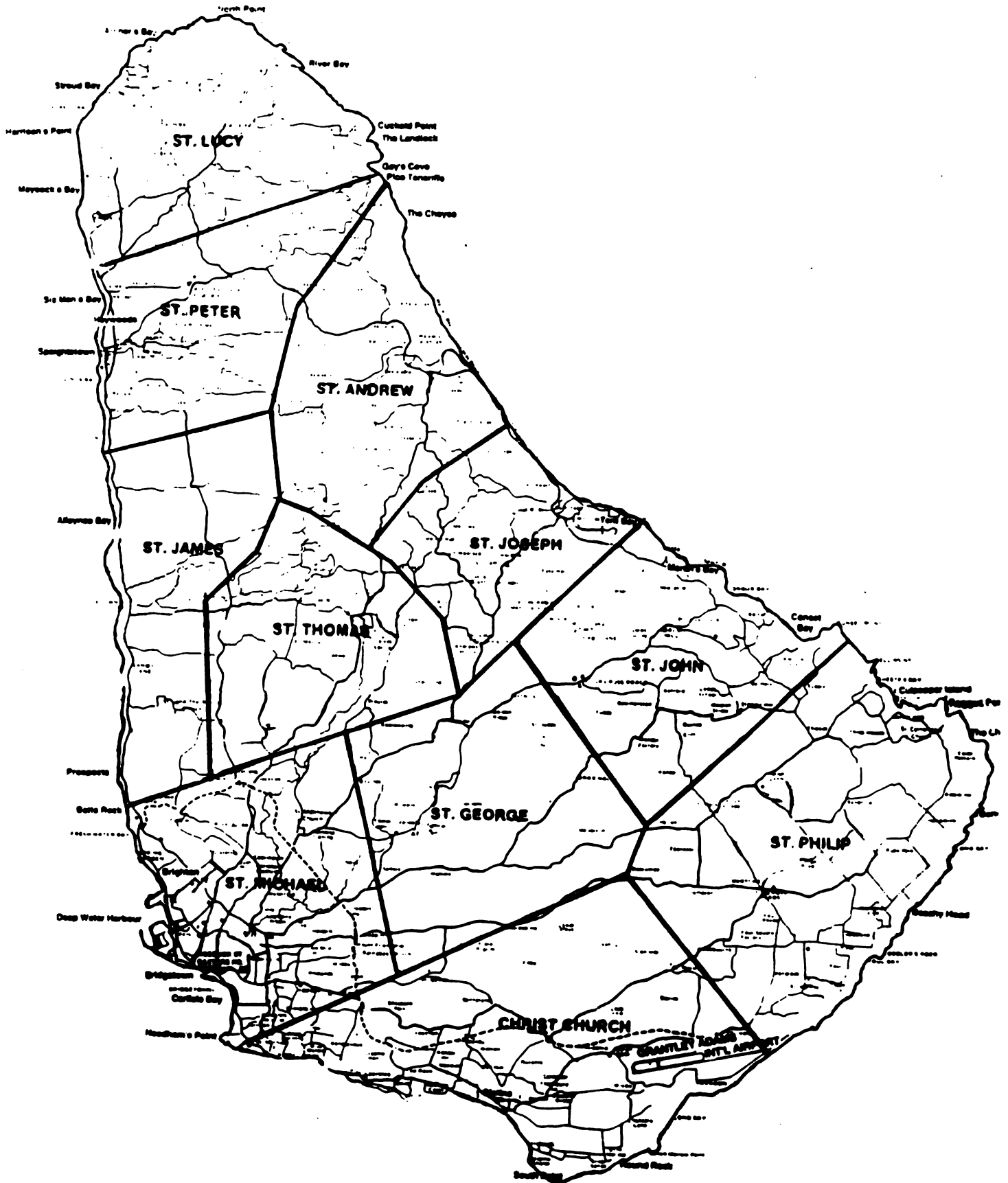


Figure I.1. Map of Barbados showing parishes and their boundaries.

The criteria for selection of these commodities were that:

- they constitute an important component of the basic diet of the population
- they are produced on small production units
- there is reason to believe that women participate in different steps of the production cycle

D. Plan of Document

Part I: Policies

This section reviews the technological and marketing policies and evaluates their impact on small-scale agriculture in Barbados. The institutional structure and current programmes for technology transfer are also reviewed and evaluated with respect to applicability to small farmers.

Part II: Technology

Traditional technologies used on small-farm units and access to improved technologies are described in this section. The farmers' level of familiarity with improved technologies is analysed, with emphasis on gender differences.

Part III: Processing and Marketing

The national market for agri-food commodities produced on small-scale units is analysed with respect to demand, price and supply, national marketing channels and marketing agents. Processing of foods on the farm is examined with respect to specialization by gender, and factors which affect the participation of women.

Part IV: Policy Recommendations

The principal opportunities for women to participate in the services, benefits and incentives derived from the existing policies, as well as the principal obstacles that prevent women food producers from participating and benefiting from improved technology and marketing, are identified and described.

Specific proposals are made for changes in existing policies that will facilitate the participation of women food producers in managing technology and in marketing their produce.

PART ONE: POLICIES

II. SECTORAL POLICIES ON TECHNOLOGY AND MARKETING

The technological and marketing policies which relate to the agricultural sector are embodied in the Agricultural Sector Plan (1988 - 1993), which lists the following objectives for the development of the agricultural sector:

- to contribute substantially to the provision of adequate food supplies at reasonable prices for the population of Barbados through increased agricultural production
- to enhance the nutritional status of the population by encouraging the consumption of locally produced food
- to promote food security
- to maintain and develop export markets for selected agricultural products
- to maintain employment opportunities
- to promote a programme of diversification in agriculture, at the same time maintaining sugar cane cultivation at optimum levels

The Agricultural Sector Plan outlines in fair detail the strategy, support services and sub-sector programmes required to meet the above objectives, and it recognises the critical role played by small farmers in food production and distribution and in providing employment for thousands of persons. The Plan does not, however, make specific reference to a specific technology or marketing policy. Moreover, the Plan does not make reference to the contribution made by the women food producers, nor does it identify any programmes aimed at maximising women's capacity and efficiency. A summary of the sectoral policies which relate to technology and marketing is provided in Table II.1a below.

A review of the agricultural sector 1988 - 1993 indicates that of the strategies which were not fully pursued during the period, those for research and development and marketing proved the most challenging to address, with many issues remaining unsolved.

The major achievements of the 1992-1993 period were:

- Conduct of a feasibility study on the establishment of an export marketing facility
- Training of MAFF personnel in Animal Production Technology, Plant Breeding, Meat Technology and Agriculture

Table II.1a. Sectoral policies on technology and marketing in Barbados, 1988 - 1993.

| POLICIES AND PROGRAMS | Description | Orientation by size of producer | | | | Gender orientation | |
|-----------------------------------|--|---------------------------------|--------|-------|---------------|--------------------|--|
| | | Small | Medium | Large | Women farmers | Other women | |
| TECHNOLOGY | | | | X | None | None | |
| | • Provision of research and extension support on a commodity basis, using a team approach | | | X | None | None | |
| Research and Extension | • Strengthening of research and development to ensure that limited staff can function efficiently and effectively | | | | | | |
| MARKETING | | | | | | | |
| Production | • Improved production services to assure better quality for consumers | X | X | X | None | None | |
| | • Application of postharvest handling for improvement of marketing system | | | | | | |
| | • Coordination of production and marketing to reduce occurrence of gluts and shortages | | | | | | |
| | • Support for the formation of producer groups or cooperatives | | | | | | |
| Markets & Distribution | • Improved collection and distribution systems | | | | | | |
| | • Provision of a package of marketing services | | | | | | |
| | • Introduction of national grades and standards | | | | | | |
| | • Improvement of public market facilities | | | | | | |
| | • Expansion of demand for local agricultural produce through increased linkages with consumers and the tourist sector. | X | X | X | None | None | |
| Export | • Development of market research and information profiles for all major markets | | | | | | |
| | • Provision of appropriate infrastructure for postharvest handling | | | | | | |
| | • Provision of export incentives | | | | | | |
| | • Improvement of public market facilities | | | | | | |
| | • Expansion of demand for local agricultural produce through increased linkages with consumers and the tourist sector. | | X | X | None | None | |
| Agro-Processing | • Promotion of large- and medium-sized agro-processing operations and smaller cottage industries | | | | | | |
| | • Delineation of tangible, well-defined roles for all existing institutions | | | | | | |
| Institutions | | X | X | X | None | None | |

Source: Agricultural Development Plan, 1988 - 1993, MAFF.

- **Implementation of an integrated livestock development project, aimed at reducing the importation of meat and meat products through stimulation of domestic production and improved marketing**

The 1993-2000 Agricultural Development Plan is currently being drafted. This new Plan focuses more clearly on issues of technology and marketing, and on the production of agricultural commodities to satisfy both domestic and export markets. To the extent that it advocates the adoption of farming systems that are environmentally friendly and economically sustainable for farm families, it can be said that the 1993-2000 Plan is less gender blind.

The specific agricultural policy objectives of the Plan are:

- (i) To increase the output of agricultural commodities, especially for the export market, such that the deficit between agricultural commodity imports and exports can be minimized;**
- (ii) To restructure and modernize the agricultural sector such that the optimum level of productivity, consistent with other policy objectives including the attainment of sustainable development, can be realized;**
- (iii) To ensure that persons who depend on agriculture for their livelihood can enjoy a reasonable quality of life and can realize some improvement in same over time;**
- (iv) To promote the adoption of farming systems which are environmentally friendly and which can enable farmers and farm workers to realize optimum levels of income;**
- (v) To ensure that adequate supplies of arable agricultural land are preserved for use by present and future generations**
- (vi) To ensure that adequate quantities of wholesome food, whether obtained locally or from foreign sources, are available to Barbadian households, particularly those of the more vulnerable groups within society.**

Table II.1b. Summarises the proposed policies in technology and marketing for the coming period.

Table II.1b. Sectoral policies on technology and marketing in Barbados, 1994 - 2000.

| Policies and programs | Description | Orientation by size of producer | | | | Gender orientation | |
|---|--|---------------------------------|--------|-------|---------------|--------------------|--|
| | | Small | Medium | Large | Women farmers | Other women | |
| TECHNOLOGY | | | | | | | |
| Production | | | | | | | |
| | • Encouragement of commercial food production | X | X | X | None | None | |
| | • Production of processed foods from local materials | | | | | | |
| | • Establishment of backyard gardens | | | | | | |
| | • Small enterprise production of small livestock | | | | | | |
| | • Strengthening of Food Quality Control Programme | | | | | | |
| | • Promotion of the use of drip irrigation systems | | | | | | |
| | • Promotion of the use of mulching to reduce water use | | | | | | |
| Development of Irrigation Water Resources | • Use of waste water for irrigating industrial crops | X | X | X | None | None | |
| | • Maximisation of use of water under the SHLLP schemes | | | | | | |
| | • Promotion of measures to prevent or reduce soil erosion | | | | | | |
| | • Strengthening of legislation making it mandatory to follow sound soil and water conservation practices | | | | | | |
| | • Training programmes in soil conservation techniques | | | | | | |
| | • Training programmes in the safe use of chemicals | | | | | | |
| Resource Conservation and Environmental Protection | • Breeding programmes for livestock and crops using breeds and varieties that are resistant to local pests and diseases | X | X | X | None | None | |
| | • Research on Integrated Pest Management | | | | | | |
| | • Adoption of mixed farming techniques, with sound crop sanitation and crop rotation practices | | | | | | |
| | • Restructuring and streamlining of research and extension services of the MAFF and BADMC | | | | | | |
| | • Emphasis on farm viability, to assist the farmer in making optimum use of available resources | | | | | | |
| | • Generation of more efficient technology | | | | | | |
| | • Dissemination of efficient technological packages | | | | | | |
| | • Use of services of leading farmers to promote improved technology, convening of field days with demonstration plots, and distribution of fact sheets and pamphlets | X | X | X | None | None | |
| Research and Extension | | | | | | | |

Table II.1b. Cont'd

| MARKETING | | | | | | |
|---------------------------------|---|--|---|---|---|------|
| Domestic Marketing | • | Provision of new facilities at Cheapside and Fairchild Street markets | X | X | X | None |
| | • | Renovation of Eagle Hall market | | | | None |
| Export Production and Marketing | • | Improvement in the extension service to farmers producing export commodities | X | X | X | None |
| | • | Provision of more effective marketing intelligence | | | | |
| | • | Establishment of a new export marketing complex with improved facilities | | | | |
| | • | Establishment of an export promotion facility | | | | |
| Agro-Processing | • | Re-activation of the agro-processing plant | | | | |
| | • | Provision of planting material and technical advice to farmers producing for the processing industry | X | X | X | None |

Source: Draft Agricultural Development Plan, 1994 - 2000, MAFF

A. Technological Policy

Over the past two decades, there have been several developments with significant impact on the level of technology applied in agriculture in Barbados. The low level of employment in the sector (caused primarily by the decline in acreage of the primary crop, sugar cane) created the need for a high degree of mechanisation and increased technology in non-sugar agriculture. Work carried out by the Ministry of Agriculture in applied research and extension on new technologies (particularly during the 1970s) led to the creation of production systems characterised by the use of improved varieties, mechanised operations (land preparation, crop seeding, harvesting, and crop drying), the establishment of drip irrigation systems, and the use of crop protection chemicals and fertilisers. The application and utilisation of high levels of technology have been encouraged through a number of national projects on export agriculture, integrated rural agricultural development, irrigation development and allocation of lands under land settlement/land lease schemes. Under these projects, the government provided subsidies for tractor cultivation, mechanical land preparation and for the establishment of approved irrigation systems. Access to and adoption of technology has also been facilitated through the 'trickle-down' of technologies from the plantations to the small farming sector.

The existence of well-established trade and distribution systems, combined with the infrastructural development (in terms of transport and communication networks) have facilitated island-wide access to machinery and material inputs for production. These factors, together with the existence of facilities for education, health and social development, have led to the creation of a relatively modern agricultural sector.

1. Technology generation and transfer

The generation and transfer of technology to small-scale production sectors in Barbados are carried out primarily by the government through the Ministry of Agriculture, Food & Fisheries, the Barbados Agricultural Development and Marketing Company (BADMC) (formerly Barbados Agricultural Development Corporation (BADC), as well as by other agencies such as the Caribbean Agricultural Research and Development Institute (CARDI), National Development Foundation of Barbados (NDFB), Bureau of Women's Affairs, and various organisations involved in rural development and development programmes for women.

There is a notable absence of any gender perspective in the generation or transfer of technologies by agencies such as the MAFF and BADMC. In general, the small-scale sector is seen by agricultural planners, researchers and extension officers as a homogeneous lot. The planners in the MAFF have stated that the technologies offered are for "farmers", male or female, and that there is no discrimination in the extension of information. In this sense, these institutions can be described as "gender-blind" on the issue of women food producers in Barbados.

Prior to its recent restructuring, the MAFF generated and transferred technology to the farming sector through its Crop Research Department and Extension and Development Division. With restructuring, the Ministry has now moved away from performing "traditional" extension services, and now adopts an integrated and developmental approach to food crop research. Agricultural officers now operate with a "commodity approach," which comprises a combination of research and extension on specific product areas, production of extension materials and transfer of technical information through seminars, symposia and other media.

The impact of this restructuring on the small-farmer sector has been detrimental with respect to access to technical information and assistance. The Ministry's services are now concentrated on those farmers who demonstrate a capability for growth and development, and who can have a meaningful impact upon national agricultural results. In effect, these services are now being concentrated on the larger farms (>10 ha) which tend to have better lands than small farms, machinery and equipment for land preparation and irrigation, and fewer problems with weed control.

