EVALUATION REPORT

CROPPING SYSTEMS RESEARCH (JAMAICA) PROJECT

November, 1984 - October, 1985

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1.0 SUMMARY

This report highlights the achievements of the Cropping Systems Research (Jamaica) Project during its first year of implementation - November, 1984 to October, 1985. The report reflects the rationale for the Cropping Systems Research Project, the objectives of the project, the project components, implementation, problems during implementation and recommendations.

The report is divided into four sections:

Section 2.0 provides the background to the project and the objectives and scope of the report;
Section 3.0 provides a description of the project components and objectives;
Section 4.0 records the achievements of the project and reflects the areas of success;
Section 5.0 records the problems during implementation
Finally, in Section 7.0, we present our conclusions and recommendations

The report is designed to share lessons learned during the first year of implementation and to outline some of the experiences during the period in question and make suggestions that will lead to the accomplishment of the project objectives

2.0 OBJECTIVES AND SCOPE OF THE PROJECT

The Cropping Systems Research (Jamaica) Project began in November, 1984. The project has a life of three (3) years and is scheduled to be completed in October, 1987.

This report represents an evaluation of the achievements of the project during its first year of implementation. During the project proposal stage and planning for implementation, no provision was made for external evaluation of this project. It was soon recognized, however, that all projects require some objective assessment.

The Data Bank and Evaluation Division of the Ministry of Agriculture, which has responsibility for the monitoring and evaluation of all internationally and locally funded projects and programmes, was requested to monitor the project.

Monitoring of this project has been on-going throughout the first year. This has been done in collaboration with the Project Coordinator at IICA, the Coordinator (MINAG), the Field Teams in the two project areas, the Data Collection Officers of the Data Bank and Evaluation Division (MINAG) and the farmers participating in the project in the two project areas.

The purpose of this report, therefore, is:

(a) To provide a comprehensive assessment of the Cropping Systems (Jamaica) Project;

(b) To evaluate the project achievements in relation to targets outlined in the project document, and

(c) To assess constraints and to make recommendations that will lead to the accomplishment of project goals.

3.0 CROPPING SYSTEMS (JAMAICA) PROJECT - RATIONALE

The rationale for the implementation of a cropping systems research project in Jamaica was based on two important factors:

1) The investigations done by the Research and Development Division of the Ministry of Agriculture was limited in scope as traditionally it was oriented towards the improvement in production of basic staple food for local consumption.
Research for export crops (sugar cane, bananas, coffee, cocoa) was done mainly by statutory bodies outside the Ministry of Agriculture, Research and Development framework.

2) The majority of domestic food producers in Jamaica, mainly small farmers operating within complex farming systems, did not have ready access to the results of the research generated. The extension approach used in the dissemination of results generated on research stations, failed to reach small farmers. The uni-disciplinary mono-crop approach to research has been unable to effectively address the complex interactions of problems within the existing multi-cropping systems.

While a significant amount of research data exists on a wide variety of crops and cropping systems islandwide, most of the technology generated from this research was produced on research stations, with little adaptive research being done on farmers' holdings. This problem was further compounded by the rather tenuous linkages between Extension and Research and Development which resulted in relevant technology not reaching the small farming sector.

In an attempt to solve some of the problems inherent at the institutional level, several options have been considered. The most interesting alternative presented to date is the Farming Systems Approach as a mechanism for generating technology appropriate to small farmers.

3.1.1 Farming Systems Research - Concepts and Definitions

The term 'Farming Systems' was applied in the 1970s to several different activities being developed around the world. These activities had a common thread and general purpose, but the methods used to pursue the goals differed greatly. The threads that bound them all together and which are basic to the farming systems research approach are:

* Concern with small-scale family farmers who generally reap a disproportionately small share of the benefits of organized research, extension and developmental activities;

* Recognition that thorough understanding of the farmers' situation gained first-hand is critical to increasing their productivity and to the formation of a basis for improving their welfare.

* The use of scientists and technicians from more than one discipline as a means of understanding the farm as an entire system rather than the isolation of components within the system. [1]

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1. Hildebrand, P.E. & Waugh, R.K.,
Farming Systems Research and Development

During the 1980s, as the more generic term "Farming Systems Research" (FSR) came into more common usage, it became evident that two basic components, when used together, comprise the farming systems approach to research and development.

The two complementary components of FSRD are: The farming systems approach to infrastructure support policy.

The farming systems research and extension approach to technology generation, evaluation and delivery.

Farming System Research and Extension (FSR/E) aims at improving the effectiveness of national research and extension services in generating and disseminating technologies appropriate to farmers.

The promise of farming systems research is that small farmers can enjoy a higher standard of living through increased agricultural production, provided that appropriate technologies are designed with sensitivity to their needs.

The Ministry of Agriculture through the Research and Development Department in its efforts to assist in solving farmer problems decided to adapt the Farming Systems Approach in one of its Land Authorities - St. Catherine.

3.1.2 Components and Objectives of the Project

The overall objective of this project is:

- To initiate and implement a structured farming systems research programme in two different ecological zones of the St. Catherine Land Authority.

The specific objectives are as follows:-

a) To identify improved production methods for the major cropping systems of the Guy's Hill and Watermount areas that are acceptable to farmers;

b) To conduct inservice training of project staff and associated personnel in on-farm research techniques;

c) To initiate and support adaptive research and a programme for technology transfer to small farmers with reference to the farming systems research in the project area, and

d) To obtain a more detailed understanding of the farming systems in the two research sites.

3.1.3 Project Implementation

The project is being implemented on behalf of the Ministry of Agriculture through the Inter-American Institute for Cooperation on Agrculture (IICA).

This organisation is responsible for the technical monitoring, and administration of funds, the Research and Development Division, Ministry of Agriculture is responsible for on-farm research. The Project is funded by the International Research Development Centre (IDRC) Canada.

Project Location

The project is located in two different ecological zones of St. Catherine, Guy's Hill and Watermount.

Research Sites

A. The Research sites in the Guy's Hill Extension Area includes the districts of Benbow, Bonnett and Lime Hall.

The area is characterised by mixed farming systems with average farm sizes of 3-4 acres fragmented into a number of parcels.
The main farming systems are:

1. Irish Potato - Vegetable or - Vegetables or
   Red Peas or - Red Peas or
   Fallow Fallow
2. Yam + Cocoa or Dasheen - Yams
3. Bananas + Coffee + Cocoa
   Livestock involved

B. The Research sites in Watermount Extension area include districts of Long Hill and Garden Hill.

The area is characterised by a mixed farming system with average farm size of 1-2 acres.
The main farming systems are:

1. Yam + Red Peas or Red Peas - Yam + Red Peas
   Cocoa or or Cocoa or
   Dasheen Vegetables Dasheen

2. Vegetable Rotation
   Cabbage - Carrots and/ Cabbage
   Tomato
   Cabbage
   Pumpkin
3. Pigeon Peas + Corn
4. Bananas/Plantains + Cocoa + Renta
   Coffee Yams
   Citrus or
   Coconuts

   Livestock involved.

PROPOSED RESEARCH YEAR I

Based on the problems identified within each systems the following areas of research were outlined:

A. On-Farm Research

1. Micro plot fertilizer experiment with corn as test crop done at each site to establish nutrient status of soils.

2. Fertilizer experiments (inorganic and organic)
   a) Irish Potato System (Guy's Hill)
   b) Yam System (Watermount)

3. Pest Management, to determine the most economical and effective measures for controlling pest within the farming systems. (Both Guy's Hill and Watermount).

4. Soil Conservation investigations
   - Use of buffer strips, live barriers
   - Contour planting.

5. Investigation of livestock system.

B. Establishment of a mini field Research Station in Guy's Hill to replicate all on farm rsearch and initiate basic research namely:
Use of live and dead mulches
Varietal trials
Storage techniques
Alternate intercrop and rotations.

