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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

224p.

PROJECT PAPER

CARIBBEAN REGIONAL

SMALL FARM MULTIPLE CROPPING SYSTEMS RESEARCH

LAC/DR:78-20

Project Number:538-0015

UNCLASSIFIED

AUG 3 1978

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR (LAC)

FROM: LAC/DR, Marshall D. Brown 

Problem: Authorization of a \$2,210,700 grant (\$625,000 in Year 1978) to finance the Small Farm Multiple Cropping System Research Project in the Caribbean Regional Program.

Discussion: The purpose of the Project is to improve small holder farming systems in the Eastern Caribbean through the development of management and production recommendations which small farmers will use, extension agents can and will explain, and credit institutions will finance. Little information is currently available on the farming systems now used by small farmers of the Caribbean Region and the socioeconomic factors influencing their choice of systems. The small islands in the Region, with their limited human, technical, and financial resources, are unable to provide the professional resources necessary for research on agricultural systems. A.I.D. has assisted the Caribbean Agricultural Research and Development Institute (CARDI), as part of the Food Crop Production grant Project (No. 538-007), to develop an outreach capacity in the eight Less Developed Countries (LDCs) of the Caribbean by establishing three agricultural research stations. This Project will assist CARDI to increase its outreach capability by conducting adaptive, on-farm research and developing multi-cropping farming systems based in part on CARDI's traditional research.

The Project provides A.I.D. grant resources to CARDI to establish cooperative country/CARDI small farmer research programs in six countries, create a socioeconomic data base through surveys and on-farm research, design at least twelve improved small holder farming systems packages, and transmit these recommendations to extension officers, planners, and other agricultural officials through publications, presentations, and field-day activities. Grant funds will finance some additional personnel for CARDI's core and country field team staff, consulting services, training, travel, and some materials and supplies.

The total Project cost is \$4,860,000 over a period of four years. A.I.D. will contribute \$2,210,700. CARDI will provide \$2,254,900, which includes a European Development Fund (EDF) grant of \$276,000 to CARDI for equipment. The island governments will contribute some \$356,000 for personnel, materials and facilities.

The Project was not included in the FY '78 CP, since it was identified subsequent to preparation of the FY '78 budget. An Advice of Program Change was forwarded to Congress, and the waiting

period expired on August 29, 1978. An Initial Environmental Examination was prepared and a Negative Threshold Decision was approved on August 24, 1978. The Working Group on Human Rights and Foreign Assistance approved this Project in its June 16, 1978 meeting. The LAC Bureau's Development Assistance Executive Committee reviewed the Project and recommended approval on August 11, 1978.

Under the Project, A.I.D. will finance a small amount of commodities -- a maximum of \$130,000 -- for on-farm multiple-cropping research activities. The commodities to be procured include fertilizer and other chemicals, special seeds, and small hand implements. The Project is specifically designed to develop farming systems recommendations which small farmers can easily implement and for which materials are readily available locally. The remainder, including special seeds, fertilizers, and chemicals, may be imported from neighboring islands included in this Project (Antigua, Dominica, Grenada, Montserrat, St. Lucia, St. Vincent). All shipments for this Project are expected to be substantially less than a trailer or container load. A review of shipping service to the Eastern Caribbean shows that U.S. flag carriers provide service to only two of the six participating countries, and only on a full "Truck or Trailer Load" (TL) or "Full Container Load" (FCL) basis. No U.S. flag carrier service at all is available to five of the participating countries. Consequently, it is safe to conclude that no direct U.S. flag carrier service to the eligible countries is available for the type of shipments expected under the Project. The small value and size and the scattered geographic nature of the shipments, furthermore, offer insufficient inducements for U.S. flag shippers to provide special services for Project shipments. SER/COM has the authority to determine that U.S. flag service is not available for the type of shipments required under the Project. A determination of non-availability is signified by SER/COM's concurrence below.

In addition, A.I.D. financing of shipping costs on A.I.D. Geographic Code 935 carriers will be authorized under this Grant. As discussed above, the small islands of the Caribbean are not regularly serviced by U.S. flag carriers. Furthermore, the small volume and small dollar value of the shipping transactions and, therefore, of the shipping fees does not make it worthwhile for U.S. shippers to provide special service for Project shipments. A review of shipping service to the Eastern Caribbean shows that no A.I.D. Geographic Code 941 flag carriers provide regular, direct service to the countries participating in this Project. Consequently, the interests of the U.S. are best served by permitting financing of transportation services on ocean vessels under flag registry of Code 935 countries. Pursuant to Delegation of Authority No. 40, and redelegation No. 40.01, SER/COM has the authority to approve

shipments on non-U.S. flag carriers for transportation costs of up to \$250,000. Approval of a waiver to authorize A.I.D. financing of shipping costs on A.I.D. Geographic Code 935 carriers for this Project is signified by SER/COM concurrence below.

The authorization includes a predominant capability and source/origin waiver to permit non-competitive procurement of technical and training services from the Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE). Approximately \$320,000 in services will be procured from CATIE. The source/origin of CATIE's services will be the Americas (A.I.D. Geographic Code 940). CATIE is a regional institution, similar to CARDI, established to serve the countries of Central America. CATIE is the only tropical agricultural research center currently conducting on-farm multiple-cropping systems research. It has approximately four years of experience in designing and carrying out multiple-cropping research and has conducted numerous farm surveys to determine farming systems used by small farmers in various regions in Central America. Many of the crops currently being tested by CATIE are those which CARDI, will be testing in the Caribbean - i.e., tropical root crops. CATIE's field research activities, conducted in at least five countries, has provided it with experience and knowledge which cannot be obtained in the U.S. Two other institutions - IRRI in the Philippines and ICROSAT in Nigeria - are experimenting in multiple-cropping. Most of their research, however, is conducted at research stations, rather than directly on farms as proposed for this Project.

Recommendation: That you sign the attached Project Authorization for the Small Farm Multiple Cropping Systems Research Grant, and that you approve the waiver to permit direct procurement of technical and training services from CATIE.