While the Planning Unit of the MAFF has admitted that there is a very real danger of marginalisation of the small farmer sector, they have indicated that the small farmers access the technology (particularly planting technology) that is provided to larger farms through a "trickle down effect" in that small farmers observe what is done on larger farms and plantations and apply similar technologies on their plots. There is, however, no strategy employed on the part of the MAFF to evaluate or monitor the extent to which this trickle-down effect occurs, or to identify any problems faced by the small farmer in adopting technologies that are aimed primarily at larger farmers. The MAFF has stated that it intends to keep the small farmer abreast of technological developments through the publication of flyers and brochures, and via radio and television programmes.

In the case of agencies which deal directly with rural development and the development of women, the generation and transfer of technology are achieved through training seminars and workshops, funded technical assistance, and projects targeted at specific production groups.

Until recently, CARDI had a lack of gender-awareness in agricultural projects. However, in 1990 CARDI embarked on an ideological shift in the approach and methodology used in its projects with a CIDA-funded sheep production and marketing project. The project's main goal is to improve the overall **welfare** of low income **farm families** with special attention paid to **women** farmers. It integrates scientific/technical and economic perspectives with social and gender aspects in order to examine the effects of on-farm technological interventions on farm family welfare.

While it is still early to evaluate the effect of this project on sheep farmers, particularly women female sheep farmers, in general it seems that the project has facilitated a holistic approach to farming, and a recognition of the need for equal partnerships in realising the project's goals.

2. Problems of access to technology

Women's access to existing technology is limited by:

- The invisibility of women in agriculture, due to a lack of data on women food producers. There is very little documented information on women food producers in Barbados. Existing information is largely anecdotal or concealed in other statistics. A case in point is the 1989 Agricultural Census, which provided comprehensive and detailed information on the agricultural sector, and on small farmers in general, but which did not disaggregate the data to reflect statistics on female farmers. On the basis of a recent request¹ made to the Planning Unit of the Ministry of Agriculture, the raw data from the census was compiled to reflect statistics on women food producers.

Without such data, it is impossible to even begin to recognise and evaluate the contribution made by women, and to design programmes to address constraints which women face in production, processing and marketing of food products.

- Disproportionately small budgets are allocated to agriculture and to women's projects. In 1992-93, the budget for MAFF was 2.7% of the total, and it represented a 22% decline when compared with the 1991 figure.
- Time constraints: Women's multiple reproductive and non-reproductive roles/tasks of caring for members of the household, household maintenance and agricultural production are often not taken into account in the design of training and extension programmes. In addition, women's access to training opportunities is constrained not only by domestic responsibilities but also by domestic relationships, i.e., differences in male-female power relations. Participation of women in decision-making can be severely constrained by these factors.
- Limited access to capital and land resources: Women farmers in Barbados number 6714, yet they own and operate a mere 6% (1309 ha) of the 21 560 ha under production in Barbados. The size of holdings is not economically viable, and cannot sustain the development of the farm family.

With respect to access to machinery and equipment for cultivation, the inefficiency of the government-run mechanization scheme and the high prices of private operators effectively hinder the timely application of operations, hence small farms productivity.

The request for disaggregated data from the 1989 Agricultural Census was made by Dr. Christine Barrow of the Department of Social Sciences, UWI, Cave Hill, Barbados.

In terms of irrigation, the inadequacy and exorbitant cost of water (BDS\$0.44 per cubic metre) for irrigation purposes has become a constant complaint of many small farmers, who currently pay monthly water bills running into thousands of dollars.

- The improper design of technologies for tasks that are handled mainly by women. Agricultural planners, researchers, and extension personnel are gender blind with respect to farmers. Thus, in the design of "improved" technology for farmers, no consideration is given to gender variables.
- The down-turn in the national economy, which has led to increased pressures on family incomes, women's time and labour.

B. Marketing Policy

The marketing of non-sugar agricultural produce in Barbados is constrained by factors, including:

- the limited domestic market
- the lack of marketing outlets and organised distribution systems
- inadequate market intelligence systems
- grossly inadequate marketing facilities for vendors

In recognition of these constraints, the (1988-1993) Agricultural Development Plan focused on:

- the production of high-quality products through the provision of adequate technical support for production, the application of proper postharvest methods, and through the organisation of producers into cooperative groups
- the improvement of domestic distribution systems, through the realisation of more efficient collection centres which will have facilities for sorting, grading, and postharvest treatments
- the provision of a package of marketing services through upgrading of the BMC/BASIS service
- improvement of physical marketing facilities, particularly the Cheapside Market

- control of importation of agricultural produce, particularly from extra-regional sources, in order to reduce instability of prices and supplies on the domestic market
- expansion of the demand for locally produced agricultural produce through the mounting of promotional campaigns aimed at encouraging consumers and the tourist sector to purchase and consume more local produce.
- Development of the export market for Barbados produce, through:
 - the development of market research and information profiles for all markets
 - the establishment of appropriate infrastructure for grading and packaging of produce
 - the provision of incentives such as an export credit revolving fund, a crop insurance scheme, price incentives to producers participating in the export programme, and a production credit scheme

Agro-processing was also recognised for its significant potential impact on reduction of the food import bill, export growth, increased domestic consumption and extended shelf life of Barbados produce. As such, the Agricultural Development Plan promoted the establishment of large and medium-sized agro-processing operations as well as small cottage industries.

Many of the initiatives for achieving the above objectives were not pursued for various reasons, including lack of funds, the limited size of the domestic market, and weak market intelligence for export agriculture.

C. Institutional Structure and Current Programmes

There are several organizations in Barbados which provide support to the rural sector in the form of training in business management and marketing; production and production services; advocacy; project development, supervision and monitoring of cooperatives; credit; technical assistance; networking and exchange of technical information.

The types of services offered, and the target groups which are served by institutions which operate agricultural research and extension programmes are summarised in Table II.2.

Table II.2. General information on institutions offering agricultural research and extension programmes in Barbados.

| Institution | Description | Product orientation | Activities | | | | | Gender orientation | |
|-------------------------|---|--|------------|-----------|---------------------------------|-------------|---|--|---|
| | | | Production | Marketing | Postharvest and food technology | Orientation | | | |
| | | | | | | L | M | | S |
| MAFF | Staff - 50 Female employees at senior technical and admin. levels Budget - \$33.4m | Food crops, livestock, cotton, cut flowers | X | X | X | X | X | None | |
| BADC | 9 Gov't estates IBDP, SHILLP and MTCS | Food crops, livestock | | | | | | | |
| Women's Bureau | Female director, research officer and clerk. Policy formulation; T.A. liaison, needs analysis | Food production and processing, small business | X | X | X | | | X | |
| NDFB | | T.A. credit training | X | X | X | | | X | |
| National Training Board | Training, apprenticeship, tec/voc skills | T.A. training | X | X | X | | X | Female accountant, job analyst, trainers, counsellors and office staff | |
| Cooperative Division | | | X | X | X | | | | |
| NGOs AND OTHERS | | | | | | | | | |
| CARDI | 3 main programmes | Food crops, livestock | X | X | X | | X | | |
| BAS | 300 farmers 6 commodity groups | Food crops, livestock | X | X | X | X | X | None | |
| BSTA | | | X | X | X | | X | | |
| ST GEORGE COOP | Mtg. coop. Female president | | X | X | X | | X | | |
| LIVESTOCK COOP | | Livestock | X | X | X | | X | | |
| SPRING HALL COOP | Marketing, credit and input supply | Food crops | X | | | | X | One outstanding female member | |
| SOUTH EASTERN COOP | Marketing and input supply | | X | | | | | Two active females | |
| 4-H | | Food crops, livestock | X | X | X | | | | |
| BARNACS | | | X | X | X | | | | |
| NCST | | Sweet potato | X | | | | | | |

Source: Porter and La Gr (1992) Profiles on Rural Development and Support Organisations in Barbados.

1. Ministry of Agriculture, Food and Fisheries (MAFF)

The Ministry of Agriculture, Food and Fisheries (MAFF) has overall responsibility for fostering, guiding and monitoring the development of the agricultural sector, and as such is the main executing agency for generation and transfer of technology to the farming sector.

The Ministry has a staff complement of approximately 50 and for financial year 1992-93 had an estimated budget of BDS\$33.4 million (representing 2.7% of total government expenditure of \$1 247.8 million. This allocation reflected a 22.0% decline when compared with the 1991 figure.

The Ministry of Agriculture, Food and Fisheries (MAFF) provides research, extension, regulatory and developmental services for crop and livestock production, as well as technical, workshop and other services for equipment and machinery used under experimental and commercial conditions. The MAFF also provides technical advisory and management services for the monitoring of subsidies and incentives.

Crops-oriented research is supported by engineering research, development and extension, particularly for farm mechanization and irrigation. The scope of work of the Ministry of Agriculture, Food and Fisheries supports the development of livestock, food crops and non-food crops (cotton, cut flowers and foliage). During the year 1992/93, the MAFF continued work on Research and Development activities in support of the Agricultural Diversification Programme.

Extension efforts focused on the dissemination of technical information to the farming community, and a number of booklets and factsheets were produced by the Information Unit. Information was also disseminated through television and radio programmes, and field days were held to expose farmers to new technologies.

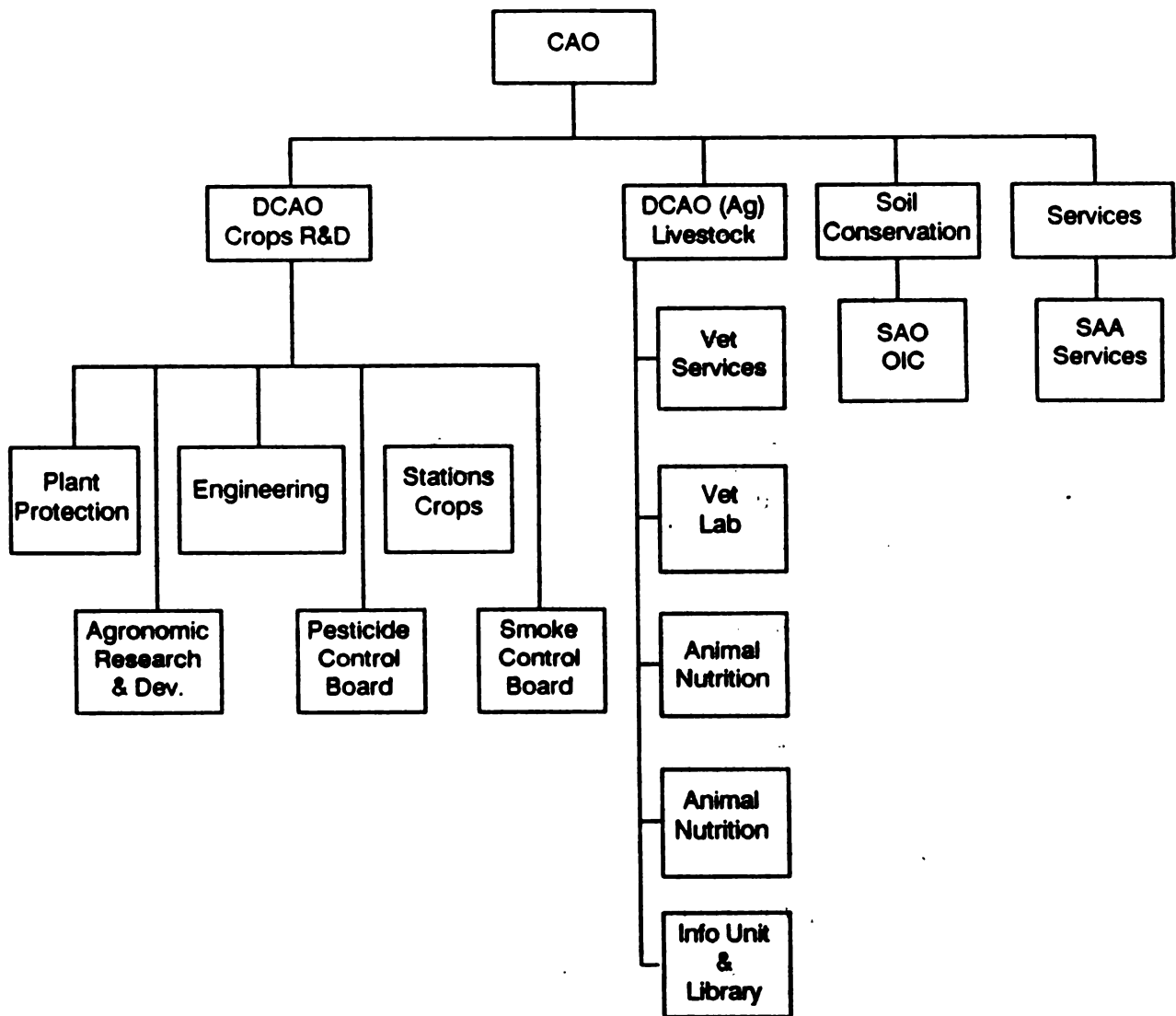


Figure II.1. Organisational structure of the Ministry of Agriculture, Food and Fisheries (MAFF) of Barbados.

With respect to research, activities focused on the following problems:

1. **Root crops:** Anthracnose in crop Lisbon yam persisted as a major problem. CARDI, in collaboration with the Ministry is investigating ways of controlling the disease under an ongoing project. Activities include screening trials for varieties which show resistance or tolerance to the disease.
2. **Vegetables:** White flies and thrips.

In response to a number of sector evaluations, the Ministry has recently undergone a programme of restructuring in an attempt to update and upgrade the quality and appropriateness of its services and delivery of information to the farming community and the general public. The organisational chart for MAFF is shown in Figure II.1.

In some cases, technology and services are out of the reach of the small farmer for reasons of inappropriateness or high cost. A case in point is the hay and silage production service offered by the MAFF under the Grassland Scheme. Under this scheme, farmers have the ability to hire machinery and equipment to be used for the making of hay and silage. However, this equipment has proven to be too expensive for the small farmer.

2. Barbados Agricultural Development and Marketing Corporation (BADMC)

The BADMC, an amalgamation of the Barbados Agricultural Development Corporation (BADC) and the Barbados Marketing Corporation (BMC), was established in September 1993 by the GOB as a pre-condition for an International Monetary Fund (IMF) structural adjustment loan to the agricultural sector. The objective of the amalgamation was to retain those services within the two institutions that are supportive of developmental and advisory agriculture (such as providing and maintaining research, extension, irrigation and rural development services) and privatise other services which can be operated on a commercial basis.

The stated "role and mission" of the BADMC are to "assist the government in the execution of agricultural policy through the formulation and implementation of programmes which are service and development oriented, as well as of an advisory and regulatory nature."

The principal activities in which the BADMC will be engaged are as follows:

- Pioneering the testing and introduction of new crops
- Providing tractor cultivation services at highly subsidised rates
- Managing the Integrated Rural Development Project
- Cooperation in agricultural development between the public and private sectors

- Promoting the development of agricultural cooperative societies, including marketing of their produce
- Providing assistance to farmers in securing arrangements for purchasing, handling, transporting, shipping, marketing and sale of produce whether within or outside of Barbados
- Stimulating and improving the production, marketing and processing of produce
- Facilitating the development of agricultural programmes, particularly among youth

a. The Barbados Agricultural Development Corporation (BADC)

The BADC was one of the major agencies for the implementation of development strategy for small farmers in Barbados. The Spring Hall Land Lease Project (SHLLP) and the Integrated Rural Development Project (IRDP) were two major projects through which this strategy was articulated.

