IMPROVING WATERSHED MANAGEMENT AND INCREASING SOCIO-ECONOMIC WELL-BEING THROUGH FARMING SYSTEMS RESEARCH AND DEVELOPMENT

A MINAG/IICA SUB-PROJECT OF THE GOJ-USAID HILLSIDE AGRICULTURAL PROJECT

FINAL VERSION

February, 1988

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VOLUME I

PROPOSAL

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1. INTRODUCTION

Soil erosion on hillsides is affecting farm productivity and jeopardizing Jamaica's future water supply. To control soil erosion, large areas now devoted to annual crops should be turned into permanent crops and pastures. In order to promote perennial cropping, the Hillside Agricultural Project 1/ will be executed through a number of sub-projects. The Northern Rio Cobre Watershed Area was identified by the Ministry of Agriculture and the Inter-American Institute for Cooperation on Agriculture as an area in which one sub-project could be implemented following a Farming Systems Research approach.

Since 1976, IICA has supported the Jamaican Ministry of Agriculture's projects to manage watersheds, control soil erosion and study intercropping alternatives. (See Annex B - Volume I)

The purpose of this sub-project is to increase the socio-economic well-being of Northern Rio Cobre Watershed residents, while conserving natural resources.

The sub-project aims to develop economically viable production systems which contribute to increased sustainable income to small farmers, while conserving watershed resources and strengthening farmer participation.

The final products of the sub-project will be:

(1) Economically efficient tree crop-based farming systems.
(2) Improved watershed management practices.
(3) Farmer organizations which support production and marketing activities of individual farmers.

1/ The Government of Jamaica and the United States Agency for International Development signed an Agreement on February 28, 1987 to finance a hillside agricultural project in the Rio Cobre-Rio Minho Watershed area.

(4) Recommendations on improved marketing systems.
(5) Recommendations for Research, Extension and Agricultural policy to increase productivity and expand acreage of perennial crops.
(6) Farming systems methodology institutionalized within MINAG (R & D Division).

The major export crops with which the sub-project will be concerned will be cacao, coffee. Of the domestic crops, the sub-project will be mainly concerned with coconut, yam, plantain, vegetables, legumes, other roots, tubers, and fruits. All of these types of crops feature in the crop mix on farms in the sub-project area.

Selected technologies developed in Jamaica and elsewhere will be tested and compared with farmers' practices on their farms. These technologies will relate to the establishment, rehabilitation, and intercropping of cacao, coffee, coconut, and mango, and to the integration of soil conservation measures in the management of these crops.

The testing of technologies for adaptation to small-farmers' conditions will be carried out using a Farming Systems Research methodology which has been designed specifically for this sub-project using the experience gained during the execution of the MINAG/IICA Cropping Systems Project.

The sub-project will be located at the northern part of the Rio Cobre watershed and is bounded by the following Extension Areas: Seafield and Pear Tree Grove in the north, Troja in the east, Riversdale in the south and Redwood in the west.

The total Budget for the five-year sub-project is J$10,760,400; the portion to be funded by the Hillside Agricultural Project (HAP) being J$6,788,500.

The summary of the budget is:

YEAR	BUDGET SUMMARY (J$ x 1000) HAP	MINAG	IICA	FARMERS
1	1,563.8	234.3	243.3	172.9
2	1,130.3	257.7	267.7	190.3
3	1,432.3	283.5	294.5	209.3
4	1,300.1	311.9	323.6	230.2
5	1,361.8	343.1	356.3	253.3
TOTAL	6,788.5	1,430.5	1,485.4	1,056.0

Sixty-three per cent (63%) of the total cost will be funded by the Hillside Agricultural Project and 37% by MINAG, IICA and the farmers.

2. BACKGROUND

2.1 Description of the geographic area of the sub-project

The geographic area identified for the location of this sub-project is comprised of five Extension Areas.

The villages included in the sub-project area have been grouped into three working districts for the purpose of organization. These districts are:

The Golden Grove District
Comprised of Seafield, Airy Mount, Golden Grove, Crawle (Golden Valley), Ham Walk, Rio Magno.

The Riversdale District
Comprised of Redwood, Cedar Valley, Hampshire, Riversdale, Williamsfield, Harewood and Darling Spring.

The Troja District
Comprised of Dunkeld, Rose Hill, Troja.

The location of the villages can be observed in the map shown on page 8A.

2.2 Farming systems in the Sub-Project area

In the sub-project area tree crops, comprising coffee, cocoa, coconut, citrus, pimento, fruit trees, breadfruit, banana, and plantain, constitute the most important group of crops grown on farms irrespective of size. (Annex C, Volume I)

Tree crops occupy 68.25% - 75.55% of the land and are followed in order of importance by rootcrops, vegetables and legumes. Cocoa, coffee and banana are the most important tree crops in the sub-project area as a whole.

Root crops occupy on average 14.15% - 16.15% of the land with higher values on farms less than 2 acres in size. The distribution of vegetable and legume cropping in the sub-project area is highly skewed with low levels of occurrence in the areas of Pear Tree Grove, Troja and Redwood and high levels in Riversdale and Seafield. The higher level of occurrence is on farms less than 2 acres in size in the Seafield area (19.6%) and this is followed by farms from 2 to 6 acres in size in the Riversdale area (13.68%). (Annex C, Volume I, Table 3.)

2.3 Key constraints to increased production

2.3.1 Cocoa

Throughout the sub-project area, Black Pod and rat damage have been reported as the major problems affecting cocoa cultivations. Apart from these problems which were evident to farmers as causes of low productivity, several other factors observed could also contribute to low productivity. These other factors such as excessive

shade, low planting density, low fertilizer usage, low level of pest and disease control, and cultural practices which exacerbate some of the problems mentioned, appear to be considered by the majority of farmers as the norm in cocoa production.

2.3.2 Coffee

Farmers in the sub-project area have identified problems related to coffee cultivation.

The main problems stated were:

1. Coffee Berry Borer infestation
2. Rat damage to coffee
3. Shortage of high quality planting material
4. Ad hoc method of collecting the coffee on the various routes
5. Ecological imbalance due to the decline of banana cultivation for export

The problems most frequently mentioned were rats and Coffee Berry Borer. It was felt that the latter was being addressed through the CIB's spraying programme. However, one of the factors militating against the control of this pest is the practice of leaving infected berries on the ground since these can serve as a source of continued infestation. Low productivity of coffee can be attributed to several factors acting in concert. These are low planting density, excessive shade in some areas, disturbance of the coffee/banana ecosystem, minor element deficiencies, and the use of outmoded pruning techniques.

The fifth problem listed above is a consequence of a policy decision. As a practice, coffee was intercropped in banana cultivations. The care given to the bananas enhanced the growth and wellbeing of the coffee. Banana for export had been the main crop for farmers in the areas mentioned and provided a cash flow on a weekly or forthnightly basis.

With the new policy of crop diversification, bananas for export are only to be grown in certain areas, and with the closing down of the banana boxing plants in this watershed area, coffee has suffered adversely due to lack of shade and general care.

It has been mentioned and duly observed that in many areas lowland coffee flourished along with bananas up to a few years ago. Today there is a marked decline in coffee production directly related to the removal of bananas as a crop grown by small farmers for export.

Any programme for coffee expansion for the small farmer must bear in mind the ecological and financial consequences of changes, made without taking into account the traditional and local technology.

It is factual to say that coffee production will be enhanced by the better care that will be given to it as companion crop to the bananas, when small farmers are again in the production of bananas for export.

2.3.3 Pimento

Pimento in the sub-project area does not appear to be affected by pimento leaf rust and farmers have not reported any problems with this crop. All of the pimento plants seen were naturally occurring or grown from seed. No cultivation of grafted pimento was observed. Because of the way in which this crop is reaped, that is, by breaking off branches, the trees exhibit "biennial" bearing with heavy bearing alternating with light bearing. Improvement in the productivity of pimento in the long term is most likely to result from the establishment of pimento using grafted plants in combination with a planned fertilizer programme.

2.3.4 Other Crops

Very little feedback has been obtained regarding problems with root crops, vegetables and legumes. Farmers appear to be satisfied with the productivity of these crops and have not reported any major problems.

2.3.5 Soil Conservation

Some soil conservation practices appear to form an integral part of the farming systems observed in the sub-project area. Mini-terracing and contour planting are much more evident in the Top Hill/Seafield area where intensive vegetable cultivation is common. In the other areas where tree crops are the basis of the farming systems, the inter-planting of food and fruit trees with coffee and/or cacao appears to provide adequate ground cover to reduce soil erosion to a low level without having to change the landform of the hillsides. In some areas, complete clearing of hillside lands has been observed on farms where coffee and coconut are being established. In such areas some form of soil conservation measures appear to be necessary. A large part of the sub-project area still remains under natural vegetation. This is the part of the watershed that is at risk of gradual denudation by persons who cut and burn trees to produce charcoal for fuel.

2.3.6 Perceived Production Problems

The problems identified by the farmers encompass the social, economic, institutional and cultural factors, all of which interact and have an impact on their production and income potential.

a. Social Factors

The social factors relate to farmers' knowledge systems - - stated briefly, farmers need information

about the control of soil erosion and the benefits of certain soil conservation practices to be able to put measures into effect that would correct this problem.

They also need information about the benefits of pest and disease control such as black pod (cocoa), berry borer and leaf rust (coffee), field sanitation, pruning etc., so that they can decide about the adoption of pest and disease control practices.

b. Economic Factors

The lack of funds for the timely purchase of inputs such as fertilizers and pesticides etc., compound the production and income problem as yields continue to be low.

c. Institutional Factors

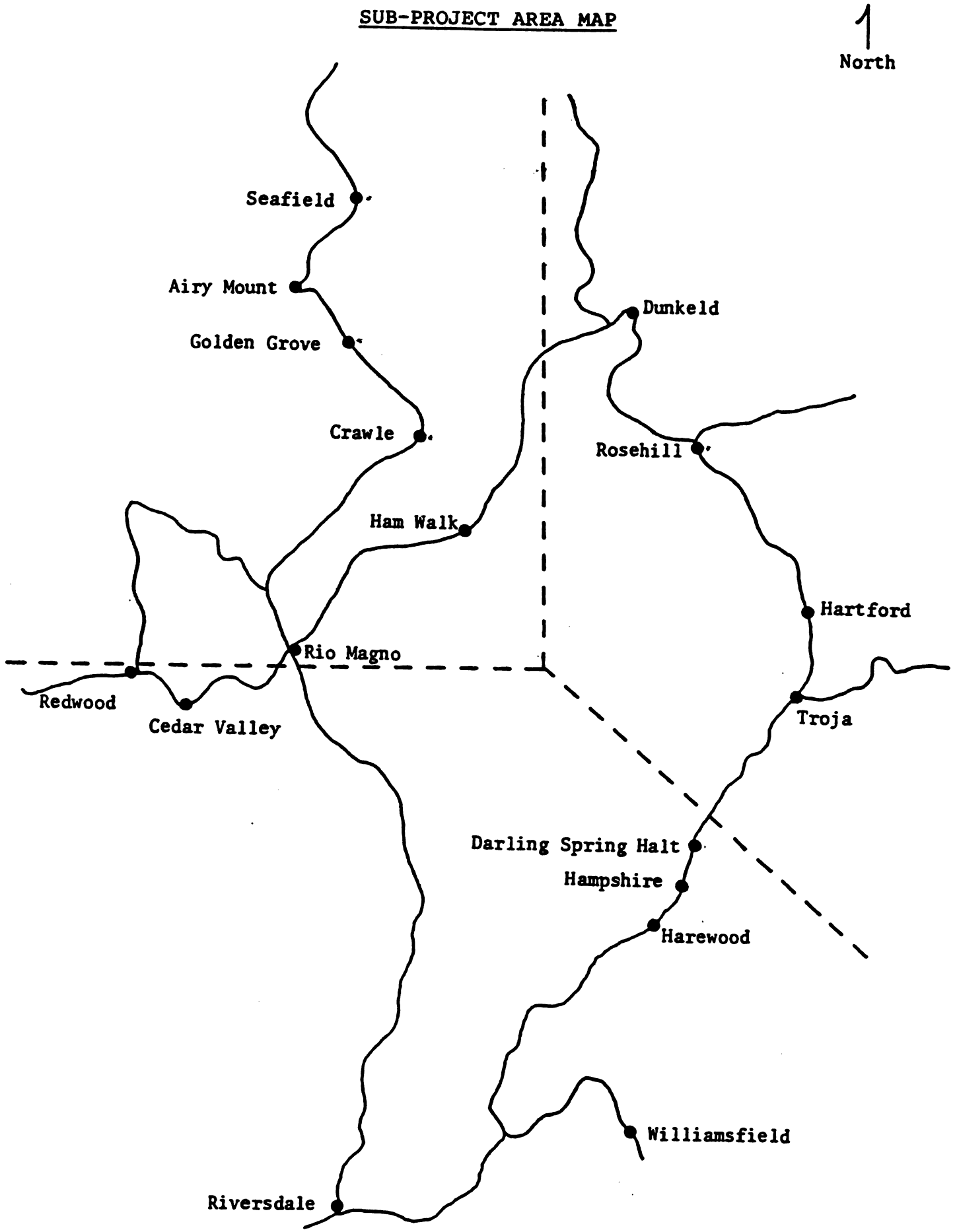
The problems at the institutional level relate to difficulties experienced by farmers in obtaining planting materials and delay in payments for produce.

d. Cultural Factors

A cultural factor - i.e. the tendency towards individualism - has resulted in the absence of community groups to act on the farmers' behalf. The need to establish such groups has been articulated by the farmers; such an organization would provide leverage and help to solve, by negotiation and joint efforts, problems encountered in their activities and at the community level.

Additional factors which have an impact on production are inadequate water supply due to the absence of water storage facilities in the area, and bad roads which limit timely marketing of crops.

SUB-PROJECT AREA MAP



Scale: 1:50,000 (Metric Edition)

2.4 Results of studies relevant to the development of the sub-project.

During the past three years, through the execution of the Cropping Systems Project, the Ministry of Agriculture has been testing a new system of generating and transferring technologies needed by small farmers to improve their efficiency and productivity. This testing has been conducted in the Guy's Hill and Watermount Divisions of the St. Catherine Land Authority. This has been done with technical and administrative support from the Inter-American Institute for Cooperation on Agriculture (IICA) and financial support from the International Development Research Centre of Canada (IDRC).

The new system being tested is a Farming Systems Approach to Research, Development, and Extension. In this system small farmers have a key role. They contribute by identifying problems and possible solutions, and actively participate in the management of on-farm experiments, demonstration trials, and farmer-managed production plots. Under this system small farmers participating in the project contribute greatly to the development of improved technologies. Such improved technologies, as are identified or developed for small farmers faced with specific agro-socio-economic conditions, should be acceptable to other small farmers who operate under similar conditions. In order to increase the rate of adoption of improved technologies some small farmers, who operate under similar conditions in communities outside of the project area, now assist in the Extension Programme by helping to manage demonstration plots on their farms. In this way, the cooperators and their neighbours can actually experience and touch the improved technologies.

Edwards (1961) has described the entrepreneurial characteristics of the Jamaican small farmer. He noted that "the objective of obtaining income was influenced by two other aims; to be accepted by the community, and to have maximum independence", and that "when cash resources were low, household expenditure, because of its urgency, generally had priority. Similarly, when money was saved, it was usually reserved for emergencies and the family's domestic use, though occasionally funds were accumulated to buy land or an animal". Edwards (ibid) also notes that "to a large extent, the farmers were pre-occupied with their limited means and the advisors (extension officers) with good husbandry ends".

These views are still valid some twenty-seven years later and are applicable to farmers in the project area.

In the sub-project area, the trap hypothesis of Stevens (1978) is found to be valid. Acceptance of the hypothesis means that a more efficient way for farmers to use their limited resources will have to be found by the sub-project through the identification of economically efficient changes in one or more components of the farming systems in the sub-project area.

In the planning of interventions with the collaboration of farmers, the strategy used in the Cropping Systems Project has been towards planning simple rather than complex trials. This emphasis on simplicity has led to farmers having a clearer understanding of the objectives of the trials and of the actual work that is done. Because of the simple nature of the trials, farmers are also better placed to evaluate visually the observed differences between treatments as the trials progress, and they can identify themselves as being intimately connected with the investigative work carried out on their farms.

3. DESCRIPTION OF SUB-PROJECT

3.1 OBJECTIVES AND EXPECTED OUTCOMES

The sub-project objectives and expected outcomes are the following:

General Objective (Goal)

Increased socio-economic well-being of Northern Rio Cobre Watershed residents, while conserving natural resources.

Specific Objective

Economically viable hillside agricultural production developed which contributes to increased sustainable income to small farmers, while conserving watershed resources and strengthening farmer organizations.

Final Products

a) Economically efficient tree crop - based farming systems.

b) Improved watershed management practices.

c) Farmer organizations which support production and marketing activities of individual farmers.

d) Recommendations for improved marketing systems.

e) Recommendations for Research, Extension and Agricultural policy.

f) Farming systems methodology institutionalized within the Ministry of Agriculture's Research and Development Division.

3.2 STRATEGY

There will be three major stages in the sub-project execution: DESIGN, IMPLEMENTATION, and EVALUATION. The Design Stage includes activities at the local level to collect information for sub- project proposal preparation and activities to start implementation of the sub-project once it is approved. The Implementation Stage includes three phases: Initiation, Evolution and Consolidation. The Evaluation Stage is related to the execution of all components throughout the pertinent stages.

Each stage will have six components: PARTICIPATION, AGRONOMICS, ECONOMICS, INSTITUTIONAL LINKAGES, ADMINISTRATION and MONITORING AND EVALUATION. (See Strategy Matrix on Page 12a).

The participation component promotes the organization of farmers in the sub-project area through teams that will ensure that farmer participation is a dynamic aspect in the implementation of the sub-project. Farmer Action Committee Teams (FACTS) will be organized during the Design Stage and will continue to operate and interact with field teams throughout the implementation of the sub-project. Both male and female farmers will be encouraged to participate since the aim is to involve all available human resources in the development process.

The agronomic component includes the development and testing, with farmer participation, of technological components with high pay-offs for farmers. The economic component consists of economic analysis and interpretation of on-farm trials and the preparation of representative farm models to test the feasibility of farmers adopting the proposed technological components given farmers' resources constraints and risk aversion.

STAGES AND COMPONENTS IN THE MINAG/IICA HILLSIDE AGRICULTURE SUB-PROJECT STRATEGY

COMPONENTS \ STAGES	STAGE I: DESIGN (1987-88)	STAGE II: IMPLEMENTATION (1988 - 1993) 1) Initiation (1988-89)	2) Evolution (1989-1991)	3) Consolidation (1991-1993)	STAGE III: TERMINAL EVALUATION (1993)
Participation	A. Farmers' participation initiated	A. Farmers' participation incorporated into Project	A. Farmers modify attitudes and agronomic activities based on participatory feedback.	A. Farmers initiate self-financed and self-managed production	A. Evaluate farmer management of tree crop farming system with technologies generated through participation in on farm trials.
Agronomics	B. Collect data on agronomic aspects	B. Develop and test technological methodology	B. Modify technologies based on A (above)	B. Verify results of superior technologies	B. Evaluate technologies most widely used in the farming system.
Economics	C. Research multi-seasonal farm models based on survey study	C. Develop multi-seasonal farm models	C. Test and refine multi-seasonal farm models based on A (above)	C. Integrate multi-seasonal farm models	C. Evaluate farm models most widely accepted in the farming system.
Institutional	D. Initiate institutional cooperation	D. Coordinate institutional services	D. Modify institutional service based on A (above)	D. Integrate institutional services.	D. Evaluate institutional cooperation component linkage maintenance institutionalization and service delivery.
Administration	E. Plan administrative logistics	E. Take steps for general project initiation.	E. Administrative Support continues	E. Administrative Support Continues.	E. Evaluate administration logistics.
Monitoring and Evaluation	F. Design monitoring and evaluation system.	F. Initiation data collection and monitoring and evaluation activities.	F. Monitoring and evaluation of major components of the project (farmer participation in agronomic trials technology generation and institutional linkages).	F. Monitoring and evaluation of farmers management of production system with new technologies, assess results of superior technologies and farm models. Evaluate institutional services and administrative support.	F. Evaluation of project impact on farmer participation, technology generation and adoption, institutional strengthening and administrative support.

The institutional linkages component provides for the participation of various institutions in the different stages of the sub-project to enhance the delivery of services to farmers. The administration component involves staff recruitment during the design phase, support to project staff, as well as the execution of all administrative activities required for sub-project implementation.

The monitoring and evaluation component will provide pertinent evaluations for all other components throughout the life of the sub-project and will execute an overall impact evaluation at the end of the sub-project.

STAGE I: DESIGN (1987-1988)
The strategy of the Design Stage will consist of planning and organizing activities before sub-project initiation. A formal baseline survey will be conducted early in 1988.

A. Farmers' participation initiated

The relationship between the farmer and the sub-project is embodied in the Farmer Action Committee Teams (FACTS). These teams will be organized in the sub-project area to incorporate farmers' participation in the implementation of the sub-project. The strategy used here centres around five main steps:

(1) Meet with farmers in their respective districts in order to advise and consult with them on the sub-project and to encourage them to articulate the major constraints faced by them in operating their farm enterprises. (Informal Survey)

(2) Outline for the farmers the emphasis on tree crop production, soil erosion and the concept of on-farm trials as major components of the sub-project.

(3) Emphasize that in this sub-project the farmers will be involved at all stages:

a) Design - defining problems and identifying possible solutions;
b) Implementation - trials will be carried out on farms with the collaboration of the farmers;
c) Evaluation - farmers will evaluate the results and select those technologies they consider appropriate to their needs.

(4) Explain the need for farmers to organize into groups for greater success in acquiring inputs, production, and marketing, thus meeting their goals for a better standard of living. The proposed form of organization is through FACTS.

(5) Explain to farmers how the sub-project activities will be executed and discuss their responsibilities in order to achieve the desired results. The strategy for stimulating farmer-collaboration in the implementation of on-farm trials is based on risk/management-sharing, and is outlined hereunder:

a) Sub-Project Financed/and Sub-Project Managed with Farmer Participation
b) Sub-Project Financed/Farmer Managed
c) Farmer Financed/Farmer Managed

B. Collect Data on Agronomic Aspects

During the Design Phase of the sub-project, a Baseline Survey will be executed to collect data on the Agronomic (and other) aspects of farming in the sub-project area. Data will be collected on:

a) agronomic problems experienced by farmers in the sub-project area;
b) cropping systems practiced;
c) productivity of crops, and
d) technologies used in the production of crops.

C. Research on Multi-seasonal Farm Models based on Survey Study

The findings from the formal baseline survey will be used to:

a) define recommendation domains; 1/
b) define technological components with high pay-offs for farmers to be tested in on-farm trials;
c) develop on-farm trials that fit into the existing farming systems being cognisant of the farmers resources, in particular labour availability for land preparation, weeding and supervision of trial plots;
d) Assist in the selection of representative farms and develop farm models representing the role of the farmer and his family as a supplier and user of farm resources, to measure the feasibility of new farming technologies being adopted by the farmer given resource constraints, farmers' goals and risk aversion.

D. Initiate Institutional Cooperation

The implementation of this sub-project requires cooperation from a number of institutions. The following institutions will participate with the Ministry of Agriculture, Research and Development Division and IICA throughout the execution of the sub-project.

- Ministry of Agriculture (other Divisions)
- Jamaica Agricultural Society
- Coffee Industry Board
- Cocoa Industry Board
- Coconut Industry Board

1/ A recommendation domain is defined by a combination of factors which characterize a group of farms.

- Jamaica Pimento Association
- Banana Growers Association
- Farmers Cooperative Federations
- Agricultural Credit Bank
- P.C. Banks
- Representatives of FACTS Groups

Coordination of these services will be the responsibility of the sub-project coordinator who will have meetings on a regular basis with representatives from the participating agencies. Representatives from each institution will also participate in joint training of extension and other staff, farmer training and field days. IICA will assist the Ministry of Agriculture, Research and Development Division, in technical and administrative aspects during the implementation of the sub-project, for the purpose of strengthening the Research and Development Division.

The linkages will be established by meeting with administrators and technicians in these organizations to inform them of the sub-project goals and objectives, and to arrive at a mutual understanding about the expectations and responsibility of the participating institutions.

It is anticipated that by cooperating in this way some of the problems outlined by farmers (such as, lack of inputs, planting materials etc., delay in payments, lack of technical advice) and other bottlenecks in the service delivery system will be removed.

Collaboration will also be established at the central level and through local branches of the Commodity Boards, Jamaica Agricultural Society and Extension Services and Credit Institutions.

E. Plan Administrative Logistics

Activities to be carried out include:

a) Staff recruitment

The Ministry of Agriculture and IICA select sub-project personnel. Fourteen direct-hired staff will be involved in the implementation of the sub-project with support from all institutions associated with the sub-project. Three field teams will be involved in the establishment and implementation of the farm trials. The Field Teams will be supported by a Technical Core Team.1/

b) Staff training

Training of sub-project staff in Farming Systems Research and Development (FSRD) concepts and procedures and in the development of farm models will take place through introductory training at the start of the sub-project.

c) Procurement of vehicles and supplies.

d) Design formats for Operation Plan and for Reporting.

e) Identify support service personnel.

F. Design Monitoring and Evaluation System

Monitoring and Evaluation (M.E.) are of critical importance for the realization of development project goals, particularly for rural development projects because of their multi-dimensional nature.

This sub-project has six major components, FARMER PARTICIPATION, AGRONOMIC TRIALS, ECONOMICS, INSTITUTIONAL LINKAGES, ADMINISTRATION AND MONITORING AND EVALUATION. Of these components, Monitoring and Evaluation will be on-going throughout sub-project implementation.

1/ Each Field Team will include one Agronomist and one Assistant Agronomist. The Technical Core Team will include one Technical Officer, one Plant Protection Officer, one Economist, and one Rural Development Specialist.

The basic framework of the evaluation methodology will be developed during the design stage and is centered around three areas:

a) The design of the baseline study which will provide a benchmark against which the sub-project impact will be evaluated. The data generated from this study will describe the present state-of-the-art with regard to farming systems, farmer participation in groups and organizations, social and economic conditions, production and cultural practices.

b) An assessment of existing institutional linkages which will be undertaken to provide a framework for any future evaluation of the impact of the sub-project on strengthening institutional linkages.

c) The design of an agro-socio-economic data collection questionnaire which will be used during the initiation of on-farm trials and for on-going data collection throughout sub-project implementation.

d) The design of a quarterly progress report format which will be linked to the Annual Operation Plan so that quarterly progress towards the achievement of annual targets can be measured.

These four sources of data will provide a comprehensive data base for the quarterly and annual assessment, and end of sub-project evaluation. These data should also serve as secondary data sources for the design of future development projects aimed at improving tree crop-based farming systems using the Farming Systems Research and Development Methodology.

STAGE II: IMPLEMENTATION (1988 - 1993)

There are three major phases of the Implementation strategy: 1) Initiation; 2) Evolution; and 3) Consolidation.

1) Initiation Phase (1988)

The strategy of the Initiation phase involves start-up activities in all six components. This phase lasts one year.

A. Farmer Participation Incorporated into Project

Farmer participation is essential to this sub-project as the methodology is based on this concept. Farmer Action Committee Teams (FACTS) organized during the Design Stage will continue to operate interacting with field teams throughout the implementation of the sub-project

Selection of farmers for collaboration with the on-farm trials based on the nature of the problem and current farmers' practices will be done by representatives of FACTS. Initial identification of a homogeneous group of farmers with reference to a particular problem will be achieved with the assistance of the extension service and the farmers themselves. Representatives from the group will be selected so that on-farm trials regarding a particular problem could be sited in each village in a sub-project area.

Execution of on-farm trials at this stage will be sub-project financed/sub-project managed. The understanding with the farmers is that in this phase the farmers would supply land, and labour to assist in routine operations such as spraying, weeding and reaping. In this phase, land preparation costs will be borne by the sub-project. All produce from on-farm trials become the property of the farmer. Farmers will be required to be present whenever on-farm trial operations are being executed so that they will be exposed to the technologies applied. It will be impressed on the farmers that the trials are their trials carried out on their behalf.

In this phase, which will occupy the entire first year of the sub-project, farmers will be involved in the following ways:

(a) Participation in FACTS to help guide sub-project implementation, as well as to allow greater leverage with institutions such as MINAG, JAS, CIB, CAIB, COIB. This will achieve results in such areas as timely payments for crops, greater access to inputs, improved water supply, roads, transportation, etc.