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

**ASSISTANT
ADMINISTRATOR**

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

Name of Entity : Caribbean Agricultural Research
and Development Institute

Name of Project: Small Farm Multiple Cropping
Systems Research

Project Number : 538-0015

Pursuant to Part I, Chapter I, -Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Grant to the Caribbean Agricultural Research and Development Institute ("CARDI") of not to exceed Six Hundred Twenty-Five Thousand United States Dollars (\$625,000) the ("Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph.

The project consists of an agricultural research program to improve small holder farming systems in the member countries of CARDI through the development of management and production recommendations for dissemination to small farmers by extension agents and financing by local credit institutions (the "Project").

I approve the total level of A.I.D. appropriated funding planned for this project of not to exceed Two Million Two Hundred Ten Thousand Seven Hundred United States Dollars (\$2,210,700), including the funding authorized above during the period FY 1978 through FY 1981. I approve further increments during that period of Grant funding up to \$1,585,700 subject to the availability of funds in accordance with A.I.D. allotment procedures.

I hereby authorize the initiation of negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and delegations of authority subject to the following essential terms and covenants and major conditions; together with such other terms and conditions as A.I.D. may deem appropriate.

A. Source and Origin of Goods and Services

Except for ocean shipping, and except as provided in Section E hereof, goods and services financed by A.I.D. shall have their source and origin in the United States or in the member countries of CARDI, except as A.I.D. may otherwise agree in writing. Ocean shipping financed under the Grant shall be procured from countries included in A.I.D. Geographic Code 935.

B. Conditions Precedent to Initial Disbursement

Prior to any disbursement or to the issuance of any commitment document under the Project Agreement, CARDI shall furnish to A.I.D., in form and substance satisfactory to A.I.D.:

- (i) a legal opinion of the General Counsel of CARDI or other legal counsel acceptable to A.I.D. to the effect that the Project Agreement has been duly authorized and/or ratified by the Board of Directors of CARDI executed on its behalf and that it constitutes a valid and legally binding obligation of the Caribbean Agricultural Research and Development Institute in accordance with all its terms;
- (ii) a certified statement of the name of the person(s) authorized under the Project Agreement to act as CARDI representative(s) under the Agreement with authenticated specimen signatures of said representatives;
- (iii) evidence that it has implemented accounting procedures sufficient to administer A.I.D. funds and meet A.I.D. reporting requirements;
- (iv) evidence that an administrative order has been issued assigning staff personnel to the Project and specifying the amount of time to be spent on this Project by each person; and
- (v) a plan for training CARDI core staff and country team leaders to be assigned to this Project.

C. Conditions Precedent to Disbursement for Project Activities in Member Countries.

Except as A.I.D. may otherwise agree in writing, prior to any disbursement or to the issuance of any commitment

documents under the Project Grant Agreement to finance Project activities in a participating member country, CARDI shall furnish to A.I.D. in form and substance satisfactory to A.I.D.:

- (i) a training program for Field Team personnel for the country in which CARDI proposes to conduct Project activities; and
- (ii) an executed cooperative agreement between CARDI and the country in which Project activities are to occur, specifying the respective responsibilities and obligations for carrying out Project activities in that country.

D. Covenants

CARDI shall covenant that:

- (i) prior to commencing Project activities in a participating member country, and prior to commencing each subsequent year's program activities, it will prepare and discuss with A.I.D. and the country an annual work plan;
- (ii) prior to the procurement or use of any pesticide financed under this Project, CARDI will inform A.I.D. in writing of the proposed procurement or use of the pesticide, including a detailed description of how the pesticide will be used and the safeguards to be followed, and shall obtain the written approval of A.I.D. prior to procurement or use of the pesticides; and
- (iii) prior to November 30, 1978 it shall execute cooperative agreements with at least three member countries, and prior to June 30, 1979 it shall execute cooperative agreements with three additional member countries.

E. Waiver

The Project will involve the use of services from the Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE). Since CATIE is the only institution presently

conducting applied on-farm multiple cropping research that is transferrable to this Project, procurement of services from CATIE is hereby authorized.

Alfredo Varela

Assistant Administrator
Bureau for Latin America and
the Caribbean

Aug 29 1978
Date

Clearance:

GC/LAC, JLKessler *JLK* Date *7/21/78*

LAC/CAR, JLockard *JL* Date *7/21/78*

LAC/DR, RGomez *R* Date *8/24*

LAC/DR, MBrown *MB* Date *8/29*

SER/COM, W. Schweitzer *W* Date *8/22*

RMC
GC/LAC, RCotten:lb:8/21/78

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT PAPER FACESHEET

1. TRANSACTION CODE: **A** (A: ADD, C: CHANGE, D: DELETE)

2. DOCUMENT CODE: **PP**
3. DOCUMENT CODE: **3**

3. COUNTRY/ENTITY: **RDO/C (Caribbean Regional)**

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): **538-0015**

E. BUREAU OFFICE: **LAC** (A: SYMBOL, B: CCPL)

7. PROJECT TITLE (Maximum 40 characters): **SMALL FARM MULTIPLE CROPPING SYSTEMS RESEARCH**

8. ESTIMATED FY OF PROJECT COMPLETION: **8|2**

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY: **7|8**, B. QUARTER: **4**, C. FINAL FY: **8|2** (Enter 1, 2, 3, or 4)

10. ESTIMATED COSTS (5000 OR EQUIVALENT \$) -

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FY	C. L.C.	D. TOTAL	E. FY	F. L.C.	G. TOTAL
AID APPROPRIATED TOTAL						
(GRANT)	215	410	625	877	1334	2211
(LOAN)						
OTHER U.S.						
HOST COUNTRY	100	473	573	186	2425	2611
OTHER DONOR(S)						
TOTALS	315	883	1198	1063	3759	4822

11. PROPOSED BUDGET APPROPRIATED FUNDS (5000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		D. 1ST FY: 78		E. 2ND FY: 79		F. 3RD FY: 80	
		C. GRANT	D. LOAN	E. GRANT	F. LOAN	G. GRANT	H. LOAN	I. GRANT	J. LOAN
(1) FN	120	070		625		585		528	
(2)									
(3)									
(4)									
TOTALS				625		585		528	