The Corporation was established in 1965 by an Act of Parliament with the following objectives:

- to stimulate, facilitate and undertake agricultural development, and to carry out, operate and participate in such agricultural projects as the Cabinet may approve
- to develop and manage, on a commercial basis, such plantations and other agricultural land as may from time to time be vested in it, along the terms of the government's agricultural policy so as to stimulate and encourage the private sector

The Corporation managed nine government-owned estates (comprising 3100 ha) used for the production of sugar cane, cotton, market garden vegetables, and tree crops.

The BADC also operated a dairy farm with 120 head of cattle. The three main services offered by the BADC to the farming community were:

1. Agricultural extension services
2. An island-wide cultivation scheme
3. Irrigation services

The major responsibilities of the Corporation were:

- implementation of the GOB's five rural development projects: the Spring Hall Land Lease Project; the Rural Development Project; the Smallholders' Mechanization Schemes; Research Activities; and Agro-Processing Operations.
- support of agro-industrial food policy
- operation of an advisory service to food processing operations
- developmental work on processing of foods based on locally-available raw materials

In terms of rural development policies, the GOB in 1979 committed itself to positive action in the area of agrarian reform and rural development at the first world conference on these matters held in Rome. The conference recommended national programmes of action on:

- a) access to land, water and other natural resources
- b) integration of women in rural development
- c) people's organisation
- d) access to inputs, markets and services

Following this, the GOB implemented (1979 - 1983) the following four rural development projects:

1. Export agriculture
2. Integrated rural agricultural development
3. Irrigation development
4. Land settlement/Land lease scheme

While these projects did provide access to land, water, inputs, markets and services, they did little for the integration of women in the rural development process.

Given its projects and extensive agricultural resources, the BADC was ideally suited to the development of technological packages for crops and livestock. However, throughout its existence, the Corporation has been severely constrained by weaknesses in organisational structure, inefficient commercial operations and continuing dependence on the GOB (through the Barbados National Bank) for financial support. (The BADC's assets were not freehold, and the Corporation could not therefore seek or attract loans or other forms of finance from commercial finance houses).

Under the IRDP and the SHLLP, irrigation water was provided at concessional rates to farmers in selected areas of St. Philip, St. George, Christ Church and St. Michael. Through its Motor Tractor Cultivation and Mechanization Schemes, which provided mechanized tillage

(ploughing, rotavating, harrowing) and planting services to small farmers at subsidised rates, the BADC had a very favourable impact on small farmers.

While these schemes benefited small farmers greatly, the service has been highly unprofitable for the BADC due to the fact that the cost of equipment maintenance far exceeded the income received from offering the low-priced service. Internal and external evaluation of the schemes has led to the conclusion that it uneconomical to service very small plots because of the number of operations needed, and because time given to very small farmers is manifested in delays and loss of production on larger full-time farms.

The diversion of the schemes to a target group that does not include the very small farmer (notably many women farmers) would serve to restrict further access of small farmers to technological offerings. During 1991-1992, 231 farmers (compared with 324 in the previous year) utilised the irrigation service under the IRDP, while the number of farmers serviced under the Motor Tractor Cultivation Scheme declined by 16.9% to 4,077, compared with the previous year.

In the area of agro-processing, the BADC undertook research and development on several foods based on locally available fruits and vegetables, and transferred some of this technology to the Barbados Agro-Processing Company.

The BADC also undertook, in collaboration with the FAO, a training course for some 38 practising small and micro-food processors (34 women, 4 men) in basic techniques of food preservation and cottage industry production of pickled vegetables (green beans, beet, okra, tomatoes, pickles, eggplant), juices, nectars, jams, jellies, and solar-dried fruit "leathers." From all reports, the training course was very successful, and some of the participants have been able to apply the techniques learnt to improve the standardisation and shelf life of their products, and to expand their product mix into new areas.

b. The Barbados Marketing Corporation (BMC) - AMS Division

The AMS Division is responsible for the preparation and dissemination of agricultural marketing and related statistical information. The Division publishes a document entitled "BASIS" (Barbados Agricultural Statistical Information Service) which is distributed to producers and marketing personnel in Barbados. BASIS provides historical information on the status of production and marketing, and makes projections on future market conditions. Such production data include data from monthly surveys of plantings of crops on estates, monthly surveys of pig and egg production, and weekly surveys of poultry production. The Division also provides information on domestic wholesale and retail prices for selected vegetables, root crops and fruits. In addition, the AMS distributes a number of commodity-specific weekly and monthly reports directly to individuals involved in the production and marketing of produce.

While BASIS information is useful, the fact that it is historical does not arouse a high level of interest in the farmer, who desires more on-line, real time information on prices and market conditions.

3. Barbados Agricultural Society (BAS)

The BAS is a non-profit organisation which was established by an Act of Parliament in 1890. The Society was revamped in 1974 and currently serves some 300 foodcrop and livestock farmers. The organisation aims to promote effective farm policies, monitor farm inputs and prices paid to farmers, report on production, help farmers improve efficiency, and provide office administrative services to farm commodity groups.

Commodity groups serviced are the Dairy and Stock Breeders Association; the National Association of Pig Farmers, Goat Breeders Association, Egg and Poultry Producers Association, Food Crop Farmers Association and the Barbados Sheep Farmers Association.

Members benefit from technical expertise of a qualified agronomist who provides assistance with programme planning and technical advice. The BAS also offers members a credit facility on seeds and fertilisers.

BAS provides a wide variety of services:

- Accounting, secretarial and management services to BAS member commodity groups.
- Marketing: BAS acts as the central marketing agency on behalf of all member producer groups
- Farm management support services to individual farm producers
- Comprehensive agricultural education and information service for individual producers, commodity groups and the public at large
- Access to farm supplies and equipment for member farmers
- Research and mobilisation of funding for on-going Barbadian agricultural development
- Advocacy: BAS represents and acts on behalf of the interest of Barbadian food producers to the GOB, Private and public agriculture-related organizations and the public at large.

On-going projects of the BAS include:

- 1. Rat bait programme: the BAS generates income through the production and sale of SHUKILL rat bait to farmers and non-farmers**
- 2. Savings and Credit Facility, which secures credit from existing institutional sources for small farmers**
- 3. Artificial Insemination (AI) Programme: the BAS provides an efficient AI service to its members by providing training in AI and transportation vehicles to the MAFF's AI department.**
- 4. Newsletter publication**

The various commodity groups served under the BAS each have specific programmes aimed at improving the production, processing, and marketing of crop and livestock products. The major programmes currently being carried out are summarised in Table II.3.

Table II.3. Current programmes undertaken by BAS commodity groups.

| Commodity group | Production | Processing and marketing |
|--|--|---|
| Food Crop Farmers Association (FCFA) | Technical assistance with production planning | Provision of a wholesale and retail outlet for farmers |
| Barbados Sheep Farmers Association (BSFA) | Production of ruminant rations based on molasses, bagasse, poultry litter, urea, minerals and vitamins | Sale of farm inputs through the BAS Farm Input Retail Outlet |
| National Association of Pig Farmers (NAPF) | Technical assistance in sheep rearing technology, grading of lamb meat, and judging of live animals | Sale of ruminant rations Sale of drugs and insecticides |
| Barbados Egg and Poultry Producers Association | Conduction of training seminars and workshops on all aspects of poultry farming | Marketing of pork carcasses to processors and retail outlets Negotiation of prices and contracts for marketing of poultry products |
| Spring Hall Land Lease Cooperative | | Provision of a market outlet for members' vegetables |

4. Bureau of Women's Affairs

In 1976 the Barbados government set up the National Commission on the Status of Women (NCSW). The Barbados Women's Bureau was set up at the same time as the administrative unit responsible for the coordination of work essential to the implementation of the recommendations of the NCSW.

The essential mandate of the bureau is as follows:

1. To monitor the situation relating to women and to report on the progress of the status of women.
2. To keep track of the 213 recommendations made by NCSW and to ensure that they are implemented.
3. To make recommendations concerning matters which affect women.
4. To undertake consciousness-raising activities in the community on the role of women.
5. To identify viable projects for funding and technical assistance which benefit women.
6. To promote research on the problems and needs of women and disseminate the results.
7. To implement national policy on women and to provide technically advanced assistance to women's organisations.

A specific project targeted to women producers in agro-processing was the Bajanne Producers. The Bureau has plans to revive interest in this project and is currently preparing proposals.

By way of background, the Bajanne Producers was started in 1980, three years after the Bureau of Women Affairs was set up. The objectives of the Bajanne Producers were as follows:

1. To establish more enterprises owned by women.
2. To facilitate employment creation for women.
3. To utilize available skills and natural resources.
4. To effect import substitution of products.

Forty-eight women and one man were trained to preserve local fruit to produce candied fruit pieces, syrups, relishes, fruit-based fillings and sauces. Training included production, marketing and quality control aspects. Members of the group were exposed to all areas of business, health standard requirements, funding sources, and the concept of appropriate

technology. Participants worked together to produce and market preserved dried fruit and by-products. Funds were obtained from the Bureau, Appropriate Technology International, USAID and the OAS. The aid funds were disbursed by the government, and money was saved and disbursed through a separate account by the Bajanne Producers, and was invested according to the wishes of the group. The salary earned by each participant was related to the participants' work and the group's sales.

The major goals set out by the project were achieved: the production and marketing of dried fruit and by-products. It was initially planned that the processing would be home-based. However, it was later decided that a centralized processing unit would be more effective. The experience of the project now shows that the home-based system should have been selected for the following reasons:

1. It was more convenient for the women to produce at home. This was supported by the fact that although production on a group basis stopped, individual women still produced and marketed from the home base.
2. Many women involved in the project found that domestic demands prevented them from being at a centralised facility for long periods.
3. The centralised approach created problems related to imbalances in effort by group members. Failure to reconcile differences led to disillusionment and collapse of the programme.

5. Women and Development Studies Unit (WAND)

The Women and Development Unit (WAND) was established in August 1978 in the context of the U.N. Decade for Women, with its goals of equality, development and peace. The Unit's goal is to build the human and institutional capacity for a model of development which is integrative, equitable, self-reliant and sustainable. In pursuit of this goal, WAND focuses on strengthening regional networks of groups working in the areas of community development, health and youth, using these experiences to point a path toward an alternative model of development.

WAND's current programme of activities is:

- the prioritising of human development
- the empowerment of women
- strengthening of community-based organisations by strengthening participatory and democratic practices
- sensitivity to gender issues
- the building of links between sectors, networks, and countries, within and outside the Caribbean.

6. Women in Development (WID)

The main objective of WID is to assist low-income persons, specifically women, in creating income-generating opportunities. WID works principally with marginalised groups and individuals in generating their own small businesses and finding jobs. WID also provides training in the management of small business and marketing. In the area of agricultural production, WID has provided loans to small-scale food processors, and has provided training in business, as well as in linking its clients with appropriate supporting organisations.

7. The National Development Foundation of Barbados (NDFB)

The NDFB is a member of the Caribbean network of National Development Foundations, created by the private sector to respond to the needs of technical assistance, training and credit for the small business sector.

The NDFB's loan portfolio currently includes women in agricultural production and processing, and there are plans to fund more agricultural projects. The Foundation recently concluded a 15-week training course on farming techniques, primarily for the "new" farmers. The group included four women. The NDFB is also working with a hot pepper pilot export project, providing assistance with the provision of credit and technical assistance to small farmers.

8. Caribbean Agricultural Research and Development Institute (CARDI)

The Caribbean Agricultural Research and Development Institute (CARDI) is an autonomous organisation serving the CARICOM states. The Institute's main objective is to contribute to agricultural development through the generation and dissemination of market-driven appropriate technology for the benefit of the member states. The three main programmes of work are animal production, crop production and technology adaptation and transfer (TAT). The animal production programme emphasises problem-solving research and technology generation. Suitably-approved technologies are tested on farmers' fields and transferred to extension agents and farmers. The TAT programme is based on the evaluation of alternative technologies developed through component research or consultation, and the subsequent adaptation and transfer. In Barbados, CARDI collaborates with the MAFF in its research and development programmes.

CARDI's current work programme in Barbados includes the Caribbean sheep production and marketing project, tissue culture of ornamental and food crop plants, control of yam anthracnose and sweet potato weevil, commercial green pigeon pea production, and onion development.

The Caribbean Sheep Production and Marketing Project, currently executed by CARDI in Barbados, Guyana and Trinidad and Tobago, has as its goal the improvement of the overall welfare of low-income sheep farm families and the development of production and marketing

capabilities of targeted farm families. Sheep farming provides employment and income for many female farmers in the region. Sales of lambs and meat provide a good source of income and the work involved is not as laborious as with other classes of livestock. In general, women tend to be responsible for care of the animals, while men make the decisions on marketing and sale of animals and on the use of money derived from the operations.

This project is particularly unique in that CARDI is required to use procedures for project participants that are **targeted to recruiting women to a level of 25% of the study group**. This WID component is integrated into all of the project's activities, and it is intended that gender-disaggregated baseline data will be used to set targets for female participation and ensure that women are trained for tasks performed by women, and that women's participation in farm activities is broadened.

To date, 15 farmers (four female) have been selected, and analyses have been carried out with respect to division of labour, decision-making responsibilities, and adoption of technologies. CARDI has developed a feeding ration based on locally available ingredients cheaper than imported rations currently in use. A new worming technique for the sheep has also been developed, and female farmers have been trained in the use of a new syringe and worming technique. Gender analyses are currently being carried out.

Social/Gender observations on the project have highlighted the following issues (Hosein 1993):

- Small farmers in the project are faced with problems of continuous investment on the sheep enterprise, particularly when the farmer is full time on the farm and depending heavily on the sheep enterprise for survival. Thus the mixed farming system and/or part-time farming serve to suit the needs of the farmers. The concept of large-scale commercialization may expose the farmer to unnecessary risk.
- The traditional parameters of increased output, productivity or profit should not be applied in the assessment of technology interventions, at the expense of all else. Use of labour, the division of labour, and the opportunity cost in relation to time are important considerations.
- The use of "farmer-friendly" technology that can be used by the farmer and his/her family, and the training of appropriate family members in the application of the technology, are important issues.
- Questions of power and authority are important (who makes the decisions related to the use of technology and non-technical decisions on and off the farm)
- The concept of self-esteem, in terms of how the farmer perceives himself or herself as a member of the community over time, and how the farmer himself

or herself achieves personal goals and aspirations are important aspects of the farm family welfare.

In terms of general achievements, it has been found that the level of management of the sheep enterprise has improved. Women are now able to do the worming of the sheep without the assistance of CARDI's extension officers, and the farmers are using the locally developed feeding ration. Some balance in the decision-making responsibilities between male and female farmers has also been achieved, with women becoming more involved in the commercial aspects of the operations.

PART TWO: TECNOLOGY

III. TECHNOLOGY AND THE SMALL FARMER IN BARBADOS

In the description of Technological Policy (Part One, Section II.a), it was noted that several developments have had significant impact on small farmers' access to and application of technology in agriculture in Barbados. The effects of projects on agricultural diversification and export marketing, research and extension by the Ministry of Agriculture and other institutions, the existence of well-established trade and distribution systems for agricultural imported goods, and the provision of infrastructure (in terms of transport and communication networks) have facilitated island-wide access to technology, machinery and material inputs for production. These factors, together with the existence of facilities for education, health and social development, have led to the creation of a fairly well-informed small farmer, and a relatively modern agricultural sector.