(b) On-farm trials
- -- selection of farmers for collaboration in the on-farm trials;
- -- participation in on-farm experimentation;
- -- participation in land preparation, weeding and supervision of trial plots. In this phase farmers are not required to make any financial contribution;
- -- keeping records of income and expenditure;
- -- giving feedback on trials conducted.

B. Develop and Test Technological Methodology

The Agronomic component consists of developing and testing, with farmers participation, technological components with high pay-offs for farmers. Technological methodologies will be developed from a comparative perspective using three methods:

(a) Farmers' method
(b) Improved methods
(c) Alternative methods

These methods will be compared on the basis of costs of inputs, labour, fertilizer, sprays, etc. and yield per acre.

It is expected that farmers will select the methods which give the highest returns to investment. Factors such as planting time, spacing, cultural practices, and fertilizer use etc. will be assessed on a comparative basis.

C. Develop Multi-seasonal Farm Models

Survey data on resources and input-output information on tree crops and other major production activities will be used in the development of farm models to conduct ex-ante and ex-post evaluations of the feasibility of new technology being adopted by farmers. These models will provide the foundation on which the multi-seasonal models will be structured in order to test investment alternatives for tree crop production and soil conservation practices showing the most profitable alternatives.

It is expected that the information generated by the models and disseminated to the farmers will assist them in improving the use of their resources, in particular capital and labour. Complementing this information, a record keeping system will be developed and implemented to generate information about the technologies and production systems being tested.

D. Co-ordinate Institutional Services - Institutional

The Sub-Project Manager and the Sub-Project Coordinator will continue having meetings on a regular basis with representatives from the participating agencies.

Representatives from each institution will participate in joint training of extension and other staff, farmer training and field days. Extension personnel working in the sub-project area will receive additional training in farm management techniques to assist farmers in record keeping and farm planning.

E. Take Steps for General Project Initiation

Initiate Technical Monitoring
Initiate Staff Training

F. Initiate Data Collection and Monitoring and Evaluation Activities

After the initial collection of data in Phase 1, the field teams will be responsible for the on-going collection of agro-socio- economic information on specific indicators. They will also plan, modify and execute on-farm experiments. Farmers will be encouraged to keep records during the implementation of the sub-project. Farm record data will be used to determine costs and income of recommended production systems and practices, as well as investment on tree crops and soil conservation practices. Additional information will be obtained regarding farmer's attitudes towards technology, farmer-researcher interaction, household data and community level data.

This data will be used to improve farm models which will be tested with participating farmers and will be used as the data base for annual assessment of sub-project implementation and sub-project impact on the target group. Farm record information on costs and income of recommended production systems and soil conservation practices will be disseminated to farmers and extension personnel during field days and seminars.

2) Evolution Phase 1989-1991

The strategy of the Evolution phase includes actions which permit the sub-project to develop in each of the six components over two years.

A. Farmers modify attitudes and agronomic activities based on participatory feedback

At this stage of sub-project implementation, it is expected that, through participation in on-farm trials, farmers would have changed attitudes towards improved technologies and the results generated.

Based on their assessment of the results of agronomic trials, experiments will be modified.

B. Modified technologies based on A. (above)

Technologies will be modified based on farmers' preferences in crops, improved varieties, innovative production practices, labour input, cost and availability of inputs, availability of markets and price, especially for new crops. It is expected that the favourable market for tree crops such as coffee, cocoa and coconut will be maintained.

C. Test and refine multi-seasonal farm models based on A. (above) 1/

Farm models prepared during this phase will be improved using the data from on-farm experiments and the farm record keeping system, taking into account, ecological, social and economic factors.

1/ Multi-seasonal farm models showing levels of production, income and use of resources for several years or the life of the sub-project.

Multi-seasonal models will be developed to test investment alternatives on tree crops and soil conservation practices. The multi-seasonal models will provide information for research, extension and agricultural policy.

D. Modify Institutional Services based on A. above

It is expected that at this stage some positive results would have been achieved. Such an occurrence should have an impact on the institutions in the following ways:

a) increased demand for planting materials
b) increased demand for chemical inputs
c) increased use of extension services
d) increased volume of production
e) increased need for transportation

Taken together all these factors should require strengthening of existing organizational structures and establishment of an additional nursery for planting material so that these needs can be met. Special consideration will be given to the environmental impact of chemical technologies before their inclusion in on-farm trials.

E. Administrative support continues

Technical monitoring is in place. Financial reporting is done routinely. Sub-project staff training is implemented. On-going support is provided to sub-project staff.

F. Monitoring and Evaluation of Major Components of the Project

Monitoring is an on-going process. These activities overlap with evaluation and together form a unified system. At this stage, however, an evaluation of the main components will be conducted.

This evaluation will have as its main objectives:

a) The annual and final assessment of the overall effectiveness of the implementation of the sub-project to determine whether assumptions made during sub-project design are still valid or whether adjustments are required to ensure that the overall objectives will be achieved. The focus of the evaluation will be on all components, farmer participation in on-farm trials and technology generation, participation in farmer's organizations, (FACTS) and interaction with other institutions and farmer research relationships.

b) The effect of farmer organization on institutional linkages, delivery of services and access to extension and credit institutions and other agricultural inputs.

c) The institutional component, effectiveness of linkages, delivery of services, etc.

d) To provide a mechanism for feedback of farmer's appraisal of trial results in particular the selection of superior technologies and multi-seasonal farm models.

e To provide information on needed adjustments of objectives, implementation strategies as well as providing information for future project planning.

3) Consolidation Phase (1991-1993)

The fourth and fifth year are considered the consolidation phase for the sub-project. The field teams and technical core team will be involved in the supervision of farmers who have been working with the sub-project for the last three years and are now managing and financing adopted technologies. They also will initiate tree crop on-farm trials with a new group of farmers. The activities carried out during this stage are as follows:.

A. Farmers Initiate Self-financed and Self-managed Production

By this time, farmers will have had three years of experience with on-farm trials and will be sufficiently knowledgeable about those methods of production that they wish to include in their production system.

From the previous years' trials, farmers would have selected those methods that fit easily into their system, taking cognizance of physical and material resources, such as land, labour and capital.

B. Verify Results of Superior Technologies

Superior technologies are defined as those technologies that were selected by farmers on the basis that they may fit more readily into the production system of a large number of farmers.

These production techniques will be monitored and evaluated by the researcher and farmer. It is expected that the results from this phase can be recommended to a larger group of farmers, on the basis of soil, cost of production, yield per acre and labour efficiency.

C. Integrate Multi-seasonal Farm Models

In the previous phase, farm models were tested and refined according to farmers' preference based on an assessment of their resources and goals. Additional on-farm experiment data will be incorporated into the models and information will be generated varying prices, constraints and resources to simulate farmer's conditions under different market and critical resource constraints. The information will be disseminated to policy makers, farmers and extension personnel.

D. Integrate Institutional Services

It is expected that the level of cooperation achieved during phases 1 - 3 will become formalized. It is imperative that these linkages remain in place in order to effect and enhance the delivery of services to farmers.

E. Administrative Support Continues

Technical monitoring on-going.
Financial reporting on-going.
Administrative support on-going.

F. Monitoring and Evaluation of Farmers' Management of Production Systems

During this period of the sub-project, farmers will be at a stage of independence and will be responsible for managing and producing crops based on technologies generated during their participation in the sub-project. There will be continued monitoring of farmers' activities in order to gain feedback on farmers' attitude toward new practices, their constraints in adopting these practices and general farm management techniques.

An evaluation will also be conducted using data generated throughout the initiation and evolution phases and will focus on:

- changes in farmers' incomes and social well-being;
- changes in farmers' attitudes and adoption of technologies;
- farm management practices;
- marketing outlets;
- institutional services;
- administrative services.

This data should provide for an adequate analysis of the sub-project achievements during the past four years and should give insights that provide for a better understanding of farmers as a group, and for a more constructive approach to planning and implementation of Farming System Research and Development Methodologies.

STAGE III: TERMINAL EVALUATION (1993)

The purpose of the terminal evaluation, or end of sub-project evaluation, is to assess the impact of the sub-project on participating farmers and their communities, as well as to compare targets and achievements, as a means of establishing whether the sub-project achieved its objectives. This evaluation will involve focusing on all the major components of the sub-project, namely on-farm trials in tree crop farming systems, farmer participation and institutional strengthening.

A. Evaluation of Farmers' Management of Tree Crops

The evaluation of farmers' management of on-farm trials in tree-based farming systems will have as its main focus farmers'

attitudes towards technologies generated using this approach. The following factors will be central to the assessment of this component:

a) time spent in managing production plots;
b) the amount of labour utilized in the management of enterprises;
c) resources allocated to tree-based farming systems, land, labour, capital and management;
d) change in cropping systems;
e) farmer-researcher relationships;
f) farmer decision-making and control in the sub-project.

B. Evaluate technologies most widely used in the farming system

The assessment will be based on farmers' acceptance and adoption of technologies generated by the on-farm trials .

The indicators used here will include:

a) farmers' attitudes towards technologies generated;
b) the technologies most readily adopted based on their assessment of resources available, land, labour, capital and management;
c) the diffusion and adoption of technologies by farmers outside of the sub-project area.

Three sources of data will be used in this evaluation exercise.

a) Data collection during sub-project implementation.
b) Annual Assessment Reports.
c) A formal survey of direct and indirect beneficiaries.

C. Evaluate Farm Models

The farm models developed during years 2, 3 and 4 will be evaluated in terms of their relevance to small farmer production systems, taking cognisance of ecological, social and economic factors.

D. Evaluate Institutional Cooperation Component

The purpose of this exercise is to assess the success of the methodology used in the sub-project, namely, establishing institutional linkages and cooperation in sub-project implementation.

This assessment will focus on three areas:

a) level of institutional cooperation;
b) institutional strengthening - delivery of services;
c) institutionalization of Farming Systems Research in Ministry of Agriculture and related institutions.

E. Evaluate Administrative Logistics

This exercise will have as its main focus the administration of sub-project activities, and will provide an assessment of effectiveness of an inter-agency approach to sub-project implementation.

The focus of this assessment will be on the timeliness of action initiation such as:

a) Staff Recruitment
b) Staff Training
c) Procurement of Vehicles and Supplies
d) Monitoring, Data Collection and Reporting

F. Evaluation of Sub-Project Impact on Farmer Participation

This exercise will involve a general assessment of the major components of the sub-project, farmer participation, technology generation and adoption, and institutional strengthening.

The methodologies to be used have already been outlined A-E. However, in this context, the focus will be on:

a) the impact of the sub-project on farmer participation in particular organization groups as the Farmer Action Committee Teams (FACTS); in technology generation through participation in on-farm trials; in evaluation of trial results and adoption of technologies.

b) The maintenance of institutional linkages, and the effectiveness of farmer participation in organizations as a means of improving delivery of services.

c) The feasibility of institutionalizing Farming Systems Research methodology as a framework for the development of the small farming sector.

These activities are considered relevant not only for assessing the successes and limitations of this sub-project, but for providing lessons of experience and a framework that would guide the design, implementation and evaluation of rural development projects.

3.3 BENEFICIARIES

The main beneficiaries of the sub-project will be the farmers in the Rio Cobre Watershed area. These farmers can be divided into three categories with respect to the type of benefit and the time period in which the expected benefits will accrue. These categories are:

(a) Immediate, direct beneficiaries

This group will consist of at least 168 farmers on whose farms the project work will be executed. These farmers will stand to benefit from project activities as soon as the project commences. They will receive all inputs for the on-farm trials and eventually also receive all produce and income generated. This income generated from on-farm trials is normally utilized by farmers in improving and expanding their farming activities using technologies absorbed through participation in the on-farm trials.

(b) Other direct beneficiaries

In the area of immediate influence of the sub-project there are 2,230 other farmers who will benefit from the results of on-farm trials through the extension of improved technology onto their farms in the production of coffee, cocoa, plantain and coconut. It is projected that over a five-year period, productivity of certain tree crops can be improved in the watershed area to the extent indicated hereunder:

Crop	Present Yield (1988)	Projected Yield after 5 yrs. (1993)
Coffee	50 boxes/acre	80 boxes/acre
Cocoa	12 boxes/acre	40 boxes/acre
Coconut	50 nuts/tree/year	75 nuts/tree/year
Plaintain	12.5 lbs/tree/year	25 lbs/tree/year

These projected increases in productivity of existing cultivations are expected to increase the average value of production from these crops in all farm size groups.
(See Table 6, Annex C, Vol. 1) as indicated hereunder:

Present average value and projected average value of crop by Farm Size Group

	Less than 2 acres		2 - 6 acres		More than 6 acres	
Crop	Present Av. Val.	Projected Av. Val.	Present Av. Val.	Projected Av. Val.	Present Av. Val.	Projected Av. Val.
Coffee	$ 517	806	1,890	3,024	5,147	8,266
Cocoa	$ 111	367	439	1,599	1,495	5,481
Coconut	$ 83	120	472	585	2,319	2,902
Plantain	$ 118	236	507	1,014	1,740	3,480
	$ 829	1,529	3,308	6,222	10,701	20,129

The projected average increase in value of products from just the four selected crops farm size group will be:

Less than 2 acres	2 - 6 acres	More than 6 acres
$700	$2,914	$9,428

There are 880 farms of less than 2 acres, 1,097 farms ranging in size from 2 to 6 acres, and 421 farms of more than 6 acres, in the area of immediate influence of the sub-project.

Projected rate of adoption of improved management systems for coffee, cocoa, coconut and plantain in the Rio Cobre Watershed area:

Year	% of Farmers adopting
3	5
4	20
5	50
6	55
7	60
8	65
9	70
10	75

The increase in value of these selected farm products will be as indicated hereunder:

	Less than 2 acres	2 - 6 acres	More than 6 acres
Year 4	$ 30,800	159,830	198,460
Year 5	$123,200	639,330	793,840
Year 6	$308,000	1,598,330	1,984,590
Year 7	$338,800	1,758,160	2,183,050
Year 8	$369,600	1,917,990	2,381,510
Year 9	$400,400	2,077,830	2,579,970
Year 10	$431,200	2,237,660	2,778,430
Year 11	$462,000	2,397,490	2,976,890

(c) Indirect beneficiaries

The Rio Cobre Watershed area encompasses the twenty Extension Areas # 12, 23-30, 36-46. Those Extension Areas outside of the immediate influence of the sub-project contain an additional 5,480 farms which form the target group of indirect beneficiaries of the sub-project.

Expansion of tree crops

In the area of immediate influence of the sub-project there are 2,618 acres available on 1,826 farms in all size categories for expansion of tree crops.

Number of farms and acreage of farms

In the area of immediate influence of the sub-project there are 2,398 farms which occupy 10,210 acres. Of these, 880 farms are less than 2 acres in size, 1,097 farms range in size from 2 to 6 acres, and 421 farms are larger than 6 acres. Average farm size of these three groups of farms are 0.87 acre, 3.56 acres, and 12.97 acres respectively.

4. SUB-PROJECT ACTIVITIES

The Sub-Project Activities will be comprised of five components. Detailed descriptions of each component are presented in the Annexes A to E of Vol. II.

A.	Farmer Participation	(See Annex A, Vol. II)
B.	Agronomic	(See Annex B, Vol. II)
C.	Economic	(See Annex C, Vol. II)
D.	Institutional Linkages	(See Annex D, Vol. II)
E.	Monitoring and Evaluation	(See Annex E, Vol. II)

Components A, B, and C already have been interacting in 1987 in identifying agro-socio-economic problems which affect the farmers' decision-making process and consequently influence adversely the way in which on-farm, household and family activities are conducted.

After the Sub-Project is initiated, the continued interaction of components A, B and C together with inputs from component D will refine thedefiniition of problems and provide greater details and insights that could not be accessed during the pre-sub-project stage. This process of refining problem-definition will be continuous throughout the duration of the Sub-Project since it is envisaged that because the "Farming Systems" in the widest interpretation are dynamic, any changes which become incorporated may in turn generate some new problems, or exacerbate old ones. Such problems as marketing and the availability of additional farm inputs would be in this category.

Interaction between components A, B, C and D will also generate and test possible solutions for the problems identified.

The agro-socio-economic analyses of the results of testing possible solutions will be executed technically through interaction of components B, C and D. Component A will then interact with B, C and D to assess the results of the analyses and select those alternative technologies which fit the respective recommendation domains.

These components will continue to interact during the validation of the selected technologies.

Component E will interact with all other components to support the monitoring and evaluation of the Sub-Project for its entire duration.

Sub-Project activities detailed in Annexes A to E will jointly output the following products:

Final Products

a) Economically efficient tree crop - based farming systems.

b) Improved watershed management practices.

c) Farmer organizations which support production and marketing activities of individual farmers.

d) Recommendations for improved marketing systems.

e) Recommendations for Research, Extension and Agricultural policy.

f) Farming systems methodology institutionalized within the Ministry of Agriculture's, Research and Development Division.

When those outputs are produced by the Sub-Project, the Specific Objective will be achieved.

The attainment of the Specific Objective, that is,

> "Economically viable hillside agricultural production developed which contributes to increased sustainable income to small farmers, while conserving watershed resources and strengthening farmer organizations"

will over a period of time contribute towards the achievement of the goal (or General Objective) of the Sub-Project.

5. SUB-PROJECT MANAGEMENT

The management of the Sub-Project will be executed by the R & D Division using the principles of management by objectives at five different levels of managerial responsibilities (A - E). The Sub-Project, from its inception, will be completely integrated in the R & D Division. The Organogram for the Sub-Project is presented on page 34a.

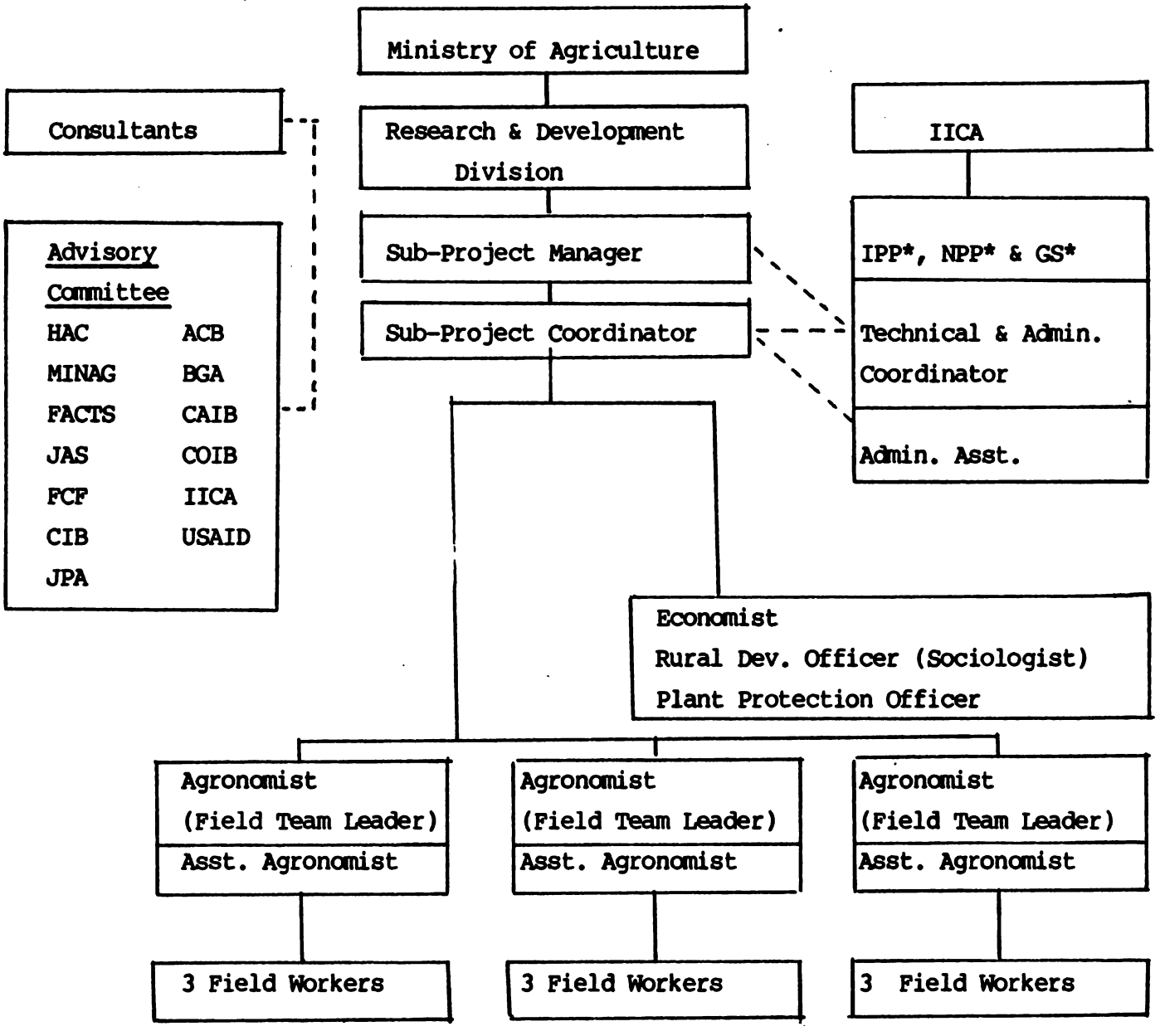
A. Sub-Project Manager

Overall sub-project management will be the responsibility of this Officer. The Sub-Project Manager will be assisted by a Sub-Project Coordinator and will receive technical and administrative support from IICA, and technical support from Consultants and the Advisory Committee.

Specific functions of the Sub-Project Manager will be to:

a) recruit Sub-Project personnel who will be based at MINAG;

ORGANOGRAM OF MINAG/IICA HILLSIDE AGRICULTURE SUB-PROJECT FOR IMPROVING WATERSHED MANAGEMENT AND INCREASING SOCIO-ECONOMIC WELL-BEING THROUGH FARMING SYSTEMS R & D.



*IPP: International Professional Personnel comprised of 1 Rural Development Specialist, 1 Economist, and 1 Agricultural Research Specialist.

*NPP: National Professional Personnel comprised of 1 Agricultural Production Specialist, and 1 Administrator.

*GS: General Services Personnel comprised of 1 Secretary

b) obtain the agreement of each responsible officer:

Sub-Project Coordinator
Members of the Technical Core Team - (Economist, Rural Development Officer, Plant Protection Officer)
Field Team Leaders and their Assistants
regarding their responsibilities, expected final outputs, the intermediate targets, and the deadlines for their achievement;

c) liase with participating public and private sector institutions, through the FSRD Hillside Agriculture Committee, and with other Divisions of MINAG;
d) coordinate the preparation of annual Operation Plans;
e) coordinate the preparation of quarterly and annual technical progress reports;
f) liase with IICA and the Hillside Agricultural Project on the overall implementation of the Sub-Project;
g) monitor technical financial and administrative aspects of the Sub-Project;
h) lead the management team, making final decisions and authorizing changes, and guiding subordinate sub-project personnel where necessary.
i) guide the development of the multidisciplinary approach to planning and problem-solving within the Sub-Project;
j) coordinate all training activities in the Sub-Projects;

B. Sub-Project Coordinator

Overall supervision of the technical aspects of sub-project implementation, will be the responsibility of this Officer who will be supported by a Technical Core Team comprised of an Economist, a Rural Development Officer and Plant Protection Officer.

Specific functions of the Sub-Project Coordinator will be to:

a) supervise and coordinate the implementation of the participation, agronomic and economic components of the Sub-Project;
b) prepare weekly, quarterly and annual technical progress reports for submission to the Sub-Project Manager;
c) supervision of Technical Core Team and Field Teams;
d) design and monitor specific implementation plans for each sub-region;
e) assume democratic interaction with FACTS;
f) attend sub-project review monthly meetings, reporting on field activities and outputs;
g) arrange and organize training events;
h) plan field experiments,analyze agronomic, plant protection, and socio-economic data for use in technical reports;
i) organize and take minutes for the regular meetings of the Hillside Advisory Committee Meeting;
j) maintain updated information on the programming, implementation and evaluation of research trials;
k) assist in the organization of seminars for extensionists and field days for farmers;
l) assist in the preparation of documents resulting from the project research and training seminars;

The Sub-Project Coordinator will liaise with coordinating committees comprised of:

Ministry of Agriculture (Field personnel)
Commodity Board Extensionists
Growers Association Extensionists
Farmers Cooperatives
P.C. Banks
Representatives of FACTS Groups
IICA

Farming Systems Research and Development Hillside Advisory Committee: The Sub-Project Coordinator will be advised by the FSRD Hillside Advisory Committee, which will be comprised of representatives from the following organizations:

Ministry of Agriculture
Riversdale District FACT
Golden Grove District FACT
Troja District FACT
Jamaica Agricultural Society
Coffee Industry Board
Cocoa Industry Board
Federation of Coffee Producers
Federation of Cocoa Producers
Coconut Industry Board
Jamaica Pimento Association
Banana Growers Association
Agricultural Credit Bank
Inter-American Institute for Cooperation on Agriculture
U.S. Agency for International Development (observer)

C. Agronomist (Field Team Leader), Economist, Rural Development Officer and Plant Protection Officer

The functions of the Agronomist in each field team will be to:

a) lead the team in site selection on farms with the collaboration of the farmers jointly identified by the Field Team and the FACT for the area;
b) participate in the planning, designing and implementation of on-farm trials (OFT);
c) lead the team in the layout of OFT;
d) lead the team in agronomic data collection and participate in socio-economic data collection;
e) be responsible for consolidating weekly field operation reports for submission to the Field Coordinator;
f) participate in all training activities.

The functions of the Economist in supporting each field team will be to:

a) participate in the planning, designing and implementation of OFT, providing the economic analysis of OFT alternatives;
b) perform the economic analysis of agronomic data collected;
c) initiate and monitor the farm record-keeping component of the field activity;

d) participate in the development of the multi-seasonal farm models (MSFM);
e) provide weekly reports to be consolidated by the Technical Officer;
f) participate in all training activities.

The functions of the Rural Development Officer in supporting each field team will be to:

a) participate in the planning, designing and implementation of OFT;
b) participate in FACT meetings, advising the FACTS of sub-project developments and coordinating FACT input into the sub-project;
c) advise the Technical Officer, Sub-Project and Field Coordinators of FACT concerns and changes required in sub-project design and implementation, in order to be more responsible to FACT/ farmers;
d) participate in the collection and analysis of socio-economic data;
e) provide weekly reports to be consolidated by the Technical Officer;
f) participate in all training activities.

The functions of the Plant Protection Officer in supporting each field team will be to:

a) participate in the planning, designing and implementation of OFT, providing the analysis of

incidence and effect of diseases and pests in OFT alternatives;

b) monitor the incidence and effect of diseases and pests on crops which are the concern of the sub-project, and advise the Technical Officer, Sub-Project and Field Coordinators of results each week;

c) participate in agronomic and socio-economic data collection, and in their analysis;

d) provide weekly reports to be consolidated by the Technical Officer.

E. The functions of the Assistant Agronomist on each Field Team will be to:

a) Assist the Agronomist in all of the functions of that position;

b) Supervise the field workers attached to each field team;

The Technical Administrative Coordinator will be based at IICA. The functions of this Officer will be to:

a) to provide technical and monitoring support to the Sub-Project Manager in the overall management of the Sub-Project;

b) be responsible to the IICA Representative for the administration of sub-project funding;

c) supervise the maintenance of accurate financial records of sub-project expenditures;

d) liase with the Sub-Project Manager and Sub-Project Coordinator regarding the maintenance of budgetary control of actual expenses in relation to the projected expenses as set out in the Operation Plan;

e) supervise the preparation of quarterly and annual financial reports;

f) prepare appropriate reports as required by IICA;
g) liase with the HAP Project Manager regarding all matters concerning funding of the Sub-Project;
h) liase with Sub-Project Coordinator and Field Coordinator regarding requisitions and supply of sub-project inputs in relation to the Operation Plan.

Administrative Assistant: The Field Coordinator will be aided by the Administrative Assistant who will be based at IICA and will support the field operations of the project through administrative activities. These activities will include:

a) procurement of vehicles, tools and equipment, agricultural inputs and other supplies for the field sites.
b) liase with Sub-Project Manager/Sub-Project Coordinator regarding the deployment of vehicles, equipment and consumable stores, and maintaining an inventory of vehicles, equipment, and consumable stores, and a record of their deployment and use;
c) maintaining accurate records of financial transactions of the sub-project;
d) reconciling of the project accounts and the IICA I-1 (weekly income and expenditure report) entries related to the sub-project.
e) analysis of the IICA Head Office computer printouts relating to the project.
f) assisting the Technical & Administrative Officer to liaise with the HAP Project Manager on finance matters.
g) other tasks as required by the project field implementation activities.