PROJECT PERSONNEL

The following personnel were identified as necessary for successful implementation of the project.

1. Interdisciplinary Technical Teams consisting of:
Three (3) Agronomists
One (1) Agricultural Economist
One (1) Plant Protection Specialist
One (1) Soil Scientist
One (1) Livestock Spcialist (Part-time in the first year)

2. One field research team per site, comprising of:
Four (4) Junior Agronomists - Guy's Hill
Two (2) Agronomists - Watermount

3. "Mini" Field Station Manager
+ two (2) field assistants.

C. TRAINING

An important aspect of the project is training. The training of project and other Ministry personnel was proposed to be conducted in collaboration with the Farming Systems Support Project Team at the University of Florida.

Training was outlined including a number of activities as follows:

1. One week seminars involving overseas personnel.
2. One week workshop with local personnel.
3. Weekly seminars and short courses.
4. One week overseas field trip per year for four team members to an on-going Farming System Research (FSR) project in the region.

MONITORING AND EVALUATION

During the design stage of this project Monitoring and Evaluation was not part of the project components however during the early stages of implementation the need for monitoring and evaluation was recognised. This activity is being carried out by the Data Bank and Evaluation Division, Ministry of Agriculture.

BASELINE SURVEY

A Baseline Survey was carried out in the project area in order to establish a bench mark from which project achievements will be measured. The data collected include information on the socio-economic characteristics of the farmers, land fragmentation, utilization and tenure, production data, cultural practices, use of family labour, use of improved technology, marketing, use of credit, decision making and constraints to full utilisation of land. The data will be analysed taking cognisance of the role of women in agricultural development in the area.

4.0 ACHIEVEMENTS OF THE CROPPING SYSTEMS JAMAICA PROJECT

The achievements of this project are varied, these include the design and implementation of varietal trails on farmers holdings and on the 'mini' research station. Training of Ministry personnel in on-farm research techniques and other aspects of the Farming Systems approach. The achievements of the individual components are reported on in detail as follows:

4.1.1 On farm Research

In keeping with the objective of improving the productivity of the potato-vegetable-legume system in the Guy's Hill and Watermount areas a number of experiments were designed and implemented. The following results obtained:

Objective 1
To improve the productivity of the potato-vegetable-legume system in the Guy's Hill area.

Action
In order to achieve this objective a number of experiments were designed and implemented. These were experiments designed to generate information on the most effective use of fertilizer inputs.

Results
Four experiments were carried out in order to compare different methods of fertilizer application on the potato crop. The results indicate that there was no significant difference in yield using the different method of application. The experiments were carried out during the period December 21, 1984, - March 1985, a period of low rainfall.

The methods compared were:

a) Fertilizer broadcast after sowing and covering of seeds (Traditional farmer practice).

b) Fertilizer placed approximately two (2) inches below and to the side of the seed.

c) Fertilizer broadcast after initial ridge and furrow construction, followed by sowing and covering of seeds. Method b) requires time and method c) is more labour intensive. It should be noted that method a) the traditional method used by farmers is less labour intensive than b) or c).

These experiments were repeated in the "fall" season a period of higher rainfail using different rates of fertilizer.

Three of the four experiments carried out to compare different rates of applying fertilizer. The result generated reveal that there is no significant difference in yield using different rates of fertilizer.

The rates compared were:

a) 112 lbs 7:14:14 per 100 lbs of seed used (farmer-practice)
b) 56 lbs 12:24:12 per 100 lbs of seed (farmer-practice)
c) 56 lbs 7:14:14 per 100 lbs of seed
d) 84 lbs 7:14:14 per 100 lbs of seed
e) 140 lbs 7:14:14 100 lbs of seed
f) 28 lbs 12:24:12 per 100 lbs of seed
g) 42 lbs 12:24:12 per 100 lbs of seed
h) 70 lbs 12:24:12 per 100 lbs of seed.

The fourth experiment of this group indicated that treatment b), which is one of the two treatments practiced by farmers (56 lbs of 12:24:12 per 100 lbs of seed used), gave a yield that was significantly greater than that of any of the other treatments. Treatment a) was significantly higher yielding than treatment c). The results indicate that the level rainfall plays a significant role in the yields obtained.

In view of the results obtained, this experiment will be repeated in 1986-87 December - March. a low rainfall period. The result also reveal that the methods of application and type of treatments used are appropriate to farmer needs.

On those farms where potato is followed with another crop after a short period, string beans, red peas and corn were plantd on these plots to test the effect of residual fertilizers. No significant differences were detected between the effects of residual fertilizers for the different treatments which were applied to the previous potato crop where test crops of string beans and red peas were planted. The test crop of corn on a site where different rates of fertilizer had been applied on potato showed that the residual effect of treatment e) - (140 lbs 7:14:14 per 100 lbs seed potato tubers) was significatnly greater than that of treatments a), b) c), d) and g). The yield of treatment e) was 2.5 tons of dried corn-on-the-cob per acre. Corn is marketed in this form.

Objective 2

To improve the productivity of the yam-vegetable-legumes system in the Watermount area.

Action

Experiments were designed and implemented in order to generate information on the use of improved varieties of vegetable crops. Varietal trials with cabbage were carried out on four farms.

Results

i) One of the trials showed no significant differnce between the yields of the 5 varieties tested. Three of the trials showed significant differences between variety means. The variety KK Cross gave significantly higher mean yields than the farmers' check variety,(Early Jersey) in three of the four trials. Mean yield of KK Cross was 26.1 tons/acre compared to 12.6 tons/acre for Early Jersey. In two of the four trials, the varieties Tropicross and King Cole also gave significantly higher yields than Early Jersey. Mean yields of Tropicross and King Cole were 21.8 tons/acre and 19.5 tons/acre respectively.

ii) Varietal trials with tomato were carried out on three farms using four varieties - Roma, Manalucie, Tropic and Floradade. In two of the three trials, Roma gave significantly higher yields than Floradade. There was no significant difference between the yields of Roma, Manalucie and Tropic in any of the trials.

In the third trial, no significant difference was detected between variety means.

Objective 3

To initiate and promote soil conservation measures in the two areas of the project.

Action:

Soil conservation demonstration plots were set out in several farms in the project area.

Three soil conservation domonstration plots were set up in the Guy's Hill area and one in the Watermount area. The demonstration plots utilized live pineapple barriers as well as hillside ditches. Additionally, one demonstration compared minimum tillage with complete tillage; and the other three demonstration plots utilized continuous mounds on the contour. No noticeable soil erosion could be observed.

MINI RESEARCH STATION

A mini research station was established in the Guy's Hill area in order to replicate all on-farm research and to initiate basic research.

This station is established on 8.5 acres of land leased for the life of the project. Two seasons work has been done with Irish potatoes.

Fertilizer trials have been conducted using bioganic fertilizer contributed to the project by "Content Agricultural Industries" a local source of fertilizer. The results of these trials are not yet available.

Experiments are also being carried out on ginger using the control rates used in Christiana and Spauldings (Ginger is a new crop being introduced into the area)

Passion Fruit is also grown on an experimental basis.