A. APPROPRIATION	N. 4TH FY: 81		O. 5TH FY: _____		LIFE OF PROJECT		12. IN DEPT. EVAL. SCHEDULES
	P. GRANT	Q. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1)	473				2211		MM YY 0 9 8 0
(2)							
(3)							
(4)							
TOTALS	473				2211		

13. DATA CHANGE INDICATOR: WERE CHANGES MADE IN THE PID FACESHEET DATA BLOCKS 12, 13, 14 OR 15 OR IN PREVIOUS FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

14. ORIGINATING OFFICE CLEARANCE: **1** (1: NO, 2: YES)

SIGNATURE: *Dwight B. Johnson*

TITLE: **Dwight B. Johnson, Acting AID Representative**

DATE SIGNED: **0|8|0|4|7|8** (MM DD YY)

15. DATE DOCUMENT RECEIVED IN AID W. OR FOR AID W. DOCUMENTS, DATE OF DISTRIBUTION: **0|8|0|7|7|8** (MM DD YY)

P R E F A C E

"Among the agreements reached with respect to regional sector issues, the following were of most significance:

First, priority should be given to agricultural research. The agricultural research organization, CARDI, should become an international research center associated with the Consultative Group for International Agricultural Research, and all Caribbean countries that are members of the group should benefit from its work".

- Concluding Statement by the Chairman, Caribbean Group for Cooperation in Economic Development at a Meeting held from 19 to 24 June, 1978, at the Headquarters of the World Bank in Washington, D. C.

PROJECT PAPER

CARIBBEAN SMALL FARM MULTIPLE CROPPING SYSTEMS

RESEARCH

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I. SUMMARY AND RECOMMENDATIONS

A. Recommendations

The A.I.D. Regional Development Office/Caribbean recommends authorization of a grant in the amount of \$2,210,700 to assist in financing the establishment of a small farm multiple cropping system research programme in the less developed countries of the Eastern Caribbean. The grant will be funded over a period of four years as follows: FY 78 - \$648,000; FY 79 - \$584,500; FY 80 - \$505,100; and FY 81 - \$473,100.

The justification for selecting a four year period to execute this Project, whereas grant funded assistance is usually limited to activities of not more than three years, lies in the inherently time consuming nature of agricultural research and the particular complexities of this Project's design to establish six country specific research activities in cooperation with each host government. Farm based adapted research is unavoidably constrained to conduct one field trial per cropping cycle - which for the majority of commodities is limited to once per year. It is anticipated that CARDI will perform the necessary start-up activities and begin field trials in three countries at the on set of the usual planting period in June 1979. Thus, the Project will be executed over three complete cropping cycles in three islands and two cropping cycles in three additional islands. This is judged to be the minimum time frame required to design, test and verify improved field tested recommendations with acceptable levels of confidence. In addition to the constraints to research imposed by natural biological and climatic cycles, the requirements of the Project to substantively involve host government institutions and personnel add a degree of complexity, albeit

useful, to the Project's design that requires an extra measure of time to accomplish.

B. Grantee

The grantee and executing agency will be the Caribbean Agricultural Research and Development Institute (CARDI). The CARDI is a regional institution established in 1974 by twelve states^{1/} in the Caribbean to, inter alia, provide for research and development needs of the agriculture of the region as identified in national plans and policies.

C. Summary Project Description

The purpose of this Project is to improve small holders' farming systems in the Eastern Caribbean through the development of management and production recommendations which small farmers can and will use, extension agents can explain and credit institutions can finance. This Project is fundamentally an adaptive research activity that will seek to adapt existing technology - already proven to be biologically superior vis-a-vis traditional technology - to better fit the resources and objectives of the small holder.

The Project calls for CARDI to establish country specific research activities in each of six islands in cooperation with host governments. Research activities in each Country-CARDI project activity

^{1/} Member States of CARDI are: Antigua, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Christopher-Nevis-Anguilla, St. Lucia, St. Vincent and Trinidad and Tobago.

will be conducted primarily on working farms, in collaboration with selected cooperating farmers, rather than traditional experiment stations. Each Country-CARDI project activity will be managed by a full-time country team of three individuals, one of whom will be provided by the host government. In support of each country team, a wide range of agricultural scientists from CARDI's "core staff" will provide specialized services to design, monitor and analyze research activities. In addition, CARDI will assign a full-time project coordinator responsible for detail project planning and timely implementation.

A central feature of this Project is the emphasis on farm based research. This feature is required since learning about the farmer's existing systems, resources, and objectives as a basis for designing rational improvements is stressed as much as testing those improvements. Another major feature of the Project's design is the focus on evaluating the interaction among the several crop and livestock enterprises typically produced by smallholders. The traditional smallholder normally grows several crops in various sequences or rotations, frequently intermixed or over-lapping on the same piece of land, and in addition, usually keeps a few head of small livestock. The traditional systems have evolved from years of experience to fit traditionally available resources and characteristics of local conditions, in order to satisfy the small farm families multiple, sometimes conflicting objectives. The research problem for smallholder farming systems is more complex than traditional research that most frequently is focused on isolating and investigating individual production variables. The problem to be solved is how to take the bits and pieces of successful biological research and fit them together with economic reality and cultural preferences to meet the needs of a system whose

multiple ends are measured in terms different from those used in traditional research. This is the reason why this Project is designed to investigate smallholders' farming systems. The only place to do this is on the farm - not the experiment station.

If the Project is successful in adapting known technology to develop recommendations that smallholders can beneficially use - within existing resource and market constraints - then this knowledge can be quickly disseminated to small farmers. Moreover, it is expected that successful project results will provide information necessary for effective re-orientation of national agricultural policies and programs to better stimulate small farmer productivity and rural development. Thus, the Project can reasonably be expected to positively influence credit and extension programmes, input supply distribution, and marketing services, but it will not perform these functions.

The total cost of the Project for four years is \$4,860,000. A.I.D. is providing \$2,210,700. A European Development Fund (EDF) grant will be used to finance \$276,000 of project cost, while the remaining \$2,254,900 of total project cost will be provided by CARDI from its core budget.