Consultants

National and international consultants will be contracted to support the project implementation and evaluation phases. These consultants will be specialized in the following areas:

a) Plant protection; disease analysis, recommended procedures, seminars, documentation.
b) Sociology and community development.
c) Project evaluation: socio-economic indicators.

Capabilities and needs of the Sub-Project for financial management

The IICA Office in Jamaica has the capability to ensure satisfactory financial management of sub-project funds. IICA in Jamaica has provided satisfactory financial management of external funds, provided for the benefit of the GOJ, since the establishment of the Office in 1976.

The projects for which the funds were managed by IICA are:

a) Allsides Project (Simon Bolivar Fund) 1976-81;
b) Cassava/Peanut Project (Simon Bolivar Fund) 1981-83;
c) Cropping Systems Project (IDRC) 1984-87;
d) Small Business Management Project (USAID) 1985-86;
e) Cropping Systems Project Phase II (IDRC) 1987-90.

The Sub-Project will need to employ a Technical and Administrative Coordinator and an Administrative Assistant to execute the financial aspect under the supervision and support of the IICA administration. The functions of these two positions have been described in the previous subsection.

6. ESTIMATED BUDGET

The budget for the Hillside Agriculture Sub-project has four sources of funding: HAP, MINAG, Farmers and IICA. From these sources 66% will be furnished by HAP and 34% by the others during years 1 and 2. During years 3 to 5, the HAP will provide 61% c the estimated budget. Over the five-year period the HAP will provide 63% of the estimat budget. The requirements for funding by the HAP are presented hereunder:

	J$ (x 1000)					
Items	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
(1) Salaries	670.8	704.3	739.5	776.5	815.3	3,706.4
(2) Travel & Transportation	425.0	132.4	132.4	132.4	132.4	954.6
(3) Commodities	154.9	80.0	73.0	69.6	67.2	444.7
(4) Training & Communications	76.4	37.9	37.9	37.9	37.9	228.0
(5) Technical Assistance	-	15.0	66.0	66.0	66.0	213.0
(6) Revolving Fund	-	-	165.0	-	-	165.0
(7) Contingency & Inflation	32.8	13.3	31.7	48.2	65.4	191.4
SUB-TOTAL	1,359.9	982.9	1,245.5	1,130.6	1,184.2	5,903.1
(8) Overheads (15%)	204.0	147.4	186.8	169.6	177.6	885.4
TOTAL	1,563.8	1,130.3	1,432.3	1,300.1	1,361.8	6,788.5

Budget Notes

A detail of expenses by item for the first year for each one of the sources is given in the next three tables. A description of such items is provided as follows:

Items covered by HAP source

1. Personnel

As stated in the Section 5, the sub-project staff will comprise fourteen direct-hired persons. The Sub-Project Manager will be a senior member of the staff of the Research & Development Division. A provision for Project Pay for this officer is made in the budget.

The Personnel Budget is comprised of the following:

Personnel based at MINAG	J$(x 1000)per year
Sub-Project Manager Project Pay	40.0 *
Sub-Project Coordinator	90.0
Secretary	23.0
Agronomist (3)	118.5
Economist	46.0
Rural Development Officer	39.5
Plant Protection Officer	46.0
Assistant Agronomist (3)	60.0
Field Workers (6)	33.0
	496.0

* Research and Development Division's contribution to Sub-Project Manager's total salary and benefits package will be J$58,000/year and a projected 10% per annum increase.

Personnel based at IICA	J$(x 1000)per year
Technical & Administrative Coordinator	105.7
Administrative Assistant	69.1
	174.8

Total budget for MINAG- and IICA-based personnel: 670.8

The Field Teams Leaders and Technical Core Team members were graded within the Government scale as NPS III and IV; the Assistant Agronomists were graded in the PSTGN scale; the field workers at J$25 per day.

The salaries and benefits of the Sub-Project Coordinator, Technical & Administrative Coordinator, and Administrative Assistant have been budgeted at levels that should attract suitable candidates for those positions.

2. Travel and Transportation

a) Vehicles

Five (5) vehicles are required: three for the Field Teams (one for each team); one to be shared by the Sub-Project Manager and Sub-Project Coordinator; and one to be shared by the members of the Technical Core Team.

There will be: 4 single-cab and 1 double-cab pick-up trucks. All will be 2-Wheel drive vehicles. The double-cab vehicle is required for the members of the Technical Core Team who will travel as a group most of the time to provide support to the different field teams in OFT-implementation and monitoring.

All vehicles (and equipment) will be considered the property of the R & D Division, Ministry of Agriculture. IICA will manage the vehicles on behalf of the R & D Division, Ministry of Agriculture.

Estimated cost of the vehicles is J$77,000 (US$14,000) for the double-cab pick-up and J$53,900 (US$9,800) for each of the single cab-units, CIF Kingston, purchased out of "in-bond" Miami.

Total estimated cost of vehicles: J$292,600

b) Local Travel

The professional staff members of MINAG, who will provide technical support to the sub-project, will utilize 11 person-days per diem per month, that is, 132 person-days per diem per year in travelling from Bodles or Hope Gardens to the sub-project area.

Total estimated per diem for MINAG support personnel:
132 days/year @ J$50/day:.....$6,600

Six Field Team Members will be required to travel from the sub-project area to MINAG, Hope Gardens, to debrief on each month's activities and accomplishments.

Total estimated per diem for Field Team personnel:
72 days/year @ J$50/day:.....J$3,600

The Sub-Project Coordinator, Rural Development Officer, Plant Protection Officer, and the Economist will utilize 387 person-days per diem per year in travelling from MINAG, Hope Gardens, or Bodles to the sub-project area.

Total estimated per diem for these personnel:

- Sub-Project Coordinator: 3 days/week x 43 weeks @ J$50/day:.....$6,450
- Plant Protection Officer, Rural Development Officer, Economist:
  each @ 2 days/week x 43 weeks @ J$50/day:....J$12,900

Total estimated local travel cost: J$29,550

c) Maintenance of vehicles, Fuel and Lubricants and Insurance of vehicles

Replacing four (4) tyres/vehicle/year. The factory-fitted tyres are ordinary bias-ply light truck tyres which, from our experience in the Cropping Systems Project, will need replacing after about 10,000 miles. This level of mileage will be attained in about 6-7 months.

Twenty (20) steel-belted radials @ J$500	J$10,000
Replacing 2 batteries/year @ J$400	800
Complete servicing: 5 vehicles/month @ J$360	21,600
Fuel, lubricants, miscellaneous repairs @ J$11,000/vehicle per year	55,000

Insurance of six vehicles: our experience in the Cropping Systems Project is that it is cost effective to insure new project vehicles full cover through the IICA Head Office Group Motor Vehicle Policy which is held with a Washington D.C.-based Insurance Company, and to maintain just Third Party Insurance on each vehicle with a local Insurance Company, with which the IICA Jamaica Office has a group motor vehicle insurance policy. Total premium per vehicle will be approximately J$3,250.

Total estimated insurance premium/year for 5 vehicles	J$ 16,250
Total estimated cost for maintenance of vehicles, Fuel and Lubricants, and Insurance of vehicles	J$102,850
Total Travel and Transportation for the first year	J$425,000
Total Travel and Transportation for each succeeding year: (J$425,000 - J$292,600)	J$132,400

3. Commodities

This item includes all materials required to carry out the field trials in the Agronomic Component such as: fertilizers, pesticides and planting materials, as well as all equipment and other research supplies. All commodities will be handed over to the R & D Division immediately after purchasing.

a) Equipment

The equipment for the first year includes JS$27,500 for a computer with graphics adapter, graphics monitor, a near-letter-quality dot matrix printer, an uninterruptible power supply, and software. A list of other equipment is indicated below:

- Weighing scales (3)	$ 1,320
- Knapsack sprayer (3)	$ 2,266
- Ultra low volume (3)	$ 2,046
- Herbicide sprayer (3)	$ 2,266
- Measuring tapes (6)	$ 968
- Pocket calculators (10)	$ 550
- Camera with lens (3)	$ 360
- Hoes, cutlasses shovels, forks, buckets, measuring spoons, etc.	$ 3,000
- Flip Chart (1)	$ 275
- Pens, pencils paper, tape, transparencies	$ 2,750
- Rain gauge (12)	$ 495
- SUB TOTAL	$43,796
Importation Costs	$ 7,445
TOTAL	$51,241

b) Planting Material

-	17,848 Coffee plants @ $0.25 ea.	$ 4,462
-	8,226 Cocoa plants @ $0.25 ea.	$ 2,056
-	8,590 Plantain suckers @ $0.50 ea.	$ 4,295
-	288 Mango plants @ $15.00 ea.	$ 4,320
-	4,353 Pineapple suckers @ $0.30 ea.	$ 1,306
-	720 Coconut plants @ $3.00 ea.	$ 2,160
	SUB TOTAL	$18,599
-	2 lbs. Cabbage seed @ $193/1/4 lb.	$ 1,544
-	3 tons Seed Potatoes @ $4,800/ton	$14,400
-	3,600 lbs Yam planting material @ $1.50/lb	$ 5,400
	TOTAL	$39,943

c) Fertilizers

2 tons 12:24:12 @ $1170/ton	$ 2,340
9 cwt 16:5:19 @ $937/ton	$ 422
17 cwt Urea @ $1108/ton	$ 942
64 cwt 6:18:27 @ $1092/ton	$ 3,494
216 cwt 12:4:28 @ $926/ton	$10,000
11 cwt Diammonium Phosphate @ $1602/ton	$ 881
21 cwt Sulphate of Ammonia @ $770/ton	$ 808
72 tons Bioganic @ $350/ton	$25,200
85 cwt 7:14:14 @ $894/ton	$ 3,800
6 cwt 12:10:18 @ $942/ton	$ 282
TOTAL	$48,169

d) Pesticides

10 L Basudin 60 EC @ $425/5L	$ 850
2 Gal. Fenitrothion @ $203/gal	$ 406
10 L Nuvacron @ $83.20/L	$ 832
50 lb Slugocide @ $6.95/lb	$ 348
100 x 400 g boxes Klerat @ $25.20/box	$ 2,520
5 Kg Daconil 2787 - 75 WP @ $85.60/Kg	$ 428
10.5 L Bravo @ $233.30/3.5L	$ 700
40 lb Copper Fungicide (Champion) @ $15/lb	$ 600
55 lb Mancozeb @ $577.50/55 lb	$ 578
5 Kg Ridomil MZ @ $121.40/Kg	$ 607
1 Gal Surfactant AP @ $84.35/gal	$ 84
TOTAL	$ 7,953

e) Other Research Supplies

8 rolls Plastic Mulch @ $950/roll	$ 7,600

Total estimated cost of Commodities: J$154,906

4. Training and Communications

a) Field Days

Nine field days will be held each year (three in each sub-region) to acquaint farmers who operate within and outside of the sub-project area with the activities and results generated. Cost per field day is estimated to be $1,375. Our experience in the Cropping Systems Project shows that this amount will suffice to pay for fuel and driver's wage for the Bodles Agricultural Research Centre's bus for transporting farmers from outside of the sub-project area, and for lunch and refreshments for approximately 150 persons.

Total estimated cost of field days: J$12,375

b) Training Courses

Training courses for sub-project staff and associated MINAG R & D and P & E personnel:

2 Training courses/year for 20 participants per course @ J$110/day/participant for 18 training days/year: J$17,600

c) Communications System

Public communication systems in the sub-project area are severely limited in scope. Our experience in the Cropping Systems Project shows that it is necessary to have an alternative means of communication between main office and support groups and the field teams.

In order to achieve this, it is proposed to provide one battery-operated transceiver (which will be specified for use with the radio network being operated by MINAG) for each of the following personnel:

1 Sub-Project Manager (MINAG)
1 Sub-Project Coordinator (MINAG)
1 Technical Core Team (MINAG)
1 Field Team I (MINAG)
1 Field Team II (MINAG)
1 Field Team III (MINAG)
1 Technical & Administrative Assistant (IICA)

Total estimated cost of 7 transceivers @ J$5,500 each: J$38,500

d) Publications

Printing of reports and publications for extension purposes have been allocated at J$7,946/year.

Reports:

3 Quarterly Reports @ 30 pages each x 50 copies:	4,500 pages
1 Semester Report @ 40 pages x 50 copies:	2,000 "
1 Annual Report @ 60 pages x 50 copies:	3,000 "
1 Achievements Publication @ 15 pages x 200 copies:	3,000 "
3 R & D and Extension Bulletins @ 6 pages x 2900 copies each	52,200 "
9,150 printed front covers:	9,150
	73,850

73,850 printed pages (including front cover) @ J$0.1076 per page: J$ 7,946.26

This cost of J$0.1076 per printed page/cover is calculated from actual variable costs experienced in the printing of 700 x 186 pages Manuals on the offset printer at the IICA Office.

Total Training and Communications cost: J$76,421

5. Technical Assistance

The short term consultants will be paid using the IICA authorized per diem according to IICA's standards for a total of 19 person months. Half will be allocated for national consultants and half for international consultants.

6. Revolving Fund

A revolving fund credit fund of J$165,000 will be operating as a contribution of the sub-project to assist farmers in the application of new technology.

7. Contingency and Inflation Factors

Years 1 and 2:	Only Contingency at 5% of Line Items 2-5 is included
Years 3 - 5:	Contingency and Inflation at 5% per year. All of the estimates of expenditure for Line Items 2-5 in years 3-5 are made at year 1 costs.

8. Overhead

Fifteen per cent (15%) has been marked as overhead expenses for IICA.

9. MINAG/IICA Contributions

MINAG contributions are mainly represented in-kind, valuing the time technical staff will devote to different aspects of the sub-project such as: attending meetings, analyzing reports, visiting fields, etc. Technical staff committed to the project are from the R & D and P & E Divisions.

These staff are:

2	Division Directors
2	Deputy Directors
3	Principal Research Officers
4	Regional Extension Officers
3	Field Extensionists
1	Agricultural Economist
1	Training Specialist

These personnel are expected to spend from 3 to 5 days per month on activities concerning the sub-project. MINAG will also provide the physical space for the training sessions at the Twickenham Park Training Centre.

IICA contributions are also in kind, and is comprised of the assistance provided by three international professionals and two national professionals who will be involved fifteen per cent of their working days per month in activities relating to the sub-project. The Technical and Administrative Coordinator, and the Administrative Assistant will share office space, equipment and services, which are valued at J$6,022 per month.

Farmers' contributions to the sub-project are represented in land and labour. It is estimated that 62.2 acres will be used for 84 trials on 168 farms which in turn will involve 40 labour days per farmer per year. Land rent has been calculated at J$80 per acre per year and labour at J$25 per day. Value of land rent and farmers' labour has been increased by 10% per year.

HA-FSRD SUB-PROJECT

DETAILS OF EXPENSES BY ITEM AND YEAR - MINAG

ITEM \ YEAR	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Technical Assistance	231,000	254,100	279,510	307,455	338,206	1,410,271
Training Centre	3,322	3,652	4,015	4,422	4,862	20,273
TOTAL	234,322	257,752	283,525	311,877	343,068	1,430,544

DETAILS OF EXPENSES BY ITEM AND YEAR - FARMERS

ITEM \ YEAR	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Land	4,976	5,474	6,021	6,623	7,285	30,379
Labour	168,000	184,800	203,280	223,608	245,969	1,025,657
TOTAL	172,976	190,274	209,301	230,231	253,254	1,056,036

DETAILS OF EXPENSES BY ITEM AND YEAR - IICA

ITEM \ YEAR	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Technical Assistance	171,083	188,191	207,010	227,711	250,482	1,044,477
Office Space & Services	72,281	79,508	87,461	95,859	105,825	440,935
TOTAL	243,364	267,699	294,471	323,570	356,221	1,485,412

7. EVALUATION

Due to the integration of the six components -- PARTICIPATION, AGRONOMICS, ECONOMICS, INSTITUTIONAL LINKAGES, ADMINISTRATION, and MONITORING & EVALUATION -- at each stage of the sub-project, the plan for monitoring and evaluation has been discussed in the description of the sub-project in Section 3. Since evaluation is integral to the sub-project, terminal evaluation, which is the final stage, is also discussed in Section 3.

This sub-project will be evaluated by the Data Bank & Evaluation Division of the Ministry of Agriculture on a Quarterly, Annual, and Terminal basis using the evaluation methodology whose basic framework is outlined on page 18.

Referring to the plan of action, which is presented in the next section, it can be seen that the term "terminal evaluation" has been used in the context of:

(a) end-of-year evaluation for each year; and

(b) end-of-sub-project evaluation at the end of the fifth year.

8. IMPLEMENTATION PLAN

A Table with the detailed chronology for the plan of action is presented on page 56a. This Table shows the main activities to be implemented (quarterly) in each of the six components of the sub-project during the five-year period. A description of activities for each component is included in Volume II.

CHRONOLOGICAL PLAN OF ACTION

STAGES AND COMPONENTS	1987-88				1988-89				1989-90				1990-91				1991-92				1992-93			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Stage I - Design																								
A. Farmers' participation initiated	X	X	X	X	X	X																		
B. Collect data on agronomic aspects				X																				
C. Research multi-seasonal farm models			X	X																				
D. Initiate institutional cooperation		X	X	X																				
E. Plan administrative logistics	X	X	X	X																				
F. Design monitoring and evaluation system			X	X																				
Stage II - Implementation																								
1. Initiation																								
A. Farmers' participation incorporated into project					X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	
B. Develop and test technological methodology					X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X
C. Develop multi-seasonal farm models					X	X	X	X																
D. Coordinate institutional services					X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X
E. Take steps for general project initiation		X	X	X																				
F. Initiate data collection and monitoring activities			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Evolution																								
A. Farmers modify attitudes and agronomic activities			X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X
B. Modify technologies based on A above					X	X	X	X		X	X	X	X		X	X	X	X	X	X				
C. Test and refine multi-seasonal farm models based on A above					X	X	X	X																
D. Modify institutional services based on A above																	X	X	X	X				
E. Administrative support continues										X	X	X	X		X	X	X	X	X	X	X	X	X	X
F. Monitoring and evaluation of major components (ABCD)					X	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X
3. Consolidation																								
A. Farmers' initiate self-financed and self-managed production													X				X	X	X	X	X	X	X	X
B. Verify results of superior technologies																	X	X	X	X	X	X	X	X
C. Integrate multi-seasonal farm models													X	X	X	X	X	X	X	X				
D. Integrate institutional services													X	X	X	X	X	X	X	X	X	X	X	X
E. Administrative support continues										X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
F. Monitoring and evaluate farmers management of BCD					X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Stage III - Terminal Evaluation																								
A. Evaluate farmer management of tree crop farming systems																			X	X			X	X
B. Evaluate technologies most widely used								X				X				X				X			X	X
C. Evaluate farm models most widely accepted																			X	X			X	X
D. Evaluate institutional cooperation linkages and services								X				X				X				X			X	X
E. Evaluate administration logistics								X				X				X				X			X	X
F. Evaluation of project impact all components								X				X				X				X			X	X

LIST OF ACRONYMS

1	ACB	Agricultural Credit Bank
2	BACO	Banana Company
3	BECO	Banana Export Company
4	BGA	Banana Growers Association
5	CAIB	Cocoa Industry Board
6	CATIE	Tropical Agriculture Research and Training Centre
7	CEPI	Center for Investment Projects
8	CIB	Coffee Industry Board
9	CIDIA	Inter-American Agricultural Information and Documentation Centre
10	CIDCO	Coffee Industry Development Company
11	CIM	Inter-American Commission on Women
12	COIB	Coconut Industry Board
13	ECLA	Economic Commission for Latin America
14	FACTS	Farmer Action Committee Teams
15	FAO	Food and Agriculture Organization of the United Nations
16	FCF	Farmer Cooperatives Federation
17	FSR	Farming Systems Research
18	FSRD	Farming Systems Research and Development
19	GOJ	Government of Jamaica
20	HAC	Hillside Agriculture Committee
21	HAP	Hillside Agricultural Project
22	IABA	Inter-American Board of Agriculture
23	IDB	Inter-American Development Bank
24	IDRC	International Development Research Centre
25	IFAD	International Fund for Agricultural Development
26	IICA	Inter-American Institute for Cooperation on Agriculture
27	ILO	International Labour Organization
28	IRDP	Integrated Rural Development Project
29	JAS	Jamaica Agricultural Society

30	JPA	Jamaica Pimento Association
31	M.E.	Monitoring and Evaluation
32	MINAG	Ministry of Agriculture
33	MSFM	Multi-Seasonal Farm Model
34	NHFDP	National Hillside Farm Development Programme
35	OAS	Organization of American States
36	OFT	On Farm Trials
37	PCB	People's Cooperative Bank
38	PIOJ	Planning Institute of Jamaica
39	PIP	Participation in Individual Programme
40	R & D	Research and Development
41	SFS	Strategy for Strengthening
42	UN	United Nations
43	UNESCO	United Nations Educational, Scientific and Cultural Organization
44	USAID	United States Agency for International Development

VOLUME I

ANNEX A

IICA INSTITUTIONAL BACKGROUND

IICA INSTITUTIONAL BACKGROUND

1.1 Nature and purposes of IICA

The Inter-American Institute for Cooperation on Agriculture (IICA) is the specialized agency for agriculture of the Inter-American system. With its present structure, it is the institutional continuation of the Inter-American Institute for Agricultural Sciences, which was created by the Council of Directors of the Pan-American Union in October of 1942.

The Convention governing the institute states that IICA's purpose is to "encourage, promote and support the efforts of the Member States to achieve their agricultural development and rural well-being." IICA is an International Organization, with full legal capacity. It is governed by its Member States, which are responsible for providing guidance, following up on activities and evaluating the Institute's actions. The Inter-American Board of Agriculture (IABA) is the Institute's highest governing body, and the General Directorate, its executive body.

The Inter-American Board of Agriculture (IABA) is composed of representatives of all the Member States. It meets every two years, and its responsibilities include approving policy guidelines and the two year programme budget. In order to perform these duties, the Board has the Executive Committee as an executive body, acting on its behalf. The Executive Committee is composed of representatives of twelve Member States, elected on the principle of rotation and geographic distribution. Its functions include examining proposals for the biennial programme budget, submitted to the Board by the Director General, and making preliminary comments and recommendations to the Board, in its role as a preparatory body.

The General Directorate is comprised of technical and administrative units responsible for coordinating and implementing of the Institute's actions, in accordance with policies established by the Board.

1.2 History of IICA's activities and priorities

IICA is an organization dedicated to meeting the needs of its Member States, which derive from their efforts for agricultural development and rural well-being. The Institute's actions and priorities have gradually shifted over the course of the years, fitting themselves to new problems and meeting new needs in the countries. The process of change is noticeable both in the issues targeted through Institute action and in its approach to technical cooperation.

Initially, the Institute concentrated on developing agricultural sciences. In accordance with the mandate of its 1944 Convention, IICA's action was to encourage and promote the developmet of agricultural science in the countries through research, graduate training and the dissemination of agricultural theory and practice. To meet its objectives, the Institute focused on two lines of action: training and research. It carried out activities in five major areas: agronomy, animal health and production, entomology, plant science and soils. At that time, the Institute was organized to meet the need for a training and research center; operationally and structurally, it was divided into units specializing in research and graduate instruction.

During the 1950's IICA expanded its sphere of activities, adding a third line of action for rural development. Regional offices were opened in Montevideo, Uruguay in 1951; and in Lima, Peru and Havana, Cuba in 1952. This marked the beginning of the Institute's shift of focus toward the countries. At that time, the regional offices were used as the base for regional cooperation projects with the countries. The key component of IICA's new operating approach was the performance of regional actions by a group of experts concentrating on areas in which the countries lacked native technical capacity. The countries' technical teams were still being developed at the time, and international experts were required to fill national needs and to help develop capacities in the countries through the graduate training programme in Turrialba.

During the 1960's profound changes occurred in international relations. Many countries assumed new commitments and geared themselves for development in the framework of the Alliance for Progress. Studies forthcoming from ECLA influenced intellectual currents of the time, which raised awareness of the problems of underdevelopment and helped redefine the role that should be played by government institutions.

The countries undertook agrarian reform and began to develop public institutions, which rapidly grew. IICA had a new administration and had received a number of recommendations from the fifth and sixth meetings of the Technical Advisory Council (Lima, March 1960 and San Jose, March 1961). The Institute revised its programmes with the assistance of external experts and its own staff members, and in consultation with national authorities in the countries. New directions and priorities were adopted for the 1960's calling on IICA to project its action throughout the hemisphere and establish general projects to benefit all of the Member States.

IICA took on a new dimension, requiring substantially increased resources to extend its programme and this was achieved with a contribution from the Special Fund of the United Nations. IICA's three lines of action from the previous period grew to six: rural development; institutional strengthening; utilization of the tropics; agriculture in arid and humid regions; the regional cooperative programme for graduate training and research in crop breeding and livestock production; and agricultural communication.

The "new dimensions" of IICA's action induced major structural change: the Institute was transformed from a research and training center into an Inter-American agency designed to provide technical assistance to its members countries. The regional offices were consolidated, the Institute's General Directorate moved from Turialba to San Jose, and the Latin American Agricultural Credit Center was set up in Mexico where it would operate from 1961 until 1966, under OAS project 201. Finally, the process of expanding and decentralizing the Institute's geographic coverage began with the establishment of offices in the Member States. All of these actions produced a diversification of IICA's technical teams and gave the Institute a permanent presence in the countries.

The changes experienced during the 1960's were incorporated into the Institute's first General Plan, approved in 1970. This plan established a new programme structure based on seven lines of action designed to expedite the consolidation and improvement of institutional systems for agricultural and rural development in the Member States. The lines of action were: information and documentation for rural development; agricultural research and technology transfer; agricultural production, productivity and marketing; regional rural development; structural change and campesino organization; and development and administration of agricultural policy.

Each one of these lines of action in turn contained one or more programmes. Thus, the Institute has a total of 28 technical programmes by the end of the 1970's. During this period, IICA experienced rapid growth in its budget and in the number of Member States. Once again, growth sparked a process of renewal and expansion of the Institute's technical team, a trend which slowed toward the end of the decade.

Significant changes which occurred during the 1970's included the assignment of high priority to cooperation in the countries and the consolidation of a network of offices in all the Member States. These changes shifted emphasis to regional directorates, which were now made responsible for coordination and supervision. IICA's actions focused on strengthening the capacity of other institutions playing an important role in the guidance of agricultural development and supporting organizations for sectoral planning and for policy implementation. The Institute also contributed by developing operational models for agrarian reform and supporting the countries in efforts to change patterns of land tenure and to organize farmers.

Area directors were transferred back to San Jose in 1980 as a means of overcoming difficulties inherent in their widespread geographic distribution, streamline operating procedures, and allow them to provide more efficient support for the offices.

IICA's process of gradual change eventually transformed the Institute into an organization for technical cooperation and institutional strengthening in the agricultural sector; the process culminated with the ratification of the new Convention by the Member States in 1980.

The Convention introduced essential changes. It clearly defined the relationship between the Institute and the countries, specifically established IICA's functions and organs, programmes and operations and consolidated the Institute's role as the specialized agency for agriculture of the OAS system.

IICA's functions as established by the new Convention are to:

a. Promote the strengthening of national education, research, and rural development institutions, in order to give impetus to the advancement and the dissemination of science and technology applied to rural progress.

b. Formulate and execute plans, programmes, projects and activities, in accordance with the needs of the governments of the Member States, that will help them meet their objectives for agricultural development and rural welfare policies and programmes.

c. Establish and maintain relations of cooperation and coordination with the Organization of American States and with other agencies or programmes, and with governmental and non-governmental entities that pursue similar objectives.

d. Act as an organ for consultation, technical execution and administration of programmes and projects in the agricultural sector, through agreements with the Organization of American States, or with national, Inter-American or international agencies and entities.

The Inter-American Board of Agriculture, at its first regular meeting held in Buenos Aires, Argentina in August of 1981, decided it was necessary to review the Institute's policies and operations to make them consistent with the new Convention. Consequently the Board requested the Director General to form a group of five external experts in agricultural and rural development to conduct a general review of IICA's operations and policies.

The group of five experts studied the problems affecting agricultural and rural sectors in the countries and recommended that the Institute adopt basic programmes, with the approval of the Member States, that would anticipate problems in Latin America and the Caribbean during the following decade. The group of experts suggested that programmes be designed to complement policies for agricultural and rural well-being defined by the countries themselves.