4.1.2 Training

Training of personnel is an integral part of this project. The objectives of the training component are:

- To train project technicians and associated personnel through seminars, workshops and field trips with respect to:
- Farming Systems Research Methodology, planning, analysis, implementation, management and reporting on field experiments.
- Collection, analysis and interpretation of socio-economic data.
- Self-training of the inter-disciplinary Core Team by
  (a) Execution of FSR Programme
  (b) Field Trips
  (c) Meetings and Seminars
  (d) On-farm Research

The list of training courses conducted during the first year of the project are as follows:

TABLE OF TRAINING SEMINARS

Date	Subject	Trainer
1/11/84	Introduction to Farming Systems	D. Bennett
2/11/84	Approach to Research, Monitoring, & Evaluation	V. Chin F. Alford J. Louden
5/11/84 6/11/84	Field work - informal survey, interacting with Guy's Hill farmers	-
7/11/84 8/11/84	Field work - informal survey, interacting with Watermount farmers	-

Date	Subject	Trainer
9/11/84	Group discussion - Review of orientation programme	-
23/11/84	Irish potato research in Jamaica	A. Dexter
23/11/84	Potato cultivation in Guy's Hill	C. Ramsay
18/ 1/85	Experimental design, analysis and interpretation of results. I. CRD, RCB and LS Designs	V. Chin
18/ 1/85	Experimental design, analysis and interpretation of results. II. CRD, and LS Split Plot Designs.	V. Chin
25/ 1/85	Introduction to Soils with reference to Soils of Jamaica. I	R. Baker
1/ 2/85	Factors influencing farmers' decision making process.	F. Alford
15/ 2/85	FSR in sociological perspective: Towards a methodology for FSR in Jamaica	J. Louden
22/ 2/85	Sociological aspects of interacting with farmers reference data collection in surveys	Discussion led by J. Louden
1/ 3/85	Soil conservation techniques	B. Cameron
8/ 3/85	Review of points of interest in project start-up sharing of field experiences amongst the teams.	Discussion led by V. Chin and D. Bennett

Date	Subject	Trainer
15/ 3/85	Planning meeting with Teams reference 2nd Trimester's work.	V. Chin D. Bennett
22/3/85	Livestock in the FSR Programme	V. Romans
19/ 3/85	Analysis and interpretation of data collected in experiments on potatoes in Guy's Hill area.	V Chin
12/ 4/85	Farm Record Keeping	D. Brown
17/ 4/85	Field tour of dry-farming area of St. Elizabeth	V. Chin and D. Bennett
26/ 4/85	Group planning of training sessions through August 9.	V. Chin and D. Bennett
2/ 5/85	Field tour of Watermount project area.	V. Chin and D. Bennett
3/ 5/85	Vegetable Crop Production Diseases of Vegetable Crop.	R. Roach
10/ 5/85	Root Crop Production	R. Baker
17/ 5/85	Pests of Vegetable Crops	J. Rhodes
21/ 5/85	Farming Systems Research Methodology	N. Mateo
18/ 6/85 to 27/ 6/85	Farming Systems Research Workshop A detailed Evaluation of this Workshop was published (August 1985)	V. Chin, D. Bennett S. Franzel, J. Dean. E. Acquah D. Cass

Date	Subject	Trainer
19/7/85	Dairy Heard Health Management	J.F. Purdy
28/10/85 to 31/10/85	Training course on Identification and Control of Diseases of Vegetables, Root, Tuber and Rhizomatous Crops.	H. Fagan and U. Martin

A number of training courses have been executed in collaboration with personnel from international organizations:

1. Workshop on Farming Systems Research organized in collaboration with MINAG and USAID.
   Workshop executed June 18 - 27, 1985. Venue: Twickenham Park Training Centre, Jamaica.

2. Training course on Identification and Control of Diseases of Vegetables, Roots, Tubers and Rhizomatous Crops organized in collaboration with MINAG and IICA Dominica.
   Training course executed October 28-31, 1985. Venue: Bodles Research Complex, Jamaica.

Apart from training in country, project personnel received overseas training through participation in seminars and courses as follows:

(1) The MINAG's FSR Coordinator, sponsored by project, attended and participated in Caribbean Farming Systems colloquim in Martinique May 9 - 11, 1985.

Two national personnel of FSR Field Team, sponsored by project will attend a training course at the International Potato Centre on Rapid Multiplication Techniques with Potato, November 5 - December 5, 1985.

4.1.3 Institutional Relations

The project is funded by a grant to the Ministry of Agriculture by the International Research Development Centre (IDRC) Canada.

The project is being executed on behalf of the Ministry of Agriculture by the Inter-American Institute for Cooperation on Agriculture (IICA) and therefore requires a high level of collaboration with the Research and Development Division of the Ministry of Agriculture who is responsible for on-farm research.

While the Research and Development Division is the main collaborating arm of the MINAG, the design of the project requires and obtains the collaboration of the following other Divisions of MINAG and other Public Sector Organizations and International Institutions:

- Forestry Division, MINAG (on soil conservation)
- Production and Extension Division, MINAG
- Data Bank and Evaluation Division, MINAGA
- Policy and Planning Division, MINAG
- Training Division, MINAG
- Engineering Division, MINAG
- St. Catherine Land Authority, MINAG
- Coffee Industry Development Company (a subsidiary of the Coffee Industry Board of Jamaica)
- Cocoa Industry Board
- International Potato Centre (CIP)
- International Maize and Wheat Improvement Centre (CIMMYT)
- International Crops Research Institute for Semi-Arid Tropics (ICRISAT)
- United States Agency for International Development (USAID)

The United States Peace Corps had provided an Agricultural Economist to assist in the project during the period January 1 to February 15, 1985.

Concertation Groups

Concertation of IICA personnel was achieved on the following actions of the project:

- Design of the questionnaire for the Baseline Survey of the Project Area. (Collaboration of Agricultural Economics Specialist of IICA Jamaica Unit and the Data Bank and Evaluation Division, MINAG.)

- Farming Systems Research Workshop. (Collaboration of Agricultural Economic Specialist of IICA Jamaica Unit.)

- Training Course on Identification and Control of Diseases of Vegetables, Roots, Tubers and Rhizomatous Crops. (Collaboration of Plant Pathologist of IICA Dominica Office.)

Key Persons who Participated in the Project and Nature of Involvement

Name	Nature of Involvement
Vivian Chin	IICA. Responsible for financial management of the project. Provides leadership and organizes all project activities. Monitoring, technical support and training and planning.
Renford Baker	MINAG. Responsible for project. Provides leadership, monitoring and technical support and training, and planning.

Name	Nature of Involvement
Daphne Bennett	Supervision of field teams. Monitoring, technical support and training, and planning. (On vacation August - December).
Claudette Lewis	Plant Protection. Also Acting Supervisor of field teams (August - December)
Hyacinth Campbell	Team Leader, Guy's Hill
Charles Reid	Team Leader, Watermount
	Team Leaders are responsible for day-to-day management of on-farm trials and collection of information on project areas.
Joseph Dehaney	Assist Team Leaders in management of on-farm trials and collection of information on project areas.
Janet Hobbins	Up to July 1985)
Desmond Forbes	(Up to June 1985)
Leon McBean	(from September 1985)
Errol Graham	(September to October 1985)
Jonice Louden (Data Bank & Evaluation Div.)	Project evaluation and sociological aspects of project.
Jonice Louden	Design questionnaire for Baseline Study in collaboration with I. E. Telfer.
Hyacinth Bernard (DBED)	Finalise questionnaire and design of training manual for baseline survey in collaboration with D. Bennett and IICA personnel in the absence of J. Louden in May 1985.
Levenia Hines (Training Div.)	Assists in organizing training events.

Name	Nature of Involvement
Victor Romans	Resource person for livestock
Roma Roach	Resource person for vegetable production.
Barrington Brown Lennox Taylor Wayne Wellington	Resource persons for soil conservation (Forestry Division)
Lennox Hemans	Extension
Cordell Ramsay	Extension
Dennis Brown	Farm Management

Quantification of the Direct Beneficiaries of the Project and indication of the Indirect Beneficiaries.