D. Summary Findings

The Caribbean multiple cropping research project appropriately addresses the problem of low productivity on traditional small farms in the Caribbean, and is financially, technically and administratively feasible. Key CARDI staff members have actively participated in the design of the Project, and it is judged to be ready for implementation on the basis of CARDI's (and predecessor agencies) long experience in serving agricultural

research needs of the Region and preliminary discussions between government agricultural officials and the CARDI Executive Director. This Project will be a major activity within CARDI's overall work programme and administrative procedures and programme planning are currently being adjusted to accommodate this effort.

The Project meets all applicable statutory criteria as indicated in the completed checklist attached as Annex D.

E. Project Issues

(1) Relationship to Previous AID Funded CARDI Projects

In FY 76 and FY 77, AID grant assistance was provided to CARDI in the amount of US\$285,000. This assistance enabled CARDI to establish 3 agricultural research stations, one each in Belize, St. Kitts, and St. Lucia. The establishment of these stations gave CARDI for the first time, facilities to carry out traditional research work in the LDCs. The stations in Belize and St. Kitts became operational in the second quarter of 1977 and St. Lucia in first quarter of 1978. Research programmes are underway testing varieties of vegetables, root crops, and edible legumes. This recently executed project to assist in establishing traditional experiment station research facilities in some of the LDCs appears to have been predicated on a strategy significantly different than the farm based research focus stressed in this Project paper. This raises questions as to the apparent shift in strategy and how the two projects will be related. From its inception, CARDI has attempted to expand its focus from a centralized basic research programme to be more supportive of the immediate agricultural development priorities of member states. This has been accomplished in part by assigning CARDI

scientists to key support roles within the national government research organizations in the MDC member states. Due to the limited national research capacity in the LDCs, CARDI has had to assume more of a leadership role. The first objective was to establish a presence in the LDCs and begin to collect empirical data on crop growth and management problems under the ecological conditions found in the LDCs. The establishment of experiment station facilities in St. Kitts, St. Lucia, and Belize have given CARDI an outreach in the relatively dry Leeward Islands, the relatively wet Windward Islands, and Belize where growing conditions are significantly different due to its location on a larger land mass.

The research stations now established in the 3 LDCs are expected to play a key supportive role to the multiple cropping systems research project proposed here. First, the production management problems and yield potential of selected crops grown in pure-stand will be known for 3 different climatic and ecological areas represented in the region. This kind of information is extremely useful to plan complementary inter-cropping models of the kind envisioned. Secondly, it is anticipated that certain problems identified on cooperating farmers plots during the course of the multiple cropping project will require "satellite experiments" to gain a better understanding of specific biological problems. These satellite experiments are usually best conducted on traditional experiment stations where appropriate control measures can be taken to isolate the particular variable under study. Thus, the LDC sited research stations will provide a needed support function to the multiple cropping systems research project. Of course, the 3 field stations will continue to conduct their usual programme of traditional testing and experimental work.

2. Extension, Promotion and Dissemination

Although the proposed project design includes no component for extending and promoting the research recommendations directly to farmers, who must in the final analysis be the focus of the project's efforts, the question of how the knowledge flowing from the research activity will be disseminated has been a primary concern of the project development committee from the outset. The task of disseminating the research recommendations and training farmers to use them is the appropriate responsibility of the national agricultural extension services in each country.

With this in mind, the multiple cropping systems research project was designed concomitantly with an agricultural extension improvement project, targeted for AID FY 79 funding, to assist the University of the West Indies (UWI) Faculty of Agriculture to increase its capability to provide training and support to improve the national agricultural extension services in the LDCs. Thus, careful attention was given to ensure coordination of the two project ideas in the developmental stages. This was accomplished by simultaneous discussions of the problems associated with small farm agriculture with key individuals in CARDI and UWI and subsequent joint participation in the design of the multiple cropping research project. Just as UWI staff members have participated in the design of this project, CARDI staff will participate in the detail design of the anticipated extension improvement project. In addition to coordinating the research and extension elements in the design phase of the project, elements of the implementation of the research project will be carried out by the UWI under contract to CARDI. This is a pragmatic decision since the UWI has professional capability

in certain disciplines, e.g. sociology, farm management and agricultural economics, not available in CARDI. Moreover, it is seen as an additional opportunity for the two institutions to establish a basis for the coordination of research and extension activities that is requisite to the ultimate success of both. It is also anticipated that CARDI will play a key role in the extension improvement project by presenting substantive material in extension agent training seminars and assisting in field day demonstrations for farmers.

3. Marketing

The problems associated with marketing production from small farms in the Eastern Caribbean are substantial and represent major constraints to the growth of the agricultural sector in the region. Factors most frequently mentioned by knowledgeable observers include the small and highly atomistic structure of internal markets, the inadequate and inappropriate transport infrastructure (especially between islands) and the absence of storage, processing or other technological services to alleviate periods of glut. The issue of marketing relative to the multiple cropping systems research project is the advisability of supporting a "production oriented" research activity in the face of frequent situations where the small farmer is unable to find a market, or at best no profitable market, for his present levels of production. Notwithstanding the exclusion of specific project elements which address the major institutional and infrastructural problems related to agricultural marketing, some marketing problems typically faced by small farmers can be ameliorated by agronomic adjustments of the farming system. Two examples may demonstrate the possibilities: First, some of the marketing problems faced by Eastern Caribbean farmers stem from the apparent high production cost per unit of

output. Thus, regionally produced commodities are frequently not price competitive with alternative sources of supply. Certainly the cost of many commodities must be lower before locally processed foods will be competitive with external sources of supply. The multiple cropping systems research project can make a significant contribution to the resolution of some marketing problems by finding ways to apply existing technology to achieve lower unit production costs, and thereby increase the quantity of selected agricultural commodities demanded from regional farmers.

A second example of how production-oriented research can contribute to solving part of the smallholder marketing problems has to do with seasonality of production. The project will identify different varieties or modified management practices to extend production periods to allow harvest when supplies are scarce, and prices are favourable. The key difference between this research and traditional CARDI research is in the use of economic optimizing criteria instead of physical optimizing criteria, e.g. the recommended modification may result in lower total yields but greater total sales.