The Board adopted the 1983-1987 Medium Term Plan, written after careful consideration of the study of problems affecting countries in the region, and following consultation with the governments of the Member States. This plan replaced the earlier seven lines of action with ten programmes to serve as a support structure for IICA's action. These programmes were: (i) formal agricultural education; (ii) support of national institutions for the generation and transfer of agricultural technology; (iii) conservation and management of renewable natural resources; (iv) animal health; (v) plant protection (vi) stimulus for agricultural and forest production; (vii) agricultural marketing and agro-industry; (viii) integrated rural development; (ix) planning and management for agricultural development and rural well-being; (x) information for agricultural development and rural well-being.

Changes were made in IICA's organization and operational structure to provide more effective and responsive technical cooperation to the countries. In 1983 the Institute adopted a matrix structure with technical channels and operational channels and divided the hemisphere into four areas: Central, Caribbean, Andean and Southern. It set up 27 national offices and established CEPI, CIDIA, and CATIE as specialized centers, the latter being an associated unit. Area directorates were once again located in the countries to conduct functions of supervision and coordination.

Rapid development in the countries, especially in technical areas and in human resources, made it necessary to review the Institute's approach to technical cooperation and its areas of action. It soon became evident that a technical cooperation model based primarily on the work of specialists with limited operating resources and acting in relative isolation from one another was no longer responding to the needs of the countries. The countries had developed their own capacities in many fields, and this obliged the Institute to find ways of maximizing its impact in solving the problems.

Today the Institute needs to make better use of scarce resources, of continuous and rapid change in its environment and of the growing move toward regional and subregional integration. Not only should it concentrate resources and activities in a smaller number of areas, but it also needs more effective instruments and procedures for cooperation so as to increase its technical expertise and exercise effective leadership in Latin America and the Caribbean.

VOLUME I

ANNEX B

IICA'S EXPERIENCE IN THE FARMING SYSTEMS APPROACH TO RESEARCH IN JAMAICA

FARMING SYSTEMS APPROACH TO RESEARCH - CONCEPTS

The Farming Systems Approach to Research (FSAR) is a product of the 1970's which developed due to frustration over partial or complete failure of other approaches in developing technology relevant for farming families located in relatively unfavourable environments. 1/

The FSAR is still evolving and, therefore, conventional wisdom for solving methodological and implementation problems has still not been developed. However, some general guidelines are emerging, but these are likely to be modified in the light of further experience. 1/

The primary goal of the FSAR is to increase the overall productivity of the farming system and the farming system is determined by the total environment in which the farm family operates. This total environment is comprised of the physical, biological and sociological components, as well as those factors such as land, labour, capital, and management which individual farm families control.

The adoption by a farm family of a farming system results from decisions made by the family regarding the allocation of their resources to different on and off-farm enterprises to fit in with their expectations of maximizing the attainment of their goals. The Sociological component as well as the factors which are under the control of the farm family have often been neglected in traditional research approaches aimed at developing improved technologies. Because of this, the small farmer, operating within a total environment that is usually markedly different from that on a research station, has often rejected such improved technologies.

1/ David Norman, 1982. The Farming Systems Approach to Research. In Farming Systems Research Symposium "Farming Systems in the Field", Kansas State University, Manhattan, Kansas, November 21-28, 1982.

As can be observed with the next section, IICA's aproach in Jamaica towards the generation of improved technologies has evolved over the past twelve years from taking research into the farming community by setting up research stations in the community (as in the Allsides Project 1976-79) and the Olive River Project 1978-81), to doing research on the farms and in the areas for which the results are intended to be used (as in the Brumdec Project 1981-1983 and the Cropping Systems Project 1984-1987). The Cropping Systems Project is the first project in Jamaica to use as its modus operandi the Farming Systems Approach to Research. IICA has provided technical support to the Ministry in their execution of that project.

IICA's experience regarding the specific problem of the Hillside Agriculture sub-project

The specific problem relates to the lack of economically viable production systems in Jamaica. This is particularly noticeable in the traditional agricultural practices pursued on the thousands of hillside farms which account for 78% of the total number farms, 15% of the land area in farms, and produce over 85% of food grown for domestic consumption as well as a significant portion of crops grown for export.

IICA's experience in solving this specific problem in Jamaica relates to its involvement in three projects:

- Allsides Project in the parish of Trelawny. (1976-1979)
- Olive River Project, also in Trelawny. (1978-1981)
- Farming Systems Research in the parish of St. Catherine in the Guy's Hill and Watermount areas. (1984-1987 Phase 1, 1988-1990 Phase 2)

ALLSIDES PILOT DEVELOPMENT PROJECT (1976-1979)

In general terms IICA's first assignment in Jamaica involved activities which were associated with the improvement of agriculture on hillside lands in which the conservation of land and water resources was of prime national interest. This assignment related to the Government of Jamaica formulating a specific project to overcome the problem concerning the inadequacy of appropriate cropping systems.

IICA was requested by the Government of Jamaica to assist in:

(i) developing a body of knowledge on hillside farming and cropping systems which are conducive to changing the pattern of traditional farming practices on steep hillside lands, and generating acceptable levels of income; and
(ii) disseminating the knowledge gained as widely as possible.

National effort to resolve the problem was predicated on research studies and major findings which indicated that:

Very high soil loss occurred on unprotected soils:-

- 136 tons per hectare, equivalent to 54 tons per acre, per annum;
- an associated and continuing heavy soil loss, together with significant reduction in production and productivity.

Very low or tolerable soil loss on land which was protected by bench-terracing:-

- 18 tons per hectare, equivalent to less than 8 tons per acre per annum; and
- an associated retarded rate of soil erosion associated with enhanced production and productivity.

Allsides in the parish of Trelawny was selected as an appropriate project area, and MINAG in cooperation with IICA prepared a project titled:

"Hillside Farming Study and Implementation Project in Jamaica - The Allsides Pilot Development Project".

The project was accepted for financing by IICA through its Simon Bolivar Fund, in December 1976, the first phase of which was to last for 3 years.

Specific Project Objective

The specific objective of the project was to:

"Develop production systems for bench-terraced farmlands, based on multiple cropping and efficient utilization of land and water resources", which will result in:

- increased level of production and productivity;
- increased net-farm income;
- enhanced nutritional profiles for hillside farm families;
- increased opportunities for rural employment;
- an institutional framework capable of implementing similar changes in other areas of the country; and
- reliable production data for commodities produced by small farmers.

Activities related to the specific problem

(1) Assisting the Ministry of Agriculture in formulating the Allsides Pilot Development Project for financing and co-implementation by IICA.

(2) Assessing fertility of soils of project area, determining limiting factors and crops which may be economically produced.

(3) Establishment of 3-acre research and demonstration plot on bench-terraced land to:

- determine and demonstrate food crop production techniques;
- study and develop new techniques and production systems, including their economic analyses.

(4) Collaboration with MINAG staff in designing and analysing systems of production.

(5) Collaboration with MINAG staff in the elaboration and execution of soil conservation projects on bench-terraced land.

(6) Maintenance of demonstration plots, data collection and analysis.

(7) Undertaking applied agronomic and economic research into cropping systems during a process of annual development and re-validation.

(8) Training and transfer of technology, using results from research and demonstration activities, through seminars, production and extension materials, workshops, field trips as part of overall technology development.

(9) Providing in-service training for Jamaican nationals in areas such as soil fertility assessment.

(10) Carrying out a case study of the domestic marketing situation with particular reference to "Higglering".

(11) Assisting farmers in adopting new technology through on-farm demonstration plots, provision of production inputs, etc.

(12) Studying the institutional framework necessary for delivering production to consumers, and making recommendations for improving organizational performance.

(13) Undertaking studies in the marketing of principal hillside crops produced in areas surrounding the project site.

(14) Determining critical problems and needs of farmers, and establishing the Allsides Pre-Cooperative.

(15) Assisting MINAG in developing methodologies for formulating a National Hillside Farm Development Programme (NHFDP).

- providing a descriptive and quantitative diagnosis of hillside agriculture;
- defining and applying criteria for selecting watershed areas needing priority rehabilitation;
- preparation of NHFDP - objectives, goals, strategy, and recommendations for implementation.

(16) Preparing an agricultural research position paper as a basis for increasing national research capability.

(17) Preparing and presenting a technical paper on hillside agriculture at the XVI Annual Convocation of the Caribbean Food Crops Society held in the Dominican Republic in 1979.

(18) Preparation of project "Pilot Hillside Agricultural Project", with IDB financing assistance, for extending the scope of the Allsides project in the Southern Trelawny area of Jamaica.

(19) Diagnosis of farming systems for Allsides and surrounding areas, and undertaking agro-socio-economic surveys in collaboration with the Ministry of Agriculture.

(20) Designing and implementing non-bench terrace conservation methods at Olive River for protecting lands on slopes similar to those at Allsides using successful cropping systems developed at Allsides.

(21) Preparation and presentation of paper titled: "The Allsides Project Case Study" at the Inter-American Congress of Food and Agricultural Production, in Sao Paulo, Brazil, September 1981.

(22) Preparing initial proposals for IFAD projects to assist with the improvement of hillside farming in Jamaica which culminated in the IFAD/IDB Small Farmer Programme in Jamaica.

(23) Designing and testing alternative models of Farmers' organizations.

(24) Re-inforcement of the operative unit at Allsides with respect to project programming, co-ordination, management and implementation.

THE OLIVE RIVER PROJECT (1978-1981)
(Developing and Testing Alternative Approaches to Bench-Terracing)

The Olive River Project, which was a sub-project of the Allsides Project, was designed to test alternative approaches to bench-terracing, in view of its very high capital cost for the construction of infrastructure. The activities involved:

(i) Identifying land not too far distant from the Allsides research station, having similar slope categories, rainfall profile and soil types to those of Allsides, and in an area in which crops included in the cropping systems developed at Allsides could be economically produced.

(ii) Construction of infrastructure for quantifying soil loss and developing measures other than bench-terracing for restricting accelerated soil erosion. These measures were:-
- individual hills with hillside ditches;
- contour mounds with hillside ditches;
- contour mounds with a grass buffer strip; and
- individual hills (used as the check).

(iii) Establishing crops and analysing the results in terms of volume of production and of soil loss.

(iv) Assessing and undertaking measures for reducing heavy nematode damage associated with yam production in general.

(v) Initiating cropping systems other than those used at Allsides including crops such as coffee and tetraploid banana.

FARMING SYSTEMS RESEARCH IN THE CROPPING SYSTEMS PROJECT
(1984-1987 Phase 1, 1988-1990 Phase 2)

The lag in the development of adaptive research (appropriate technology) and the low rate of adoption by farmers of even that technology which is available occasioned a search for corrective measures for overcoming these deficiencies, especially in the interest of small farmers.

In November 1984 MINAG, through its Research and Development Division, with assistance from IICA and funding by the IDRC of Canada, formulated the Cropping Systems Project to test the appropriateness of the Farming Systems Research Approach for improving the major cropping systems in the Guy's Hill and Watermount areas of the St. Catherine Land Authority. IICA was assigned the responsibility for technical support, monitoring services and administration of the funds while MINAG undertook responsibility for on-farm research.

PROJECT OBJECTIVES (FSR)

Overall Objective

"To initiate and implement a structured farming system research project in two different ecological zones of the St. Catherine Land Authority".

Specific Objective

(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 in-service 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 being undertaken in the project area.
(d) To obtain a more detailed understanding of the farming systems in the two project areas.

The results obtained in the Cropping Systems Project indicate that the Farming Systems Research Approach was an appropriate methodology for adapting technology to the small-farmer environment since it resulted in a more rapid assimilation of beneficial technology by small-farmers than had been experienced through other approaches.

ACHIEVEMENTS

The major achievement of the programme in which IICA was involved since 1976 include:

1. Development of a body of technical information for use in undertaking the programme of work pursued at Allsides.
2. Development and testing of 20 cropping systems for Allsides from which 8 were replicated, re-tested and validated.
3. Identification and development of alternative soil conservation measures to that of bench-terracing (at Olive River).
4. Quantification of soil loss under non-bench terraced measures of soil conservation.
5. Preparation and distribution of technical information covering various aspects of cropping systems on soil- conserved land.
6. Considerable data and information related to the hillside agricultural project procured through experimental work, case studies, surveys, workshops and seminars.
7. Creation of the Allsides Pre-Cooperative.
8. Preparation of the Pilot Hillside Agricultural Project.
9. Preparation of the National Hillside Farmer Development Programme.
10. Determination of soil loss from cropping systems developed on land protected with non-bench terraced measures.
11. Provided a catalytic effect to other organizations undertaking projects in the area of developing cropping systems on soil-conserved lands, as a means for solving the specific problem.

CROPPING SYSTEMS PROJECT STRATEGY

The strategy used in the execution of the Cropping Systems Project (Phase I) is outlined hereunder:

Pre-project strategy required that a rapid rural appraisal in the project areas through informal survey be carried out by the core team of the Ministry of Agriculture and IICA over a 5 month period. Data collected was used to design the project in which a detailed first year programme was outlined.

Project initiation strategy required that the following sequence of operations be executed:

i) Ministry of Agriculture and IICA select field team personnel with the objective of achieving a mixture of disciplines/ experiences. Final composition of two field teams was three agronomists, one extensionist, one soil conservationist, and one land development specialist.

ii) Training of project staff and associated personnel in FSR concepts and procedures through introductory (re-orientation) training at start of project and later through execution of a FSR Workshop with assistance of the Farming Systems Support Project, University of Florida, and training of staff and associated personnel in subject matter related to their needs.

iii) Selection of farmers for collaboration in the on-farm trials based on the nature of the problem and current farmers' practices. Initial identification of a homogeneous group of farmers with reference to a particular problem was achieved with the assistance of the extension service and the farmers themselves. Representatives from the group were selected so that on-farm trials regarding a particular problem could be sited in each village in a project area.

iv) Execution of on-farm trials which were project financed/ project managed. The understanding achieved with the farmers was that in this phase the farmers would supply land, and his/her labour to assist in routine operations such as spraying of pesticides, weeding, and reaping. In this phase, land preparation costs were borne by the project. All produce outcoming from on-farm trials became the property of the farmer. Farmers were required to be present whenever operations on the on-farm trials were being executed so that they could be exposed to the technologies applied. It was impressed on the farmers that the trials were their trials on their behalf. In this phase, which occupied the entire first year of the project, three out of twenty-two farmers were released from the programme because they could not fulfill their obligations.

v) Execution of a formal agro-socio-economic survey covering a 10 per cent random sample of farmers in selected extension areas within the project areas, using the Farmers' Register as the listing frame for sampling. The Farmers' Register contains basic agronomic information on farmers throughout the island such as name and address of farmer, size of farm, acreages of the different export and domestic crops cultivated, and number and type of livestock.

vi) Annual project evaluations were assigned to the Data Bank and Evaluation Division of the Ministry of Agriculture.

Project evolution strategy assumes that once a project gets underway, the interaction with farmers will enable the project teams to achieve a better understanding of the circumstances which influence the farmers' decision-making process. Outcoming from the interaction and collaboration with other farmers during the initiation phase was a very clear message that farmers were most

interested in engaging in the production of crops that have a good market or potential for marketing. The amount of net profit likely to be achieved from any particular crop or livestock enterprise was an important consideration, but it was not as important as having an assured market. For example, in both the Guy's Hill and Watermount areas of the project, coffee and cacao occupy 15-23% of farm areas. In Watermount, sugar cane occupies 20 per cent of the farm areas. These are managed under a system characterized by low costs of production, low productivity, and low net profits. However, farmers continue to maintain these crops under this system because they have reliable markets and minimum guaranteed prices. This provides farmers with an assured income and these crops are generally referred to as the "old age pension".

Another significant feedback from farmers was that they aimed at producing only that amount of produce that they felt confident of being able to market based on previous experience. This is a rational use of resources on the farmers' part. The introduction of a new variety of cabbage which could be managed by the farmer without additional costs, and which was twice as productive and also preferred by consumers, influenced the farmers to change their technology as well as their outlook concerning how much they could produce safely.

During the first year of the project, it was noted also that while farmers were spreading their risks by cultivating several different crops at the same time on different sections of their farms, there were other sections of cultivable land not cropped. Some of these sections were in the fallow phase of their cropping systems but other sections were not utilized because the farmers were not confident that they could properly manage other crops which had good market potential.

This feedback from farmers led to a modification of the strategy. Initially, the strategy required the project to be concerned with crops which the farmers were cultivating and to work towards improving the major cropping systems. However, because of the self-imposed limitations by farmers on the production level for any particular crop, it was felt that while improvements in the production systems would improve their efficiency of production, the impact of the project on their total well-being could be greatly increased if the project also was concerned with the introduction to their cropping systems of new crops which have good market potential.

This strategy was seen as a way of working towards providing farmers with a greater number of production alternatives. Since Jamaican small producers are mainly market-oriented, an approach which sought to identify crops which increased their options seemed desirable. The inclusion of new crops in on-farm trials aimed at reducing marketing problems by developing or adapting technologies for the production of readily marketable crops under hillside farming conditions. During this phase, ginger and passion fruit were introduced as new crops and Tropicross, KK Cross, and King Cole were introduced as new cabbage varieties.

During this phase of the project, it became evident that the unavailability of high quality potato planting material was the most important problem limiting production of potatoes in the Guy's Hill project area. Farmers, as a last resort, were obliged to use low quality planting material in potato production. In some instances, as much as 50 per cent of the tubers used did not germinate. Plants which emerged were unthrifty and yields were low.

The unavailability of high quality planting material of potatoes was seen as a major constraint to increasing productivity. In seeking a solution to this problem, a strategy was developed in the project whereby:

(a) project and associated personnel would be trained at the International Potato Centre in rapid multiplication of potato planting material, in vitro culture of potato, and virus testing techniques with a view towards initiating a pilot programme for the production of high quality planting material of the commercial potato varieties grown in Jamaica;

(b) farmers would be trained to manage material outcoming from the pilot programme and to produce their own tuber planting material;

(c) farmers would be trained in rapid multiplication techniques to produce their own rooted stem cuttings and rooted single node cuttings;

(d) the University of the West Indies Botany Department and the Scientific Research Council would sub-culture and multiply virus-tested in vitro potato plantlets in their tissue culture facilities so as to produce continuous supplies of virus-tested stocks for supplying farmers who would need to renew their basic stock of planting material from which to take cuttings for rapid multiplication;

(e) the pilot programme would expand in geographical scope to include the major potato growing areas in Jamaica, and would hopefully be the forerunner of a national potato seed production project.

During the project evolution phase, the project started to address the long-term problem of hillside farming in the context of watershed conservation. The strategy of the project in this respect was to first develop and/or adapt technologies for the economic cultivation of annual cash crops and then to use these technologies for intercropping during the establishment phase of tree crops.

The strategy assumed that once we could identify economically viable technologies for use in intercropping tree crops during their establishment phase up to 2 years after planting, then these technologies could be used to encourage farmers who owned the land on which they farmed to plant more tree crops while at the same time producing annual cash crops as intercrops.

An analysis of the data of the formal baseline survey showed that on a single farm there may be different cropping systems for different sections of the farm. The most frequent cropping system encountered was continuous tree crops cultivation which occurred 46.9% and 44.9% of the time in Guy's Hill and Watermount respectively. Vegetables/legumes/grains/roots/condiments in various sequences and combinations occurred 26.0% and 21.2% of the time in Guy's Hill and Watermount respectively.

In the Cropping Systems reported for Guy's Hill and Watermount, 20.0% and 6.7% respectively of those systems contain a fallow period. Also, 6.3% of the farmers in Watermount and 7.1% of the farmers in Guy's Hill reported having some portion of their farm under pasture. Lands which were at sometime in the past farmed but which have been allowed to revert back to scrubland (referred to as "ruinate" lands) occupied portions of 18.9% of the farms in Watermount and 16.1% of the farms in Guy's Hill. There are several

factors which influence this land use practice. They are lack of resources, restoration of fertility, field sanitation, or lack of knowledge of production alternatives.

Project consolidation strategy

The third year of the project was considered the consolidation phase. In that year, establishment work with tree crops (coffee and cocoa) and their banana intercrop continued, as well as work on integration of feed crops/livestock farming systems. Consolidation of the work on potatoes in Watermount achieved the stage of farmer-financed, farmer-managed production. This stage was also reached in both project areas with small scale broiler production.

In both areas also as the year came to a close, two farmers (one in each area of the project) had commenced making preparations to put in farmer-financed, farmer-managed yam production using the mini-sett technology which was first demonstrated in the project areas on their farms.

In the potato planting material production pilot programme the complete set of steps in the programme were melded together -- tissue culture, rapid multiplication using stem cuttings and on-farm introduction of rooted stem cuttings. Some farmers began rooting their own cuttings and transplanting them, but lost their transplanted plots when the heavy rains fell in November.

The experience which IICA has gained during the last twelve years through the project just described, as well as its experience in assisting the Ministry of Agriculture in their execution, strengthens IICA's capacity to provide technical support to the Ministry of Agriculture in their execution of the FSRD-Hillside Agriculture Sub-Project proposed in this document.

VOLUME I

ANNEX C

AGRICULTURAL CHARACTERISTICS OF THE NORTHERN RIO COBRE WATERSHED AREA

VOLUME I

ANNEX C

Agricultural Characteristics of the Northern Rio Cobre Watershed Area.

A series of Tables* is provided in this Annex showing the main agricultural charactertistics of the area of influence of the sub-project. The analysis of these characteristics has provided orientation in the selection of trials indicated in Annex B, Volume II, Agronomic Component.

The following information is furnished:

TABLE 1 -
Farm Land Acreage and Number of Farms by MINAG Extension Areas

TABLE 2 -
Number of Farms and Average Acreage by MINAG Extension Areas and Range of Farm Size

TABLE 3 -
Crop Mix Percentage by MINAG Extension areas and Range of Farm Size

TABLE 4 -
Crop Mix Percentage and Acreage by Range of Farm Size and Crop Category

TABLE 5 -
Total Livestock and Number of Farms with Livestock by MINAG Extension Areas and Range of Farm Size

TABLE 6 -
Average Farmgate Prices, Production and Harvest, Value by Range of Farm Size and Crop Category

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*The data presented in these Tables 1-5 are produced from the analyses of the information contained in the Farmers' Register for the Extension Areas named. Table 6 contains estimates about the "average" farm in different size groups. Farmgate prices were supplied by the Ministry of Agriculture's Marketing Division.

TABLE 1. Farm Land Acreage and Number of Farms by MINAG Extension Areas

Extension	Total Area (acres)	Number of Farms	Avg. Farm Size (Acres)
Riversdale	2,142	403	5.3
Sea Field	1,394	364	3.8
Guys Hill	1,620	551	2.9
Pear Tree	1,299	272	4.8
Redwood	1,360	305	4.5
Troja	2,395	503	7.8
TOTAL	10,210	2,398	4.25

TABLE 2. Number of Farms and Average Acreage by MINAG Extension Areas and Range of Farm Size

	2 Acres		2 - 6 Acres		6 Acres	
	Number	Avg. Size	Number	Avg. Size	Number	Avg. Size
Riversdale	116	.70	181	3.77	106	13
Sea Field	127	.89	183	3.64	54	11.4
Guys Hill	261	.91	235	3.31	55	11
Pear Tree	86	.92	133	3.66	53	13.8
Red Wood	106	.99	140	3.42	59	13.2
Troja	184	.81	225	3.56	94	15.4
TOTAL	880	.87	1,097	3.56	421	12.97

TABLE 4. Crop Mix Percentage and Acreage by Range of Farm Size and Crop Category

CROP	< 2 Acres		2 - 6 Acres		> 6 Acres	
	%	Acres	%	Acres	%	Acres
Tree Crops						
Coffee	18.65	.16	16.90	.60	12.60	1.64
Cocoa	15.75	.14	17.10	.61	16.00	2.09
Coconut	2.25	.02	3.15	.11	4.25	.55
Pimento	2.15	.02	2.60	.09	5.25	.68
Citrus	4.25	.04	4.65	.17	7.85	1.03
Banana	20.10	.18	22.85	.18	22.85	2.97
Plaintain	4.10	.04	4.35	.15	4.10	.53
Fruit	1.00	.01	1.35	.05	2.65	.34
	68.25	.61	72.95	2.59	75.55	9.83
Roots and Tubers						
Yam	8.75	.08	7.60	.27	7.85	1.03
Cassava	1.60	.01	1.15	.04	1.25	.16
Potato	1.40	.01	1.50	.05	1.40	.18
Other	4.40	.04	4.00	.14	3.65	.47
	16.15	.14	14.25	.50	14.15	1.84
Vegetable	4.90	.04	4.10	.15	3.35	.43
Legumes	3.60	.03	3.25	.12	2.85	.37
	8.50	.07	7.35	.27	6.20	.80
Sugar	5.85	.05	4.25	.15	2.75	.36
Other	1.15	.01	1.40	.05	1.10	.14
	7.00	.06	5.65	.20	3.85	.50
TOTAL	99.90	.88	100.20	3.56	99.75	12.97

TABLE 3. Crop Mix Percentages by MINAG Extension Areas and Range of Farm Size in Acres

	GUY'S HILL			PEAR TREE GROVE			REDWOOD		
Tree Crop	< 2	2-6	> 6	< 2	2-6	> 6	< 2	2-6	> 6
Coffee	14.49	18.56	10.08	20.10	30.69	19.80	22.50	17.94	10.58
Cocoa	1.68	8.00	6.72	29.48	37.62	30.60	13.00	11.96	8.28
Coconut	0	0	0.42	2.68	8.91	9.90	1.00	2.30	1.38
Citrus	0	0.96	0.63	4.02	6.93	10.80	6.50	6.44	16.56
Pimento	0.21	0.96	1.68	6.70	5.94	9.90	4.00	4.60	6.90
Banana	22.68	24.00	14.50	56.09	55.38	30.15	8.14	6.50	5.12
Plantain	5.04	3.84	1.82	3.95	2.84	1.80	2.59	2.25	1.44
Fruits	0	0.48	0.26	2.37	1.42	2.25	1.11	0.75	2.08
SUB TOTAL	44.10	56.80	36.11	125.39	149.73	115.20	58.84	52.74	52.34
Roots and Tubers									
Yam	14.49	9.60	3.12	7.90	7.10	5.85	7.77	3.75	2.56
Cassava	0.63	0	0	0.79	0	0	2.96	1.50	0.78
Potato	0	0.48	0	0.79	0.71	0	2.59	1.00	0.64
Other Root Crops	6.30	2.88	1.82	2.37	2.13	2.70	4.81	3.75	1.76
SUB TOTAL	21.42	12.96	4.94	11.85	9.94	8.55	18.13	10.00	5.74
Vegetable	10.08	4.80	4.15	1.58	1.42	0.45	1.48	1.50	0.16
Legumes	3.78	1.92	0.78	2.37	0.71	1.35	5.55	3.00	1.12
SUB TOTAL	13.86	6.72	4.94	3.95	2.13	1.80	7.03	4.50	1.28
Sugar	4.62	3.52	1.26	4.02	4.95	1.80	2.00	1.84	1.38
Other	0	0	0	0	3.96	6.30	1.50	1.38	0.46
SUB TOTAL	4.62	3.52	1.26	4.02	8.91	8.10	3.50	3.22	1.84
TOTAL	84.00	80.00	47.25	145.21	170.71	133.65	87.50	70.46	61.20

	RIVERSDALE			SEAFIELD			TROJA		
Tree Crop	< 2	2-6	> 6	< 2	2-6	> 6	< 2	2-6	> 6
Coffee	7.59	5.25	5.89	7.50	11.70	7.75	6.50	5.94	3.20
Cocoa	2.76	3.15	3.41	8.40	12.30	9.00	30.50	32.40	24.40
Coconut	4.37	2.73	4.34	0.20	1.20	1.80	0.50	3.78	5.60
Citrus	6.21	6.30	12.09	0.90	0.30	0.30	0.50	0.54	1.20
Pimento	0.69	0.84	0.93	4.40	2.10	0.50	0	0.54	1.20
Banana	20.25	17.67	10.75	26.60	21.10	14.50	23.97	17.10	8.74
Plantain	9.75	5.70	5.16	7.70	6.20	2.60	2.55	3.04	1.52
Fruits	4.50	2.28	3.87	0	0.48	0.58	0	0.38	0.38
SUB TOTAL	56.12	43.92	46.44	55.70	55.38	37.03	64.52	63.72	46.24
Roots and Tubers									
Yam	12.75	5.70	6.45	7.00	5.30	3.50	12.24	9.50	4.94
Cassava	6.24	3.99	3.01	0	0	0	0.51	0.38	0.38
Potato	5.25	5.13	3.87	0.70	0.48	0.29	0.51	0.76	0.57
Other Root Crops	3.00	3.42	1.72	7.70	5.28	3.19	6.12	2.66	0.95
SUB TOTAL	27.24	18.24	15.05	15.40	11.06	6.98	19.38	13.30	6.84
Vegetable	10.50	9.69	5.59	14.00	5.80	2.30	1.53	0.76	0.19
Legumes	3.00	3.99	2.58	5.60	3.40	2.00	3.57	3.04	1.52
SUB TOTAL	13.50	13.68	8.17	19.60	9.20	4.30	5.10	3.80	1.71
Sugar	1.15	2.94	4.03	0	0	0	6.50	5.40	2.80
Other	0	0	0	0	0	0	5.50	5.40	2.00
SUB TOTAL	1.15	2.94	4.03	0	0	0	12.00	10.80	4.80
TOTAL	98.01	78.78	73.69	90.70	75.64	48.31	101.00	91.62	59.59