IICA Action	Direct Beneficiaries	Indirect Beneficiaries
Farming Systems Research Workshop June 18-27, 1985	19 National professional personnel of MINAG who participated full-time in this training event.	Divisions of Rural Physical Planning, Data Bank & Evaluation, Production & Extension, St. Catherine and Land Authority.
Training Seminars and Planning meetings: 2 Planning Meetings 16 Seminars 3 Field Tours	National professional personnel of MINAG. Attendance ranged from 8-14 per training event. Average attendance per event: 10	MINAG and farmers in project area where problems can be better addressed by extension officers and field team members who received training.

IICA Action	Direct Beneficiaries	Indirect Beneficiaries
Training course on Identification and Control of Diseases of Vegetables, Roots Tubers and Rhizomatous crops. Oct. 28-31,1985	17 national professional personnel of MINAG who participated in this training event.	MINAG and farmers in project area whose problems can be better addressed by extension officers & field team members who received training.
On-farm research	19 farmers who collaborated in the project.	Farmers who visit trial sites on an informal basis. MINAG for whom information is generated.
Training in Rapid Multiplication Techniques with Potato sponsored by project	2 National Professional personnel of MINAG who received this training at CIP.	MINAG for whom a pilot seed potato production programme is to be initiated in collaboration with CIP. Farmers who will be participating in the programme.

4.1.4 Publications generated by the project

No major publications have been generated during this year being the first year of project implementation. However a number of documents have been produced as a result of the various activities performed during the period.

The documents, for which the titles are listed, are all mimeographed:

"Complete Block Design and Statistical Analysis" (38pp)

"Split-Plot Designs and Statistical Analysis"(7pp)

"The Analysis of an Unbalanced Design" (15pp)

"Farm Records Keeping" (6pp)

"Towards a Methodology for Farming Systems Research in Jamaica Project: (9pp)

"Dairy Herd Health Management" (28pp)

"Notes for a Training Course in Crop Pathology for the Farming Systems: Research Team" (49pp)

"Symptons of the More Important Diseases of Corn" (4pp)

"Symptoms and Control of the More Important Diseases of Beans" (2pp)

"Symptoms and Control of the More Important Diseases of Yams" (5pp)

"Symptoms and Control of the More Important Diseases of Passion Fruit" (3pp)

"Symptoms and Control of the More Important Diseases of Legumes" (4pp)

"Symptoms and Control of the More Important Diseases of Aroids" (3pp)

"Diseases, Symptoms and Control in Selected Vegetable Crops (Tabulated)" (7pp)

"Baseline Survey Questionnaire - Farming Systems Research Project" (19pp)

"Interviewers Manual for Baseline Survey for FSR Project Jamaica" (43pp)
"Evaluation Report: Jamaica Farming Systems Research Workshop of the Cropping Systems Project" (52pp)

A list of Courses, Technical Meetings, Conferences, Official Seminars organized by the Project, Indicating Title of Course, Place and Date, Number and Occupation of participants and Results obtained are recorded as follows:

The following abbreviations are used to indicate occupations of participants:
A = Agronomist; EO = Extension Officer; AE = Agric. Economist; S = Sociologist; PPO = Plant Protection Officer; SS = Soil Scientist; T = Training Officer; AG = Animal Scientist; SGTS = Small Business Training Specialist; ST = Statistician; FM = Farm Management Specialist; M = Marketing Specialist; PP = Plant Pathologist; E = Entomologist.

Title of Courses, Technical Meetings	Place & Date	Occupation of Participants	Results
Experimental design Analysis and interpretation of results I: CRD, RCB and LS Designs.	IICA 11/1/85	14: A, EO, AE, S, PPO, SS	In-service training of national personnel in and associated with project.
Experimental design analysis and interpretation of results II: CRD, RCB and LS Designs.	IICA 18/1/85	10: A, PPO, AE S.	"

Title of Courses, Technical Meetings	Place & Date	Occupation of Participants	Results
Introduction to Soils with reference to Soils of Jamaica (I)	IICA 25/1/85	13: A, PPO, AE, EO, S	In-service training of national personnel in and associated with project.
Factors influencing farmers' decision-making process	SCLA, Linstead 1/2/85	9: A, PPO	"
Introduction to Soils with reference to Soils of Jamaica II	IICA 8/2/85	14: A, PPO, AE, EO, S, T	"
FSR in sociological perspective: Toward a methodology for FSR in Jamaica	IICA 15/2/85	12: A, PPO, AE, S, EO	"
Sociological aspects of interacting with farmers reference data collection in surveys	IICA 22/2/85	10: A, PPO	"
Soil conservation Techniques I	SCLA, Linstead 1/3/85	8: A, PPO, EO	"

Title of Courses, Technical Meetings	Place & Date	Occupation of Participants	Results
Review of points of interest in project start-up and sharing of field experiences amongst teams	SCLA Linstead 8/3/85	8: A, PPO, EO	"
Planning meeting with Teams reference 2nd Trimester's work.	IICA 15/3/85	10: A, EO, S	"
Livestock in the FSR Programme.	Bodles Research Complex 22/3/85	8: A, PPO, EO	"
Analysis and interpretation of data collected in experiments on potatoes in the Guy's Hill Area.	IICA 29/3/85	8: A, PPO, EO	"
Farm Record Keeping	IICA 12/4/85	18: A, PPO, EO T, SBTS.	"
Field tour of dry-farming area of St. Elizabeth.	St.Eliz. 17/4/85	12: A, PPO, EO, T, SS	"
Group planning of training sessions through Aug. 9	BRC 26/4/85	8: A, PPO, EO	
Field tour of Watermount project area	Watermount 2/5/85	10: A, PPO, EO, T, S.	"

Title of Courses Technical Meetings	Place & Date	Occupation of Participants	Results
Vegetable Crop Production & Diseases of Vegetable Crops	BRC 3/5/85	10: A, PPO, EO	In-service training of national personnel in and associated with project.
Field tour of Guy's Hill project area	Guy's Hill 9/5/85	10: A, PPO, EO, SS	"
Root Crop Production	BRC 10/5/85	10: A, PPO, EO, T, S.	"
Pests of Vegetable Crops	BRC 17/5/85	8: A, PPO, EO	"
Farming Systems Research Methodology	BRC 21/5/85	14: A, PPO, EO S, SS, T	"
Farming Systems Research Workshop	Twickenham Park 18/6/85 to 27/6/85	19: A, PPO, EO ST, S, FM, M	"
Dairy Herd Health Management	BRC 19/7/85	9: A, PPO, EO	"

Title of Course, Technical Meetings	Place & Date	Occupation of Participants	Results
Training course on Identification and Control of Diseases of Vegetables, Roots Tubers and Rhizomatous Crops	BRC 28/10/85 to 31/10/85	17: A, PPO, EO AS, T, PP, E,S.	In-service training of national personnel in and associated with project.

Relations with training events and the assistance provided by the Project's Specialists:
Training courses are coordinated by the Ministry of Agriculture, Training Division.
The IICA project specialist jointly organizes all training events with the collaboration of MINAG's personnel. Subject matter for training events is determined by the needs of the Field Team personnel through consultations with the teams, in collaboration with MINAG Core Team members. The MINAG'S Coordinator arranges for resource persons from the University to assist in the training events as trainers. The IICA project specialist serves as a resource person on planning, design and management of on-farm trials, on the analysis and interpretation of experimental data and on the farming systems approach to research.

5.0 PROBLEMS ENCOUNTERED DURING IMPLEMENTATION

1. Shortage of Vehicular Support

During the early stages of implementation there was a shortage of vehicles for use by the field team and core team.

A Jeep from the Research and Development Division was repaired for use by the field team. This vehicle was put in operation during July and August. The vehicle was involved in an accident and is still out of order. In September a Datsun Nissan pick-up ordered specifically for use by the project was delivered.