Production on small-farmer units in Barbados is characterised by the following:

- Production on units ranging in size from <0.025 to 10 ha. These lands are either owned (50% of holdings) or belong to the family (6% of holdings). Up to 22% of small farmers rent lands for production.
- Mixed farming is practised in many cases, with an emphasis either on vegetables or livestock. Vegetable farmers may keep a small stock of animals for household consumption, or for a quick cash sale. Conversely, livestock farmers may operate a small plot for household consumption or for quick cash sales.
- Rotation of a range of vegetable crops is practised throughout the year. This provides the farmer with a certain measure of non-chemical insect and weed control. It also gives the farmer a fairly steady source of income since many crops can be harvested and sold over a long period.
- Small livestock farmers tend to have a range of livestock, primarily pigs, sheep and poultry. Many female farmers tend to regard animals almost like children, and groom and doctor the animals, which may even have special names.
- Land-starved small livestock farmers often tie out their animals to graze on idle lands or on other farmers' properties.
- The use of traditional tools such as forks, hoes, rakes and hoses, combined with more modern technologies such as mechanized land preparation and crop establishment, trickle irrigation and mechanization. Mechanised services are purchased from government or private contractors.
- Small farmers tend to be well abreast of technologies with respect to seed types and characteristics of crop cultivars, the use of commercial crop protection chemicals and

fertilizers. There is a heavy dependence on chemicals for insect and weed control in vegetable production. These chemicals are usually applied using shoulder-mounted and knapsack sprayers.

- Small farmers receive information on production inputs from extension personnel of the MAFF, as well as from the distributors and suppliers of production inputs (such as animal feeds, equipment, fertilisers and chemicals).
- Small farmers tend to be weak in the area of farm management, particularly in areas such as production planning, maintenance of simple records and accounts, and the use of environmentally friendly practices such as integrated pest management. One reason given for this is that if all costs were accounted for, including family labour, the farmer might discover that he/she is losing money, and this is something which they would prefer not to know.
- Reluctance to access formal credit systems. Small farmers prefer to utilise cash from sales of produce or livestock, or family loans to finance production activities. This aversion to borrowing stems from the need to have collateral (which many women do not have), to prepare a business plan (for which many female farmers are not adequately trained), and to "expose" the business of the farm to a stranger. In addition, many small farmers do not like to have long-standing debts.

Traditional and "improved" technologies will be discussed on a crop by crop basis for the commodities identified for the project, namely sweet potato, market garden vegetables and livestock.

A. Sweet Potato

1. Current technologies

Production

Sweet potato is grown by a number of small farmers, as well as by the plantations. In terms of production inputs, it is one of the easiest crops to produce, and one of the most lucrative. The main constraint to production is infection by the scarabee weevil.

The crop is usually grown in pure stand. Unit operations involved in the production of sweet potato are as follows:

1. **Selection of planting material (slips)**
Very few farmers treat the planting material to prevent damage by the sweet potato weevil. The weevil problems are further compounded when farmers leave crop residue in the field to rot. The primary soil insecticides (Aldrin, Dieldrin and Chlordane) have

been used, but environmental hazards associated with these pesticides have resulted in a virtually total ban on all organo-chlorinated insecticides.

2. Planting of slips (manual)
3. Weed control
4. Harvesting (manual and mechanical)

On small farms, sweet potatoes are usually sold by the rod², and harvested by hawkers (marketing agents, usually women). In some cases, mechanical harvesting is carried out by contracting the services of a machine operator with a sweet potato digger. This machinery was originally developed by the Engineering Division of the MAFF, and the design was later adapted for the manufacture of commercial machines in Barbados.

Like all root crops, sweet potatoes have a relatively long shelf life and can be stored (remain unharvested) in the ground for a few weeks after maturity. This feature provides the small farmer with some degree of flexibility with respect to marketing and pricing. However, delayed harvesting does increase the susceptibility of the potatoes to weevil infestation as well as to attack by rats in the field.

Processing

There is very little processing of sweet potato at the small farmer level, except for the production of sweet potato pudding (white pudding) as catered food. Some farmers also utilise the sweet potato by drying it (either naturally or in an oven), and pulverising the dried pieces to make sweet potato flour, then used in the production of baked items.

2. Improved technologies offered

Production

Current research emphasis is on the control of the sweet potato weevil, and selection of varieties that are most suited for export marketing and local processing. The main variety grown for export is A26/7, with Toquecita being grown for processing into chips. An Integrated Pest Management (IPM) package has been devised for sweet potato weevil in the Caribbean and is advocated by the MAFF in Barbados. The IPM package involves the following approaches:

² A rod is a traditional measure of length. In the field, it is equivalent to approximately 3m (10 ft.) along a row of crop.

- Crop rotation: Fields should not be replanted with sweet potatoes for at least three years.
- The use of relatively clean planting material: The general consensus is that farmers usually take the sweet potato weevil to their field. The MAFF recommends that a nursery be established to provide farmers with clean, treated planting material.
- Prompt harvesting to avoid build-up of pest populations.

Processing

The NCST is currently carrying out a project on sweet potato improvement, aimed at the production of standardised formulations for products such as sweet potato cookies, cakes, doughnuts and breads. The project is still at the research stage, and technology is not ready for dissemination.

B. Vegetables

1. Current technologies

The major vegetables which are produced by small farmers are:

Green beans, beet, broccoli, cabbage, carrot, cauliflower, christophene, corn, cucumber, eggplant, lettuce, onion, dried peas, sweet pepper, belly pumpkin, sorrel, spinach, squash, tomato, cassava, peanut, sweet potato, yam, chive, eschallot, parsley, pepper, thyme, watermelon, cantaloupe.

In terms of use of agricultural equipment, traditional hand tools for tillage and cultivation such as forks, hoes, spades, rakes and others predominate (See Figure III.1). While very few small production units possess tractors and other power sources, they do possess cultivation equipment in the form of ploughs, rotavators, and to a lesser extent, harrows and furrowing equipment. Equipment for fertilizer application is not predominant, with very few standard fertilizer applicators or distributors being used. Spraying equipment, particularly knapsack and hand sprayers, is used extensively and the significant number of units is a reflection of the heavy dependence on chemical weed and insect control. Irrigation system components in the form of sprinklers and drip (trickle) systems are used on all sizes of holdings. Hoses are also used extensively.

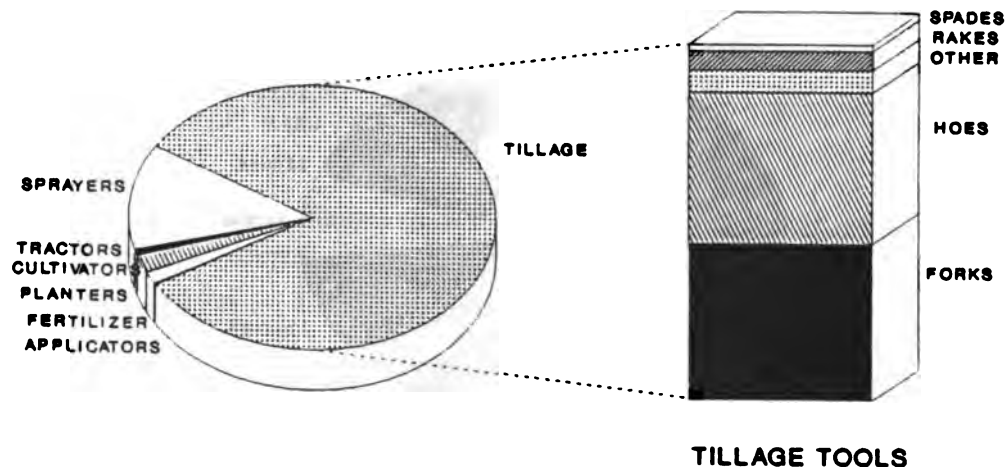


Figure III.1. Equipment used in small farmer production (1989 Agricultural Census).

Most of the production inputs are imported, and can be very expensive. Farmers purchase their inputs from local distributors and agents, such as WIMCAL, Geddes Grant and Carters, as well as from cooperatives and the BAS (if they are members of these organizations). The commercial distributors of agricultural chemicals and other inputs normally provide a certain level of technical assistance to the farmer in the use of the products. Some suppliers also offer credit arrangements for the purchase of equipment (such as knapsack sprayers). A very small percentage of inputs is derived from local materials (pen manures and compost). The fact that Barbados is well supplied with an extensive network of roads and a modern telecommunications system means that farmers throughout the island have adequate physical and economic access to inputs. Some distributors deliver orders while, in many cases, small farmers who possess their own vehicles purchase their inputs at the supplier.

The main crop production activities are crop establishment (including preparation of land and seedlings, cultural operations (including irrigation, weed and pest control, and fertiliser application) and harvesting. In general, small farmers plant practise inter-planting and crop rotation, selecting vegetables on the basis of their own production skills and experience with the crop; adaptability of the crop to the specific conditions of the plot (viz. soil type, available water, susceptibility to pests and infection); and market conditions. Marigolds are used as protective plants against white fly infestation in cabbage.

There are basically nine types of inorganic fertilizer used by farmers in Barbados. Figure III.2 shows the distribution in fertilizer use on small farms by fertilizer type. The major types used are sulphate of ammonia, potash, urea, 12:12:17:2, and 22:0:22. Organic fertilizers are still used in many small farmer systems, with the main types of material being poultry, sheep/goat and cattle manure.

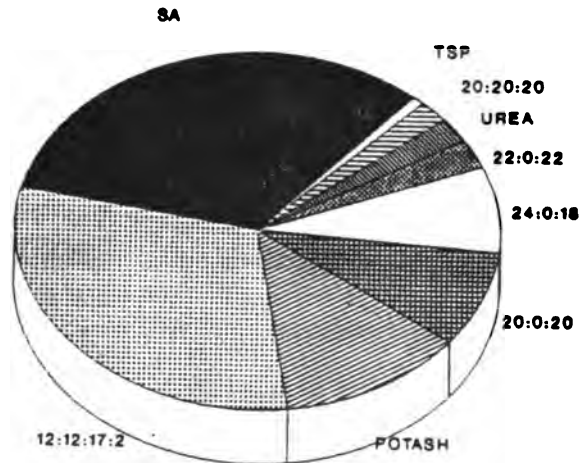


Figure III.2. Fertiliser use on small farms by fertiliser type (1989 Agricultural Census).

2. Improved technologies

Improved technologies focus on

- Supply of improved seed varieties for a range of vegetables, including tomato, sweet pepper, carrot, lettuce, and cabbage.
- The control of pests and diseases, particularly white flies, thrips, and the Diamond-back moth, which continue to have a significant effect on vegetable production. The practice of Integrated Pest Management (IPM) and the safe and discriminate use of environmentally-friendly chemicals for pest and weed control are being advocated by the MAFF, as well as by certain chemicals distributors, in an effort to protect and conserve environmental resources, and to reduce the risk of domestic groundwater contamination by soluble chemicals. Mulching is being advocated for thrip control, while biological control techniques are being proposed for the control of white flies and diamond-back moth. In the case of the moth, wasps are used to destroy eggs and larvae.
- Use of drip irrigation and mulches to maximise water use.

The BAS has recently been advocating low-level technology "Hydroponic systems" for small-scale production of vegetables (See Figure III.6). Although hydroponics offers interesting possibilities, its appropriateness for small-scale vegetable production in Barbados is doubtful, particularly since there are small farmers who can produce vegetables more efficiently and profitably using standard production technology on existing plots. "Tyre gardens" have also

been advocated for small scale production of herbs and vegetables, particularly in areas lacking topsoil.

C. Livestock

Livestock production in the small-farmer sector focuses on the rearing of pigs, sheep, poultry (broilers, layers, ducks and turkeys), cattle (dairy and beef), rabbits and goats (See Table III.1)

Table III.1. Total numbers of livestock reported on holdings on census day, by size of holding.

| Size of holding | PIGS | Sheep | Poultry | Cattle | Rabbits | Goats |
|----------------------|--------|--------|-----------|--------|---------|-------|
| Landless (<0.025 ha) | 2 294 | 6 091 | 245 663 | 2 709 | 3 807 | 1 151 |
| 0.025-0.1 ha | 11 129 | 8 640 | 477 357 | 2 196 | 1 933 | 1 154 |
| 0.1 - 0.2 ha | 6 635 | 3 442 | 45 551 | 1 443 | 1 013 | 636 |
| 0.2 - 0.5 ha | 3 841 | 16 177 | 2 349 667 | 1 587 | 1 404 | 893 |
| 0.5 - 1.0 ha | 1 057 | 1 539 | 68 825 | 685 | 598 | 252 |
| 1.0 - 2.0 ha | 840 | 1 521 | 102 938 | 533 | 167 | 173 |
| 2.0 - 3.0 ha | 564 | 555 | 14 519 | 196 | 431 | 47 |
| 3.0 - 4.0 ha | 79 | 152 | 44 741 | 31 | 26 | 26 |
| 4.0 - 5.0 ha | 1 294 | 322 | 98 972 | 216 | 2 | 2 |
| 5.0 -10.0 ha | | 348 | 188 724 | 153 | 110 | 16 |

Source: 1989 Agricultural Census

1. Current technologies

A common feature of small-scale production is the raising of poultry and small stock such as pigs, rabbits and sheep. Pigs, rabbits and poultry are normally reared in housed systems where they are fed with a mixture of imported concentrates, culled agricultural produce, and scraps. With small ruminants (sheep and goats), tethering and free (uncontrolled) grazing are extensively practised with little supplementary feeding.

In terms of equipment for livestock production, poultry equipment used on small holdings consists mainly of pens (wooden supports with wiremesh sides), with some automatic waterers and feeders.

2. Improved technologies

Improved technologies in livestock production being promoted cover various aspects of improved feeding and management, including artificial insemination in pigs, use of a locally-produced ruminant ration, intensive management and housing designs for sheep and goats, forage production, tick eradication in cattle, and worming of sheep.

IV. USE OF TECHNOLOGIES IN SMALL PRODUCTION UNITS AND BY WOMEN

A. Inputs, Instruments and Practices

1. Inputs

The use of inputs such as planting materials, fertilisers and crop protection chemicals is dominated by women on the farm. Even where use by men is relatively significant (as with the use of chemicals for pest and weed control), it is still at a much lower level than among women (See Table IV.1).

Table IV.1. Use of inputs on farms by type of inputs and gender participation in Barbados in 1994.

| Inputs | Number of farms | Family members who use inputs | | |
|--------------------------------|-----------------|-------------------------------|-----|------|
| | | Women | Men | Both |
| Traditional seeds | 59 | 41 | 1 | 17 |
| Improved seeds | 106 | 72 | 2 | 32 |
| Traditional planting materials | 64 | 45 | 1 | 18 |
| Improved planting materials | 70 | 50 | 1 | 19 |
| Inorganic fertilizers | 114 | 75 | 4 | 35 |
| Organic fertilizers | 81 | 53 | 4 | 24 |
| Insecticide | 114 | 67 | 16 | 31 |
| Fungicide | 100 | 56 | 16 | 28 |
| Weedicide | 98 | 54 | 17 | 27 |
| Nematicide | 8 | 6 | - | 2 |
| Animal feed | 56 | 41 | - | 15 |
| Vaccines | 47 | 34 | 2 | 11 |
| Supplements | 42 | 33 | - | 9 |
| Processing ingredients | 5 | 3 | 1 | 1 |

Source: Survey of 150 Women Farmers, Study of Rural Women Food Producers in Small-Scale Agriculture.

The major cause of loss is due to pests and diseases (Table IV.2). As such, agricultural chemicals used for weed, insect and pest control are used extensively by small farmers, particularly those within the size range of < 0.4 ha to 2.0 ha (Table IV.2).

Table IV.2. Percentage of production lost on small farms in Barbados in 1994.

| Crops | Total production | Losses % | | | Given away |
|-------------|------------------|----------|----------|--------------|------------|
| | | Theft | Spoilage | Pest/Disease | |
| Beet | 12 291.65 | | | 14.76 | 0.28 |
| String Bean | 35 396.68 | 0.01 | 0.04 | 15.93 | |
| Eggplant | 2 086.56 | | | 43.48 | |
| Tomato | 68 588.86 | | | 14.75 | |
| Cucumber | 106 302.28 | | | 11.91 | |
| Melon | 35 063.28 | | | 20.44 | |

Table IV.3. Number of farms by types of chemicals used in production, crop and farm size.

| Farm Size (ha) | Fertiliser | Insecticide | Weedicide | Fungicide |
|----------------|------------|-------------|-----------|-----------|
| < 0.4 | 90 | 75 | 51 | 37 |
| 0.4 - < 2.0 | 58 | 57 | 48 | 33 |
| 2.0 - < 4.0 | 5 | 5 | 5 | 4 |
| 4.0 - < 10.0 | 2 | 2 | - | - |

Source: Survey of 150 Women Farmers.