TABLE 5 Total Livestock and number of Farms with Livestock by MINAG Extension Areas and Range of Farm Size

		GOATS			CATTLE			PIGS			POULTRY		
		2	2 - 6	6	2	2 - 6	6	2	2 - 6	6	2	2 - 6	6
Riveredale	Heads	155	215	241	48	165	294	69	193	146	714	2080	2485
	Farms	37	50	56	11	33	36	23	39	31	47	72	63
Sea Field	Heads	95	198	105	35	180	131	18	76	63	599	1595	499
	Farms	36	58	25	21	68	35	14	39	13	19	38	11
Guy's Hill	Heads	128	247	64	54	164	79	69	103	80	760	694	664
	Farms	27	42	24	17	29	33	19	37	13	31	44	27
Pear Tree	Heads	76	192	141	9	23	79	20	33	50	330	632	383
	Farms	18	41	31	4	15	15	14	21	17	23	43	23
Red Wood	Heads	70	184	182	14	37	61	34	75	39	396	2784	913
	Farms	18	39	17	8	18	16	16	24	9	33	58	25
Troja	Heads	99	153	97	14	76	148	51	81	43	550	1030	601
	Farms	31	48	22	8	37	44	22	43	18	25	34	10
TOTALS	Heads	623	1189	830	174	645	792	261	561	421	3349	8815	5545
	Farms	167	278	175	69	200	179	108	203	101	178	289	159

TABLE 6. Average Farmgate Prices, Production and Harvest Value by Range of Farm Size and Crop Category *

CROP	Average Farmgate Prices	2 ACRES Production	2 ACRES Value	2 - 6 ACRES Production	2 - 6 ACRES Value	6 ACRES Production	6 ACRES Value
Tree Crops							
Coffee	$63.00/box (61 lb/box)	501 lb 8.2 boxes	$ 517	1835 lb 30 boxes	$ 1,890	4984 lb 81.7 boxes	$ 5,147
Cocoa	$65.56/box (56 lb/box)	97 lb 1.7 boxes	$ 111	375 lb 6.7 boxes	$ 439	1278 lb 22.8 boxes	$ 1,495
Coconut	$1.00/nut	83 nuts (1.6 trees)	$ 83	472 nuts (7.8 trees)	$ 472	2319 nuts (38.7 trees)	$ 2,319
Pimento	$3.65/lb (dry)	21 lb dry (1.5 trees)	$ 77	104 lb dry (6.5 trees)	$ 380	764 lb dry (47 trees)	$ 2,789
Citrus	$9.50/box (85 lb/box)	24 boxes (5.6 trees)	$ 228	106 boxes (25 trees)	$ 1,007	649 boxes (153 trees)	$ 6,166
Banana (green)	$5.00/bunch (30 lb/bunch)	2644 lb (88 bunches)	$ 440	12161 lb (405 bunches)	$ 2,025	44307 lb (1477 bunches)	$ 7,385
Plantain	35c/lb	337 lb	$ 118	1448 lb	$ 507	4972 lb	$ 1,740
Fruit	58c/lb	91 lb	$ 53	496 lb	$ 288	3547 lb	$ 2,057
SUB TOTAL			$1,627		$ 7,008		$29,098
Roots and Tubers							
Yam	63c/lb	786 lb	$ 495	2760 lb	$ 1,739	10387 lb	$ 6,544
Cassava	39c/lb	142 lb	$ 55	411 lb	$ 160	1629 lb	$ 635
Potato	89c/lb	119 lb	$ 106	515 lb	$ 458	1750 lb	$ 1,558
Other	$1.25/lb	205 lb	$ 256	754 lb	$ 943	2508 lb	$ 3,135
SUB TOTAL			$ 912		$ 3,300		$11,872
Vegetable	73c/lb	313 lb	$ 228	1058 lb	$ 772	3150 lb	$ 2,300
Legumes	$2.82/lb	28 lb	$ 79	100 lb	$ 282	320 lb	$ 902
SUB TOTAL			$ 307		$ 1,054		$ 3,202
Sugar (cane)	$113.30/ton	1.28 tons	$ 145	3.74 tons	$ 424	8.82 tons	$ 999
TOTAL VALUE			$2,991		$11,786		$45,171

* Prices given for years 1985, 1986

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ANNEX D

MINAG EXTENSION AREA CODES AND NUMBER OF FARMERS FOR THE RIO COBRE WATERSHED AREA

MINAG EXTENSION AREA CODES FOR THE RIO COBRE WATERSHED AREA

Codes		No. of Farmers
23	Mt. Moreland	134
24	Waugh Hill	331
25	Sligoville	136
26	Above Rocks	441
27	St. Faiths	292
12	Giblatore	242
28	Harkers Hall	511
29	Lucky Valley	298
30	Bog Walk	323
36	Dover Castle	919
37	Benbow	526
38	Guy's Hill	552
39	Seafield	372
40	Pear Tree Grove	277
41	Red Wood	307
42	Riversdale	408
43	Troja	516
44	Mt. Industry	324
45	Aberdeen	437
46	Glengoffee	532
	TOTAL	7,878

PARISH OF
ST. CATHERINE

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ANNEX E

LOGICAL FRAMEWORK MATRIX

LOGICAL FRAMEWORK MATRIX

NARRATIVE SUMMARY	INDICATORS AND GOALS	EXTERNAL CONDITIONING FACTORS
General Objective:		
To increase the socio-economic well-being of Northern Rio Cobre watershed residents, while conserving natural resources	Annual growth rate in export and domestic crop production	Annual growth rate in export crop production of 5%. Annual growth rate in domestic crop production of 4%	
Specific Objective:		
To develop economically viable systems which contribute to increased sustainable income to small farmers while conserving watershed resources and strengthening farmer organizations	Improved Production Systems and conservation of established resources	Permanent crop-based production systems developed that are economically and ecologically viable	Farmers and Commodity Boards resource personnel have collaborated in all phases of the generation and transfer of agricultural technology in the economic analysis of on-farm trials and production plots; in carrying out the market analysis and in the analysis of the effect of adoption of new technologies on the farm enterprise and on the farm family

NARRATIVE SUMMARY	INDICATORS AND GOALS		EXTERNAL CONDITIONING FACTORS
Final Products:			
1. Economically efficient tree crop based farming systems	Tree crops based farming systems developed	Demonstration of tree crops rehabilitation techniques and development of complementary annual crops farming systems. Efficient intercropping of tree crops during establishment phase.	Collaboration of Farmers and Commodity Boards in all phases of the execution and analyses of the farming systems investigations and in the transference of technologies and other information generated.
2. Improved watershed management practices	The embodiment of soil conservation practice is common in new cultivations, and there is progressive installation of soil conservation measures in existing cultivations.	Adoption of integrated soil conservation practices	Farmers and Commodity Boards field personnel assist in disseminating technologies for soil conservation in the sub-project area

NARRATIVE SUMMARY	INDICATORS AND GOALS		EXTERNAL CONDITIONING FACTORS
3. Strengthening of existing farmers' organizations and coordination of farmers' groups in production and marketing activities	Farmers' organization activities and farmers' group activities	Increased activities and interest. Improved systems for acquiring inputs, and for marketing of produce. Support for the dissemination of information	Collaboration of farmers' organizations in the dissemination of information and in the development of economically viable systems for acquiring inputs and for marketing of produce
4. Recommendations for research, extension, and agricultural policy generated	Recommendations for Research, Extension and Agricultural Policy for Hillside Agriculture	One farm model per recommendation domain developed by the end of the 1st year of implementation of the project. One multi-period farm model per recommendation domain developed by the end of 2nd year	Policy and Planning Division resource personnel collaborate at all phases of data collection, analyses, and development of recommendations

NARRATIVE SUMMARY	INDICATORS AND GOALS	EXTERNAL CONDITIONING FACTORS
5. Recommendations on improved marketing systems established	Market analysis reports	Structure, operation and effectiveness of present market systems defined. Identification of constraints and potentials. Recommendations for improved marketing systems documented	Resource personnel of the Marketing Division of MINAG collaborate at all phases of data collection and analyses and in the development of the recommendations for improved marketing systems
6. Farming systems methodology institutionalized with Ministry of Agriculture and Commodity Boards	Process institutionalization is implemented	Phased institutionalization of the Farming Systems Research methodology in MINAG and Commodity Boards. 1991: Southern Region 1992: Southern & Central Regions 1993: Southern, Central & Northern	Farmers and Commodity Boards resource personnel have collaborated in all phases of the generation and transfer of agricultural technology in the economic analysis of on-farm trials and production plots; in carrying out the market analysis and in the analysis of the effect of adoption of new technologies on the farm enterprise and on the farm family

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ANNEX F

PARTICIPATION OF WOMEN IN

MINAG/IICA HILLSIDE AGRICULTURE SUB-PROJECT

BACKGROUND

The MINAG-IICA Hillside Agriculture Project, to be implemented in the Northern Rio Cobre Watershed area of St. Catherine, has as its principal goals the development of economically viable production systems, increased sustainable income, conserving watershed resources and strengthening farmer participation.

The target beneficiaries are 1,880 farmers in the area with land holdings of 25 acres or less with tree crop farming systems in particular coffee, cocoa and coconut.

The important role played by women in the food production system as farm managers, agricultural labours and users of agro-technologies, serve as a mandate for their incorporation in the design planning and implementation of all agriculture development projects.

This action is necessary to ensure that women are not only participants in the development process, but are direct beneficiaries of development efforts aimed at increasing the social wellbeing of the rural poor.

Their incorporation in the Hillside Agriculture Project is essential as they represent approximately 20 per cent of farmers in Jamaica, consequently they are users of technologies both in their role as farm managers and agricultural labourers.

The planning of a women's component in this project, is the result of the participation of women in several meetings held to stimulate farmers interest in this project; females accounted for 17.0 per cent of farmers present. This strategy is also aimed at helping women overcome 'differential access' to development efforts and to improve their social and economic wellbeing.

This section of the document provides an overview of the role of women in agriculture and an outline of how women will be incorporated in the Hillside Agriculture Project.

WOMENS' PARTICIPATION IN AGRICULTURE: AN OVERVIEW

The role of women in the development process as well as their failure to benefit from development initiatives, has received concentrated attention over the last two decades. This arose because of the recognition that in spite of their known contribution in maintaining national food security in many developing countries, this was not reflected in agricultural statistics. Therefore, women were said to be 'invisible' as conventional methods of data collection failed to generate data that adequately reflected their participation.

These data collection methodologies were often based on inadequate conceptualization, definition and measurement. Conceptually, the identification of the farm as a unit of observation proved to be problematic because it isolated crops and livestock decisions and activities associated with their care from other productive and social activities.

Operationally, it lead to gathering information from the 'farmer' typically the man with social authority over the household.

The application of these collection methods to the evaluation of rural development projects resulted in data which indicated that women were not participating in agriculture and rural development, and were therefore not beneficiaries of development initiatives.

The differential impact on women is seen in their conditions of poverty and deprivation, a result of institutionalized discrimination reinforced by custom and traditional attitudes.

Since the mid 1970's there has been a growing body of literature generated mainly by female scholars in disciplines such as sociology, anthropology and economics on womens role, status and contribution to the development process. This data which involves studies from Africa, Asia, Latin America and the Caribbean has been well documented and has increased the statistical visibility of women. These studies highlight their contribution to all sectors of the economy and in particular the predominance of women in agriculture and food production systems in the Third World (Table 1).

The recording of womens contribution to the development process and the recognition of their unequal access to productive resources and project benefits has lead to a new orientation toward project planning and design with an emphasis on women as the main beneficiaries.

Towards the end of the 1970's there has been a number of projects funded by national and international agencies with a focus on income generating projects aimed at incorporating women into development projects, while at the same time increasing income and family wellbeing. These programmes have contributed to the employment of many rural women who have responsibility for the economic support of a number of dependents in the role as heads of households.

The importance of women's work in food production systems is illustrated by the fact that even in countries where religious custom discourages participation in activities outside the home, women are active in agriculture as is the case in Muslim areas in Africa.

TABLE 1
ECONOMICALLY ACTIVE FEMALE POPULATION (% OF TOTAL POPULATION)
IN SOME SELECTED COUNTRIES 1/ IN AGRICULTURE

AFRICA		ARAB STATES		ASIA		LATIN AMERICA	
Botswana	46.76	Algeria	1.81	Bangladesh	11.81	Argentina	19.30
Burundi	45.27	Egypt	4.06	India	27.13	Barbados	28.43
Central Africa Rep.	53.37	Iraq	2.07	Indonesia	21.60	Bolivia	12.91
Chad	17.51	Jordan	2.87	Iran	7.47	Brazil	12.84
Cape Verde Islands	4.82	Libyan Arab Rep.	2.60	Malaysia	21.50	Chile	13.48
Congo	25.67	Morocco	7.47	Pakistan	5.52	Colombia	14.58
Equatorial Guinea	2.68	Saudi Arabia	2.50	Sri Lanka	16.53	Costa Rica	11.20
Ethiopia	29.95	Sudan	6.64			Haiti	46.37
Gahon	38.35	Tunisia	3.62			Mexico	10.00
Gambia	46.11					Jamaica	25.66
Ghana	32.20					Peru	12.12
Guinea	38.14						
Guinea-Bissau	2.36						
Ivory Coast	47.26						
Kenya	27.37						
Lesotho	49.05						
Madagascar	47.00						
Malawi	34.96						
Mali	53.35						
Mauritania	2.60						
Mozambique	20.80						
Niger	6.24						
Nigeria	32.37						
People's Rep.of Benin	43.34						
Rwanda	51.63						
Senegal	34.30						
Sierra Leone	26.67						
Somalia	22.82						
Swaziland	43.95						
United Rep.of Cameron	41.17						
Tanzania	31.47						
Upper Volta	51.94						
Zaire	37.93						
Zambia	27.32						

NOTE: While the variation in these figures is of interest, it should be noted that overall the figures tend to be low due to the narrow definition used. This is precisely one of the causes of the lack of recognition of the importance of women's labour to agricultural production. The ILO, which compiles such data from national statistics, is concerned at the bias and is currently working to reduce it (ILO, 1982).

1/ ILO Yearbook of Labour Statistics 1981, pp. 32-70

Source: Women in Agriculture Production. Selected Papers. F.A.O. 1985

In looking at the gender division of labour in a cross cultural perspective, we observe that in Africa, women were found to do most of the work in the areas of cultivation, transportation of crops from field to home, marketing and storage. It was reported by the United Nations (1975) that women did an equal amount of work in planting seed and cuttings and caring for domestic animals. Table 2.

TABLE 2

DIVISION OF LABOUR BY SEX IN AFRICA

Agricultural Tasks	Percent of Total Labour in Hours	
	Women	Men
Hoeing/weeding	70	30
Harvesting	60	40
Transport Crop from field to home	80	20
Storing Crop	80	20
Marketing Crop	60	40
Planting	50	50
Caring for Domestic Animals	50	50

Source: Women in Agricultural Production FAO/UN 1985.

In Islamic countries women are involved in agricultural activities. In Pakistan for example, about 50 percent of women cultivate and harvest wheat, in Jordan 60 percent of women weed crops. Small animal production for family and market is also usually womens work. Some tasks especially seasonal ones such as clearing and preparing land are mainly mens' work; even so women may participate. In one area of Kenya 58 percent women were involved in clearing bush and ploughing. (FAO Information Note on Women in Agriculture.)

WOMEN IN AGRICULTURE IN JAMAICA

An examination of available literature on the historical development of agriculture in Jamaica reveals that women have been active participants in agriculture as labourers as well as workers in households of plantation owners.

Women had the double burden of contributing their own labour (producers) and providing labour through childbearing (reproducers) for the plantations.

Additionally, this data shows that women were disadvantaged during this period as men monopolized elite jobs as drivers, headmen and craftsmen. Women developed and dominated the Sunday markets and the internal marketing system and still play an important role today in the food distribution system.

The participation of women in agriculture has changed in the period since emancipation, and womens' work roles became more centered in the domestic sphere and a skewed sexual division of labour in favour of men in estate wage labour emerged. This marked the beginning of an exodus of women out of wage work in agriculture and their confinement to the subsistence economy and to domestic work in towns.

The out migration of males during the early nineteenth century resulted in the return of women to the agricultural sector in order to continue the operation of family holdings and produce crops and livestock both for cash income and family subsistence with limited resources.

The most recent data on women the 1978/79 Agricultural Census shows that of the total 182,169 farms island wide having single holders, 35,188 or 19.3 per cent were operated by women, but the land represented only 12.0 per cent of the total (Table 3). Women who are farm operators assume this role because of two important demographic factors: male migration and male mortality.

TABLE 3

NUMBER OF FARMS AND ACREAGE OPERATED BY SINGLE HOLDER
BY SEX OF SINGLE HOLDER BY PARISH

Parish	No. of Farms			Acreage		
	Total	Male	Female	Total	Male	Female
St. Andrew	8,873	7,187	1,686	23,584	20,595	2,989
St. Thomas	11,495	9,206	2,289	45,065	40,213	4,852
Portland	8,421	7,031	1,390	49,788	45,954	3,834
St. Mary	12,420	10,195	2,225	57,670	50,980	6,690
St. Ann	14,937	12,640	2,297	78,392	70,289	8,103
Trelawny	10,618	8,524	2,094	53,141	48,723	4,418
St. James	8,562	7,115	1,447	46,405	41,199	3,206
Hanover	7,632	6,061	1,571	39,001	32,712	6,289
Westmoreland	17,492	14,053	3,439	88,488	76,399	12,089
St. Elizabeth	19,071	14,811	4,260	98,763	87,731	11,032
Manchester	18,113	14,070	4,043	68,297	58,385	9,912
Clarendon	23,799	19,172	4,627	94,644	82,941	11,703
St. Catherine	20,736	16,916	3,820	82,455	72,596	9,859
TOTAL	182,169	146,981	35,188	825,693	728,717	96,976

SOURCE: 1978/79 Agriculture Census - Department of Statistics

Le Franc (1987) highlights two important factors that relate to women and size of farms. The first is that female-operated farms tend to be confined to micro-plots: 92.2 per cent of all women were to be found in 0-5 acre size category, with 46.9 per cent holding less than one acre. The comparable figures for males were 80.2 per cent and 29.3 per cent.

The second factor is that the female small-farmer seems to be much older than her male counterpart. Table 4. A number of small farm surveys have found percentages of women in the 50+ age group, that ranged from 58.3 per cent to a high of 77.3 per cent: the corresponding figures for males were 45.0% to a high of 60.0% (MINAG/IICA 1986; IRDP 1983; IDB/IFAD Baseline Study 1983).

TABLE 4

PERCENTAGE DISTRIBUTION OF FARMERS BY SEX AND FARM SIZE - 1978-1979

	S E X	
Size Category	Male	Female
0 - 1	29.3	46.9
1 - 5	50.9	43.3
5 - 10	12.6	6.5
10 - 25	5.3	2.2
25 - 100	1.4	0.7
100 - 500	0.4	0.3
500+	0.1	0.02
	146,981 (100.0)	35,188 (99.9)
	80.7	19.3

Source: Census of Agriculture, 1978-79 Preliminary Report

Women play an important role in food production, as small producers and as agricultural labourers carry out a range of activities such as field sanitation (cocoa) planting, weeding and fertilizer application. In banana production, women are involved in caring for bunches, pruning, sleeving, dehanding, etc..... and boxing of fruit in the boxing plant.

In an agro-socio-economic study of farmers in Cambridge, St. James, Glengoffe, North Central, St. Catherine, Clarendon, St. Ann and Whitehall, it was found (Table 5) that women accounted for 48.4 per cent of farmers involved in banana production. Women were also responsible for distribution of this crop as 27.0 per cent of the volume produced was handled by higglers.

The findings of another study showed that even when women were not principal farm operators, (47 per cent) they assisted in farming operations, (21 per cent) collaborated in planting and harvesting and 5 per cent were consulted by male partners about changing cropping patterns. (Baseline Study First Rural Development Project MINAG 1979.)

TABLE 5

ESTIMATED POPULATION BY AGE GROUP AND SEX
LOCATION: ALL AREAS

Age Group Year	Total	S E X Male	Female
Under 10	5,140	2,518	2,622
	15.8	7.7	8.1
10 - 19	10,139	5,232	4,906
	31.2	16.1	15.1
20 - 29	4,556	2,501	2,055
	14.0	7.7	6.3
30 - 39	2,466	1,091	1,375
	7.6	3.4	4.2
40 - 49	2,516	1,325	1,191
	7.7	4.1	3.7
50 - 59	2,829	1,416	1,414
	8.7	4.4	4.4
60 or over	4,623	2,542	2,081
	14.2	7.8	6.4
No Response	227	131	96
	.7	.4	.3
TOTAL	32,495	16,755	15,740
	100.0	51.6	48.4

SECOND ROW FOR EACH VARIABLE INDICATES PERCENTAGE
SOURCE: An Agro-Socio-Economic Survey of Banana Farmers 1982

Data from the Labour Force Statistics compiled by the Department of Statistics in Jamaica, identify certain trends related to agriculture, forestry and fishing for the period 1975-1986. It is instructive to note that agriculture has been de-feminized since the period of slavery. As shown in Table (6) women accounted for approximately 24 percent of the labour force in 1975, there was an increase over the next three years to 28 percent in 1978. There was a decline by 4 percent in 1979 to approximately 25 percent. After this the number of female labourers fluctuated and ranged between 25 percent in 1980 to 27 percent in 1983. Since that time there has been a decline to approximately 24 percent in 1986, the figure stated for 1975.

TABLE 7

LABOUR FORCE IN AGRICULTURE, FORESTRY, FISHING

Year	Male Labour Force	Employed	% Employed	Female Labour Force	Employed	% Employed
1975	173,600	168,600	97	54,700	48,600	88
1976	189,700	183,500	96	71,100	65,000	93
1977	186,500	178,200	95	70,400	61,200	86
1978	199,300	191,300	95	78,900	75,600	95
1979	200,000	193,900	97	66,000	59,600	90
1980	200,100	192,800	96	65,600	59,800	91
1981	210,400	204,700	97	77,000	69,800	90
1982	202,800	201,900	99	69,600	60,600	87
1983	195,700	186,300	95	73,300	57,200	78
1984	201,800	197,600	98	68,300	63,800	93
1985	210,000	214,100	98	69,400	66,600	96
1986	219,100	214,600	98	69,000	63,500	92

Compiled from Labour Force Publications (1975 - 86)
Department of Statistics 1986

INTEGRATION OF WOMEN IN RURAL DEVELOPMENT PROJECTS IN JAMAICA

Since its inaguration in 1975, the United Nations Decade for Women has engendered a number of activities with a special significance for those concerned with rural development. In response to the theme "Equality, Development, Peace" for women, many Governments have been giving increasing attention to the plight of rural women and their vital economic and social contribution, by establishing mechanisms aimed at integrating them fully into the development process.

The World Plan of Action, (1975) called for integrated rural development, with special attention to womens' role as producers, processors and vendors of food.

Training needs were identified for:

(a) modern methods of farming, marketing, purchasing and sales techniques;
(b) basic accounting and organizational methods;
(c) fundamentals of hygiene and nutrition;
(d) crafts and co-operatives education.

The CIM (Inter-American Commission of Women, OAS) Plan of Action called for the integration of women into the rural economy and suggested the following actions:

(a) improved opportunities for women to own rural property on an equal basis with men;
(b) female participation in programmes for small farmers such as loan and subsidy programmes;
(c) the development of special financing systems for female borrowers.

Both Government and Non-Government Agencies have had the responsibility for improving and promoting the welfare of women as a major component of human resource development. In Jamaica the Bureau of Womens' Affairs was established by Government in 1975, with the main functions being to devise strategies and to promote policies and developmental programmes that would accelerate the general improvement of womens' social and economic status.

The Caricom Plan of Action, 1977, focused on Agriculture since the sector played a significant role in local economies and suggested that women should be encouraged to participate in agriculture and acquire agricultural skills.

Among the strategies outlined in this proposal are:

(a) development of agro-based industries;
(b) special training for rural women to participate in economic and social production and to use new agricultural technologies. Areas of training identified were: use of new equipment, co-operatives, entrepreneurship, commerce, marketing, animal husbandry, and fisheries. Training in health and family planning, and a general raising of educational levels.

The Bureau embarked on a number of activities which started in 1980 with the operation of the Women's Centre, co-ordination of developmental income generating pilot projects and the implementation of training in management skills, and co-operative development for various womens' groups.

The Working Group on Women obtained the support of the World Population Council and USAID to improve the social and economic status of women in low-income households. Among a number of projects funded is an Urban Farming Project in Cash Crops with twenty (20) beneficiaries. Other development projects are shown in Table 8.

TABLE 8

DEVELOPMENT PROJECTS CO-ORDINATED BY WOMENS BUREAU SINCE 1980

Type of Activity	Target Population Age Group	Year Started	Location	No. of Participants	Status of Project
Cassava Bammy Project. St. Elizabeth	20-75 years	1975	Santa Cruz	88	On-going
Contract Farming Ginger, Pepper			Hanover	16	
Goat Rearing Proj.		1978	Orange Bay	9	On-going
" " "	12-26 years	1978	Grove Town Manchester	'82 '83 '85 10 8 8	On-going
Black Hill Pig & Vegetable Farm	27-40 years	1978	Black Hill Portland	8	On-going
Womens Goat Rearing Project (IICA)		1981-83	Allside		com-pleted

In Jamaica, a National Preparatory Committee was appointed in 1984, to assist the Bureau of Womens Affairs in developing a draft National Plan for Women to serve as a reference for Government Policies and Programmes.

The Preparatory Committee consists of over twenty (20) representatives from Government bodies, voluntary social organizations and professional. The programmes of work includes:

i) the formulation of proposals on the theme, "Equality, Development and Peace", as it impinges on Jamaica's development;
ii) the drafting of recommendations on the sub-themes of education and training, employment and health;
iii) reviewing the legal status of Jamaican Women, and
iv) planning strategies to involve a greater number of women in its work programme.

The Bureau of Womens Affairs has become a powerful vehicle for the articulation and promotion of womens rights, and has succeeded in placing womens concerns on the national agenda. In 1985, a major step was taken by government in response to these concerns, and resulted in a statement of objectives which affirms Government's commitment to develop programmes and activities to ensure the full integration of women in development.

Other projects aimed at integrating women in the development process have been implemented by the Ministry of Agriculture through its Production and Extension Division.

During the period 1967-1976 a programme, mainly Home Economics, was implemented. The programme sought to help families through extension to avail themselves of educational and service programmes that would contribute to their upliftment.

This programme was broadened in scope and during the period 1979-1985, a Rural Farm Family Development Programme was implemented. The main components of the programme included instruction in food production and utilization with an emphasis on family nutrition, home and money management, child care and family welfare, family planning and population education, and income generation for the family.

Special consideration of the programme which adopted an integrated approach to rural development were:

- increasing resources and purchasing power of families;
- improving the housing, equipment and work habits of women;
- accelerating the participation of women and other community members in identifying their specific needs and in planning their specific projects;
- assisting in determining ways of securing an increase in income of households through improving their cropping patterns and storage to avoid loss of food;
- training extension workers to guide the leaders and women in their various community and family activities through innovative methods;
- devising and testing equipment and designing appropriate technology to effect conservation of fuel and energy.

In addition to the broad-based programme which is financed by the Government, the unit implemented a number of internationally funded projects. One such project was the "International Family Planning Project" a joint project of the American Home Economics Association, the Jamaican Home Economics Association and the National Family Planning Project sponsored by USAID through the National Family Planning Board.

The Rural Farm Family Development Programme in the Ministry of Agriculture maintained a staff of trained personnel to teach and advise rural families, especially farm families, on a wide variety of topics pertaining to family health and welfare and to cost saving devices and techniques in the operation of a home.