In the absence of the Jeep, which is under repair, permission was given for one field team leader to use her personal vehicle in executing project activities for which a mileage allowance will be paid. This arrangement will continue until the damaged vehicle is repaired.

2. Shortage of Funds in the Research and Development Division

Due to budgetary constraints, the Research and Development Division has been unable to supply the required support for the project. This has resulted in the Division being unable to provide the four (4) field workers as agreed in the project document. As a result of the devaluation of the Jamaican dollar during the period, the funds available for project activities were increased, funds were therefore made available to finance the cost of field labour employed for the execution of project activities.

3. Uncertainty about responsibility for project activities

Although the project agreement explicitly defines the role of each agency involved in the implementation of the project, there was some misconception as to where the responsibilities for project activities rest.

This problem was resolved by setting up a Committee of Management made up of representatives from the following divisions within the Ministry of Agriculture:
Research and Development Division
Policy Planning and Review Division
Data Bank and Evaluation Division
Training Division
Field Team Leaders (2), and the
Project Co-ordinator, IICA.

This committee meets once per month to review project achievements and to make recommendation that will assist in the successful implementation of the project.

4. On-Farm Trials

The problem encountered in on-farm trials has been the high value of co-efficient variations observed for most of the experiments. This has come about because of the varied use to which the site had been put before the project. There was no time to engage in serial analysis for potential sites, thus, in order to solve this problem, during the next year, much larger sites will be utilised and increased replications.

In order to be better equipped in the interpretation of results, a rain-gauge has been provided for each project site. It was observed that rainfall is not uniform throughout the two project areas.

5. Delay in analysis of Baseline Data

This delay was due to the fact that the Data Processing Schedule of the Ministry was filled through to 1986. The necessary preparations are being made to have the data processed in May 1986.

6.0 AGRO-SOCIO ECONOMIC CHARACTERISTICS OF FARMERS PARTICIPATING IN THE PROJECT

The successful implementation of any project is dependent on the social and economic characteristics of the target group. Evidence from empirical studies suggest that cultural, social and economic factors affect the acceptance of technology.

The aim of the farming systems research project is to generate technology that is acceptable to the farmer. The farmer's resources, personal and material, are crucial in this process. The level of interaction between the farmer and the extension agent is critical for successful interpersonal relationship. The material resources available (and capital labour) to the farmer are essential to the adoption of agricultural technologies generated over time.

Seventeen (17) farmers participated in the project, fifteen (15) males and two (2) females. The sex and age of farmers are shown in Table I. (Annex I)

Size of Family

Family organisation is a critical factor in determining the goals of the farm family. The size determines how the family income is to be distributed in terms of providing food, shelter, clothing and the farm business investments. The size of the family as shown in the table illustrates that forty-one (41%) per cent of household have between four to seven family members, twenty-nine (29%) per cent between eight to ten, eighteen (18%) per cent between one to three, and six (6%) per cent between twelve to fourteen and fifteen to sixteen.

Employment status of family members

Thirty-five (35%) per cent of family members work on the farm part-time, twenty-six (26%) per cent work on the farm full-time, while twenty-nine (29%) per cent do not work but are unemployed, two (2%) per cent work elsewhere and eight (8%) per cent have children under twelve years old as shown in Table III.

Educational attainment

Sixty-five (65%) per cent of the farmers attended Secondary School for up to three years, while twelve (12%) per cent attended Secondary School up to six years and could be considered illiterate. Twenty-three (23%) per cent attended Primary School for three years and could be considered literate (see Table IV). The high level of educational attainment of the target group should enhance project success.

Availability of Productive Resources

The extent to which the productive resources - land capital and labour are available to the individual largely determines the success of his/her enterprise.

FARM SIZE TENURE AND FRAGMENTATION

The size of farms of project beneficiaries range from 0 to 10 acres. Forty-seven (47%) per cent of farms in the project are between 5-9.99 acres, twenty-nine (29%) per cent range between 2-4.49 acres, twelve (12%) per cent of farms range between 0-1.99 acres and twelve (12%) per cent are ten acres and over.

Land tenure is a determining factor in the type of crops grown and the type of long term investment planned by the farmer. Tenure also affects the type of technology adopted especially soil conservation measures. Farmers tend not to erect permanent structures on land not owned. In our sample seventy (70%) per cent of farms all sizes are owned, while twenty-four (24%) per cent rented and six (6%) per cent leased over ten years. (See Table V)

Fragmentation is another feature of small farm organisation, a number of farmers operate up to four parcels of land. One hundred (100%) per cent of the small farmers show that their farm enterprise is fragmented. Eighty-two (82%) per cent of farms owned and eighteen (18%) per cent of those rented are fragmented. (See Table VI) The degree of fragmentation make it difficult for farmers to efficiently manage their farms.

Use of inputs fertilizers

Eighty-eight per cent (88%) of the farmers used fertilizer. Among these, seventy-four (74%) per cent used 7-14-14. Thirteen (13%) per cent used 12-24-12 and sulphate of amonia. Twelve (12%) per cent of the farmers did not use fertilizer. (See Table VII)

Method and time of fertilizer application

The traditional method of fertilizer application is broadcasting. Eighty (80%) per cent of the farmers broadcast fertilizer after planting, while six (6%) per cent broadcast before planting, six (6%) per cent broadcast to hill.

Thirty-eight (38%) per cent of farmers apply fertilizer before planting, thirty-one (31%) per cent before germination, fifteen (15%) after planting and fruit-set and eight (8%) per cent after fruit-set and two to three weeks after planting. (Table VII)

Farm Equipment

All farmers use farm equipment, however only thirty-five (35%) per cent of this equipment is owned as opposed to sixty-five (65%) per cent which is rented. Equipment used include hand sprayer, knapsack sprayer, and mist blowers. (Table XI)

Labour

Among the farmers surveyed, the major sources of labour were free family labour and paid labour. Labour was employed for all farming activities, land preparation, planting weeding, fertilizer application, soil conservation, harvesting and marketing. The highest level of family labour used was in harvesting and marketing seventy-eight (78%) per cent respectively. All farmers used the highest level of paid labour for land preparation and planting - one hundred (100%) per cent and ninety-four (94%) per cent respectively Eighty-eight (88%) per cent used hired labour for fertilizer application. It is observed that hired labour is used for the heavy activities such as land preparation which include digging hills, trenches, etc.

Soil Conservation

Fifty-six (56%) per cent of farmers practiced soil conservation methods. Thirty-eight (38%) per cent used contour drains, twelve (12%) per cent used contour barriers and six (6%) per cent used strip cropping. Forty-four (44%) per cent of farmers did not use soil conservation.

ON-FARM ACTIVITIES OF FAMILY MEMBERS

Farmers use family labour for all activities on the farm. The highest contribution of adult family labour is in planting, harvesting and weeding. Children only participate in animal rearing. (Table XI)

Farming Experience

Most of the farmers in the survey are exprerienced farmers whose farming activities range from ten to twenty-five years. Forty-seven (47%) per cent of farmers have over twenty-five years experience. Twenty-three (23%) per cent between fifteen and nineteen years and twelve (12%) per cent between ten to fourteen and five to nine years respectively. Six (6%) per cent had one to four years experience. (Table XIII)

AGRICULTURAL CREDIT

The inaccessibility of capital continues to be a major problem in the small farming sector. Although all farmers were aware of loans being available from commercial banks and Peoples Cooperative Banks, ninety-four (94%) per cent of farmers did not apply for loans. Six (6%) per cent of farmers applied for loans but the loan was not approved. In order to qualify for credit, small farmers require a registered title, or two guarantors, and other collateral. Most small farms with small holdings do not qualify for credit. The main source of funding of their enterprise is from sale of farm produce, sale of livestock or "throw pardner".