The main chemicals used include Malathion, Diazinon, Ambush, Sevin, Tambo, Grammoxone and Roundup. The heavy use of chemicals by women in small-production systems has deterring effects on the health of women, particularly those of child bearing age. It also warrants concern with respect to the effects on groundwater sources, the ultimate build-up of residual levels of chemicals in the soil and in subsequent crops, and in the health of the nation on the whole.

2. Instruments

The use of hand tools (such as fork, hoe, rake, and shovel), irrigation equipment (hoses, overhead sprinkler systems and drip or trickle irrigation systems), and sprayers for application of crop protection chemicals, are the major equipment types used by on the farms surveyed (Table IV.4). Use by female family members far outweighs use by male members for these three equipment types, indicating that the majority of labour involved in land preparation, weeding, crop protection, and irrigation is undertaken by women.

Table IV.4. Types of equipment, tools and inputs used in the farms surveyed, Barbados, 1994.

| Type of equipment | Use in Farms (%) | Use by family members | |
|-----------------------|------------------|-----------------------|----------|
| | | Female (%) | Male (%) |
| Hand tools | 87.7 | 57.5 | 1.4 |
| Plough | 9.6 | 3.4 | 1.4 |
| Cart | 3.4 | 3.7 | - |
| Tractor | 3.4 | 1.4 | 1.4 |
| Trailer | 1.4 | 0.7 | 0.7 |
| Irrigation equipment | 71.2 | 43.2 | 3.4 |
| Sprayers | 82.9 | 50.7 | 5.5 |
| Seeders | 4.8 | 2.1 | 2.1 |
| Indigenous implements | 1.4 | 0.7 | - |

3. Practices

The predominance of women in the use of inputs is confirmed by their participation in vegetable production activities. The data show that all of the major activities are undertaken primarily by women, with some participation by men in the areas of planting, crop care, purchase and use of fertilisers and chemicals, harvesting and marketing (See Tables IV.5 & 6).

Table IV.5. Family member participation in vegetable production by type of activity.

| Activities | Respondents | Other women | Men |
|---|--------------------|--------------------|------------|
| Purchasing/Preparation of planting material | 188 | 10 | 62 |
| Land preparation | 135 | 16 | 58 |
| Planting | 220 | 32 | 87 |
| Crop care | 222 | 43 | 238 |
| Purchase/use of fertiliser & chemicals | 224 | 48 | 112 |
| Harvesting | 218 | 50 | 98 |
| Post harvest | 217 | 50 | 96 |
| Marketing | 204 | 49 | 95 |

Table IV.6. Family member participation in sweet potato production by type of activity.

| Activities | Respondents | Other women | Men |
|---|--------------------|--------------------|------------|
| Purchasing/preparation of planting material | 16 | 1 | 2 |
| Land preparation | 8 | 7 | 7 |
| Planting | 18 | 9 | 9 |
| Crop care | 17 | 9 | 13 |
| Purchase/use of fertiliser & chemicals | 3 | 1 | 2 |
| Harvesting | 19 | 10 | 11 |
| Post harvest | 18 | 9 | 12 |
| Marketing | 16 | 7 | 11 |

In terms of participation in livestock rearing activities on small production units, women are primarily responsible for the operations involved in care and management of animals. These include grazing, feeding and watering; cleaning, milking, health care, and parturition. Men, on the other hand, tend to be involved in pen construction, breeding, slaughtering, and marketing of the meat. This situation has been observed particularly in sheep production, where women generally do all the work involved in bringing the animal to a marketable condition, but have little say in the slaughter, sale, disposal or use of profits from the sale of the animal.

Family member participation in livestock production by type of livestock and type of activity are shown in Tables IV.7 to IV.9.

Table IV.7. Family member participation in livestock production (cattle) by type of activity.

| Activities | Respondents | Other women | Men |
|-------------------------------|-------------|-------------|-----|
| Feeding | 5 | 2 | 1 |
| Clean/maintain house & equip. | 3 | 2 | 1 |
| Animal health | 4 | 1 | 1 |
| Breeding | 5 | 2 | 3 |
| Dressing & milking | 4 | 2 | 1 |

Table IV.8. Family member participation in livestock production (small stock) by type of activity.

| Activities | Respondents | Other women | Men |
|-------------------------------|-------------|-------------|-----|
| Feeding | 40 | - | 8 |
| Clean/maintain house & equip. | 40 | - | 9 |
| Animal health | 29 | 1 | 9 |
| Breeding | 16 | 1 | 12 |
| Dressing & milking | 6 | 2 | 1 |

Table IV.9. Family member participation in livestock production (poultry) by type of activity.

| Activities | Respondents | Other women | Men |
|-------------------------------|-------------|-------------|-----|
| Feeding | 37 | - | 4 |
| Clean/maintain house & equip. | 34 | - | 6 |
| Animal health | 27 | - | 4 |
| Dressing & milking | 23 | 2 | 2 |

In terms of farm management, while both male and female partners tend to make a number of joint decisions on production, marketing and management of the enterprise, it is the woman

who dominates the decision making with respect to all of the resources. The importance of the woman as a key resource in the management of the farm is reflected in Table IV.10, which shows the woman making decisions on production, post-production management, marketing, and farm management.

B. Adoption of Improved Technologies

The adoption of improved technologies reportedly varies by gender. Technical and extension officers have reported that women tend to listen more carefully, and carry out recommended practices more diligently than their male counterparts; because of this, women food producers tend to be better farmers than men.

Table IV.10. Women's participation in productive and management decisions on farm.

| Resources | Decision maker | | | |
|------------------------------|----------------|-------------------|------|-------|
| | Woman | Man/ Companion | Both | Other |
| Inputs-crop prod. | 76 | 7 | 38 | 1 |
| Purchase machinery/equipment | 46 | 2 | 27 | 1 |
| Crops to be planted | 75 | 5 | 37 | - |
| Livestock to be raised | 49 | 1 | 28 | 1 |
| Products to be sold | 87 | 4 | 46 | 1 |
| What markets | 92 | 3 | 39 | 2 |
| Price of goods | 87 | 3 | 39 | 2 |
| Use of loans | 24 | - | 13 | - |
| Farm management | 94 | 1 | 47 | 1 |
| Use of profit | 86 | 3 | 50 | 1 |
| Organization of production | 90 | 3 | 44 | 1 |
| Hiring farm labour | 46 | 1 | 28 | 1 |
| Other | 1 | - | 1 | - |

C. Familiarity with and Access to Improved Technologies

The agencies involved in technology generation and transfer have all stated that the information produced is geared towards the farmer, and that there is no gender perspective to the

development or application of the technology. As such, both male and female farmers receive training in technical aspects of vegetable and livestock production.

Female farmers interviewed reported that they received training in various technologies, and that they would like to continue to receive training in the areas shown in Table IV.11.

Table IV.11. Women and men farmers that have received training or technical assistance by area, Barbados, 1994.

| Subject area | Women | Men | Both |
|------------------------------|--------------|------------|-------------|
| Seed selection/production | 27 | 1 | 1 |
| Use of fertilizers/pesticide | 40 | 2 | 1 |
| Post harvest storage | 29 | 1 | - |
| Marketing | 38 | 1 | 1 |
| Feeding & grazing | 23 | 1 | 1 |
| Farm management | 39 | 3 | 2 |
| Packaging | 28 | - | - |
| Processing | 29 | - | - |
| Other | 1 | - | - |

V. APPROPRIATENESS OF TECHNOLOGICAL OFFERING FOR WOMEN FOOD PRODUCERS

Except for the CARDI Sheep Production and Marketing Project, technology interventions by most of the major agricultural research and development institutions described in Part I of the document, have been "gender blind." Agricultural diversification programmes have focused on technical and economic factors (such as increase in export earnings, increased production levels, decreased cost of production, increase in income and number of farmers trained). Gender issues such as the distribution of income in the household, timing of training activities, information loss, decision making in the household, and disaggregation of tasks by gender have not been addressed. As a result, agricultural diversification policies and programmes have led to shifts in division of labour which have in turn, led to displacement of women and loss of women's control over their income (particularly in the marketing of produce), conflicts between men and women, increased praedial larceny of high value crops, loss of bio-diversity, and uneconomic and inefficient use of time on export crops.

The appropriateness of technology for women food producers must therefore be considered, not only with respect to the technical aspects of a new method or technique, but also with respect to how the application of the technology fits in with activities that arise out of her existing multiple reproductive, productive and community managing roles, and with gender relations in the farm family. Analysis of the daily activities of women farmers shows that women incorporate their productive tasks into their daily reproductive responsibilities, spending on average of 90 hours/week on household tasks, primarily on child care, food preparation and gardening (Table V.1). Although male farmers were not identified *per se* in the study, it would appear that male farmers tend to compartmentalise productive and reproductive activities, focusing mainly on productive activities, and viewing domestic responsibilities as an interruption of their work.

The availability of the female farmer for training depends on whether or not she has responsibility for school-aged children who have to be prepared for school, transported to and from school and other activities, supervised and cared for. The survey data has shown that women small farmers spend 33 hours on average per week on child care. Such women tend not to "go to the garden" before 8.45 or 9.00 a.m. or between 2.00 and 3.00 p.m. Other women who may not have heavy household activities early in the morning often go to their plots from as early as 6.00 a.m.

Technology offerings therefore have to take into account:

- the size, location and quality of the agricultural holding that can be realistically managed by a female farmer, to satisfy domestic and commercial needs
- support mechanisms which must be put in place at the farm family and community levels, to allow women to participate in training activities. These mechanisms may include the provision of health, laundry, daycare for children and elderly, and legal services

- incorporation of ergonomic and occupational health and safety factors into the design of tools and equipment which are used by women.

Table V.1. Women's use of time on domestic activities.

| Domestic activities | Avg. hrs./week |
|----------------------------|-----------------------|
| Prepare food | 14.34 |
| Carry water | 8.00 |
| Wash clothes | 4.90 |
| Iron clothes | 2.62 |
| Clean house | 4.66 |
| Child care | 33.00 |
| Shopping | 2.60 |
| Repair house & furniture | 2.00 |
| Sew/mend clothes | 3.50 |
| Pay bills | 1.75 |
| Clean yard | 3.27 |
| Tend garden | 13.16 |
| Transport children/others | 8.42 |

In terms of technology improvements for women food producers, there is need for

- Design of appropriate systems for rainwater catchment, storage and distribution, so as to reduce the cost of irrigation, particularly in the dry season.
- Design of animal feed formulations which utilise locally available forages (such as lucaena), and reduce the need to import costly feeds.
- Trials on the increased use of organic fertilisers (such as compost, pen manures, blood meal, fish meal), and reduced use of chemicals for crop production.

PART THREE: PROCESSING AND MARKETING

VI. THE NATIONAL MARKET FOR AGRI-FOOD COMMODITIES PRODUCED ON SMALL PRODUCTION UNITS

Introduction

The national market for raw and processed agricultural products is comprised of a complex matrix of players which include farmers, farmers' organisations, middlemen and other hucksters, small and large importers and traders, supermarkets, foodservice establishments, small-scale food processors, the hospitality industry and various institutions. Commodities traded by and among these players include imported items (cereals, livestock and dairy products, fresh fruits and vegetables), and locally produced fresh fruits, vegetables, root crops and processed foods.

The structure of the trade and the major players will be discussed in section C, after an analysis of the general market conditions facing small farmers in Barbados.

A. Demand, Price and Supply

1. General market conditions

Marketing is the perhaps the greatest challenge faced by small farmers. Constrained by low economies of scale, competition from other small farmers and plantation estates, and inadequate market intelligence, most small farmers have little control over the market. Despite the fact that small farmers do possess some specialisation in market garden vegetables, their advantage in the market exists only for a few months of the year, primarily during the sugar harvesting season, when the estates plant minimal quantities of these crops. The estates, on the other hand, control the greater part of the market in crops such as sweet potato, yam, carrots and onions.

A number of current and future developments are likely to influence the demand for commodities produced by small farmers in Barbados. These are:

- The expansion of the tourism industry, with attendant expansion of foodservice establishments requiring local fresh fruits, vegetables, herbs, root crops and livestock products.
- The proposed strengthening of linkages among the rural sector, agriculture and tourism (Agricultural Sector Plan 1993 - 2000).
- The proposed revitalisation of the Barbados Agro-Processing Plant. This will provide additional markets for fruits (including passion fruit, carambola, guava and cherries) and vegetables (peppers, cucumbers, pumpkin) suitable for processing into juices, purees, preserves, and condiments.

- The expansion of production for export markets. Commodities targeted include carrots, beets, onions and tomatoes for the CARICOM market, and hot peppers, spinach, okra and squash for extra-regional markets.
- An increasing health consciousness throughout the Barbadian population, which may increase the demand for fresh fruits, vegetables and herbs.
- Structural adjustment and the growth of the informal sector. Increasing unemployment has led to an increase in services related to the marketing of agricultural produce. Many persons (particularly young men) now purchase produce from farmers and importers, and sell produce to offices, banks and various institutions, from their vehicles.

The extent to which the small farmer can benefit from these developments depends on access to *information*, particularly with respect to:

- Market niches on which they can capitalise.
- Grades and standards required for the hospitality, processing sector and export sectors.
- National markets for fresh produce (trends by age group and gender, types of foods consumed, specific target groups, added-value products, etc.).

and on access to technical assistance with respect to:

- Production and postharvest handling methods and techniques to achieve required quality levels.
- Marketing strategies and techniques to achieve better price returns and competitive edge.

2. Supply and prices

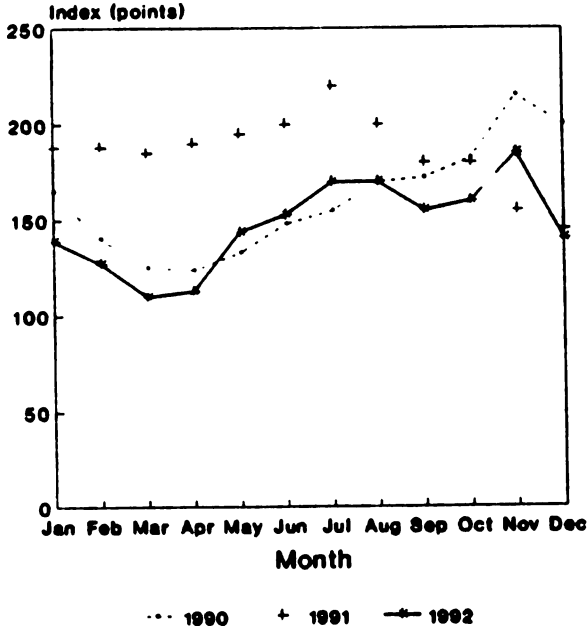
Data available on some 36 farmers which are surveyed monthly by the Agricultural Marketing Services Division of the BADMC, provides some information on the acreages and crops planted in 1992, and the prices received in the marketplace. These farmers represent a small proportion of the small farming sector, who operate mixed vegetable farms across the eleven parishes. They planted an estimated 408 acres of food crops during 1992. Cucumber plantings totalled 53.4 acres, less than the area planted in 1991. Beans and carrots were planted throughout the year, and these crops accounted for 41.72 and 36.12 acres respectively. Cabbages accounted for 28.4 acres, and sweet pepper, okra, onion and butternut squash

recorded notable acreages. Among the ground provisions, 19 acres of sweet potato and approximately 2 acres of yam were planted by small farmers.