These Officers were also engaged in establishing income-generating projects and activities, and an immediate aim was to explore ways and means of accelerating these enterprises.

The unit placed much emphasis on drawing women and girls, as well as interested men and boys into an active role of participating in planning the activities for implementation. The philosophy was based on the belief that the development of good attitudes among the people, their commitment to change, the establishing of values and goals and the improvement of skills and knowledge would enhance their development. It is accepted that human resources, like natural resources, are diverse and this concept must be interwoven in the programme. Extension education allows for the free flow of information through a two-way system of communication between the educator (Extension Officer) and the learner (Farm Family).

In 1984, a new project "Strengthening of the Rural Farm Family Development Programme" was initiated with Funding from the Food and Agricultural Organization of the United Nations (FAO/UN). The programme is being strengthened by an input of funds that will be used to provide loans to farm families participating in the programme.

The General Objectives of this programme are:

a) to assist rural women and families to develop skills that will help them increase agricultural production and make the best utilization of agricultural products;

b) to assist rural folk (particularly women and youth) to acquire skills necessary for participation in income - generating activities;

c) to assist home-makers to acquire knowledge and develop skills conducive to improved family health nutrition and general well-being as well as better home management;

d) to help rural women and families improve on their decision-making, problem-solving processes, as well as to develop their leadership abilities.

The project has a special and direct relevance for accelerating the integration of poor rural women in the social and economic development process through:

i) promoting better understanding and obtaining support from planners, policy-makers and staff of the Ministry of Agriculture for their role in natural development;

ii) mobilizing rural women themselves to establish self-help organizations, develop their leadership skills, introduce appropriate technology designed to alleviate their work loads and to facilitate their participation in committing organizations.

Specific Objectives

1) To increase the agricultural productivity of Jamaican women by establishing more effective extension and marketing support services.

2) To strengthen delivery and co-ordination services of the Rural Family Development Project as the national and field level concerning various rural development activities, such as research training, extension credit, marketing, land and water development, co-operatives for rural women.

3) To assist Government in the selection, planning and implementation of pilot projects in the Western Region, which will enable methodologies and techniques to reach women farmers mor effectively.

4) To improve the planning and project implementation skills of the field officers, enabling them to improve the effectiveness of rural development services reaching rural women through an integrated approach by providing in-service training opportunities for the field officers.

5) To develop agricultural package programmes, including training materials, designed for rural women by taking into consideration their development needs and cultural factors which prevent them from becoming equal partners of development;

6) To make rural women more knowledgeable on population and family planning and maternal and child care issues, in order to help reduce infant mortality and morbidity.

A. A Revolving Fund is provided by the project and is set up to disburse agricultural loans to women's organized groups.

Another integrated development programme is funded by the Inter-American Development Bank and the International Fund for Agriculture. The "Small Farmer Development Programme" (Rural Farm Credit) was started in 1983. This programme has two main objectives:

(i) to strengthen the institutional and financial framework for agricultural lending; and

(ii) to increase the standards of living and productivity of approximately 20,000 small farmers with holdings between 2-10 acres by means of timely credit technical assistance and soil conservation practices.

The project is designed to achieve the aforementioned purposes and objectives through the implementation of the following main activities:

A credit component which will:

(a) provide financing for approximately 20,000 small farmers for the execution of production plans that call for fixed investments;

(b) infrastructure of planting materials, purchase of livestock, small equipment and hand tools, and other investments as may be necessary in additional to permanent investments.

B. A supporting programme which includes the financing of two different types of activities:

(i) Agronomic Soil Conservation practices covering the construction of soil conservation treatments at the farm level, to establish new forests in selected areas to provide protection against soil erosion.

(ii) Extension services, soil conservation and technical assistance for eligible producers to develop farm infrastructure by adopting soil conservation measures.

Data from the interim evaluation indicate that women are among the beneficiaries of loans disbursed through this project. Women represent 27 per cent of those farmers receiving loans and account for 19 per cent of farmers in this programme who are members of the Jamaica Agricultural Society. Eleven per cent (11%) of women were members of the farmers cooperative. All the women, 100 per cent, were members of the Peoples Cooperative Bank, a requirement for accessing loans through these institutions.

Women have also featured among the beneficiaries of the Cropping Systems Research (Jamaica) 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.

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

The project is being implemented by the Ministry of Agriculture with technical support from the Inter-American Institute for Cooperation on Agriculture (IICA).

Women have been beneficiaries at several levels as farmers, researchers and in other technical areas. Ten per cent (10%) of participating farmers in 1986, and 50 percent (50%) of researchers and extensionists on the field teams and 40 percent (40%) of core team members are women.

It is clear that women are now benefitting from development strategies, but their participation need to be further encouraged. The Hillside Agriculture Project will involve women farmers in technology generation by encouraging their participation in project design, implementation (on-farm trials) and evaluation (give feed back on trial results).

PARTICIPATION OF WOMEN IN HILLSIDE AGRICULTURE SUB-PROJECT

The incorporation of women in this project will be achieved by selecting women as direct beneficiaries. Their selection is justified because women featured among those farmers who attended meetings held to solicit farmer participation. Females accounted for 12.0 per cent (21/177) of farmers present in the first three meetings held in the project area.

The implementation strategy of this project involves specific activities aimed at improving tree crop farming systems, and farmers well-being through the design, adoption and transfer of technology. The incorporation of women will ensure that they are active participants and beneficiaries of these changes.

The participation of women in this project will achieve the following results:

- Data that will provide a clearer understanding of the role of women in tree crop farming system.
- Improvement in women access to technology and socio-economic well-being.
- Training of women in agriculture and related fields (farmers and professionals).
- Data that will show women in agricultural research, extension and farm operations.
- The mobilization of all human resources in development efforts.

The impact of the project on women will be assessed with reference to variables such as income, access to land and productive resources, employment and participation in organizations.

MONITORING AND EVALUATION

The monitoring and evaluation system designed to examine the participation of women in farming systems research will examine the following:

(1) How the resources of the households (land, capital, labour) are utilized.
(2) What activities does each member of the household perform in crop production (land preparation, planting, weeding, fertilizing, harvesting, marketing and processing).
(3) Who makes decisions about: what to produce, selection of planting material, employment of farm labour, and the use of technology.
(4) The use of technology and credit: how does the location of farm affect the use of technology, what are the constraints to the adoption of available technology, how does the size of farm and inadequate collateral affect access to credit.
(5) Livestock: who cares for livestock, how does this interact with the cropping system, what are the constraints to introducing livestock into the cropping system.
(6) Farm Management: who has knowledge about crops/livestock, crop care and record keeping; how does household member's participation in community organizations influence their activities.
(7) Sociological characteristics of the farmer: age, sex, educational attainment.
(8) Structural variables: social organization of household, land tenure and fragmentation of holdings, employment of labour and wages paid for agricultural labour.

The household as the unit of analysis will be defined as:

> "one or more persons voluntarily living together and sharing at least one meal in general, father, mother, children and other relatives, as well as other persons sharing their household arrangements (UNESCO 1983)."

The following items will be used to assess womens involvement in the project.

1. Project inputs and outputs
   - (i) Percentage of women among beneficiaries receiving direct project benefits, by age, marital status, size of farm and tenure.
   - (ii) Percentage of women receiving aquacultural inputs (fertilizers insecticides, seeds, equipment.
   - (iii) Percentage of women among people trained by the project.

2. Adoption of Technology
   - (i) Attitudes of female towards technologies generated.
   - (ii) Types of technologies adopted by females.
   - (iii) Changes in production by crop.
   - (iv) Changes in crop sales (number of standard units sold, month sold, seller, place sold, unit price.
   - (v) Changes in yields/crops.

3. Impact (to assess change)

(a) Income, expenditures and savings:
   - (i) income differentials between men and women;
   - (ii) income levels of the target population by sex; and
   - (iii) expenditure and savings differentials between men and women;

(b) Health and nutrition:
- (i) food consumption differentials between men and women and changes in them;
- (ii) access to health facilities for men and women;
- (iii) changes in the nutritional status of children 1-4;
- (iv) changes in the health status of the farmer by gender.

(c) Access to land and productive resources:
- (i) proportion of land held by women;
- (ii) legal and traditional practices with regard to the ownership, inheritance and use of land, houses and other property, and production assets by women; and
- (iii) decision-making within households with respect to production and its disposal, including marketing;

(d) Employment and labour time allocation:
- (i) total employment in major agricultural tasks in project area-division by socio-economic status and gender;
- (ii) economic activity of women, including unpaid work in the family holdings, e.g. child care, cooking and cleaning;
- (iii) part time and seasonal employment of women; and
- (iv) secondary occupations of rural women (e.g. cottage industries).

(e) Participation in beneficiary organizations and decision-making:
- (i) number and nature of beneficiary institutions for men, women and joint;
- (ii) leadership, decision-making practices and effectiveness of the institutions with respect to men and women;
- (iii) percentage of female members of participatory instituions. e.g. agricultural cooperatives, farmers' associations, women's associations;
- (iv) participation of women in project-related meetings e.g. with project and other government officials.
- (v) participation of women in Farmer Action Committee Teams (FACTS).

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ANNEX G

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VOLUME II

ANNEX A

FARMER PARTICIPATION

FARMER PARTICIPATION IN THE HILLSIDE AGRICULTURE SUB-PROJECT

Farmer participation is indispensible to the success of the sub-project.

During the design of the sub-project, farmers have been consulted both in terms of their priorities for assistance and with regard to their present working and living conditions.

During implementation of the sub-project, a number of mechanisms will ensure that farmers have a say in the services and technologies they receive, as well as an opportunity to provide feedback on whether these are actually meeting their needs.

During sub-project evaluation, the farmers' input also will be sought. An on-going exercise with farmers will enable them to indicate which sub-project adjustments might increase effectiveness. In addition, the end of sub-project evaluation will be done with farmers, culminating in: (i) a round table dialogue on accomplishments and failures of the sub-project, and (ii) participant-observer evaluation of sub-project outputs in particular technology design.

Frame of Reference

Involving farmers in a development project such as the Hillside Agriculture/FSR can result in different levels of participation. These can be defined as follows:

A. **Consultation:** an occasional input at the discretion of sub-project personnel, but no on-going involvement from the farmers, would fall at the lowest level of the participation scale. At this level, the sub-project personnel control 100% of the decisions and responsibilities, while the farmers have no decision-sharing authority,

B. Representation: on-going input, but only on formally organized occasions, would indicate the next level of participation. At this level, the farmers assume minor responsibilities and share authority, usually through representation in their groups or associations, such as sitting on a committee and attending regularly scheduled meetings.

C. Incorporation: on-going involvement, both formally and informally, would indicate a greater degree of participation. At this level, the farmers, through their associations, assume major responsibilities and have an increasingly important decision-making role. For example, they attend regularly scheduled meetings as well as represent their own interests informally with sub-project staff.

D. Direction: when the farmers have complete control and leadership in the sub-project with a goal toward self-management, this represents the most advanced level of participation.

The farmers should also be involved in all three of the major stages of sub-project development:

1. Planning: the stage where the sub-project is designed; institutional, financial and personnel resources are considered in terms of sub-project needs and potential impact.

2. Implementation: the stage where the sub-project is operational, made possible through a series of activities and events.

3. Evaluation: the stage where the sub-project is assessed to determine whether it is meeting the objectives it set out to achieve. This should be a continuous process, giving feedback for continued sub-project improvement and strengthening.

A matrix depicting possible levels of participation during different sub-project stages would look like this:

Level of Participation:	A.Consultation:	B.Representation:	C.Incorporation:	D.Direction:
Sub-Project Stages:				
1. Planning	1A	1B	1C	1D
2. Implementation	2A	2B	2C	2D
3. Evaluation	3A	3B	3C	3D

The sections in the matrix may be defined in the following ways:

1. During the Planning Stage

1A. Consultation during planning: direct farmer input during the design of the sub-project at the initiation of the sub-project staff. This is keeping with the approach to planning from the 'bottom up'. Informal meetings will be held with farmers who will articulate their farming problems and prioritize those which need to be urgently addressed.

1B. Representation during planning: on-going formal input of farmers during the design of the sub-project and some responsibilities shared with the sub-project staff. The proposed form of organization is through Farmers' Action Committee Teams. This grouping is responsible for the management of the sub-project from a 'farmer participation' position.

1C. Incorporation during planning: on-going involvement of farmers during the design of the sub-project, increased responsibilities and authority for decision-making.

1D. Direction during planning: farmers exercise leadership and control during the design of the sub-project: authority to make decisions and take responsibility remains in the hands of the farmers.

During the planning stage of the Hillside Agriculture/FSR sub-project, IICA will aim to involve the farmers at the Incorporation level of participation. Should a second phase of the sub-project follow, every effort should be made for farmers to operate at the Direction level during sub-project planning.

2. During the Implementation Stage

2A. Consultation during implementation: farmers provide occasional input during sub-project activities, at the discretion of the sub-project staff.

2B. Representation during implementation: farmers provide on-going formal input through their associations during sub-project activities, and share some responsibilities with the sub-project staff.

2C. Incorporation during implementation: farmers are continuously involved during sub-project activities, with increased responsibilities and authority for decision-making.

2D. Direction during implementation: farmers exercise leadership and control during sub-project activities; the authority to make decisions and take responsibility remains in the hands of the farmers.

During the implementation stage of the Hillside Agriculture/FSR sub-project, farmer appraisal and assessment will be on-going (not to be confused with evaluation stage). Participation will also be ensured through their organization Farmer Action Committee Teams (FACTS). This organization should allow farmers to gain greater leverage with Commodity Boards and other agencies responsible for providing support services.

3. <u>During the Evaluation Stage</u>

3A. Consultation during evaluation: farmers provide direct input during sub-project assessment, through dialogue with sub-project staff, providing feedback on sub-project activities.

3B. Representation during evaluation: farmers provide on-going formal input during sub-project assessment, and some responsibilities are shared between farmers' associations and the sub-project staff.

3C. Incorporation during evaluation: farmers are continuously involved in sub-project assessment, while having increased responsibilities and authority in decision-making.

3D. Direction during evaluation: farmers provide leadership and control during sub-project assessment; the authority to make decisions and take responsibility remains in their hands.

During the evaluation stage of the Hillside Agriculture/FSR sub-project, IICA will aim to involve the farmers at the Incorporation level of participation. As with the planning stage, however, should a second phase of the sub-project emerge, every effort should be made to enable farmers to direct the evaluation activities.

Objective and Strategy

The objective for the farmer participation component of the sub-project is to foster and strengthen farmers' organizations which support production and marketing activities of individual farmers.

The strategy for attaining this objective is three-fold and involves relationships between the farmer, the farmer organization(s), and the sub-project.

1. Farmer Action Committee Team (FACT)

The relationship between the farmer and the sub-project exists through the farmer action committee team (FACT). Each of the sub-project sub-regions will have at least one FACT which will be organized and carry out its work in the following way:

- 1.1 Identify towns/farming areas in each sub-region
- 1.2 Hold pre-project meetings with farmers
- 1.3 Farmers discuss the FACT sub-project concept amongst themselves
- 1.4 Sub-Project is initiated and FACT is formed
- 1.5 FACT works closely with IICA and other agencies on the plans for implementing the sub-project
- 1.6 Regular meetings are held between FACT and implementing agencies during the life of the sub-project
- 1.7 Mechanism continues as above during implementation and evaluation

Of the above activities, 1.1 through 1.3 are already taking place during the sub-project planning phase and 1.4 through 1.7 will continue during the implementation and evaluation phases.

2. Organizational Structure FACTS

The FACTS committees will be comprised of not less than seven (7) persons with at least one farmer from each district.

Responsibilities -
- select farmers to participate in the sub-project
- arrange meetings on a regular basis and invite members of the technical teams to participate
- to make suggestions about sub-project implementation

All farmers participating in the sub-project will be FACT members.

3. Participation in Individual Programmes (PIP)

The relationship between the farmer and the organization is called participation in individual programmes and will be implemented through the following steps:

2.1 Sub-Project staff speak with individual farmers.

2.2 Socio-economic profiles of farmers are done together with them.

2.3 Level of farmer interest in specific programmes is determined together with them.

2.4 Farmer participation in existing organizations is strengthened.

2.5 Farmer participation in new organizations is formalized.

4. Strategy for Strengthening (SFS)

The relationship between the organization(s) and the sub-project is called the strategy for strengthening and will be implemented through the following steps:

3.1 Define farmer organization needs
3.2 Audit available resources
3.3 Identify strengthening methods
3.4 Support organizations to implement methods

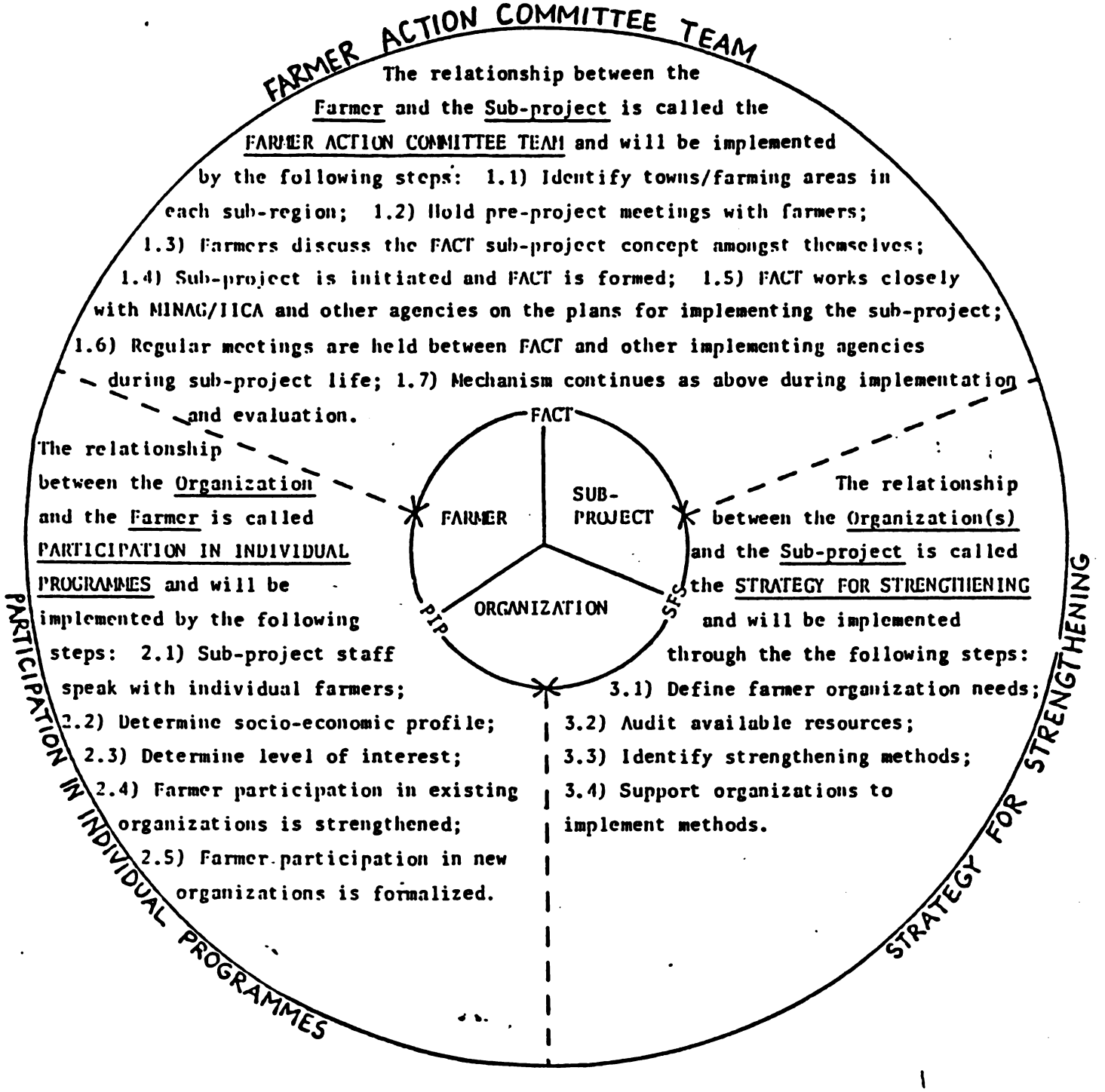
A visual presentation of the inter-relationship between these three strategy components may be seen on the following page. The next page presents the implementation plan for the three-fold strategy and its activities.

Products

The following products, outputs or results are expected from the implementation of the participation component strategy:

Farmers will:

- feel that the sub-project is theirs; they will refer to it as "our FACT project" rather than the USAID, IICA or Ministry project;
- show a greater commitment to aspects of the FRS methodology which have benefitted them;
- understand more about how to control the planning, implementation and evaluation of a hillside sub-project;
- develop greater confidence in their relations with the participating agencies, evidenced by their ability to hold the agencies accountable for service promised


FARMER ACTION COMMITTEE TEAM
The relationship between the Farmer and the Sub-project is called the FARMER ACTION COMMITTEE TEAM and will be implemented by the following steps: 1.1) Identify towns/farming areas in each sub-region; 1.2) Hold pre-project meetings with farmers; 1.3) Farmers discuss the FACT sub-project concept amongst themselves; 1.4) Sub-project is initiated and FACT is formed; 1.5) FACT works closely with MINAG/IICA and other agencies on the plans for implementing the sub-project; 1.6) Regular meetings are held between FACT and other implementing agencies during sub-project life; 1.7) Mechanism continues as above during implementation and evaluation.
FACT
FARMER
SUB-PROJECT
ORGANIZATION
PIP
SFS
The relationship between the Organization and the Farmer is called PARTICIPATION IN INDIVIDUAL PROGRAMMES and will be implemented by the following steps: 2.1) Sub-project staff speak with individual farmers; 2.2) Determine socio-economic profile; 2.3) Determine level of interest; 2.4) Farmer participation in existing organizations is strengthened; 2.5) Farmer participation in new organizations is formalized.
The relationship between the Organization(s) and the Sub-project is called the STRATEGY FOR STRENGTHENING and will be implemented through the the following steps: 3.1) Define farmer organization needs; 3.2) Audit available resources; 3.3) Identify strengthening methods; 3.4) Support organizations to implement methods.
PARTICIPATION IN INDIVIDUAL PROGRAMMES
STRATEGY FOR STRENGTHENING

- have greater confidence in bilaterial and multilateral agencies, evidenced by their ability to provide useful feedback to project funders and technical cooperants.

Farmers' Organizations will:

- respond more specifically to farmer's needs;
- be controlled more by the farmers;
- offer and provide improved services to farmers.

The following pages contain summaries of the first three meetings with farmers held in the three sub-project sub-regions: Golden Grove, Riversdale and Troja.

HILLSIDE AGRICULTURE COMMITTEE (HAC)

FACT — FORM I

Meeting 1 - Golden Grove — April 29, 1987

Objectives

(i) To identify the problems of small hillside farmers in the area.

(ii) To educate farmers on the possibility of solving their problems through participation in community organizations.

(iii) To educate farmers on the importance of preserving their land resource through soil conservation.

(iv) To demonstrate the possibility for increased income by cultivating tree crops.

(v) To solicit their participation in the sub-project.

Results

The message was well communicated with the following results:

1. The farmers' problems were well articulated by them.
2. Farmers were interested in forming community organizations in order to gain greater leverage as one farmer noted: "Unity is Strength".
3. Farmers demonstrated their awareness of the need to invest for their future, to preserve the soil and the advantages of planting tree crops.

Attendance	Male	Female	Youth	TOTAL
Start	28	5		33
Mid Session	40	8	12	48
Finish	33	6	10	39

Observations

The high turn out and intense level of participation by farmers in the meeting in adverse weather conditions, highlight the problems of small farmers and point to the need for assistance in solving their problems.

HILLSIDE AGRICULTURE COMMITTEE

FACT — Form II

Meeting 1 Riversdale — May 20, 1987

Objectives

(i) To identify the problems of small hillside farmers in the area.

(ii) To educate farmers on the possibility of solving their problems through participation in community organizations.

(iii) To educate farmers on the importance of preserving their land resources through soil conservation.

(iv) To demonstrate the possibility of increased income by cultivating tree crops.

(v) To solicit their participation in the sub-project.

Results

The message was well communicated with the following results.

1. The farmers problems were well articulated by them.
2. Farmers were aware of the benefits of cooperation as one farmer remarked: "You are the persons who will make the success. Success is the key word. The sky is the limit".
3. Farmers demonstrated their awareness of the need to invest for their future, to preserve the soil and the advantages in planting tree crops.

Attendance

	Male	Female	Youth	Total
Start	28	9	1	37
Mid-session	55	20	5	75
Finish	54	13	5	67

Observations

1. The high turnout and intense participation by farmers suggest that farmer involvement in sub-project design is paramount.
2. The differences in the type of problems focused on by these farmers viz. the need for mechanical technology indicate that there is need to remove some of the drudgery.

HILLSIDE AGRICULTURE COMMITTEE (HAC)

FACT — Form I

Meeting 1 Troja — June 4, 1987

Objectives

(i) To identify the problems of small hillside farmers in the area.

(ii) To educate farmers on the possibility of solving their problems through participation in community organizations.

(iii) To educate farmers on the importance of preserving their land resource through soil conservation.

(iv) To demonstrate the possibility for increased income by cultivating tree crops.

(v) To solicit their participation in the sub-project.

Results

The message 'farmer participation' was well communicated with the following results:

(i) The farmers problems were well articulated by them.

(ii) Farmers saw farming as their only means of livelihood and showed interest in participating in the sub-project as a means of improving their living standards.

(iii) Many had heard about the Guy's Hill FSR project and on their behalf one farmer hoped that the sub-project would increase their cocoa yields to 15 boxes per acre.

Attendance

	Male	Female	Youth	Total
Start	14	1	2	15
Mid-session	49	2	17	51
End	49	2	20	71

Observation

1. The turn out was slow at the beginning but the members increased steadily and farmers present were cooperative and receptive to the ideas of "farmer participation".

2. There were differences in the problems focused on by these farmers, namely, cane diseases and low prices for cocoa.

VOLUME II

ANNEX B

AGRONOMIC COMPONENT

AGRONOMIC COMPONENT

The Present Position

The major export crops with which the sub-project will be concerned will be cacao, coffee, and pimento. Of the domestic crops the sub-project will be mainly concerned with coconut, yam, plantain, vegetables, legumes, roots and fruits. All of these types of crops feature in the crop mix on farms in the project area. Cacao appears to be the most important crop for small farmers in most of the villages in the sub-project area. The next most important crop in the sub-project area appears to be coffee. Pimento is scattered throughout the sub-project area but traditionally this is not a cultivated crop. In some of the villages coconut is an important crop. With the de-emphasizing of banana as an export crop from small farms in the sub-project area the reduction in attention given to bananas has had an adverse effect on intercropped coffee. Yam is grown mainly as a domestic food crop, and there is a very low level of vegetable cultivation in the area as a whole. The main area for vegetables, legumes, roots and tuber crops is the Seafield/Top Hill area in the north. Apart from a large livestock farmer in the Rio Magno area there is little evidence that livestock rearing forms an important part of the small farm enterprise.

Throughout the sub-project area, Black Pod disease has been reported as the major problem affecting cacao cultivations. The next most important problem reported was rat damage. Apart from these problems which were evident to farmers as causes of low productivity, several other factors observed could obviously contribute to low productivity. These other factors such as excessive shade, low planting density, low fertilizer usage, low level of pest and disease control, and cultural practices which exacerbate some of the problems mentioned, appear to be considered by the majority of farmers as the norm in cacao production.

Coffee from the farmers view was affected by fewer problems. The only problem mentioned was coffee berry borer, and this they felt was being treated through the Coffee Industry Board's spraying programme. However, one of the factors militating against the control of this pest is the practice of leaving infected berries on the ground since these can serve as a source of continued infestation. Low productivity of coffee can be attributed to several factors acting in concert. These are low planting density, excessive shade in some areas, disturbance of the coffee/banana ecosystem, minor element deficiencies, and the use of outmoded pruning techniques.

Pimento in the sub-project area does not appear to be affected by pimento leaf rust and farmers have not reported any problems with this crop. All of the pimento plants seen were naturally occurring or grown from seed. No cultivation of grafted pimento was observed. Because of the way in which this crop is reaped, that is, by breaking off branches, the trees exhibit "biennial" bearing with heavy bearing alternating with light bearing. Improvement in productivity of pimento in the long term is most likely to result from the establishment of pimento using grafted plants in combination with a planned fertilizer programme.