Ninety-four (94%) per cent of farmers report their main source of cash as sale of farm produce, twelve (12%) per cent sale of livestock, six (6%) per cent borrowed from family members, "throw pardner" or from trading activities. (Table XIV)

Type of information

Seventy (70%) per cent of farmers ranked information on new technology as the most important type of information. While information on Government action was recorded as least important. This might be related to the farmers experience with limited access to available government activities. (Table XV)

Marketing problems

Because of its intermediary role between producer and consumer, marketing plays a critical role in the farming sector. Problems in marketing their produce is a major barrier to the growth in living standards of agricultural producers. Although the problems are wide ranging, fifty-nine (59%) per cent of farmers report low prices as one of the major problems, forty-seven (47%) per cent transportation and bad roads, twenty-nine (29%) per cent spoilage and damage, twenty-four (24%) per cent rejection and eighteen (18%) per cent low demand. (Table XVI) The main marketing outlets were commodity boards for coffee, cocoa, sugar cane and higgler for root crops and vegetable.

Difficulties in acquiring inputs

Access to farm inputs is an important factor in continuing agricultural production. Fifty-eight (58%) per cent of farmers felt the farm inputs (planting materials, sprays, fertilizers etc.) are too costly, twenty-four (24%) per cent report their main difficulty as unavailability and eighteen (18%) per cent as lack of transportation. (Table XVII)

FACTORS LIMITING FULL UTILISATION OF LAND

Seventy-six (76%) per cent of farmers indicate lack of funds as a limiting factor to full utilisation of land, sixty-five (65%) per cent high cost of inputs, thirty-five (35%) per cent unavailability of labour and thirty-five (35%) per cent low price for produce, twelve (12%) per cent indicate praedial larceny and unavailability of inputs. (Table XVIII)

CROPPING SYSTEMS

The farmers operate very complex farming systems as follows:

	Present	Last Season	Two Seasons Ago
1.	Coffee, Plantains Fallow Yellow Yam Pasture	Coffee, Plantains, Fallow/Cabbage, Yellow Yam Pasture	Coffee, Cocoa, Fallow Yellow Yam Pasture
2.	Coffee, Banana Food, Forest Ruinate Yams/Plantain Grassland	Coffee, Banana, Food Forest, Ruinate Yams/Plantain Grassland	Coffee, Banana, Food Forest, Ruinate Yams/Plantain Grassland
3.	Tomato Yam, Plantain Grassland	Yam, Plantain Irish Potato Grassland	Yam, Plantain Grassland

	Present	Last Season	Two Seasons Ago
4.	Banana	Banana	Banana
	Coffee	Coffee	Coffee
	Cocoa	Cocoa	Cocoa
	Food Forest	Food Forest	Food Forest
	Fallow	Fallow	Cow Pea, Ginger
5.	Cocoa, Banana	Cocoa, Banana	Cocoa, Banana
	Coffee	Coffee	Coffee
	Pasture	Tomato/Pineapple	Yams, Pasture
6.	Banana, Coffee	Banana, Coffee	Banana, Coffee
	Cocoa, Pineapple	Cocoa, Pineapple	Cocoa, Pineapple
	Fallow	Tomato, Cabbage	Cucumber, Corn, Red Peas, Fallow
7.	Banana	Banana, Coffee	Banana, Coffee
	Cocoa	Cocoa	Cocoa
	Coffee	Coffee	Coffee
	Fallow	Cabbage, Carrot	Pasture
8.	Sugar Cane	Sugar Cane	Sugar Cane
	Banana	Banana	Banana
	Coffee	Coffee	Coffee
	Fallow/Yam	Tomato/Yam	Yam

7.0 FARMERS ASSESSMENT OF THE PROJECT

In order to elicit farmer responses to the programme during its first year of implementation, an interview schedule was designed. The results of the survey are recorded below.

Question by question response are as follows:

1. Seventeen (17) farmers participated in the project, responses were received from sixteen (16) - fourteen (14) male and two (2) females.

2. Did you grow the usual crops?
   Ten (10) farmers grew traditional crops and three (3) farmers introduced new crops.

YES	NO	NR
10	3	1 (selected but not started crop)

3. How was the yield compared with the previous crop?
   A number of farmers reported higher yields while three reported lower. The yields and type of crop are as follows:

Crop	No. of Farmers planting Crop	Higher	About the same	Lower
Carrots	2	2	-	-
Red Pea	3	2	-	-
Cow Pea	1	-	-	1
Cabbage	3	3	-	-
Tomato	2	2	1	-
String bean	2	2	1	-
Irish Potato	4	3	-	1
Corn	3	2	-	1
Cocoa	1	2	-	1

4. What factors led to results stated?
A number of factors were reported, these include rainfall, cultural practices, and improved seed varieties. Some of the factors stated are as follows:

- Better rainfall pattern
- Better cultural practices and improved technology (2)
- Improved seed variety - carrot
- Improved variety (corn)
- Improved methods of use in the application of fertilizer, fungicide and insecticide (2)
- Red pea yield increased due to new planting distance
- Carrot yield improved due to new variety planted, also site selection and soil type.
- Good yield of red pea due to improved cultural practices.

The comments by farmers recording lower yields are as follows:

- Poor Irish Potato seed (2)
- Disease affected crop - string bean, red peas and corn
- Crop not reaped destroyed by drought.

5. Was any new crop introduced on your farm?

Yes	No
8	8

Eight (8) farmers introduced new crops. The crops introduced by farmers are as follows:

6. If yes, which crops?

Crop	No. of Farmers
Tomato	3
Cabbage	3
Passion Fruit	1
Pineapple	2
Cucumber	1
Ginger	2
Carrot	1
Irish Potato	1
	14

7. In what way has the programme affected your attitude toward farming?

The project has affected the majority of farmers in a positive way, this is reflected in the comments recorded as follows:

- Has a more technical approach to farming (2)
- The Farmer has a more responsible attitude to farming, he is more dedicated to his crops.
- Farmer has a more technical approach to farming and if the technology recommended is followed, he will get improved yield.
- The Farmer has a new outlook on farming. He has a more scientific approach to crop husbandry.
- The Farmer learnt improved methods in crop culture which he thinks will increase his yield. He now has a more scientific approach towards agriculture (6).
- Better appreciation of farming methods.
- Learnt more modern ways to do traditional farming.
- The Farmer has learnt better cultural practices re crop husbandry, more keen on yields.
- The Farmer has a more technical outlook on vegetable farming.

- The Farmer now sees farming as a very technical operation and increased yields can be obtained if improved crop care methods are used.
- The Farmer believes that improved methods will increase yield and quantity of produce.
- The Farmer learnt new technical ideas in farming hence making her have a more scientific approach to farming.
- Farmer now has a more technical approach in his crop care methods. He now places more emphasis on fertilizer and fungicide selection and application.
- The Farmer thinks he can increase crop yield by being more scientific with farming methods.

8. What did you learn from the field team about the management of crops?

The majority of farmers learnt new methods of land preparation, crop care and improved cultural practices. These are as follows:

- Proper application of fertilizers and sprays give better yields.
- Tomato should be staked, weed and mould and degourmondized (3)
- To fertilize soil before establishing crop.
- Prevertative spraying for fungus and insects.
- Soil should be treated and fertilized before establishing crops (3).
- Regular spraying cycle should be practiced (3)
- Correct planting distance of crops (carrots, red peas)
- A cover crop should always be established with any crop you want to plant.

- Proper lining out and construction of furrows with walkway space allows farmer to better tend the crops.
- Improved methods of planting seeds, spacing etc.
- Fertilizer, fungicide and insecticide applications (2)
- That a Scientific approach to farming is necessary.
- Proper methods of budding and degourmandizing.
- Improved method of transplanting and managing seed nursery.
- Improved method of fertilizer selection and application for specific crops.
- Treating seeds with insecticides before sowing. (2)
- Improved methods in constructing vegetable seed beds.
- Regular spraying cycle. (2)
- Proper lining out of field before planting. (2)
- To estimate yield of crop.
- Proper methods of constructing contour drains.
- Proper spraying cycle for vegetable crops.