Some major agricultural marketing problems are beyond the management decisions of individual farmers and are therefore beyond the scope of the research project. The governments and external assistance agencies are expected to seek to remove the infrastructural and institutional bottlenecks in agricultural marketing through other projects and activities. The multiple cropping systems research project will, however, focus on how the farmer can best accommodate his farming sub-system to the market conditions and opportunities that currently exist, and assist him to take advantage of these opportunities. There is reason

to believe production oriented research can assist individual farmers to improve their marketing position vis-a-vis a seriously deficient agricultural marketing system.

F. Conditions and Covenants

The following are in addition to the standard conditions and covenants associated with AID grants.

1. Source and Origin of Goods and Services

Except for ocean shipping and except for consulting services, goods and services financed by AID under the Project shall have their source and origin in Geographic Code 000 and the member countries of CARDI, except as AID may otherwise agree in writing. Services financed under the grant shall have their source and origin in Geographic Code 940 and the member countries of CARDI. Ocean shipping financed under the grant shall be from Geographic Code 935.

2. Conditions Precedent to Initial Disbursement

Prior to any disbursement or to the issuance of any commitment documents under the Project Agreement, CARDI shall furnish to AID, in form and substance satisfactory to AID:

- (a) a legal opinion of the General Counsel of CARDI or other legal counsel acceptable to AID to the effect that the Project Agreement has been duly authorized and/or ratified by the Board of Directors of CARDI executed on its behalf and that it constitutes a valid and legally binding obligation of the Caribbean Agricultural Research & Development Institute in accordance with all its terms; and

(b) a certified statement of the name of the person(s) authorized under the Project Agreement to act as CARDI representative(s) under the Agreement with authenticated specimen signatures of said representatives;

(c) evidence that it has adopted, put into place and implemented accounting procedures sufficient to control AID funds and meet AID reporting requirements;

(d) evidence that an administrative order has been issued, formally assigning staff personnel to the project and specifying the level of effort of each;

(e) evidence that funding from other donors for Project capital costs has definitely been committed to the Project.

3. Conditions Precedent to Disbursement for other than Technical Services

Except as AID may otherwise agree in writing, prior to any disbursement or to the issuance of any commitment documents under the Project Grant Agreement to finance other than technical assistance, CARDI shall furnish to AID in form and substance satisfactory to AID:

(a) a training plan for core staff and Country Field Team personnel;

(b) a cooperative agreement between CARDI and the country in which project activities are to occur, specifying the respective responsibilities and obligations for carrying out project activities in that country.

4. Covenants

a. Project Evaluation. The Parties agree to establish an evaluation programme as part of the Project. Except as the Parties otherwise agree in writing, the programme will include, during the implementation of the Project and at one or more points thereafter:

- i) evaluation of progress toward attainment of the objectives of the Project;
- ii) identification and evaluation of problem areas of constraints which may inhibit such attainment;
- iii) assessment of how such information may be used to help overcome such problems; and
- iv) evaluation, to the degree feasible, of the overall development impact of the Project.

b. Annual Work Programme. Before each year's work in each country, CARDI will prepare and discuss with AID and that country an annual experimental work programme.

5. Requested Waivers

In order to accomplish the objectives of the Project and to prevent substantial delay in implementation, it is judged necessary that the following waivers of normal AID regulations be approved:

- a) Waiver of Geographic Code 000 for AID financing of Shipping Costs to Code 935

The Caribbean Region and particularly the LDCs which will participate in this Project are simply not able to comply with the normal shipping source requirement. American flag carriers do not call at these islands with sufficient frequency to enable project financed

commodities such as input supplies and experimental materials to be secured in a timely manner. Although these commodities do not compose a large portion of the proposed project budget they are critical to the entire farm-based research programme and their delay in arrival would significantly jeopardize implementation. The LDCs are well serviced by other Code 935 flag carriers, however.

b) Waiver of 50-50 shipping requirement.

Because of the scarcity of U.S. flag carriers servicing the LDCs it is impossible to expect that 50% of the gross tonnage and 50% of the gross freight revenue generated by ocean shipment for project goods be on U.S. flag vessels.

c) Waiver of Geographic Code 000 source of technical assistance to Geographic Code 940 and member countries of CARDI.

The multicropping practices to be investigated and improved upon in the project are not frequently found outside of the tropics and expertise in this area is not readily obtainable in the U.S. An institution such as CATIE in Central America, however, has had recent and germane experience with multicropping techniques as a regional research facility on tropical agriculture, CATIE also has functions and responsibilities very similar to those which CARDI is assuming. Granting of the requested waiver would permit CARDI to draw upon the unique assistance which CATIE could offer.

H. A.I.D. Project Committee:

William Baucom, AID/W - Agriculture Economist

Thomas King, RDO/C - Agriculture IDI

Donald Boyd, RDO/C - Capital Development IDI

Bert Swanson, Agricultural Extension Consultant

Albert Brown, Agricultural Development Consultant

A.I.D. Reviewing and Approving Officer:

Dwight Johnson, RDO/C - Acting AID Representative

II. DETAILED PROJECT DESCRIPTION

A. Project Setting

The English-speaking LDC states of the Windward and Leeward Island Archipelago (Antigua, Dominica, Grenada, Montserrat, St. Lucia, St. Vincent and St. Kitts/Nevis/Anguilla) share many common attributes, including similar economic and political histories, limited resource endowments, and increasing population densities. Agriculture dominates their economies. All have significant smallholder populations whose operations are characterized by low productivity. However, the limited national income and low tax revenues do not allow the level of public support of adaptive agricultural research needed to achieve significant improvement in agricultural productivity. This low level of agricultural productivity, is related to other problems, the correction of which is the objective of this project.

B. Project Strategy and Program Rationale

Three sets of problems must be considered in order to design an effective response to the smallholder productivity problems:

- . Problems of the smallholder target population and their effects;
- . Problems caused by the dichotomy between the characteristics of the traditional smallholder farming system and those of traditional agricultural research methods; and
- . Problems associated with the region's institutional resource constraints.