The Wholesale Price Index (WPI) for the period 1990 - 1992 is shown in Figure V.1. When compared to 1990 and 1991, the wholesale prices of the majority of vegetables, ground provisions, and herbs were lower during 1992. The Wholesale Price Index fell by 21.8% or 40.5 points to 145.4 from 185.9 recorded in 1991.

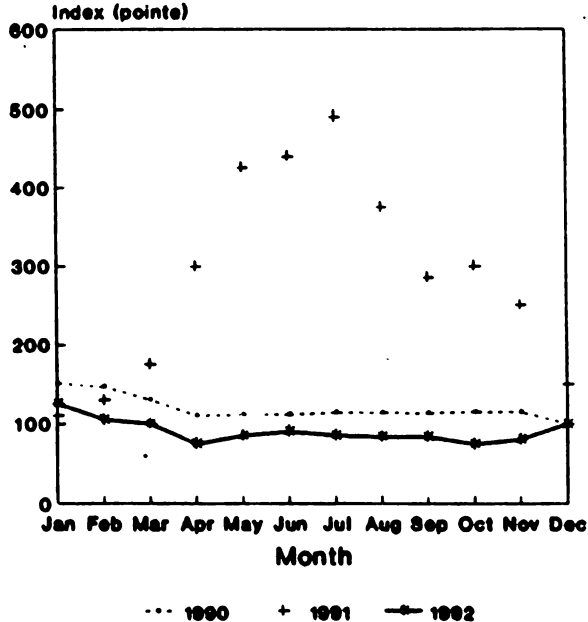
The ground provisions component of the WPI recorded significant decreases among the crop categories. Sweet potato prices were significantly lower in 1992 than in 1991. The price trend for 1990 and 1992 are almost identical, with prices in 1992 being lower than those in 1990. The supply of sweet potatoes during 1990 and 1992 was fairly constant, with very little fluctuation in quantities available throughout the year. Prices in 1992 ranged from BDS\$0.70 and \$1.25 per kg to register an annual average of \$0.87 per kg. In contrast, prices for sweet potatoes during 1991 ranged between \$1.12 and \$4.92 per kg (some of the highest prices ever recorded for this crop) (See Figure V.2).

Figure VI.1. Wholesale price index (1990-1992)



Source: AMS Division

Figure VI.2. Average wholesale prices (sweet potato, 1990-1992)



Source: AMS Division

Prices for herbs were lower in 1992 than in 1991. The Index fell by 5.9 points from 12.5 to 136.6. Prices were, however, relatively stable throughout the year, with the monthly indices ranging between 131.8 and 140.5 points.

Vegetable prices in 1992 were notably lower as the Index fell by 24.2 points from 168.7 recorded during 1991 to 144.5. During March and April, prices are at their lowest, and the Vegetable Index stood at 75 and 75.8 points respectively. Prices were highest during August and November.

Current average wholesale prices for selected vegetable crops are given in Table V.2.

In terms of access to market information on prices and mechanisms for intervening in marketing processes, small-scale producers generally obtain their price information from radio programmes, the BASIS report in the daily newspaper and by telephoning current and potential customers and fellow farmers. The information gleaned from these sources serves as a base for negotiating prices, which may be adjusted either upwards or downwards, depending on the quality of produce which the farmer is offering, and the general availability of the product (whether it is in glut or scarce).

The absence of a collective marketing effort by the majority of small farmers, combined at times with the influence of high volumes of similar commodities produced by the estates, creates a very competitive pricing situation, with the result that farmers end up under-cutting each other, and sometimes selling below production cost, in order to attract customers and keep the market.

Table VI.1. Selected crops: Average wholesale prices, Barbados, 1992.

| Crop | May avg. price | June avg. price |
|--------------------|-----------------------|------------------------|
| Bean | 473 | 742 |
| Beet | 150 | 211 |
| Cabbage | 159 | 424 |
| Carrot | 119 | 123 |
| Cauliflower | 550 | 600 |
| Christophene | 318 | 561 |
| Cucumber | 195 | 280 |
| Eggplant | 206 | 206 |
| Lettuce (per head) | 90 | 88 |
| Marrow | 192 | 194 |
| Okra | 278 | 293 |
| Pepper-sweet | 264 | 310 |
| Pumpkin-belly | 258 | 257 |
| Pumpkin-garden | 281 | 282 |
| Squash-b/nut | 131 | 152 |
| Tomato-large | 199 | 391 |
| Banana-green | 107 | 96 |
| Cassava | 169 | 194 |
| Eddoe | 208 | 211 |
| Plantain | 185 | 182 |
| Sweet potato | 298 | 367 |
| Yam | 220 | 234 |
| Eschalot | 1015 | 1056 |
| Marjoram | 1111 | 1132 |
| Parsley | 1004 | 1012 |
| Pepper-hot | 224 | 23 |
| Thyme | 1197 | 1182 |
| Banana-ripe | 175 | 175 |
| Grapefruit | 206 | 184 |
| Lime | 343 | 276 |
| Orange | 209 | 203 |
| Pineapple | 272 | 268 |
| Watermelon | 211 | 286 |

One mechanism used for intervening in the marketing process is to become the sole supplier of an item, particularly if it is in scarce supply. A tomato farmer may for example, purchase tomatoes from her competitors in order to "keep the market."

B. National Marketing Channels

It is estimated that over 75% of the national output of fresh vegetables and fruits is derived from small farmer holdings. This estimate is based on discussions held with purchasing personnel at the BAS outlet and at the major supermarkets.

Figure V.3 shows the national marketing channels for food products generated by the small-farm sector.

Small-scale producers market their vegetables and livestock products in a variety of ways. For example, sales may be transacted at the farm gate level: a farmer may sell sweet potatoes "by the rod" to hucksters who would harvest the crop themselves; or harvested produce may be picked up at the farm, on the basis of sales confirmed by telephone with middlemen (from vegetable depots, restaurants and/or supermarket outlets). Farm-gate sales of produce with agents and middlemen predominate among female small farmers.

Livestock (pigs, sheep, and cattle) are generally sold to long-standing customers who would "engage" a particular portion of the carcass, or to a farmers' organisation which may handle the marketing of the carcasses. Butchering is carried out mainly at the BADMC. In the case of poultry, sales of live birds generally take place at the farmgate, while sale of processed birds takes place at the farm gate as well as at the retailer's outlet.

Many small farmers personally deliver produce and livestock products to customers who may include individual consumers, supermarkets, hotels, foodservice outlets and ACTCO (the marketing depot operated by the Barbados Agricultural Society). The farmers normally have long-standing relationships with these customers, and would confirm orders (volume, quality and prices) by telephone before delivery. Alternatively, a new customer may call a farmer to enquire about business and transact a sale.

While most small farmers tend to sell to hucksters rather than operate a stall in the market themselves, more and more farmers are opting to sell their produce, as well as produce purchased from other farmers. Stalls are usually set up in the markets or at busy intersections on highways and sidewalks. Produce is also sold directly from farm vehicles. A recent innovation is the establishment by farmers of marketing depots in high traffic density areas (such as Bridgetown and Spring Garden Highway), and the use of classified advertisements in the daily newspapers and on television, for home delivery of fruits and vegetables.

Within recent times, small farmers have been marketing fruits and vegetables (primarily hot pepper, sweet potato, breadfruit, golden apple, and spinach) through exporters for sale on regional and international fresh produce markets. The exporters normally take produce on the basis of verbal agreements from specific farmers with whom they have built up a certain level of trust over time.

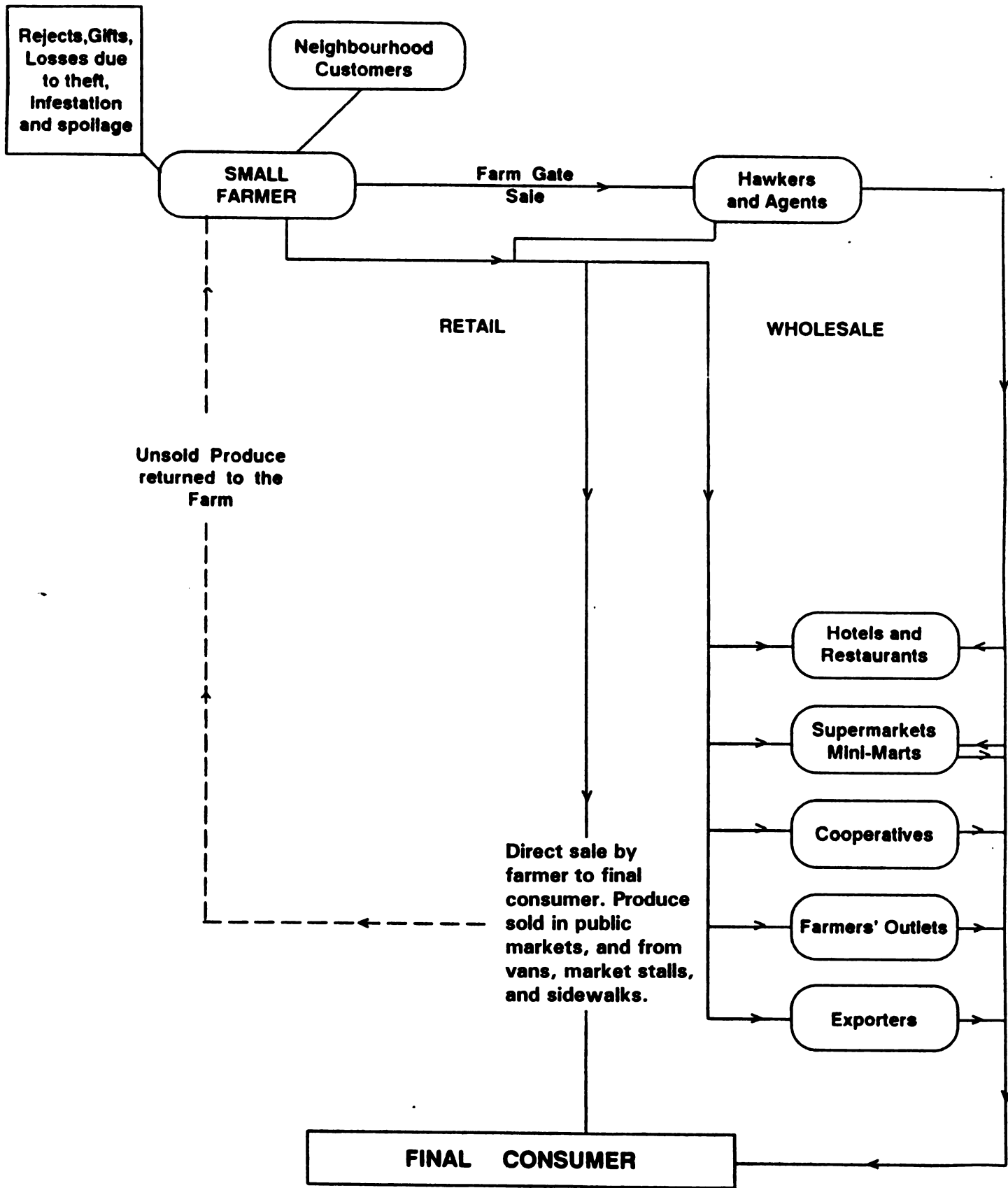


Figure VI.3. Marketing system showing outlets available to small farmer and major operators, Barbados, 1994.

C. Marketing Agents

1. Public markets

There are five public markets in Barbados. These are:

1. Fairchild Street Market, Bridgetown
2. Cheapside Market, Bridgetown
3. Eagle Hall Market, St. Michael
4. Six Roads Market, St. Philip
5. Oistins Market, Christ Church

All of these markets (except the Oistins Market) were constructed some years ago to house hawkers plying their trade in fresh produce. The Cheapside market was built in the early 1900s and served as a rum and sugar bond until it was converted into a public market. Within recent years, however, the importance of the 'town' market as the principal source for fresh produce has declined with the increased involvement of supermarkets in the retailing of fresh produce and the growing urban decentralization, which has resulted in the availability of fresh produce at various locations throughout the country.

The deplorable and unsanitary conditions at the Fairchild Street, Cheapside and Eagle Hall markets have also impacted negatively on business in the public markets. One of the major problems is the lack of basic management and maintenance. This is evidenced by broken toilets at Cheapside and Fairchild street markets, non-functional cold storage facilities (the facility at Cheapside has not worked for the past 15 years), huge holes in roofs which offer no protection against the sun or rain, and broken vendors' stalls. In addition, refuse is dumped at the back of the Fairchild Street market, causing swarms of flies to invade the interior. Vendors have complained that sales have plummeted because of the bad conditions in the market. In addition to the many infrastructural problems at the Cheapside and Fairchild street markets, vendors are prey to thieves who have 'taken over' both markets.

The market vendors, predominantly women who have been selling in the markets from the time they were built, are now being forced out of the markets and many have resorted to selling on the sidewalks. In the case of Cheapside, vendors ply their trade from the backs of cars and vans, and under huge umbrellas at the end of the car park that is situated at the back of the market. At Fairchild Street, vendors have take over every available space between Julie 'N Supermarket and the bus terminal.

Many of the vendors are convinced that if the ambiance of the markets is enhanced, the sanitation improved, and the spaces properly policed, the consumers will return to the location, and vendors will then vie with one another for space in the new environment. One vendor in the Fairchild Street market has in fact, upgraded his stall with modern display cases and other features, in an effort to create a modern shopping area.

The government has recognised the existing markets are inadequate in many ways and have drawn up plans for a major capital works programme on all public markets, beginning with the renovation of both Fairchild Street and Cheapside Markets. Despite the existence of these plans, however, the government has not been able to commence renovations because of a "lack of resources."

2. Street markets

Within recent times, public streets and car parks have been used for the sale of farm produce. Streets in Bridgetown for example (such as Swan Street) have been cordoned off from vehicular traffic and sectioned for individual operators. Most of the makeshift stalls are operated by young men who sell a wide range of imported fruits (apples grapes, pears, oranges, pineapples, mangoes), as well as local fruits and vegetables. Prices offered in the street markets are often competitive with prices offered in the supermarkets, and the consumer has the opportunity to select what (s)he wants.

Street markets have recently come in for criticism with respect to poor hygiene and sanitation, and the danger of congestion, particularly when there is an emergency like a fire on the street. There are, however, political considerations in the siting of these vendors in the city areas.

3. Cooperatives and farmers' outlets

a. ACTCO

In 1982, the BAS established the Agricultural Commodity Trading Company (ACTCO) with the objective of marketing agricultural produce on domestic, regional and extra-regional markets.

The company has not been very successful in terms of export marketing. ACTCO was involved in an export programme in conjunction with CATCO and the BMC during the period 1982 to 1986. Under this programme, ACTCO was responsible for postharvest handling and packing operations which included dry preparation and chill storage of produce, and payment of farmers. Problems of high rejects, low prices and non-payment by importers, led to serious financial difficulties, and eventually, curtailment of ACTCO's export activity.

Today, ACTCO's efforts are concentrated on providing a secure domestic market for the produce of its members. A high percentage of the produce purchased is sold to Julie'N Supermarket, the largest supermarket in the country. The remainder of the produce is sold to consumer groups (such as food service outlets, government institutions, commercial banks) and the ACTCO's retail outlet which has packing/grading, display and chill storage facilities.