9. Would you utilize any of the practices recommended during the next planting period of the crop?
The majority of farmers said they would use practices recommended.

Yes	No	NR
15	-	1

9A. If yes, which practices and for which crop?
The answer received pertained to several crops. These are summarised as follows:

Crop Name:	Recommended Practice
Tomato	Degourmandizing, regular spraying, weeding and moulding. Treating seeds and soil before spraying. Proper construction of contour drains. Treating of seed beds and seeds before sowing. Lining out of vegetable beds. Estimation of crop yields. Proper management of seed bed nursery. Transplanting seedlings..
Cabbage	Constructing vegetable beds with walkway thus enabling crops to be monitored without walking in beds. Soil treatment and fertilization before planting crop. Regular spraying to prevent fungus, insects and pests. Estimating crop yields. Treatment of seeds and seed beds.
Carrot	Soil treatment and fertilization before planting crop. (3) Regular spraying. Making proper seed beds. Ensure that a cover crop is planted with this crop.
Red Pea	Peas should be planted at least one (1) seed 4 inches apart along the rows 18 inches between rows. Proper spacing of row planting one (1) seed per hole. Proper application of fertilizer and fungicide.

Crop	Recommended Practices
Irish Potato	Proper planting distance also construction of furrows. Spraying cycle for applying fungicide and insecticide. (2). Land preparation - bedding. Applying fertilizer before planting seed.
Corn	Planting less seeds per hole.

10. What factor(s) would prevent you adopting any of the practices recommended?
All respondent answered that nothing would prevent the adoption of these practices.

11. The interviewer was requested to record any comments the farmer would like to pass on.
The general concensus among farmers is that the project is beneficial to farmers in the area, however many feel that more farmers should be involved.
These comments are as follows:
- Farmers need more improved marketing system.
- Farmers think the project is very good and should be continued in the area. Also more farmers should be selected to participate in the project. (6)
- Farmers think that field team should assist with marketing for farmers in the project area. (3).
- Farmer has approximately four and a half acres of land in farming and is willing to follow any new methods offered by the team.
- The farmers think that farmers who participate in the research project should obtain financial benefits. (3)
- The farmer thinks IICA should have a loan programme for farmers in the area. (2).

- The farmer thinks the research project is a very good plan and introduction to proper storage methods would be beneficial.
- The farmer thinks that the research project is very essential and by implementing the new methods yields and quality will be increased.

12. The interviewers were asked to comment on the ways in which the programme affected farmers in their area. Many of the farmers in the area have been influenced in their farming practices by the existence of the project in the area. This is reflected in the comments given below:

- Some other farmers in the area are influenced by the project and want to participate.
- The programme has motivated other farmers in adopting a more technical approach to farming on a whole.
- Some farmers are influenced by new farming techniques.
- More farmers in the area are influenced to become scientific in their methods by results observed on IICA project.
- Some farmers in the area are quite anxious to participate in the programme. In order to learn improved methods of farming from field team.
- Some farmers obtain improved yields by practicing methods used by those farmers participating in the project.

From the responses given, we discern that the project has had a positive impact on farmers in the area. The major constraint being the lack of manpower to carry out on-farm experiments which require management by the field teams. It is anticipated that during the second year of the project more farmer-managed trials will be carried out, thus enabling the field teams to work with new farmers in the area.

8.0 SUMMARY AND CONCLUSIONS

The Cropping Systems Research Project can be considered to be an excellent project in concept, its aim being to improve the cropping systems of small farmers by generating technology acceptable to them.

Although the project is only in its first year of implementation, it has had significant impact on farmers in the project area. This is reflected in the number of farmers requesting participation in the project and confirmed by their assessment recorded in Section 6.0

The project has the potential for making a significant contribution to agricultural production in the two areas in which it is located and to areas with similar ecology in the island.

The experiments with new crops e.g. ginger and passion fruit and the rehabilitation of traditional crops - coffee, citrus and cocoa - should assist in improving the living standards of farmers in the area.

Many farmers in the area have been motivated to adopt a more technical approach to farming by observing proper land preparation techniques, field sanitation, proper spacing, improved cultural practices, regular spraying and improved methods of fertilizer application, all of which are essential if yields are to be increased.

The main area of concern among farmers however is the lack of an assured market for their product should increase yields be obtained.

Another area in which the project has had an impact is in the training of local personnel. This training has been carried out on a regular basis throughout the project year. Resource persons included local personnel within the Ministry of Agriculture. Training has also been conducted using personnel farm International Agencies such as USAID Farming Systems Support Project, who assisted in the two week workshop held in June 1985. Their invaluable contribution has been documented in the Evaluation report on that workshop.

Other areas of contact with International Agencies include the International Potato Centre (CIP) Peru where the two (2) field team leaders will spend four weeks learning rapid multiplication techniques using potatoes. It is anticipated that technology learned will be transferred to other local personnel. This should have a major impact on potato production in Jamaica.

Another important area of contact has been with the Inter-American Institute for Cooperation on Agriculture (IICA) who have responsibility for administering grant funds, providing technical support services in areas of project coordination, project implementation and technical monitoring of the project.

The Project Co-ordinator (IICA) has played a leading role in the design and implementation of on-farm experiments in collaboration with one officer from the Research and Development Division and the two field teams.

Institutionalisation of Farming Systems Research in the Ministry of Agriculture

Although the project is a Ministry of Agriculture project, the field teams who do all the on-farm research have no status within the Ministry. This situation needs to be addressed.

During the life of the project, these individuals would have received invaluable training both locally and overseas in farming systems research, data collection and technology related to new crop research and development.

It is imperative therefore that some mechanism be put in progress to absorb these persons within the staff structure of the Research and Development Division, so that at the end of the project these skills are not lost to the Ministry.

Should the Farming Systems Research Approach be accepted as the appropriate method of generating agricultural development, these persons will be well equipped to assist in the implementation of such a programme island wide.

The benefits of the project have long term consequences for agricultural research in Jamaica. The achievements in the first year have been remarkable. Although the project is being implemented on a small scale, the potential for changing the conditions of small farmers in Jamaica is tremendous.

8.1.1 Recommendations

That appropriate steps be taken to incorporate the two field teams within the staff structure of the Research and Development Division.

That attention be given to identifying assured marketing outlets for agricultural produce for small farmers in the project area.

8.1.2 FINANCIAL REPORT (November 1, 1984 - October 31, 1985)

ITEMS	Original Budget (US$)	Actual Expenditure	%	Estimates YEAR II 86-87	COMMENTS
SALARIES AND ALLOWANCES					
1. Junior Agronomist (6)	25,800.00	20,597.31	80	21,600.00	-
2. Field Labour	1,500.00	1,044.30	69	3,900.00	Additional labour for propogating planting material.
3. Secretarial Help	8,500.00	6,859.00	80	7,500.00	-
RESEARCH EXPENSES					
4. Field Supplies	500.00	459.99	92	8,700.00	Additional field supplies to start pilot project for rapid multiplication of potato.
5. Chemical & Organic Fertilizers	1,400.00	470.23	33	1.400.00	-
6. Insecticides, fungicides and Herbicides	2,200.00	718.94	32	1,000.00	-
7. Planting Material	1,400.00	1,265.85	90	4,000.00	Larger farmer-managed trials to be executed.
8. Maintenance & Fuel	13,600.00	3,398.96	25	6,300.00	-
9. Insurance & Vehicles	1,000.00	916.41	91	-	-
10. Local Travel	3,700.00	3,666.09	98	6,000.00	Ministry of Agriculture subsistence rates increased by 60%.
11. Publications	1,000.00	94.38	9	1,000.00	-
EQUIPMENT					
12. Miscellaneous	4,000.00	3,675.74	92	1,200.00	Motor blowers, sprayers, overhead projector, cameras, other field equipment.
13. Repairs to Vehicles (2)	6,000.00	5,362.99	89	-	Land Cruiser and Land Rover (MINAG).
14. Vehicle Purchase	10,000.00	7,147.00	71	-	Datsun Pick-up (Double Cabin)
15. Supporting Services 10% of items #1 - 11	6,100.00	3,949.19	68	-	-
TOTAL	86,700.00	59,627.27		69,840.00	

Expenditure on all items are within the budget set with no area exceeding budgetary allocation.
The low levels of expenditure in some areas may be due to the fact that during the early stages of implementation field activities were low keyed and the absence of the vehicle which arrived in September 1985.