(1) Target Group Problems

The fundamental problem of the smallholder target group is that its members do not find enough satisfactions and incentives to stay on the farm and meet their own needs while producing the agricultural surplus required by the rest of the economy. From this problem flow others:

- Rural-urban migration creates urban unemployment and reduces the availability of agricultural labor.
- Scarce foreign exchange is used to buy food which could be produced domestically.
- Poor performance of the agricultural sector limits economic growth and tax revenues and results in poorly fed and unhealthy citizens.

We know of these problems, and we speculate about their causes, but the cause-effect relationships are not well understood. Rural-urban migration is a fact, but neither its extent nor the relative importance of its causative factors is known. Low production is a fact, but little is known about why farmers do not adopt more productive and apparently profitable technologies. Smallholders follow complex multi-cropping systems, but little is known about the characteristics of these systems. Correcting this data inadequacy through research - biological, economic and cultural - is a major objective of this project.

(2) Traditional Farming Systems vs. Traditional Research

The traditional smallholder farming system is complex. It is normally comprised of several enterprises or commodity lines which are grown in various sequences or rotations frequently intermixed or overlapping on the same piece of land. The system has evolved from experience to fit the availability of traditional resources and the characteristics of local conditions, in order to satisfy the farm families' multiple, sometimes conflicting objectives.

Although the general nature of these systems is known, little accurate information is available to describe the chronology of events over a year's time or the frequency or relative

importance of different systems and combinations. There is a similar ignorance of the relative importance of the farm families' objectives, e.g. income, cash flow, labour utilization, nutrition, risk reduction, and of the capacity of the various systems (and there are many) to fulfill these objectives.

Traditional agricultural research abstracts from reality to isolate, control and investigate individual variables. Optimazation criteria are selected for ease and consistency of measurement - yield, fruit size or other characteristics. When economic analysis is added, it is usually performed on a single commodity or practice, following the technological recommendation. The result is then turned over to the extension service and/or the farmer to fit into a much more complex system with multiple objectives, which is the farmers' real world.

The process relies heavily on the assumption that farmers (perhaps with extension assistance) can and will properly assess all variables and incorporate the practice into the system. The assumption works after a fashion, but slowly and with differential results among classes of farmers, depending on their ability to assess the impact of the innovation and to absorb its risks. This is why revolutionary breakthroughs like the high yielding varieties of the green revolution received rapid acceptance, and also the reason why the benefits of those breakthroughs flow initially to larger farmers. And therein undoubtedly lies the reason for the reluctance of smallholders to adopt many of the apparently desirable technological innovations which have been amply documented through traditional research.

The problem to be solved is how to take the bits and pieces of successful biological research and fit them together with economic reality and cultural preferences to meet the needs of a system whose multiple ends are measured in terms different from those used in research. This is the reason why this project has been designed to investigate the smallholders' farming systems. The only place to do this is on the farm - not the experiment station.

(3) The Institutional Resource Problem

The small islands in the Eastern Caribbean have limited populations, limited income, limited revenue, and consequently, limited technical resources. Research on agricultural systems is expensive in terms of professional manpower requirements (economists, sociologists, anthropologists and systems analysts as well as a variety of agricultural specialists). None of the LDCs could be expected to put together and maintain all these needed professional resources. CARDI: on the other hand, has an extensive array of well-qualified agricultural research personnel, but these are organized as technical specialists working principally in St. Augustine or they pursue traditional research problems within their technical discipline.

The institutional resource problem is how to get this CARDI talent focused on the needs of the LDCs to perform adaptive research into smallholder cropping systems. The chosen solution is the organization of cooperative Country-CARDI programmes in which CARDI establishes in each country a staff for farming systems research and arranges for its support by Core Staff specialists as needed.

C. Project Design

The Project Design Summary (Logical Framework) is included in Chapter VI, Evaluation Plan. This section summarizes and elaborates on that information.

(1) Goal Statement

To increase value of agricultural production in the LDC's of the Eastern Caribbean through the improvement of small farm profitability, nutritional productivity and employment generation.

The accomplishment of this goal will require a number of actions beyond the scope of this project. Research results will have to be disseminated, productive inputs made available, credit programmes adjusted, and market demand channeled to smallholders. The smallholders, responding to their own needs and incentives, must make decisions and channel family resources into activities which can satisfy their well-being.

This project is fundamentally an adaptive research project whose purpose is to determine the characteristics of small farm systems and their reigning conditions and objectives in order to adapt research-proven innovations to meet the farmers' objectives. If successful, it will provide information necessary for effective re-orientation of the other policies and programmes of the agricultural system cited above, but it will not perform those functions.

(2) Purpose Statement

To improve small holders' farming systems in the Eastern Caribbean through the development of management and production recommendations which farmers can and will use, extension agents can explain and credit institutions will finance.

Recommendations must come out of this work described in terms of farmers' objectives and economic criteria when incorporated into a system. The desirability of a practice is not determined by maximization of yield but by optimization of income, factor utilization and the satisfaction of well-being. This is admittedly a tall order, but illiterate farmers are expected to be able to do it with much less understanding of the technological and economic variables than that of crop specialists or economists.

(3) Output Statement

"The expected outputs of this activity include:

- (a) The establishment of cooperative Country/CARDI small farmer systems research programmes in six countries.
- (b) The creation of a small farmer socio-economic information base, obtained through surveys and onfarm research.
- (c) The design of at least 12 significantly improved smallholder farming systems based on the integration of crop and livestock-specific proven technology with empirically based economic analysis that take into account profitability, cash flow, nutritional contribution and labor utilization characteristics.
- (d) The transmittal of smallholder characteristics and improved farming systems recommendations to extension officers, credit officers, planners, and other agricultural officials through publications, presentations and field-day activities."

4. Inputs

The following narrative and Table 1 summarize the inputs required by this project and their source and value. A more detailed statement is included in Chapter IV, Financial Plan. Backup information is included in Annex J.