Pineapple is an important cash crop in the Redwood/Cedar Valley area. In this area, some amount of vegetable cash cropping is also practiced, and other cash crops found were sweet cassava and sugar cane for juicing. The market outlets for sweet cassava were the Linstead market and higglers. The price realized for sweet cassava when sold in the Linstead market was J$0.80 per pound. When sugar cane is sold in Linstead market the price realized is J$35 per bundle of 14 canes, when sold off the farm to higglers only J$16 - $20 per bundle is realized.

Some soil conservation practices appear to form an integral part of the farming systems observed in the sub-project area. Mini-terracing and contour planting are much more evident in the Top Hill/Seafield area where intensive vegetable cultivation is common. In the other areas where tree crops are the basis of the farming systems, the inter-planting of food and fruit trees with coffee and/or cacao appears to provide adequate ground cover to reduce soil erosion to a low level without having to change the landform of the hillsides. In some areas, complete clearing of hillside lands has been observed on farms where coffee and coconut are being established. In such areas some form of soil conservation measures appear to be necessary. A large part of the sub-project area still remains under natural vegetation.

What is to be done

The Agronomic component will be executed in five phases. During the Design Phase the collection of agronomic data on farming in the sub-project area will be accomplished through the execution of a Baseline Survey. This data will be analyzed to yield more detailed information on agronomic practices carried out on farms and agronomic problems experienced by farmers than is presented in this document. Using this information and that which is already available, the programme for on-farm testing and developing technologies acceptable to farmers will be designed and implemented during the Initiation Phase. This programme will then be modified through information feedback from farmers. On-farm testing and developing of modified technologies will be executed in the Evolution Phase. The verification of improved technologies acceptable to farmers will commence in the Consolidation Phase at which stage it is expected that farmers who have been participants in the sub-project will take on leadership roles in technology adoption through self-financed, self-managed production.

The fifth phase, the Terminal Evaluation Phase will be an ex-post evaluation to determine and evaluate the effects of these technologies which have been adopted, as well as end-of-year evaluations.

For the annual crops, soil conservation practices, and the use of tree crops/annual crops systems to enhance soil conservation, it is expected that the first four phases can be executed during the period 1988-1993. The progress with tree crops will be slower and by 1993 it is expected that activities concerned with the establishment of tree crops will be either at the end of the Initiation Phase or at the beginning of the Evolution Phase. By 1993 the activities concerned with the rehabilitation of tree crops is expected to be either at the end of the Evolution Phase or at the beginning of the Consolidation Phase.

Number of sites

The proposed sub-project area can be divided up into three districts including the villages as follows:

Golden Grove:	Seafield, Airy Mount, Golden Grove, Crawle, Rio Magno, Golden Valley, Ham Walk.
Troja:	Dunkeld, Rose Hill, Troja.
Riversdale:	Hampshire, Redwood, Cedar Valley, Riversdale, Williamsfield, Darling Spring Hall, Harewood.

In each village, passion fruit will be introduced as a new crop having good market potential using 4 x 1/4 acre plots per village as demonstration plots to be planted on the very steep slopes with minimum tillage and no land clearing.

For each of the villages the other crops to be dealt with in the sub-project are:

Top Hill/Seafield

2 Coffee establishment/plantain-vegetable intercropping trials.
2 Cocoa establishment/plantain-vegetable intercropping trials.

Airy Mount

1 Coffee establishment/plantain-vegetable intercropping trial.
1 Cocoa Establishment/plantain-vegetable intercropping trial.

Golden Grove

2 Coffee rehabilitation trials.
2 Cocoa rehabilitation trials.
2 Coffee establishment/plantain-vegetable intercropping trials.
2 Cocoa establishment/plantain-vegetable intercropping trials.

Crawle

1 Cocoa rehabilitation trial.
1 Coffee rehabilitation trial.
1 Coconut management trial.
1 Coffee establishment/plantain-vegetable intercropping trial.
1 Cocoa establishment/plantain-vegetable intercropping trial.
1 Coconut establishment/intercropping trial.

Rio Magno

1 Cocoa rehabilitation trial.
1 Cocoa establishment/plantain-vegetable intercropping trial.
1 Sugar cane intercropping trial.
1 Mango establishment/intercropping trial.

Redwood/Cedar Valley

1 Cocoa rehabilitation trial.
1 Coffee rehabilitation trial.
1 Mango rehabilitation trial.
1 Pineapple management trial.
1 Coconut management trial.
1 Cocoa establishment/plantain-vegetable intercropping trial.
1 Coffee establishment/plantain-vegetable intercropping trial.
1 Coconut establishment/intercropping trial.
1 Mango establishment/intercropping trial.

Ham Walk

1 Cocoa rehabilitation trial.
1 Coffee rehabilitation trial.
1 Cocoa establishment/plantain-vegetable intercropping trial.
1 Coffee establishment/plantain-vegetable intercropping trial.

Dunkeld

1 Cocoa rehabilitation trial.
1 Coffee rehabilitation trial.
1 Cocoa establishment/plantain-vegetable intercropping trial.
1 Coffee establishment/plantain-vegetable intercropping trial.

Rose Hill

1 Cocoa rehabilitation trial.
1 Coffee rehabilitation trial.
1 Cocoa establishment/plantain-vegetable intercropping trial.
1 Coffee establishment/plantain-vegetable intercropping trial.
1 Coconut establishment/intercropping trial.
1 Pineapple management trial.

Troja

2 Coffee rehabilitation trials.
4 Cocoa rehabilitation trials.
2 Coffee establishment/plantain-vegetable intercropping trials.
4 Cocoa establishment/plantain-vegetable intercropping trials.

Hampshire

1 Coffee rehabilitation trial.
1 Cocoa rehabilitation trial.
1 Coffee establishment/plantain-vegetable intercropping trial.
1 Cocoa establishment/plaintain-vegetable intercropping trial.

Riversdale

2 Coffee rehabilitation trials.
2 Cocoa rehabilitation trials.
2 Coffee establishment/plantain-vegetable intercropping trials.
2 Cocoa establishment/plantain-vegetable intercropping trials.
2 Coconut establishment/intercropping trials.
1 Coconut management trial.

Williamsfield

1 Cocoa rehabilitation trial.
1 Cocoa establishment/plantain-vegetable intercropping trial.

Darling Spring Hall

1 Cocoa rehabilitation trial.
1 Coffee rehabilitation trial.
1 Cocoa establishment/plantain-vegetable intercropping trial.
1 Coffee establishment/plantain-vegetable intercropping trial.

Harewood

1 Coffee rehabilitation trial.
1 Cocoa rehabilitation trial.
1 Coffee establishment/plantain-vegetable intercropping trial.
1 Cocoa establishment/plantain-vegetable intercropping trial.

How it is to be done

Cocoa rehabilitation trials

These trials will test and compare the practices outlined hereunder with farmers' practice on farms with the full collaboration of farmers on whose farms the trials will be sited.

1. Excessive shade to be thinned to about 30 percent and trees fertilized with 2 lbs 16-9-18 per tree at the start of the Spring rains, and with 2 lbs sulphate of ammonia per tree at the start of the fall rains.

2. Control of diseases and pests. Black Pod caused by the fungus Phytophthora palmivora brings about symptoms of rotting of the outside of the older pods. The disease does not affect the beans but if the beans are not mature, they will be prevented from reaching maturity. Black Pod disease attacks cocoa especially under damp, cool, shaded conditions and can be controlled by reducing shade, removing infected pods, and by spraying with Kocide. Plants to be grown under highly fertile, well-drained conditions in order to reduce the incidence of Cherelle Wilt. Pests such as slugs, caterpillars, aphids and thrips to be controlled with appropriate pesticides as and when necessary. Severe thrips infestations can result in drying out of leaves and if uncontrolled, can

lead to plant mortality. Rats, which are considered to be a major pest of cocoa to be controlled by use of Klerat blocks, and rat barriers placed on the trunks of cocoa and overhanging shade trees.

3. Pruning to produce trees with good shape (good canopy architecture), removal of diseased pods, removal of tying branches and gormandizers.

4. Weeding as and when necessary. Each trial will be carried out on two farms which are near to each other. On each farm, the cocoa cultivation will be divided up into two approximately equal sections, the farmer's treatment and the treatment outlined at (1) to (3) above will be randomly allocated to the sections. This simple design provides for combining the results of all such trials and subjecting the results to a combined statistical analylsis. Base data will be collected during the first harvesting period after the sub-project gets underway and before any treatment is applied. This base data will be used in carrying out covariance analysis in order to adjust means and obtain a realistic interpretation of the experimental results. This type of data collection and statistical procedure will be carried out for all tree crop rehabilitation work.

Coffee Rehabilitation and Coffee Establishment Trials

The information used in determining the practices which will be compared with farmers' practices for rehabilitation and establishment of coffee has been selected from "Coffee Estalbishment and Crop Care" by P. Jackson, and "A Review of Coffee Productivity and Processing in Jamaica" by Donald Fiester, as well as from the experiences gained in establishing coffee in the Cropping Systems Project.

Coffee rehabilitation trials

These trials will test and compare the practices outlined hereunder with farmers' practice on farms with the full collaboration of farmers on whose farms the trials will be sited.

1. Execessive shade to be thinned to about 30 percent and plants fertilized with 1 1/2 lbs 10-5-20 at the beginning of the first rains following the first harvesting period after the sub-project gets underway.

2. Approximately 6 months after the first application of fertilizer and at the beginning of the next rains, apply 1 lb sulphate of ammonia per plant.

3. Cut back 2-3 months after the application of sulphate of ammonia, this should be in July immediately after the harvesting period. In selecting plots for inclusion in these trials, preference will be given to plots in which the plants are planted in rows with a regular spatial arrangement and the Baumont-Fukunaga 1-3-2-4 Row System for cutting back (which is now increasingly used in Costa Rica, Guatemala, and parts of Colombia) will be used as the technique for promoting sustained high productivity from year to year.

4. After the first harvesting period following the start of the project a light pruning to remove branches which might be uneconomic or which block light from the centre of the plant is to be done.

5. Control pests and diseases. The diseases of concern are coffee leaf rust (Hemileia vastatrix), anthracnose (Colletotrichum sp.), and leaf spot (Cercospora sp.). Spraying to be done just before and during the rainy seasons with Kocide at 3-week intervals, and with Bayleton at the first observation of coffee leaf rust symptoms. Pests to be monitored and controlled as and when necessary using appropriate pesticides are coffee berry borer, leaf hoppers, leaf miner, scale insects, mealy bugs, rats, black ants, and slugs.

6. Identify and initiate appropriate treatment for correcting any micro-nutrient deficiencies that may be affecting the coffee plants in the trial plots. Likely conditions to be monitored are deficiencies of magnesium, boron, zinc, and iron.

7. General field sanitation such as weeding when necessary, and when spraying to control coffee berry borer, to spray any berries on the ground around the coffee plants as these berries are possible sources for reinfestation.

Each trial will be carried out on two farms which are near to each other. On each farm, the coffee cultivation will be divided into two approximately equal sections, the farmer's treatment and the treatment outlined at (1) to (7) above will be randomly allocated to the sections. Base data will be collected during the first harvesting period after the sub-project gets underway and before any treatment is applied. Data analysis will be as outlined for the cocoa rehabilitation trials.

Coffee establishment/intercropping trials

These trials will compare different methods of establishing coffee with the farmers' method. The treatments to be compared are:

1. Farmers method: No inorganic or organic fertilizer + "rat-cut" seedlings (Rat-cut seedlings are plants which grow from seed of berries cut by rats). Planting distance 5 ft within row x 10 ft between rows with 1 seedling per planting hole.

2. Method recommended by the Coffee Industry Development Company (CIDCO): 4 ozs 6-18-27 + 2 gallons poultry manure per plant hole + improved seedlings from CIDCO. Planting distance 5 ft within row x 10 ft between rows with 1 seedling per planting hole.

3. 4 ozs 6-18-27 + 2 gallons poultry manure per planting hole + improved seedlings from CIDCO. Planting distance 5 ft within row x 5 ft between rows with 1 seedling per planting hole.

4. 4 ozs 6-18-27 + 4 ozs Diammonium phosphate (DAP) + 2 gallons poultry manure per planting hole + improved seedlings from CIDCO. Planting distance 5 ft within row x 5 ft between rows with 3 seedlings per planting hole.

5. 4 ozs 6-18-27 + 4 ozs DAP + 2 gallons poultry manure per planting hole + improved seedlings from CIDCO. Planting distance 3 1/2 ft within row x 7 ft between rows with 3 seedlings per planting hole.

Each of these trials will be sited on two farms which are near to each other and which satisfy MINAG-IICA's criteria for selection. Two months after planting each plant or group of plants in a planting hole (hill) in plots receiving treatments 3 to 5 will receive 4 ozs urea fertilizer. Plants or groups of plants in each hill in plots receiving treatments 3 to 5 are to be managed to produce 4-7 vertical stems per hill with no other pruning until after the first good crop is reaped. Plants receiving treatments 1 and 2 will be managed to produce 3-4 vertical stems per plant. At about 3-4 years after planting out, immediately after the first good crop is reaped, cutting back will be practiced as outlined hereunder:

Treatment 1: Cutting back using farmer's method.

Treatment 2: Cutting back method recommended by CIDCO. Plants are topped when 3-4 ft tall, and again when 6-7 ft tall. Only one new shoot is to be permitted to develop per main stem after each topping. Cutting back to 15-18 inches is to be done only when yields begin to decrease.

Treatments 3 - 5: Plots receiving these treatments will be pruned according to the Baumont-Funkunaga 1-3-2-4 Row System. In each plot rows are numbered from 1 to 4 in sequence and the sequence is repeated until all plants in the #1 rows are cut back to 12-15 inch stumps. Thereafter the sequence of cutting back yearly will be #3, #2, #4, after which the cycle is repeated. Temporary shade will be provided by plantain, and permanent shade by Leucaena and Calliandra. Intercropping of alleys will be carried out using appropriate soil conservation measures. Crops to be used as intercrops will be chosen from among the following: potato, red peas, green corn, tomato, cabbage, lettuce.

Cocoa establishment/intercropping trials

These trials will compare different methods of establishing cocoa with the farmers' method. The treatments to be compared are:

1. Farmer's method (no soil amelioration).
2. Cocoa Industry Board's method.
3. 5 lbs Bioganic fertilizer + 4 ozs 16-9-18 per planting hole.
4. 2 gallons poultry manure + 4 ozs 16-9-18 per planting hole.

Spacing for treatments 3 and 4 to be 10 ft. x 10 ft. Cocoa plants to be supplied by CAIB. Planting holes to be 1 1/2' x 1 1/2' x 1 1/2'. Temporary shade: Plantain. Permanent shade: Calliandra & Leucaena.

During the first 4 years, the plantain shade plants in treatments 2, 3 and 4 will be fertilized. Clippings from Calliandra and Leucaena shade plants will be incorporated around cocoa plants. From the fourth year onwards, treatments 3 and 4 will receive 2 lbs 16-9-18 per tree at the start of the Spring rains and 2 lbs sulphate of ammonia at the start of the Fall rains.

Each trial is to be sited on two neighbouring farms with two blocks on each farm. During the course of these trials, a monitoring system will be developed to monitor nutrient status of the plants through leaf analysis. Depending on the indications obtained, treatments 3 and 4 may be modified accordingly. Plant protection will be applied to treatments 2, 3 and 4 as and when necessary. Farmer's practice will be followed with treatment 1. Complete records of labour and material inputs will be maintained in order to facilitate the economic analysis.

Data on simple indices of plant development will be collected at 6-month intervals in order to monitor plant growth in different treatments.

Intercropping of alleys will be carried out using appropriate soil conservation measures. Crops to be used as intercrops will be chosen from among the following: potato, red peas, green corn, tomato, cabbage and lettuce. It is expected that the attention which will be given to the intercrops with respect to pest and disease control will also benefit the cocoa and plantain crops.

Coconut management trials

These trials will compare the management practices recommended by the Coconut Industry Board with the farmers' practices. For these trials only farms with trees which have already started to bear nuts will be selected. Depending on the extent of coconut cultivation on individual farms selected, a single trial may be sited on one or more farms.

Some amount of intercropping of coconuts is already being done by farmers. Attention will be given to improving the intercropping system with the objective of converting to permanent tree intercrop.

Coconut establishment/intercropping trials

These trials will compare the establishment techniques recommended by the Coconut Industry Board with farmers' practices from the time of site preparation through to the first year of production of nuts. Alternative inter-cropping systems will be tested for compatibility with coconut palm development.

Mango establishment/intercropping trials

Mango establishment plots will be set up on farms using the technology outlined hereunder:

1. Site selection: sites to be at altitudes of 1,500 ft above sea level or less. At 2,000 ft above sea level or higher elevations, it is recommended that commercial mango cultivation should not be attempted. Soils should be free draining and neither too acidic or alkaline.

2. Lining and planting:

Variety	Spacing
St. Julian (Julie)	20 ft x 20 ft
East Indian	25 ft x 25 ft
Haden	35 ft x 35 ft
Bombay	45 ft x 45 ft
Keitt	30 ft x 30 ft
Kent	30 ft x 30 ft

3. Planting: will be done during early part of the first rainy season after the sub-project gets underway in order to give plants a good start to withstand the following dry season.

   Planting holes 1 1/2 ft x 1 1/2 ft x 1 1/2 ft. Topsoil to be set aside for placing at base of hole. Each planting hole to receive 2 gallons poultry manure and 4 ozs 12-24-12. Mound soil around stem to 6" to allow for settling and also to facilitate drainage and control of fiddler beetle.

4. Fertilizing: in second and succeeding years while trees are non-bearing apply 1/2 - 3/4 lb 16-9-18 per tree at beginning of each rainy season. As soon as the first set of blossoms appear, apply 1/2 - 3/4 lb 12-10-18 per tree, and when fruits are about 1/4 of full size apply 3/4 - 1 lb 7-14-14 + 1/4 lb $MgSO_4$ (Epsom Salts) per tree. Thereafter, annual fertilizer applications should be:
   -- pre-bloom application of 2-3 lbs 12-10-18 per tree
   -- when fruits are 1/4 of full size an application of 2-3 lbs 7-14-14 + 1/4 lb $MgSO_4$ (Epsom salts) per tree.

5. Plants will be circle weeded to control directly competitive weeds. Intercropping with vegetables will be carried out with appropriate soil conservation measures to determine alternative economically viable intercropping systems. Each intercropping trial will be replicated on the same farm since the land area to be occupied by the mango establishment plots will be relative large.

6. Pruning will be carried out only for the following purposes:
   -- to remove low-lying branches
   -- to remove dead branches
   -- to thin out the centre if it is too dense

   In mango production pruning as a routine measure has not shown significant beneficial results and in certain cases can be detrimental since it reduces leaf area index.

7. Pest and disease control: Diseases to be monitored are:

(i) Anthracnose (Colletotrichum gleosporoides) which can attack the plant at all stages of development causing a variety of symptoms such as leaf spot, wither tip, blossom blight, fruit rosetting, fruit rot and post-harvest damage. Polyembryonic varieties are resistant and monoembryonic ones are susceptible.

(ii) Powdery mildew (Oidium sp.) symptoms are white powdery growth mainly on young leaves, inflorescences and fruits. Infected areas turn brown and premature leaf fall may occur. Bombay and East Indian are susceptible varieties. Pests to be monitored are thrips, scale insects slugs, black ants, wasps, and later when plants begin to bear the West Indian fruit flies (Anostrepha mombinbraeobtans).

Preventive sprays and baiting for slug control will be applied at the same time when pest and disease control in vegetable intercrops is being carried out.

Mango rehabilitation trials

In the sub-project area, mango is not cultivated as an orchard crop, but rather as individual trees scattered throughout the farm. Thus, rehabilitation trials will have to be carried out on an individual tree basis.

All of the mango trees available for these trials on the selected farms in the Rio Magno, and Redwood/Cedar Valley areas will be included in these trials. The rehabilitation trials will have the treatments indicated hereunder.

Components of Treatments	Treatment A	B	C	D	E	F	G	H
Topworking	-	-	+	+	-	-	+	+
Pest & Disease Control	-	+	-	+	-	+	-	+
Fertilizer Use	-	-	-	-	+	+	+	+

- without component
+ with component

The experimental design cannot be decided until the farms are selected and the distribution of trees known. We may use either a completely randomized design or an unbalanced design using incomplete blocks. In either case, the experimental unit will be a single tree from which yield data will be collected in the first bearing after the sub-project gets underway. An untreated control (Treatment A) will be present on each farm.

Pimento establishment and management/intercropping trials

At present, most of the pimento is reaped from uncultivated plants grown from seeds dropped by birds. The present production base for pimento does not facilitate the imposition of the necessary crop husbandry practices which can lead to increased productivity and to increased production. In order to widen the production base for pimento, the extent of cultivation of grafted pimento needs to be increased. Grafted pimento planted as an orchard crop will be much more amenable to sound husbandry practices. Also, grafted plants begin their productive life at an earlier age than seedling plants. There is an attitude of complacency on the part of small farmers regarding the pimento industry stemming from the fact that historically the crop has been produced without significant capital outlay and with major costs being expended only in labour for reaping, threshing, and drying of the crop. The entire production

system is pervaded by a very low level of technology which is little different from the practices of 100 years ago, which are now inadequate and are likely to be even more so in the next century.

These trials will concentrate on the establishment and management of small orchards of grafted pimento for berry production, and in developing a system of drying, threshing and cleaning pimento berries that is less labour intensive and less costly.

It is known that applications of nitrogenous fertilizer promotes flushing. However, in the Ward's Plot of the Beverley Pimento Research Station in St. Ann which was planted out in 1964, the unfertilized trees in 1972 produced 2-3 times the average yield of the trees fertilized with 8 and 16 lbs. 10-10-20 per tree.

In the first year, fertilization was at the rate of 1 lb per tree in March and September, and this was increased by 1/2 lb more per tree in each succeeding year and adjusted in 1968 to dressings of 4 and 8 lbs per tree in Spring and Fall. These treatments were compared with no fertilizer for which the results for 1972, which was the most productive year up to 1974, have been referred to.

These establishment trials will concentrate mainly on growing pimento as an orchard crop at a spacing of 22 ft x 22 ft. Planting holes of dimension 1 1/2 ft x 1 1/2 ft x 1 1/2 ft will be ameliorated with 2 gallons poultry manure and 4 ozs 12-24-12. Intercropping trials with vegetable crops will be carried out to identify economically viable alternative intercropping systems under adequate soil conservation regimes.

After the initial fertilization of the planting hole, no additional fertilizer will be applied unless deficiency symptons are diagnosed.

Pineapple Management Trials

Pineapple management trials will be carried out in the Rosehill and Redwood/Cedar Valley areas where this crop is grown as a cash crop.

Varieties to be handled are Sugar Loaf, Red Spanish and Smooth Cayenne. Suckers and basal slips will be used as planting material for establishing the trials. Basal slips can be left on the fruit stalk for further development after the fruit is picked. When they attain 12" - 15" they can be removed for planting. When suckers are being selected for planting it is important that those which are already flowering are not used. It is also possible for very large suckers to fruit prematurely giving low yield. Thus, avoid selecting very large suckers.

Proper selection of planting material is essential for good establishment and good yield later on. Planting material should not be selected from plants with deformed fruits, diseased plants, or plants with small-eyed fruits.

Planting material should be selected as far as possible from plants having fruits of true-to-type morphology, fruits being borne on a short fruit stalk, and the stem of the plant should be relatively short. Dip planting material in a mixture of 1/2 pint Malathion + 1 lb. Difolaton in 10 gal. water just before planting out.

Soil should be well-prepared before planting since excessive cultivation immediately around plants is not desirable after planting.

Spacing: Double row system to be used.
Beds (continuous mounds 2 ft. wide, and 4 - 6 ft. apart depending on cultivar (4 ft. for Red Spanish and Smooth Cayenne, 6 ft. Sugar Loaf).
2 rows of plants per continuous mound
12 - 18" apart across and along mound using triangle planting pattern.
Grade planting material according to thickness of base and size of leaf portion.
Plant each grade size in separate blocks to reduce adverse competition between plants.
Plants should be set firmly but not too deep in the soil otherside growth will be slow and plants weak and spindly. Soil should not be allowed to rest in the centre of the plants since this can cause loss of planting material.

Pest and disease control: Soil samples to be assessed for nematode infestation levels to determine necessity for using nematicides. Several options: DD, Nemagon (liquids); Nemaphos, Nemacur (granules). Mealy bug is a major pest of pineapple and the hosts of mealy bugs are ants. Thus, control all ants before planting using monocrotophos at 1 pint in 100 gal. water, (2 teaspoon/gal). Apply to nests and trails before and after planting.

Weeding: Avoid deep weeding cultivation around plants since this disturbs the shallow root system of the plants.

Fertilizers: 1 oz 16-5-19 per plant at 6 weeks after planting
thereafter at the start of each rainy season.
1 oz 16-5-19 per plant.

During the establishment stage of the management trials, intercropping systems will be tested to identify the most compatible systems in view of the shallow rooting system of the pineapple plant.

VOLUME II

ANNEX C

ECONOMIC COMPONENT

ECONOMICS AND MARKETING

Introduction

Farmers in the sub-project area do not have enough reliable information to base their production and investment decisions. Their lack of information and knowledge on how to interpret economic information restrict their possibilities to take advantage of the production alternatives open to them. The sub-project will emphasize the generation and dissemination of economic information to assist farmers to decide on the adoption of production opportunities, technologies and soil conservation practices developed by the sub-project. Economic information based on baseline survey, on farm experiments, farm records will be disseminated to farmers and extension personnel through field days and short training sessions.

Farm Models and Record Keeping

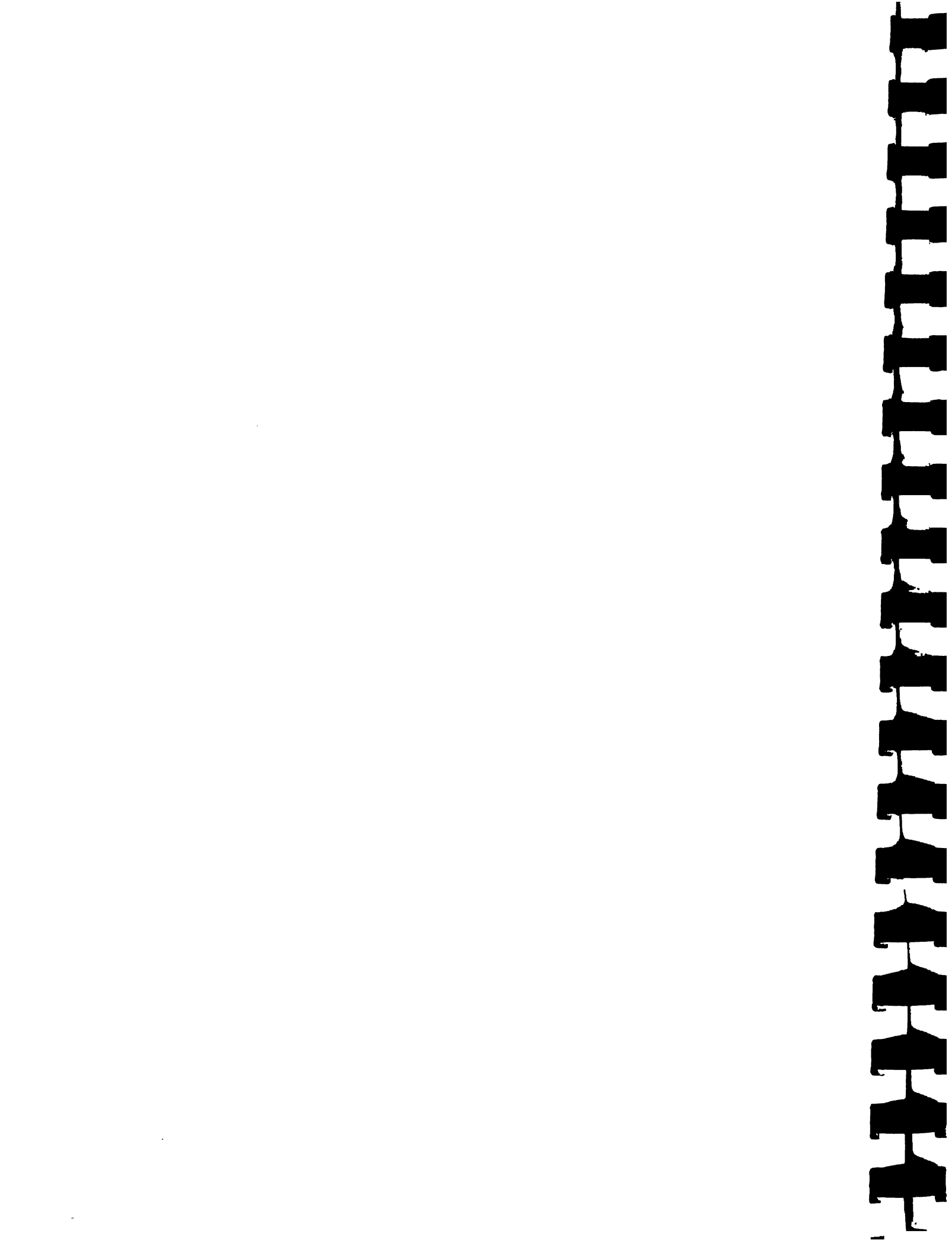
During the first year of the sub-project, the agricultural economists will use baseline study data and other sources of information to assist in:

(i) the definition and determination of recommendation domains (groups of similar farmers) to select experimental sites and demonstration farms; and
(ii) to prepare farm models representing actual production situation.