ANNEX I

TABLE 1

No. of farmers by age and sex

Age	Sex Male	Female	Total	%
< 20	-	-	-	-
20 - 29	2	-	2	12
30 - 39	2	1	3	18
40 - 49	5	-	6	35
50 - 59	2	-	2	12
>60	3	1	4	23
	15	2	17	100

TABLE II

No. of farmers by size of household

Size of household	No. of farms	%
1 - 3	3	18
4 - 7	7	41
8 - 10	5	29
10 - 12	-	-
12 - 14	1	6
15 - 16	1	6
TOTAL	17	100

TABLE III

No. of farmers by employment status of family members

Employment status of family members	No.	%
Work part-time on the farm	17	26
Work full-time on the farm	22	35
Do not work on the farm but is unemployed	19	29
Work elsewhere	1	2
Other (specify) Children under 12 years	5	8
TOTAL	64	100

TABLE IV

No. of farmers by education by sex

Educational Attainment	S E X			
	Male	Female	Total	%
Primary				
0 - 3 years	4	-	4	23
0 - 6 "	-	-	-	-
Secondary				
0 - 3 years	11	-	11	65
4 - 6 "	2	-	2	12
Agricultural School				
1 Year	-	-	-	-
2 Years	-	-	-	-
3 Years	-	-	-	-
Agricultural Short Course				
1 Course	-	-	-	-
2 "	-	-	-	-
Technical	-	-	-	-
College	-	-	-	-
University	-	-	-	-
TOTAL	16	1	17	100

TABLE V

No. of farmers by size group of farm, by tenure

Size Group of Farm	T E N U R E								Total	%
	Owned	%	Lease <10 yrs	%	Lease 10 yrs>	%	Rented	%		
0-<2 acres	2		-		-		-		2	12
2-<5 "	5		-		-		-		5	29
5-<10 "	4		1		-		3		8	47
10+ "	1		-		-		1		2	12
TOTAL	12	70	1	6	-		4	24	17	100

TABLE VI

No. of farmers by tenure and fragmentation of farm (No. of parcels)

TENURE	F R A G M E N T A T I O N				Total	%
	i	ii	iii	iv		
Owned	-	4	6	4	14	82
Lease <10 years	-	-	-	-	-	
Lease >10 years	-	-	-	-	-	
Rented	-	-	3	-	3	18
Other						
TOTAL -		4	9	4	17	100

TABLE VII

No. of farmers using fertilizer by size group of farm

Fertilizer Type	SIZE GROUP OF FARM					
	0- < 2	2- < 5	5- < 10	> 10	Total	%
12 - 24 - 12	1	1	-	-	2	12
7 - 14 - 14	11	-	-	-	11	74
6 - 18 - 27	-	-	-	-	-	
6 - 6 - 18	-	-	-	-	-	
Sulphate of Amonia	2	-	-	-	-	
TOTAL	14	1	-	-	150	

TABLE VIII

No. of farmers by method of fertilizer application

Method of Application	Number of farmers	%
Broadcast before planting	1	6
" after "	12	80
' to hill	1	6
Bank around root	1	6
Other specify		
TOTAL	15	N= 15

TABLE IX

No. of farmers by time of fertilizer application

Time of Application	Number of farmers	%
At planting	-	
After germination	4	31
At first weeding	1	8
At fruit set	2	15
At planting and fruit set	1	8
2 - 3 weeks after planting	-	-
4 - 6 weeks after planting	5	38
Other specify before planting		
TOTAL	13	100

TABLE X

No. of farmers using farm equipment by tenure

Type of Equipment	TENURE					Total	%
	Owned	%	Hired	Borrowed	%		
Tractor	-		-	-		-	
Hand Tractor	-		-	-		-	
Hand Sprayer	2	12	-	2	12	4	23
Knapsack Sprayer	4	23	-	5	30	9	54
Mist blower	-		-	4	23	4	23
Other							
TOTAL	6	35	-	11	65	17	100

TABLE XI

No. of farmers by farming activity by source of labour

Farming Activities	SOURCE OF LABOUR			
	Free Family	%	Paid Labour	%
Land Preparation	5	29	17	100
Planting	11	65	16	94
Weeding	10	59	15	88
Fertilizer Application	8	47	3	17
Soil Conservation	1	6	2	8
Harvesting	13	76	2	8
Marketing	13	76	-	-

TABLE XII

No. of farmers using soil conservation

Type of Soil Conservation	NO. OF FARMERS Yes	No	Total	%
Contour drains	6	-	6	38
Contour barriers	2	-	2	12
Strip cropping	1	-	1	6
Other specify	-	-	-	-
None	-	7	7	44
Total	9	7	16	100

TABLE XIII

No. of farmers by type of activities of family members.

Type of Activities	FAMILY MEMBERS		Total	%
	Adults	Children		
Land preparation	1	-	1	6
Planting	12	-	12	70
Weeding	13	-	13	76
Harvesting	15	-	15	88
Animal rearing	9	1	10	59
Marketing	4	-	4	23

TABLE XIV

No. of farmers by number of years in farming

No. of years in farming	No. of farmers	%
1 - 4 years	1	6
5 - 9 "	-	12
10 - 14 "	2	12
15 - 19 "	2	12
20 - 24 "	4	23
25 "	8	47
TOTAL	17	100

TABLE XV

No. of farmers by source of cash for farm activities

Source of Cash	No	%
Sell livestock	2	12
Borrow from family	1	6
Throw pardner	1	6
Sale of farm produce	16	94
Other trade	1	6

TABLE XVI

No. of farmers reporting most important type of information by rank

Most important information	Rank	No. of farmers	%
Information on new technology	1	12	70
Information on standard production methods	2	8	47
Information from extension Officers	3	8	47
Information on prices	4	10	59
Information on government action	5	15	88

Extremely important	1
Very important	2
Important	3
Unimportant	4
Least important	5

TABLE XVII

No. of farmers by main marketing problems

Main marketing problem	No. of farmers	%
Low prices	10	59
Transport	8	47
Bad roads	8	47
Spoilage and damage	5	29
Labour	-	-
Rejection	4	24
Low demand	3	18
Other (specify) No market	1	6

TABLE XVIII

No. of farmers who encountered difficulties in acquiring inputs (planting materials, sprays, fertilizers etc.)

Reasons	No. of farmers	%
Unavailability	4	24
Too costly	10	58
Lack of transportation	3	18
Other		
TOTAL	17	100

TABLE XIX

No. of farmers by factors limiting full utilization of land

Limiting Factors	No. of farmers	%
Lack of funds to develop land	13	76
High cost of inputs	11	65
Unavailability of inputs	2	12
Unavailability of labour	6	35
Distance from market	5	29
Inadequate market	3	17
Low price for produce	6	35
Praedial larceny	2	12