(a) Personnel

- (1) Central Direction, Management and Support of the project. This is estimated at approximately 60 Professional persons years (PPYs) of CARDI's Core Staff, plus the necessary sub-professional and administrative support for the project.
- (2) One Field Team for each Country, to manage field experimentation and data collection, each team to consist of one professional and two sub-professionals.

CARDI will provide from its own core budget all the salary and payroll related costs of current Core Staff assigned to the project and of their sub-professional and administrative support staff. CARDI will also provide from its current core budget three professionals and six sub-professionals to form the Country Field Teams. AID will provide CARDI with funds to employ up to 14 PPYs of new hires to fill the additional positions on CARDI's Core Staff deemed necessary for the satisfactory implementation of this project. AID will also provide CARDI with funds to employ up to 10 PPYs of fulltime agronomists to head three of the Country Field Teams. Each host country will provide a fulltime sub-professional for the Country Field Team and professional collaboration and coordination equivalent to one-fourth time of the Chief Agricultural Officer.

(b) Consulting Services

- (1) Contract with UWI for baseline surveys of 600 small-holdings in six countries.
- (2) Cooperative Agreement with CATIE for approximately 35 Professional Person Months of multicropping systems advisory services.
- (3) Up to 30 Professional Person Months of other international consulting services as needed to deal with problems of a biological, economic or cultural nature including technical assistance in integrated pest management systems.
- (4) Up to 2 PPYs of a resident Multicropping Systems Research Advisor.
- (5) Cooperative Agreement with UWI for approximately 35 Professional Person Months of technical advisory services in the biological and social sciences.
- (6) Three contracted evaluations.

AID will fund all consulting services.

(c) Training

- (1) Regional Multicropping Research Orientation Seminars for all CARDI Staff and key government officials.
- (2) Training for six country field team leaders in multicropping research at IRRI/Philippines.
- (3) Twenty international orientation visits by CARDI personnel to exchange information and observations on multicropping systems research with colleagues in the Americas, Africa, and Asia.

AID will fund costs of training courses, including travel.

(d) Capital Costs

- (1) Six 4-wheel drive pickup trucks and 12 motorcycles for the Country Field Teams.
- (2) Office, farming and research equipment for national and CARDI experimental stations in each country.
- (3) Physical improvements to CARDI's Central soil fertility laboratory and greenhouse, pest diagnosis laboratory, and plant growing shed.
- (4) Laboratory equipment for the soils and pest diagnosis laboratories.

CARDI has arranged to procure this equipment and the needed capital improvements through other donors.

(e) Other Costs

- (1) Approximately 170 air fares and 850 days per diem for annual travel within the region.
- (2) Input supplies, hired labor and other experimental material for on-farm research, valued at approximately \$320,000.
- (3) Contingencies equivalent to 5% of respective contributions.

CARDI will fund approximately one-fourth of travel costs and one-half of experimental costs from its core budget. AID will provide CARDI with funds for three-fourths of travel costs and one-half of experimental costs.

TABLE I
SUMMARY COST ESTIMATE AND FINANCIAL PLAN
 (US\$ 000)

	AID			CARDI			COUNTRY	PROGRAM		
	FX	LC	TOTAL	FX	LC	TOTAL	LC	FX	LC	TOTAL
Personnel	147.3	472.1	619.4	-	1783.2	1783.2	296.6	147.3	2551.9	2699.2
Consulting Services	580.0	230.0	810.0	-	-	-	-	580.0	230.0	810.0
Capital Costs	-	-	-	156.0	120.0	276.0*	-	156.0	120.0	276.0
Training	80.0	25.0	105.0	-	-	-	-	80.0	25.0	105.0
Other Costs	70.0	606.3	676.3	30.0	165.7	195.7	60.0	100.00	832.0	932.0
TOTALS	877.3	1333.4	2210.7	186.0	2068.9	2254.9	356.6	1063.3	3758.9	4822.2

The above figures include a 10% per year inflation factor

The US contribution includes a 5% contingency factor (\$96,100)

No contingency factor is applied to the CARDI contribution

* European Development Fund (EDF) grant to CARDI

D. PROJECT METHODS

This project provides financial and technical support to CARDI to enable that institution to enter into cooperative agreements with any of its LDC member states to conduct joint farm-based Research into smallholder farming systems. It is anticipated that six such country cooperative agreements will be implemented in the island states of St. Lucia, St. Vincent, Dominica, Antigua, Montserrat, and Grenada. St. Kitts, while not prohibited from this project, is not expected to participate directly because the structure of its agricultural sector is least appropriate for this project's approach, and because the CARDI research facility established in St. Kitts, with earlier A.I.D. Grant funded assistance, is adequately serving the present agricultural research needs of St. Kitts. Belize, the remaining LDC member of CARDI, is also being served with a research facility established with previous A.I.D. grant assistance and current work programs are being expanded with a UNDP/OPEC grant to CARDI. Thus, Belize is not expected to be selected as a country for activity under the project proposed here.

1. Target Group

The target group (see Annex G) is comprised of smallholders with from one to five acres of arable land or its equivalent, who have the potential to achieve a yearly income of EC\$4000 (about US\$1600). This is an approximation of equivalent earning power as plantation labor or in casual urban employment which are the principal competitive occupational opportunities. Current farming income is usually well below that level.

There are about 38,000 smallholders of this approximate size class in the six islands, constituting seventy-five percent of all holdings.

TABLE 2
DISTRIBUTION OF TARGET GROUP BY COUNTRY

	<u>Montserrat</u>	<u>Antigua</u>	<u>Dominica</u>	<u>St. Lucia</u>	<u>St. Vincent</u>	<u>Grenada</u>	<u>TOTAL</u>
Size Range (Acres)	1 - 5	0.25	0 - 5	1 - 5	1 - 5	0 - 5	
Holdings	496	5551	6045	3825	10098	12510	38,525
% of Total Holdings	39.8	96.6	73.9	36.7	89.0	88.7	75.5

Holdings of this size are usually occupied under leasehold or ownership by a family of six which is headed by an older adult (mean age of 50 years), and commonly includes a younger adult and minor children. The head of household may be male, female or a couple with shared labor and decision-making responsibilities. One or both of the household heads may be employed off farm at least part time. Younger adults frequently have left home and may or may not assist the household economy through remittances, but are seldom available for farm work. In fact, the unattractiveness of farm life for such individuals is a major reason for their departure from the rural areas and for the high average age of heads of households.