Several small farmers market their produce through the BAS. A sample BAS purchase record indicated that some 43 tonnes of produce, comprising 8 tonnes of fruits, 29 tonnes of vegetables, and 6 tonnes of meat, were purchased during the month of March, 1994.

b. Barbados Sheep Farmers Association (BSFA)

The BSFA has been involved in the marketing of live Black Belly Sheep into regional and international markets. Under an agreement with the MOA, the Association is the sole exporter of live sheep from Barbados. The Association has recently initiated the marketing of fresh lamb, and with the assistance of Volunteers in Overseas Cooperative Assistance (VOCA), instructed the BSFA/ACTO employees in the grading of lamb meat.

The Association faces problems in the marketing of lamb to hotels and supermarkets because of competition from non-members who market directly to these customers, low throughput of sheep, and uncompetitive prices of local lamb vis-a-vis imports from New Zealand.

Future projects being planned by the BSFA include the production of minced lamb from culled adult sheep, the establishment of a sheep feedlot which will serve as a market for weaned lambs from some 1700 small farmers, and the establishment of a feed mixing plant to produce a feed based on local ingredients for all classes of livestock.

c. National Association of Pig Farmers

The Association has been involved in the marketing of pigs and pork since 1976. Currently, the Association markets pork carcasses to local processors who assess the quality of the carcass on the basis of backfat measurement.

d. Barbados Egg and Poultry Producers Association

The Association assists in the arrangement of contracts between its members and processors. It lobbies with the processors as well as with the government on price issues.

e. St. George Farmers' Marketing Cooperative Society Ltd.

The Cooperative services some fifty small farmers, of which twenty-five are members of the group. It operates a retail outlet which offers a wide range of fresh fruit and vegetables, poultry meat, lamb and beef to consumers in the district.

4. Supermarkets/mini marts

Supermarkets and mini-marts have emerged as important and significant outlets for both fresh and processed agricultural commodities. It has been estimated that supermarkets handle over 30% of local fresh produce.

5. Fresh produce exporters

a. Export Packaging Unit (EPU)

Formerly under BML, now within BADMC, the EPU was established in 1986 at the end of this winter vegetable project, which was initiated to service the production of the small farmer sector. The EPU was established with the objective of continuing the export of fresh produce and supporting the agricultural diversification thrust.

The EPU currently exports a mix of some 31 commodities (including raw produce as well as semi-processed agricultural commodities) which are sourced primarily from small farmers.

b. Other exporters

CATCO, King's Agro Foods, Malvern, Thorpe's, Kirton Farms, Cariba, Gale's Agro Foods, Mt. Wilton, and Caribana are the major exporters of fresh produce out of Barbados. These exporters enter into verbal agreements with a number of small farmers for supply of fresh produce for their operations.

6. Hucksters

Historically, huckstering has provided an important economic outlet for women, and has been the cornerstone of survival strategies for many households. In the past, female farmers generally traded their own produce, transporting it by foot and by cart to urban areas, where they would sell on busy street corners or in public markets and allocated areas. Some women also sold produce at farm gate to female hucksters.

Today, huckstering has taken on different dimensions, not only with improvements in transportation and communications, but also in terms of what is sold and the gender of the trader. The downturn in the economy, and the parity of the Barbados dollar, vis-a-vis other regional currencies, has led to the development of a burgeoning trade in a range of both food and non-food "suitcase-trade" items, which are all sold in the marketplace.

With respect to the gender issue, many unemployed young men have sought to earn a living by entering the huckstering trade, purchasing produce primarily from fresh fruit importers, as well as from small farmers and plantations. Those which purchase imported fruit tend to sell

around Bridgetown, mainly on the two bridges, in the Fairchild Street bus stand, and in the Swan Street area. Local fruits, including fat pork, sea grapes, dunks, guineps, plums, and cashews are also sold mainly by young men, who harvest 'wild' trees that grow mainly in the eastern parishes. These fruits (except for guineps which are sold by the bunch) are normally sorted and packaged in small plastic bags which are sold for \$1.00 each. Others have opted to purchase vehicles (mainly mini-vans), and offer a mobile service to various offices in the areas bordering the city.

Locally produced vegetables and root crops are still, however, sold mainly by female hucksters who operate on the sidewalks and carparks outside of the public markets, mainly on Fridays and Saturdays. Some trading takes place on Sunday mornings, primarily at Eagle Hall and Fairchild Street markets.

VII. PROCESSING AND MARKETING OF FOODSTUFFS ON SMALL PRODUCTION UNITS AND BY WOMEN

A. Processing: Relationship between Type of Product and Specialisation by Gender

Although the cottage industry and micro-enterprise food processing sector is dominated by women, the majority of these women are not small farmers. At the small farmer level, processed foods prepared on the farm tend to be largely for use by the household, rather than for commercial sale. Commercial processing was observed only for the slaughter, dressing and packaging of chilled poultry, shelled and frozen pigeon peas, and preparation of sweet potato "pudding and souse." In all of these cases, women were primarily responsible for all processing activities.

The virtual absence of processing as a commercial activity on small farms in Barbados is a reflection of the under-development of the national agro-processing sector, the heavy reliance on imported processed foods, and the lack of awareness of the processing and commercial potential of locally available fruits, vegetables and root crops. Thus, opportunities for the production of semi-processed products (such as frozen vegetables and root crops, minced hot pepper, brined vegetables, solar dried products) are lost to the farmer.

B. Marketing: Access to Different Types of Markets

Women participate in all aspects of marketing, from sourcing of market information on products and prices, to preparation of commodities for sale, negotiation and transaction of sales, transporting of produce to the marketplace, display, promotion and actual selling. Women's intimate knowledge of the dynamics of the market provides her with the necessary tools to maximise her income, and with the information necessary for production planning.

1. Products

The products marketed by women differ from those marketed by men in terms of the range carried, and the value of the items. Women market over 30 different commodities, ranging from "cash crops" such as carrots, string beans, and sweet peppers to the lesser valued items such as okra and seasoning. Male farmers, on the other hand, handle mostly the short-term vegetable cash crops (Tables V.3 and V.4).

Table VII.1. Products marketed by women, Barbados, 1994.

| Crops | Place of sale | | | | | | | |
|-----------------|---------------|--------|-------------|-------|-------------|-------|-----------|-------|
| | Farm gate | | Town market | | Institution | | Factories | |
| | No. | % | No. | % | No. | % | No. | % |
| Bean | 2 | 100.00 | - | - | - | - | - | - |
| Pigeon pea | 2 | 66.67 | 1 | 33.33 | - | - | - | - |
| Beet root | 2 | 20.00 | - | - | 6 | 60.00 | - | - |
| Carrot | 12 | 37.50 | 1 | 3.12 | 16 | 50.00 | 2 | 6.25 |
| Cabbage | 8 | 32.00 | 2 | 8.00 | 11 | 44.00 | 2 | 8.00 |
| Chinese cabbage | - | - | 1 | 33.33 | 2 | 66.67 | - | - |
| Lettuce | 8 | 27.59 | 3 | 10.34 | 14 | 48.28 | 2 | 2.90 |
| Calaloo | 1 | 33.33 | - | - | 2 | 66.67 | - | - |
| Cauliflower | 3 | 100.00 | - | - | - | - | - | - |
| Broccoli | 2 | 100.00 | - | - | - | - | - | - |
| String bean | 16 | 41.03 | 5 | 12.82 | 17 | 43.59 | - | - |
| Eggplant | 1 | 50.00 | - | - | - | - | 1 | 50.00 |
| Chive | 1 | 33.33 | - | - | 2 | 66.67 | - | - |
| Okra | 8 | 50.00 | - | - | 5 | 31.25 | 2 | 12.50 |
| Tomato | 8 | 33.33 | 3 | 12.50 | 11 | 45.83 | 1 | 4.17 |
| Cucumber | 13 | 32.50 | 5 | 12.50 | 17 | 42.50 | 3 | 7.50 |
| Squash | 4 | 57.14 | 2 | 28.57 | 1 | 14.29 | - | - |
| Pumpkin | 9 | 64.29 | 1 | 7.14 | 3 | 21.43 | 1 | 7.14 |
| Shallot | 7 | 38.89 | 2 | 11.11 | 6 | 33.33 | 2 | 11.11 |
| Hot pepper | 1 | 20.00 | - | - | 3 | 60.00 | 1 | 20.00 |
| Sweet pepper | 10 | 47.62 | 1 | 4.76 | 8 | 38.10 | 1 | 4.76 |
| Seasoning | 1 | 33.33 | - | - | 2 | 66.67 | - | - |
| Thyme | 1 | 33.33 | - | - | 1 | 33.33 | 1 | 33.33 |
| Herbs | 4 | 57.14 | - | - | 2 | 28.57 | - | - |
| Parsley | 1 | 100.00 | - | - | - | - | - | - |
| Melon | 3 | 25.00 | 1 | 8.33 | 7 | 58.33 | 1 | 8.33 |
| Corn | 5 | 71.43 | - | - | 2 | 28.57 | - | - |
| Sweet potato | 12 | 60.00 | 4 | 20.00 | 3 | 15.00 | - | - |
| Cassava | 7 | 87.50 | - | - | 1 | 12.50 | - | - |
| Yam | 6 | 85.71 | - | - | 1 | 14.29 | - | - |
| Sorrel | 1 | 50.00 | - | - | - | - | - | - |
| Totals | 161 | | 33 | | 144 | | 20 | |

Table VII.2. Products marketed by men, Barbados, 1994.

| Crops | Place of sale | | | | | |
|---------------|---------------|--------|-------------|--------|-------------|--------|
| | Farm gate | | Town market | | Institution | |
| | No. | % | No. | % | No. | % |
| Peanut | - | - | 1 | 100.00 | - | - |
| Beet root | - | - | - | - | 1 | 100.00 |
| Carrot | 1 | 25.00 | - | - | 3 | 75.00 |
| Cabbage | 1 | 33.33 | - | - | 2 | 66.67 |
| Lettuce | - | - | - | - | 2 | 100.00 |
| Cauliflower | - | - | - | - | 1 | 100.00 |
| String bean | - | - | 1 | 25.00 | 3 | 75.00 |
| Tomato | 1 | 33.33 | - | - | 2 | 66.67 |
| Cucumber | - | - | 1 | 20.00 | 4 | 80.00 |
| Pumpkin | - | - | - | - | 2 | 100.00 |
| Sweet pepper | - | - | - | - | 1 | 100.00 |
| Sweet potato | - | - | - | - | 1 | 100.00 |
| Cassava | 1 | 100.00 | - | - | - | - |
| Yam | 1 | 100.00 | - | - | - | - |
| Totals | 5 | | 3 | | 22 | |

2. Markets

A comparison of Tables V.3 and V.4 indicates a significantly higher proportion of sales by men to institutions, than at the farm gate or to a town market by women. Further, although men tend to sell more frequently to institutions, far more women sell a wider range of products both to institutions, factories and town markets, and at farm gate level.

The tendency of men to sell more to institutions reflects their preference for pre-negotiated deals for bulk sales with specific buyers. Women, on the other hand, show a wider distribution of sales across four major types of markets, indicating their ability and willingness to access a range of buyers, their tendency to sell on a more individual and personalised basis, and their patience in selling. Extension officers have also reported that men tend to "stick out for price," forego sales and suffer the loss of product more so than women, who would be willing to drop the price of an item in order to make a sale. Given the female farmer's level of participation

in the production and management of the crop, as well as her reproductive responsibilities in providing income for her family, it is not surprising that she would ensure that all of her efforts in bringing commodities to a marketable condition are not in vain.

3. Transportation and amount of time dedicated

The major types of transportation available to the small farmer are privately owned vehicles (mainly vans and cars), and public transportation in the form of minibuses or mini-vans, taxis and buses. Many female farmers own or have access to a vehicle.

Given that most sales are transacted at farm gate level or with institutions, time dedicated to marketing consists mainly of time spent on the telephone providing information to buyers, and negotiating sales, and time spent delivering produce to consumers. Deliveries are normally made when the farmer goes out on other errands, for example, when she is purchasing inputs, or transporting children to and from school. The tendency for female farmers to sell from home base (via telephone or at the farm gate) facilitates time management.

Despite the convenience of selling from home base, many female farmers are now opting to sell in town markets or set up their own sales depots, primarily because of increasing competition from other farmers, hucksters and supermarkets.

PART FOUR: POLICY RECOMMENDATIONS

VIII. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

- The women food producers of Barbados operate 39% of the total number of agricultural holdings reported in the 1989 Agricultural Census. Despite this, the acreage occupied by these holdings comprises a mere 6% of the total area under agricultural production.
- Women are responsible for the marketing and distribution for a significant volume of the fresh produce produced and consumed in Barbados. Despite this, however, the government has not placed sufficient priority on expediting the refurbishment of existing facilities for market vendors. Approximately 49% of the women surveyed indicated that marketing systems and marketing infrastructure must be improved (See Table V.5).
- The contribution made by women food producers, in terms of self employment, food production and distribution, savings in foreign exchange, and the establishment of a stable economy, is significant and cannot be ignored.
- Production on very small units has been shown to be economically non-viable. Women food producers must have access to larger holdings, as well as access to the production inputs and support services necessary to enable maximum utilisation of the entire holding.
- In order to be efficient, the female small farmer must be able to utilise appropriate technology in maximise productivity and minimise losses. Improved extension services, cheaper inputs, and more modern equipment have all been cited as major areas in which improvements are needed for women farmers (See Table V.5).
- Seventy-two percent (72%) of female farmers are 45 years and older (Figure V.3). This statistic has serious implications for the future involvement of women in farming. Within the last two decades, the economy of the island has been oriented towards the tourist industry and manufacturing industries (with data processing industries assuming significance within the last decade). The high demand for female labour in these industries, coupled with the attraction of expanded educational opportunities, security, prestige, mobility and higher salaries offered by these two sectors, it is highly likely that younger women will not opt to enter the agriculture sector. There is an urgent need for the re-introduction of agricultural science into the curriculum of all schools, training in agri-business, and for the promotion of careers in agriculture as worthwhile and prestigious professions.
- The multiplicity of tasks carried out by women food producers calls for skills in time management, inventiveness and resourcefulness. Technologies must be devised which

make optimal use of these qualities that have been honed so well by rural women, without creating more work for them. Planners, researchers and extension personnel must therefore design and transfer technologies with consideration for women's physical capabilities and availability.

- Effective policies and actions cannot be formulated without a sound information base. The available information on women food producers in Barbados has to be compiled, analysed, and disseminated, in order that institutions could develop beneficial programmes. Moreover, the contribution of women to food production, processing and marketing must be publicised through the media.

Table VIII.1. Principal improvements needed for farming/marketing/processing.

| Improvements needed | Number of women | As percentage of all women |
|---------------------------------|------------------------|-----------------------------------|
| Availability | 9 | 6.16 |
| Better & guaranteed markets | 71 | 48.63 |
| More storage facilities | 2 | 1.37 |
| Cheaper inputs | 82 | 56.16 |
| Better prices | 5 | 3.42 |
| Financial assistance | 15 | 10.27 |
| Improved extension services | 20 | 13.70 |
| Technical training | 13 | 8.90 |
| Proper irrigation | 21 | 14.38 |
| Provision for modern equipment | 18 | 12.33 |
| Better roads & transportation | 8 | 5.48 |
| Incentives for farmers | 9 | 6.16 |
| Import restrictions | 4 | 2.74 |
| Easier access to loans | 11 | 7.53 |
| More information | 7 | 4.79 |
| Protective laws (theft) | 4 | 2.74 |
| Better pest control measures | 8 | 5.48 |
| More respect for female farmers | 1 | 0.68 |

B. Recommendations

Given the above framework, the following proposals are made for facilitating the involvement of women in agricultural production, agro-processing and marketing:

1. Include women (from official women's bureaux, and NGOs to beneficiaries) in the development of policies and strategies, and in the formulation of projects for agricultural development in Barbados. Concomitant with this should be gender training for agricultural planners, researchers and extension officers.
2. Build in to projects systems for monitoring and evaluation of the impact of the projects on beneficiaries, as well as systems of sustainability.
3. Establish systems for collection of data on women food producers, processors and marketers, and use gender-disaggregated data to evaluate the potential effects of policies and programmes on target groups.
4. Establish a close network among all agencies and institutions involved in the improvement of working conditions for the female farmer, so that scarce resources can be optimised, without duplication of time and effort. In this context, the expertise of existing programmes and agencies, especially those with a regional orientation, should be used in order to build regional capacity and linkages.
5. Devise policies to encourage "new and young blood" into the agricultural sector, and to create business opportunities in agricultural production and agro-industry that can compete with tourism and manufacturing.
6. Accelerate land reform and land use policies, to make more and better land available to female farmers and farm units.
7. Provide training in technical as well as business aspects of agriculture production and marketing. Such training should be scheduled to complement the activities and availability of the female food producer.
8. Encourage the formation of cooperative marketing associations which will go a long way to providing a secure market for the farmer and stabilising prices.
9. Develop the agro-processing for small farmers either (a) along the lines of producing a semi-processed product which can be used by a final processor, or in the foodservice industry or (b) along the lines of a cooperative processing. In addition, develop projects which can be pursued as cottage industries, and install systems for quality control and quality assurance for these small production units.