Complementing this information, a record keeping system will be developed and implemented to generate cost-benefit information about the technologies and production systems being tested.

The baseline study will provide information of farmers' resources, enterprise mix, systems and sub-systems of production and their interactions and labour and other resource constraints during the year. This information will be used to describe the actual situation of farmers in each recommendation domain in terms of use of resources, production and income generated and to identify the most limiting factors to improve his income taking into consideration soil conservation practices. Representative farms will be selected in each recommendation domain and farm models will be developed. The farm models will represent the role of the farmers as a supplier and user of farm resources and the production systems, sub-system and constraints faced by the farmers. The farm models will permit the analysis of the whole system and the interactions among activities and the timely identification of critical resources that may affect the adoption of the changes proposed. Economic policy and research recommendations to alleviate constraints faced by the farmer will be developed based on these analysis.

The farm models will provide an excellent foundation to structure multi-period models to test investment alternatives on crop trees and soil conservation practices showing the most profitable alternatives to test in farmers fields. The multi-period models will provide information about what economic conditions should prevail for certain practices being adopted by farmers and the production and income flow as farmers move from the actual to the desired situation. Parametric routine will be used to simulate farmers circumstances under different market and critical resource constraints. This will provide some assessment of the risk involved in some of the proposed production alternatives. The multi-period models will provide information about the amount of working capital required by the farmers until crop trees start generating income.



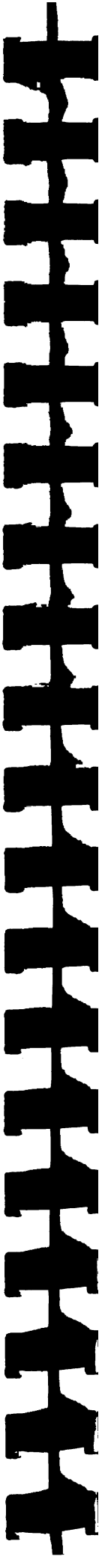
It is expected that during the first semester of implementation of the sub-project, no less than one farm model for recommendation domain will be developed. If the baseline data shows the need of more than one representative farm for each recommendation domain the rest of the models will be completed during the first year of implementation of the sub-project to test ex-ant and ex-post proposed production systems.

The development and testing of the record keeping system will start during the first quarter of implementation of the sub-project. The system will be implemented in demonstration farms and collaborator farmers to register quantitative and value data of expense, income and investment on crop trees and soil conservation practices carried out on experimental sites and collaborator farmers. As farmers become more familiar with record keeping, registration of expenditures and income for the whole farm will be attempted.

Farm records data will be used to determine costs and income of recommended production system and practices and the information disseminated to farmers and extension personnel during field days and seminars.

The agricultural economist of the team will be responsible to assist the farmers with the recording and analysis of the information. It is expected that the farm record keeping system will be implemented in no less than 10 farms in each recommendation domain including some farms not directly involved in the sub-project.

Another of the activities to generate information will consist of the generation of cost-benefit analysis of cultural practices proposed by the sub-project. Also enterprise budgets for tree crops (establishment and maintenance) will be developed. This information will be disseminated to farmers and extension personnel.



The farm record keeping; the economic analysis of experimental results; the ex-ante and ex-post economic evaluation of experimental results and soil conservation practices on farmers' income and return to his resources; and the generation of enterprise and farm budgets will be a continuous activity during the life of the sub-project.

Marketing and Credit

Some complementary activities developed by the sub-project will consist of the analysis of the credit and marketing constraints. Baseline data will be used to define some critical marketing problems for some tree crops. Price series analysis will be conducted and trends determined to forecast tendencies. This information will be used in the preparation of the multi-period models.

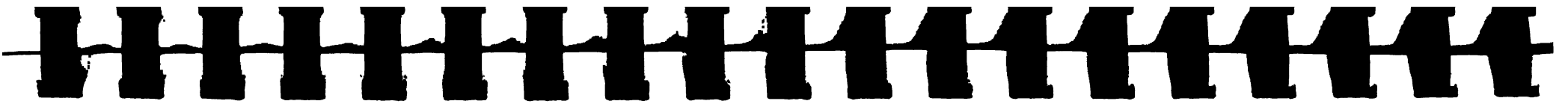
When considered necessary an analysis of market size and structure will be attempted trying to identify the impact that sub-project crop tree output could have in markets (national and foreign) in the future.

Cash flows and credit needs will be estimated for different production situations and period of time and sources of credit for investment financing will be identified.

Market and credit information will be disseminated to the farmers during the field days and seminars. It is expected that there will be 2 field days every crop season for experimental site with a total participation of no less than 15 farmers.

Dissemination of Information and Training

In order to assist farmers in the interpretation of economic data and to improve the decision making process seminars will be organized in selected farms.



The seminars and subjects to deal in the seminars will be organized with farmers participation. It is expected that seminars will last no more than half a day and that there will be one seminar per month during the life of the sub-project. It is expected that seminars will start during the second year of the sub-project and that there will be no less than two seminars per month per recommendation domain. Total participation per seminar is expected at no less than 20 farmers with a total of 40 farmers per recommendation domain.

Training

The sub-project contemplates the training of extension personnel in farm management techniques to assist farmers in farm planning and in record keeping to control and evaluate farm plan results and determine efficiency ratios for labour and capital. The training of extension personnel will be conducted in 4 days workshops. A total of four workshops will be conducted during the first year with an estimated participation of 22 extensionists (MINAG, Commodity Boards, Processing companies) working with farmers in the sub-project area. During the second year of implementation of the sub-project, 2 days workshops will be organized to present research results, their economic interpretation and impact on farmers income, production and soil conservation. Concepts of evaluating investment alternatives on crop trees will be presented.

IICA's agricultural economist will have the main responsibility of assisting in the development of the methodological guide lines for the different economic studies and farm management tools developed in the sub-project and in the mathematical formulation, processing and interpretation of results of the multi-period farm models. It is expected that agricultural economists working in the sub-project will require some refresher training in the development of multi-period farm models. This training will be organized by IICA Agricultural Economist and will be carried out during the first quarter of implementation of the sub-project.

Base Line Study

Economic Inform

A. Farm Size, t
family labo
tree crop m
permanent h
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Home consum
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Frequency ar
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B. The informat
available, s
intensity of
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how it affec
reduce risk.
and livestoc
returns to r
crops and in

ıdy

ɔrmation

, tenure and resources (land and available farmers' bour and major capital items); livestock, permanent mix, crop rotations, multiple cropping, inputs use, hired labour, temporary hired labour, costs and major crops and tree crops Crop and livestock ɔns. Use of credit - sources and crops financed. quantities sold; sales before harvest, immediately 'est? Storage capacity permanent crops marketing Emphasis will be put in the collection of n to detect relationships between enterprise .

ɲption of farm grown products. Outside farm work - ɣear in days and outside sources of income.

ınd causes of crop failure by crop during the last 3 ıking of crops by level of risk in terms of whether ɾices. Practices to reduce risk.

tion collected will be used to determine: Resources stock of capital, most restrictive resources, f land cropped. Cash constraints, seasonal f labour, home consumption and surplus marketed and ɔts marketing strategy. Risk and strategies to Annual cropping pattern and the use of each crop ɨk production. Total production, income, financial esources, efficient farmers (management of tree come).

This survey
describing
limiting fa
with each f

These sets
socio-econo
determine s
and quantif
interaction
technologie

The characteris
help to select
farm experiment
credit input di
to be considere

The information
production and
resources and c

Efficient farme
and income will
demonstration f

The information
on tree crops a
the development
evaluation of t
farmers. The f
will affect farm

rvey information complements the survey information
ing actual farmers technology for tree crops, major
g factors on yields and extent of the loss associated
ch factor.

ets of information collected in the baseline study plus
conomic, climate and soil information would allow to
ne system of production, sub-systems and their relations
ntification of the more important relationships and
tions necessary to identify and deign potentially useful
ɔgies for tree crops.

ɛristics of farmers and their management practices will
ɛct the representative sites and practices to test on
ients. The baseline study will provide information on
: distribution and marketing constraints that will need
lered in the sub-project proposal.

:ion will allow to examine the whole system of
ınd their interactions and to determine critical
d constraints through time.

rmers in terms of management of tree crops, production
ill be detected and analyzed to use as case studies and
n farms.

ion collected on resources and input-output information
s and other major production activities will be used in
ent of farm models to conduct ex-ante and ex-post
f the feasibility of new technology being adopted by
e farm models will show how the proposed technologies
farm resources use, determine critical resources and

how farmers inc
increases throu
crops are adopt
management prac
are made.

Economics and M

- Use baselin
  recommendat
  experimenta

- Generation
  farmers to
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Activities

- Development
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- Development
  in demonstr
- Development
  crop trees
- Ex-ante and
  results and
- Seminars at
  interpretat
- Training of
- Field days
  production

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income and returns to his investment and labour
hrough time as improved cultural practices for tree
lopted; the area under tree crops is increased; soil
ractices are adopted; and soil conservation investments

d Marketing

line information to assist in the definition of
lation domains (groups of similar farmers) to select
ital sites, demonstration farms and develop farm models.

n and dissemination of economic information to assist
o decide on the adoption of production opportunitites,
ies and soil conservation practices developed by the
ct.

Economically efficient cocoa and coffee-based
farming systems developed.
Recommendations for Research, Extension and Economic
Policy generated.
Marketing and credit constraints identified.

: of multi-period farm models for each recommendation

and implementation of a farm record keeping system
ation farms and collaborator farmers.
of cost-benefit studies of cultural practices and
technologies proposed by the sub-project.
ex-post financial evaluation of experimental
soil conservation practices.
the farm level to assist farmers in the
on of economic information.
extension personnel in farm management techniques.
o disseminate economic information on recommended
ystems and cultural practices.

VOLUME II

ANNEX D

INSTITUTIONAL LINKAGES

During the plan
Project, MINAG/
several other i
project. The l
in three forms:

i) indiv:
ii) throu
and
iii) throu

The following i
be participatin

The FSRD-Hillsi
Managers of the
expected that t
to the sub-proj

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- C
- C
- J
- B
- F
- A
- R

INSTITUTIONAL LINKAGES

lanning and execution of the Hillside Agricultural Sub-
AG/IICA will have to maintain relationships with
r institutions also participating in the overall USAID
e linkages with the participating institutions will be
ıs:

ividual
ough an FSRD-Hillside Advisory Committee in Kingston,

ɔugh a local Committee at the sub-project area

is a list of institutions which it is envisaged will
.ng with MINAG/IICA at the proposed levels.

ide Advisory Committee is composed of Directors or
e institutions or their representatives. It is
this group will provide general guidance and support
ject. The institutions at this level are:

Jamaica Agricultural Society
Coffee Industry Board
Cocoa Industry Board
Coconut Industry Board
Jamaica Pimento Association
Banana Growers Association
Farmers Cooperatives Federations
A. C. Bank
Representatives of FACTS groups

A local coordin
activities amon
Hillside Agricu
sub-project. T
and technical r
are:

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Analysis of ins
Ministry of Agr
In the Ministry
Research and De
and Extension,
expected that d
of experiments
results will be
conducted joint
and Training Th
required to pro
evaluation suppo

The extension se
extensionists wh
visits to them.
with other insti
the area conduct
of St. Catherine

rdinating committee will be created to coordinate among institutions with active participation in the ricultural project within the limits of this . This committee will be composed of local directors al representatives of the different institutions. These

Ministry of Agriculture
Commodity Boards Extensionists
Growers Association Extensionists
Farmers' Cooperatives
P. C. Banks
Representatives of FACTS groups

institutional capabilities

Agriculture

stry of Agriculture, the linkage will be between the d Development Division and the Divisions of Production on, Policy and Planning, Marketing and Training. It is at decisions will be made jointly with R & D on the type its to be undertaken. It is expected that research l be transferred to farmers through training programmes ointly with the Divisions of Production and Extension ; The Data Bank and Evaluation Division will be provide routine monitoring and annual and terminal support.

n service is covered by two College of Agriculture s who receive requests from farmers or do routine em. These extensionists do not have formal linkages nstitutions in the region. There is one FSR project in ducted by MINAG-IICA in Guy's Hill and Watermount area rine.

The Jamaica Agr

The JAS, founde
farmers in Jama
membership of 7
Catherine there
members in the

River
Sea F
Red W
Pear
Guy's

The participati
objectives: a)
articulate thei
MINAG/IICA the
orientation to
participation w
with representa
local committee
Federation Ltd.

Commodity Board

The Commodity B
Board and the C
planting materi
produced. They
services and ma
all commodities
Committee. The
form a pressure

:ultural Society

in 1885, is the leading organization representing
ca. According to its 1986 Annual Report it has a
,638 in 1,015 branches. In the parish of St.
are 11,316 members in 111 branches. There are 394
rea of the sub-project, distributed as follows:

sdale	113
ield	31
ood	40
Tree Grove	60
s Hill	150

ion of the Jamaica Agricultural Society has two main
it is an opportunity for farmers, as a group, to
ir opinions about the sub-project, and b) it gives
e opportunity to dialogue and get feedback on their
to the development of the sub-project. JAS
will be at two levels, through an advisory committee
tation from JAS central authorities and through a
ee with representation from JAS Cooperatives
d., active in the area of the sub-project.

ards

y Boards now active in the area are the Coffee Industry
e Cocoa Industry Board. These Boards provide inputs,
erials, fertilizers, sprays and purchase the crop
hey also offer additional services such as extension
d marketing. The linkages with the Boards must be for
ties, active and non-active, mainly through the Advisory
The linkages with the Boards are technical, but they
sure group through which farmers needs are articulated.

The Coffee Indu

Industry Develo

CIB was establi
1948 and commen
regulate the gr
to encourage th
person may purc
with the proces

The subsidiary
present non-mar
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control; produc
among others.

The Cocoa Indus

CAIB was establ
Its main object
Industry of the
processing, pur
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operate subsida
farms, to manuf
products, and t
Minister of Agr
of the Board, c

The Coconut Ind

COIB was establi
as a successor
functions are t
growers, which
on the state of
licensing of co

ry Board (CIB) and its subsidiary the Coffee
ıent Company (CIDCO)

ıed under the Coffee Industry Regulation Law of
ed operations in 1950. Its main objectives are to
wing, processing, purchasing and sale of coffee and
: development of the Coffee Industry in Jamaica. No
ıase coffee berries or operate a factory involved
sing of coffee without a licence issued by CIB.

CIDCO was created in 1981 and is responsible for the
:keting activities of CIB which are wide ranging:
se control in particular Coffee Borer and Leaf Rust
ction of seedlings, extension services and research,

ıstry Board (CAIB):

ɔlished under the Cocoa Industry Board Law of 1957.
ctives are to encourage the development of the Cocoa
he island and to regulate and control the growing,
ıurchase and sale of cocoa. Also, to promote the
:rsons engaged in this industry. CAIB is empowered to
idaries and to deal in cocoa plants, to operate cocoa
nufacture, process, buy or sell cocoa or any cocoa
d to operate cocoa research station or projects. The
Agriculture, following consultation with the Chairman
l, can issue general directives in matters of policy.

Industry Board (COIB)

tablished in 1945 under the Coconut Industry Control Act
sor to the Coconut Marketing Board. Its present
ıre to provide administrative and extension services to
ıich include: keeping the Government of Jamaica informed
te of the industry, marketing the crop, arranging for
of copra manufacturers, arranging for insurance of

coconut trees aga
out research on t
on their agricult
material.

The Banana Export

Its main concern c
Company BACO was d
activities. It ha
included again wit

- Adv
- Pes
- Pro
- App

The Jamaica Piment

This Association wa
promoting pimento p
sponsored by the Mi
Jamaica's Pimento a
could command a bet
activities of the J
seedling materials.
growing areas has a
the Export Division
services through a

A Pimento Clearing H
becoming the sole ex
the traditional patt
village produce deal
belongs to the Expor
its main functions a

s against damage by windstorms and by disease, carrying
on the problems of the industry and advising growers
icultural problems and production of adequate planting

kport Company (BECO)

:ern deals with marketing services. The former Banana
was divested of many of its current non-marketing
It has been proposed that the following activities be
in within its responsibilities in BECO:

- Advisory services
- Pest/disease control, specifically crop spraying
- Provision of planting material
- Applied research

?imento Association (JPA)

:ion was created ten years ago with the purpose of
nento production under high quality standards. It is
the Ministry of Agriculture whose policy is to promote
nento as a major spice in the world so that the farmers
i a better price for the crop. One of the main
f the JPA is the production and distribution of grafted
erials. The identification of the most suitable
s has also been undertaken. The JPA works closely with
ivision of the Ministry of Agriculture which provides
)ugh a warehouse in Kingston

earing House was created in Jamaica in August 1942
sole exporter of pimento from this country, changing
ıal pattern of harvesting arrangements of selling to
ıce dealers and later on to large exporters. It
ıe Export Division of the Ministry of Agriculture and
:tions are to collect, process, market and sell pimento.

In handling the
maintains store
clearing, weigh
present time, p
Research and ex
Agriculture, Ex

Banks

An important li
established wit
exist between t
Ministry of Agr

The origin of t
Societies) beco
Societies Law i
Credit Board La
service and the
to expedite the
needed to be or
and promoted by
the Agricultura
People's Cooper

P.C. Banks have
members. The Ba
Credit Bank at a
a rate of 15%, c
the banking syst
establishment in
loans to farmers
that the Jamaica
for small farmer

ıe island's entire pimento crop, the warehouse
:ehouse, barbeques and equipment services for
ghing, and bagging pimento in Kingston. At the
propagation of seedlings is also carried out.
extension services are provided by the Ministry of
Extension Service.

linkage at both central and local level must be
ith A. C. B. and P.C. Banks. Strong coordination must
the P.C. Banks and the extension service of the
griculture.

the P.C. Banks dates back to 1905 (Agricultural Loan
coming more active under the Agricultural Loan
in 1912 and later on in 1960 under the Agricultural
Law. By the decade of the forties, the extension
ıe Jamaica Agricultural Society decided that in order
ıeir work and increase their coverage, the farmers
organized into groups. Out of these groups, created
by the agricultural institutions of those days, grew
:al Cooperative Loan Banks, which developed into the
erative Banks.

ve an islandwide coverage with 115 offices and 130,000
Banks usually obtain funds from the Agricultural
: an interest rate of 11% for on-lending to farmers at
, compared to interest charged by other sections of
ystem, which exceeds sometimes 15%. Since its
in 1981, the AC Bank had provided $116 million in
ers in 42 of 115 PC Banks. The policy of the GOJ is
.ca Agricultural Credit Bank should administer loans
ıers through P.C. Banks.

Strategy for

In order to a
through the f

STEP 1

A detailed ex
participating
farmers and lc
sub-project is

STEP 2

Additional con
institutions t
define means o

STEP 3

After receivin
meeting is hel
both, central
plan of instit

STEP 4

Two committees
central level (
level (sub-proj
matters and the
field.

STEP 5

All future rela
through the Com
demanded by cir
1988 - 1993.

tional participation

nstitutional participation, MINAG-IICA must go
g steps:

.on of the sub-project is made to prospective
tutions at central level (Kingston) and to
nstitutions (sub-project area) when the
:iated.

.s are made with prospective participating
:ceive feedback on the sub-project design and
articipation.

Feedback comments indicated in Step 2, a second
with prospective participating institutions at
id local levels, in order to present a comprehensive
:ional participation.

are created: A FSRD Hillside Advisory Committee at
(Kingston) and a Coordinating Committee at local
ject area). The first one deals with general policy
ie second one with coordination of activities in the

:lationships with the institutions will continue
Committee meetings and through individual contacts as
circumstances during the execution of the sub-project.

VOLUME II

ANNEX "E"

MONITORING AND EVALUATION METHODOLOGY

MONITORING

Monitoring
realization
development

The Hillsid
FARMER PART
LINKAGES, M
and evaluat
project impl

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development pr
using the Farm
data will be di
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.UATION SYSTEM HILLSIDE AGRICULTURAL SUB-PROJECT

.uation (M.E.) are of critical importance for the
elopment projects, particularly for rural
ts because of their multi-dimensional nature.

ulture sub-project has six major components,
:ON, AGRONOMIC TRIALS, ECONOMICS, INSTITUTIONAL
ING AND EVALUATION and ADMINISTRATION. Monitoring
these components will be on-going throughout
ation.

rk of the evaluation methodology will be developed
ı phase and is centered around three areas:

sign of the baseline study which will provide a
ark on which the project impact will be evaluated.
enerated from this study will describe the
-of-the-art with regard to farming system, farmer
cipation in groups and organizations, social and
mic conditions, production and cultural practices.

sessment of existing institutional linkages will be
taken to provide a framework for any future
ıation of the impact of the project on strengthening
itutional linkages.

design of agro-socio-economic data collection
tionnaire during the initiation of on-farm trials and
on-going data collection throughout sub-project
lementation.

ources of data will provide a comprehensive data base
ıl assessment and end of project evaluation. These data
serve as secondary data sources for the design of future
projects aimed at improving tree based farming systems
rming Systems Research and Development Methodology. The
disaggregated by sex to allow for an analysis of
icipation in the sub-project.

The Baseline S

The objective
situation at t
as a data base
framework on w
will be guided

- To assess
  cocoa and

- To assess
  in the far
  from land

- To assess
  activities
  suitable f
  new crops

- To assess
  activities
  and to ide
  research a

- To assess
  input supp
  informatio

- To identif
  farmers to

- To identif
  implementa

study is to collect information on the actual
l level. This information will serve not only
mparing project impact, but will form the
anned interventions into the farming system
objectives of the survey are:

s' income from tree crops, in particular coffee,
ts.

volvement and role of each member of the family
rprise through all stages of crop production,
ation to harvesting and marketing.

illingness of the farmer to accept the project
. to cultivate perennial crops only on land
ch a venture, to grow tree crops, to introduce
o change cropping patterns.

notivation for farmers' interest in sub-project
cluding changes in traditional cropping patterns
reasons for reluctance, attitudes to farming,
roup participation.

al farmer relationships with extension officers,
tores, credit institutions and source of
d decision-making.

onstraints to production and strategies used by
ercome them.

ther sociological constraints to sub-project
n.

The Questionna

A draft questi
total of 114 q
indexes has be
identify and t
problems cited
area, as well
attitudes and
participating

The schedule i

1. Demographi
2. Land Tenure
3. Production,
4. Pest and Di
5. Cultural Pr
6. Tree Crop P
7. Farm Labour
8. Credit Util
9. Constraints
10. Decision-ma
    farming, re
11. Membership
12. Extension a
13. Housing and

Expected Result

(1) Data from wh
    state-of-the
(2) Identificati
    the producti
    tree crops.
(3) Identificati
    education, i
    livestock, o

e (interview schedule) which is comprised of a
ns divided into thirteen critical information
igned. The questions included are designed to
stantiate the intensity of some of the main
ne farmers in the Northern Rio Cobre Watershed
elicit information on activities, intentions,
nterest of farm families in the area in
development project.

ganized to collect information on the following:

ocial and economic data of the farm household.
ıd utilization.
ıcome, Expenditure and Marketing.
ase Control and use of Technology.
tices.
)duction and Soil Conservation.
)tilization.
zation - Formal and Informal
to Farming.
ing, perception and motivation, attitudes to
search and group participation.
ın Farmer Organizations.
nd other sources of information.
Social amenities.

:s

which can be generated a detailed description of the
he-art in the area with regard to farming systems.
.tion of the most common problems experienced within
:tion system which contributed to low productivity of
s.
ation of household dynamics, age structure, sex,
, income from agricultural production of crops/
:, off-farm employment, and health status.

(4) Identifi
affect t
(5) Identifi
possibil
(6) Identifi
services
marketin
(7) Identifi
cocoa an

Methodology

A. The Sampl

The Farmers'
Baseline Stud
sub-project a
having holdin
Farmers' Regi

Based on the
taken from a
with using su
it was decide
adequate repr
characteristi
substitutes w

B. Data Coll

Data collecti
and Evaluatio
watershed are
activities: C
Officers (4).

f social, cultural and attitudinal factors which
f technology.
f farmers' attitudes towards tree crops and the
r the sub-project to introduce new crops.
›f institutional effectiveness, i.e. extension
lity Boards, credit institutions and the
n.
of income earned from tree crops such as coffee,
ut.

ter (1982) will be used as a listing frame for the
. listing of all farmers (male and female) in the
as defined by existing boundary descriptions).
: between 0-25 acres will be extracted from the
.

ing frame cited above, a random sample of 20% was
›le size of 641 farmers. The problems associated
a dated listing frame have been considered, however,
hat it would be the best option since it ensured an
ntation of farmers with the socio-economic
›f the project target group. It is envisaged that
. be selected during field work.

tion Personnel

personnel will include officers from the Data Bank
Division, MINAG, complemented by recruits from the
. Six (6) persons will be involved in field
ordinator (1), Supervisor (1), and Data Collection

C. Training

The intervie
Agriculture

Training wil
what these o
collection p
rural people
meaning of wo
entire interv

D. Duration

The proposed
timeframe all
rugged terrai
collection of
questionnaire

A detailed imp

Data Analysis

The data analy
allow for anal
system, their
labour and tec

Monitoring and

Monitoring is a
evaluation and
however, an eva

ewers

l be trained by members of the Hillside
ect Team.

.e background information on USAID and IICA and
:ions do, sociological research and data
es, communication strategies for approaching
rm families, the vocabulary of the study and the
d concepts used in the study, role-play of the
:hedule and a question and answer session.

ld Work

table for data collection is 4 weeks. The
.or possible delays in the field, locating farmers,
l weather conditions. It is envisaged that each
r should complete a minimum of 2 and a maximum of 3
day.

ıentation schedule is shown.

Sex

s will involve a disaggregation of data by sex to
:is of womens' participation in tree crop farming
:cess to productive resources such as land, capital,
nology.

Evaluation - Project Implementation

ın on-going process. These activities overlap with
together form a unified system. At this stage,
aluation of the main components will be conducted.

This evalu

(i)

(ii)

(iii)

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(vii)

have as its main objectives:

sal of sub-project progress and to determine
sumptions made during sub-project design are
.d or whether adjustments are required to ensure
overall objectives will be achieved. The focus
aluation will be on all components, farmer
tion in on-farm trials and technology generation,
tion in farmer's organizations, FACTS and other
organizations and farmer research relationships.

ct of farmer's organization on institutional
, delivery of services and access to extension and
nstitutions and other agricultural inputs.

:itutional component, effectiveness of linkages,
y of services, etc.

ide a mechanism for feedback of farmer's appraisal
ıl results in particular the selection of superior
ıogies and multi-seasonal farm models.

ess the overall effectiveness of the implementation
sub-project.

ovide information on needed adjustments of
tives, implementation strategies as well as providing
mation for future project planning.

ovide annual assessments of sub-project
ementation.

During sub-
farmers act
toward new
and genera.

An evaluat:
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This data
achievemen
farmers as
sub-projec
and Develo

The method
have to be
who, using
detailed p
the positi
procedures
this propc
shceme for

execution there will be continued monitoring of
in order to gain feedback on farmers attitude
s, their constraints in adopting these practices
nagement techniques.

also be conducted using data generated througout
evolution phases and will focus on:
in farmers' income and social well-being;
in farmers' attitude and adoption of technologies;
ıagement practices;
ıg outlets;
tional services;
trative services.

provide for an adequate analysis of the sub-project
should provide for a better understanding of
up, and for a more constructive approach to
ning and implementation of Farming System Research
Methodologies.

for conducting the monitoring and evaluation will
loped by a specialist on this subject (consultant)
information furnished by the baseline study and the
›f action for each one of the components, will be in
E defining the pertinent variables and the statistical
deal with them. At the present stage of preparing
it is rather too early to arrive at a comprehensive
: sub-project evaluation.