10. Educate the population at large on the benefits of developing a sound national agricultural base, and on the business opportunities possible in agricultural production, processing and marketing.

C. Project Proposals

1. Proposal #1

Title: Linking the Small Farm and Tourism Sectors

Definition of Problem/Justification

- Tourism is a major contributor to the GDP of Barbados.
- Barbadian hoteliers have reported that the major barriers to the development of greater linkages with the farming sector are lack of availability of commodities, and poor and inconsistent quality.
- Weak linkages exist because of lack of communication between hoteliers and farmers.
- The development of economic linkages between the tourism and the agricultural sectors would induce an internally generated development process through the generation of additional employment and incomes, and through the conservation of foreign exchange.
- The extent to which the small farmer can take advantage of the market opportunities in the tourism and hospitality industries therefore depends on access to **market information**, particularly with respect to purchasing schedules, quantity requirements, grades and quality standards, and prices. It also depends on access to **technical assistance** with respect to production and postharvest handling methods and techniques to achieve required quality levels, and **training** in marketing strategies and techniques to achieve better price returns.

Specific objectives

- To create and/or strengthen linkages between small farmer production and tourism through the identification of market opportunities and facilitation of trade between farmers and buyers in the hotel and hospitality industries.
- To create a pool of high-quality farmers through the provision of training in the techniques of production, postharvest handling and processing which will enable them to meet the required specifications and standards of the buyers.

- To provide basic training in market development and promotion, in order to enable the farmer to achieve optimal price returns.
- To compile and disseminate relevant supply and delivery information to the farmer

Expected outputs

- Generation of higher farm incomes through the establishment of targeted markets, and increased sales levels.
- Employment generation at the levels of production, processing, distribution and marketing.
- Increased utilisation of locally produced goods and services by the tourism sector.
- Conservation of foreign exchange.
- Positive spill-over effects on domestic consumers, in terms of greater appreciation of local foods and local cuisine, and consequently greater demand for and utilisation of locally produced agricultural commodities and agro-processed goods.

Activities to be executed

- Selection of farmers with the capability, interest and commitment to the production of high-quality agricultural produce and processed foods for the tourism sector.
- Identification of potential buyers within the tourism industry.
- Determination of distribution and purchasing systems for fresh agricultural produce and agro-processed products.
- Training in production and postharvest handling technology and processing techniques for specific commodities.
- Training in marketing.
- Formulation and implementation of operational/marketing plans for the development of identified areas of opportunity. These plans would include promotional activities such as trade shows specifically geared to the hotel and hospitality industries, gourmet cooking demonstrations using local foods, and "Buy Local" campaigns. Plans would also include the establishment of information databases on specifications, and demand/supply conditions.

Possible implementing organisations or agencies: BADMC, Barbados Hotel Tourism Association, BIMAP, Bureau of Women's Affairs, EEC (funding), DB (funding), National Council of Science and Technology, National Development Foundation and WID.

2. Proposal #2

Title: Establishment of a Women's Processing Cooperative

Definition of problem/justification

- Marketing is the one of main constraints faced by small farmers. Processing offers an alternative market for small farmers' produce, and the opportunity for higher returns because of added value input.
- Many small farmers are not aware of the possible processing applications for their commodities and/or their commercial potential.
- Processed items currently produced by small farmers and micro-enterprises lack competitive edge because of non-differentiation of product types, and non-compliance with regulations governing packaging and labelling.
- The establishment of a processing cooperative would enable pooling of resources for the production of commodities to standard specifications. It would also facilitate access to cheaper production inputs through bulk purchase and access to bulk buyers in local, regional and extra-regional markets (hotels, foodservice establishments, government institutions, downstream processors).

Specific objectives

- To establish a facility for the operation of a cooperative processing operation.
- To expand the market opportunities available to the small farmer and micro-enterprises.
- To offer alternative ways to utilise products both for home consumption, as well as for commercial production.
- To upgrade the quality of processed products currently available on the market.
- To develop sustainable linkages between the rural sector and other sectors of the economy.

Expected outputs

- Higher levels of earnings in the rural sector.
- Increased employment and incomes.
- Greater utilisation of locally produced commodities.
- Improved nutritional status of farm families, and of the general population.

Activities to be executed

- Conduct of research to identify processed products with market potential.
- Matching of market opportunities with capability of farmers, in terms of agricultural commodities available, technical skills and level of interest.
- Selection of product mix and determination of throughput capacity of processing operation.
- Identification of an appropriate location for the cooperative (bearing in mind location of production areas, women's time and availability, and legal and engineering requirements).
- Design of layout of facility (bearing in mind the possible need for on-site support services such as daycare).
- Identification and selection of equipment and machinery for processing operations.
- Construction and commissioning of facility.
- Identification and selection of farmers and micro-entrepreneurs for training.
- Training in theoretical basics of food processing, and practical application of methods and techniques, for the production of specific products.
- Training in the establishment and operation of a cooperative.
- Training in marketing.

Possible implementing organisations or agencies: BADMC, BIMAP, Bureau of Women's Affairs, FAO (funding), IDB (funding), National Council of Science and Technology, National Development Foundation, UNIFEM (funding), and WID.

3. Proposal #3

Title: Commercialisation of the "Bridgetown Market" Concept

Background

"Bridgetown Market" is an annual event in the Crop Over celebrations in Barbados, which showcases the work of micro-entrepreneurs in handicraft, agricultural production, food processing, and food preparation. It is an ideal opportunity for locals and tourists alike to sample local fare and to discover the tremendous potential of the small business sector.

This proposal is aimed at making the Bridgetown market a more permanent feature on the Barbadian landscape, in order to facilitate increased linkages between rural and urban sectors, increase the utilisation of and appreciation for local foods, and exploit export market opportunities by offering visitors local cuisine and handicraft products.

The project will involve the establishment of an open-air facility with attractive booths, seating accommodation, and entertainment areas. Booths would be rented to concessionaires at reasonable rates. In terms of siting, Baxter's Road, Pelican Village or Cheapside would be ideal. In the case of both Baxter's Road and Pelican Village, the siting of the facility would lead to upgrading of these landmarks and a resurgence of business. In the case of Cheapside, the facility could be located in the existing market.

This proposal has tremendous potential for participation and investment by the private sector.

Justification

- Marketing is the one of main constraints faced by small farmers and micro-entrepreneurs. The establishment of this facility would provide a daily market for the supply of fresh produce and fish to food preparation areas, and processed products (such as seasoning, fruit juices, syrups and sauces).
- The "Bridgetown Market" would provide significant employment opportunities for management and operation of the facility, as well as for supply and delivery of inputs to the facility.

- Visitors and locals alike would be able to sample local cuisine at affordable prices, in comfortable, pleasant surroundings.

Specific objectives

- To establish a structured open-air 'street market' for the promotion and sale of prepared foods, agro-processed products, handicraft, art and agricultural produce.
- To invite private sector participation in the establishment of the facility.
- To increase consumption of locally produced foods and goods.
- To provide employment opportunities, particularly for women and youth.
- To develop sustainable linkages between the rural sector and other sectors of the economy.

Expected outputs

- Upgrading of current marketing infrastructure and marketing systems.
- Higher levels of earnings in the rural sector.
- Increased employment and incomes.
- Greater utilisation of locally produced commodities.
- Improved quality of life.

Activities to be executed

- Preparation of an investment profile, and identification of possible private sector participation. This profile would include preliminary engineering design and architectural drawings for the facility, identification of possible sites, description of operation and management procedure, and financial projections.
- Securing of financial resources.
- Construction of facility.
- Tendering for concessionaires.

- Hiring of employees.
- Promotion of the facility.

Possible implementing organisations or agencies: BIDC, CTO, EEC (funding), IDB (funding), MAFF, NDF, and WID.

4. Proposal #4

Title: Technology Design for Small-Scale Food Production

Definition of problem/justification

Women food producers have highlighted the provision of adequate extension services, cheaper inputs and access to modern equipment as areas in which improvements are needed in the production, processing and marketing of food crops and livestock in Barbados. In an effort to address these constraints, this proposal aims at technology improvements with respect to irrigation, animal feeds, and use of chemicals and fertilisers.

Specific objectives

- To design appropriate systems for rainwater catchment, storage and distribution, so as to reduce the cost of irrigation, particularly in the dry season.
- To design animal feed formulations which utilise locally available forages (such as lucerna), and reduce the need to import costly feeds.
- To conduct trials on the increased use of organic fertilisers by using locally available materials, such as compost, pen manures, blood meal, and fish meal.
- To investigate methods and techniques for minimising the use of chemicals for crop production, so as to protect the health of the farmer and consumer alike, and to protect the groundwater resources of the island.
- To disseminate the information to farmers through documentation, training and demonstrations.

Expected outputs

- Reduced production costs due to reduction in the cost of major production component, namely water, animal feed inputs, chemicals and fertilisers.
- Increased extension support in the application of new technologies.
- Increased agricultural productivity and increased incomes.
- Progress towards a more sustainable form of agricultural development through the use of locally available and indigenous materials and by-products, and protection of natural water resources from chemical pollution.
- Improved health of farmers and consumers through the consumption of more "healthy" foods and reduced exposure to and ingestion of agricultural chemicals.
- Spin-off benefits to industry with respect to commercial design and manufacture of water catchment and storage systems, silage and composting systems.

Activities to be executed

Water catchment systems

- Evaluation of water resources in selected small-farming communities.
- Identification and design of simple on-farm systems for water catchment, storage and distribution, which utilize a high percentage of local materials and which can be established using farm labour.
- Training of farmers in the installation and operation of systems.

Feed formulations

- Identification of local plants and ingredients which can be used in feed formulations.
- Design formulations which are cost effective, nutritionally adequate and appropriate to current feeding systems.
- Conduct of feeding trials with various classes of livestock.
- Training of farmers in the use of the feed formulations.

Use of organic fertiliser

- Identification and assessment of locally available ingredients which can be used as fertilisers or in mixes.
- Conduct of fertiliser trials (including cost analysis).
- Training of farmers in the use of the fertiliser.

Use of non-chemical methods of pest and weed control

- Identification of alternative methods for controlling economically important pests.
- Development of programmes for reduced chemical use, including such techniques as crop rotation, use of natural predators and protective plant species, and use of stickers.
- Training of farmers in application of techniques.

It is envisaged that these programmes will be included in the research and development programmes of the existing institutions which offer agricultural research and extension, and that close liaison among these agencies will maximise limited resources, and reduce duplication of effort.

Possible Implementing Organisations or Agencies: BADMC, BAS, CARDI, FAO (funding and TA), IDB (funding), and MAFF.

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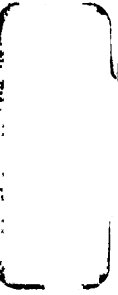
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APPENDIX I: MAFF PUBLICATIONS

1. A Guide to Cotton Growing - Michael Grant Bsc
2. Safe Use of Pesticides - E.H. Alleyne, Ph.D. Entomologist
3. A Practical Guide to Weed Control in Barbados - Anthony Maynard,Bsc.
4. Peanut Production Guide - H.A. Williams, Bsc.
5. Establishment of Plantains - Mark Byer, Bsc.
6. Recommendations on White (Irish) Potato -Anthony Maynard, Bsc.
7. Fruit Tree Production - Steve Skeete, Msc.
8. Disease of Sheep & Goats in Barbados - Dr. V.S. St. John.
9. Rabbit Production - Gerry Thomas
10. Calf Management - Dr. R. N. Maitland
11. Disease of Poultry in Barbados - Dr. V.S. St. John
12. Disease of Pigs in Barbados - Dr. V.S. St. John
13. Rapid Multiplication of Plantains, Bananas and Figs - Leslie Brereton Bsc.
14. Propagation of Breadfruit, Guavas and Cherries - DeLaney Barker, Dip. ECIAF
15. List of Parasites of Domestic Animals in Barbados - C.J. Roach, Bsc.
16. Pig Production - Adrian Yarde, Msc.
17. Disease of Rabbits in Barbados - Dr. R.N. Maitland, Bsc., B.V.M.
18. Goat Rearing - Gerry Thomas, Dip. ECIAF
19. Cabbage Production - Albert Farnum, Dip. ECIAF
20. Cucumber Production - A. Farnum Dip. ECIAF, C.O. Simpson Bsc. & H.A. Williams Bsc.
21. Squash Production - A. Farnum Dip. ECIAF, C. O. Simpson Bsc. & H.A. Williams Bsc.

22. Sweet Potato Production - C.. Simpson Bsc. & H.A. Williams Bsc.
23. Okra Production - M. Byer BSC. C.O. Simpson Bsc. & H.A. Williams Bsc.
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26. Costing Proposal for the Production of one Acre of Heliconia - C Lucas, Msc. & A. Zahalka
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28. Costing Proposal for the Production of one Acre of Anthurium - C. Lucas, Msc. & A. Zahalka

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PROGRAM FOR THE ANALYSIS OF AGRICULTURAL
POLICIES VIS-A-VIS WOMEN FOOD PRODUCERS
IN THE ANDEAN REGION, THE SOUTHERN CONE
AND THE CARIBBEAN

This Program, executed by the Inter-American Institute for Cooperation on Agriculture (IICA) and financed by the Inter-American Development Bank (IDB) under Technical Cooperation Agreement ATN/SF-4064-RE, covered 18 countries in Latin America and the Caribbean. The first phase was implemented in 1992-1993 in six countries in Central America, under the auspices of the Council of Central American Agricultural Ministers in its XII Ordinary Meeting in March 1992. Results were published in the book *Mujeres de Maíz* (IICA/IDB 1995).

The second phase was carried out in the Andean Region (Bolivia, Colombia, Ecuador, Peru and Venezuela), the Southern Cone (Brazil, Paraguay and Uruguay) and the Caribbean (Barbados, Guyana, Jamaica and Suriname), by request of the First Ladies during their Summit Meeting on the Economic Advancement of Rural Women held in Geneva, Switzerland in February 1992.

Three documents were prepared for each country presenting the technical results from the four areas of research of the Program: a) assessment of the participation of women in the agricultural sector and their contribution as food producers on small-scale farms; b) analysis of agricultural policies and programs and their effects on rural women as food producers; c) evaluation of the technology used on small farms by women in food production processes; and d) analysis of the role of women in processing and marketing farm food products.

Other Program activities included the elaboration of regional comparative documents, the formulation of policy proposals and related actions, national and regional seminars for discussion of Program recommendations, and the publishing and distribution of the final results.