2. Organization

The multiple cropping systems research project will be a major activity in CARDI's program of work. The project will be the responsibility of a full-time Project Coordinator who reports directly to the Director of Program Operations. The Project Coordinator will have line responsibility for monitoring country team activity, planning research activities, scheduling support of core scientist, executing training plans, and developing scopes of work for consultants.

Core scientist assigned to support this project will range from full-time to quarter-time depending on the need for the specialist's talent. Core staff will be expected to visit each of the six country programs at least one time for each assigned quarter. The full-time vegetable agronomist assigned to the project, for example, would make 24 country visits per year. If three days is an average length of a single visit, this individual would then be "in the field" about one-third of his time.

The adaptive research to be conducted in each country will be carried out by a full-time country team consisting of a CARDI professional (Country Team Leader) and two sub-professionals, one provided by CARDI and one by the host country. It is expected that the conduct of the field trials and collection of longitudinal data will preclude the country team from involvement in other tasks outside the scope of the multiple cropping research project.

Each of the six country teams will be advised and supported by the Chief Agricultural Officer (CAO) of the host country (and his designees) at a level equivalent to one-quarter time. Significant participation of the

host country CAO and other officials is envisioned to develop project work plans and evaluate research findings.

While primary financial and administrative control for the project will reside with the Project Coordinator in St. Augustine, each of the six country team leaders will have limited authority to expend project funds for consumable supplies, casual labor and equipment maintenance as required for day to day operations.

3. Farm-based Multicropping Systems Research

This project is based on applied systems research concepts which seek to adapt proven technological innovation to improve or supplant existing systems to achieve the objectives of the system operator - in this case the smallholder. The research must involve the following discoveries:

- (1) A quantitative description of the system - inputs, outputs, process sequences, resources, constraints, parameters. Since most small holders follow a mixed enterprise system with various commodity lines rotated, overlapped, or intertwined in space and time, such research is commonly referred to as Multicropping Research.
- (2) Definition and acknowledgement that the operator has multiple, sometimes congruent, sometimes conflicting objectives - income generation, cash flow optimization, saving accumulation, labor force utilization, risk avoidance, nutrition satisfaction.

- (3) Assessment of the degree to which existing farming systems satisfy smallholder objectives and identification of the factors which limit their satisfaction - low yield, seasonality of production and market demand, unsuitable product quality, labor force availability or other constraints.
- (4) Identification of proven technological innovations which could improve the probability of satisfying the operators' objectives. Such innovations are developed and proven on experiment stations but adapted to farming systems through farm based research.
- (5) The design and testing on the farm of improvements to existing systems, and of alternative improved systems, with "improvement" being measured in terms of its capacity to meet the operators' objectives.
- (6) The generalization of the results of these efforts to fit typical small farm systems for ready extension and dissemination.

These applied systems research methods are fairly well advanced in Central American Agricultural research, having been sponsored by AID's Regional Office for Central America and Panama (ROCAP) through the Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE). It is a new approach for CARDI, however.

In this type of research, learning about the farmers' existing systems, resources and motivations as a basis for designing rational

improvements is stressed as much as testing those improvements. Hopefully both will go on apace but at different levels of importance over time.

During the first year, for example, greatest stress is laid on recording the characteristics of the existing system. Intervention experiments will be concentrated on introducing a technological improvement on a small part of the farmers' fields to provide a comparison between causes and effects. System changes, e.g. altering planting dates, sequences or commodity lines, will take place only after careful consideration of the existing system and the reasons the farmer may have for following that system. The following pattern is contemplated:

Year I:

Primary emphasis on collecting data on the farmers' systems. Interventions, if any, limited to substitution of clearly advantageous technologies within the system.

Year II:

Cautious alterations of the existing system, primarily through shifting planting dates and/or input use to optimize variables needed to achieve farmers' objectives; development, discussion and theoretical analysis of alternative systems.

Year III:

Selection and cautious testing of carefully selected alternative systems.

Year IV:

Modification of systems in response to empirical results and retests.

This is not a static situation. At some point within and beyond the four years, project activities may shift to include ecologic areas, target groups, farming systems and practices other than those initially selected. Such alterations will have to be made in light of conditions encountered in the experimental program and the degree of success achieved by the project.

4. Establishing Research Priorities

The research to be conducted under this project may cover any group of smallholders, any ecological zone, any farming system, any crop or class of livestock, or any practice. These massive theoretical possibilities are to be systematically reduced to priorities through two surveys and a set of annual country experimental plans:

- (1) A reconnaissance survey will be used to identify ecological zones and farming systems, and to select priority target areas for initial project activity.
- (2) A detailed survey of selected target areas will define the characteristics of farms within these areas and will be used to identify cooperating farmers and the nature of information to be gathered on a continuing basis.
- (3) An annual experimental plan prepared each year for each country will define the interventions to be tested, the method of testing, and the data to be collected, and will relate this to the resources to be used and the parties to be responsible. All of these decisions will be taken following a collaborative process which involves the farmer, the Country Field Team, the Country's Chief Agricultural Officer (CAO), and the CARDI Core Staff.

III. PROJECT ANALYSIS

A. Economic Analysis

1. Contribution of Agriculture to GDP

The predominant role of agriculture in the economies of the Eastern Caribbean states from early colonial settlement to the present is well documented. The agricultural sector still represents the economic mainstay for most of the Caribbean states, although the relative importance of tourism, government, and industry sectors have steadily increased over the past two decades.

Table 3 presents estimates of gross domestic product in 1976 for selected CARICOM countries and shows the estimated proportion of GDP attributable to the agriculture sector. It can be readily observed from these data that in almost all of the LDC's of the region, agriculture accounts for at least a fifth of GDP. In addition, agriculture is frequently the major source of employment and primary generator of foreign exchange among the LDCs of the Eastern Caribbean. Notwithstanding the significant growth of tourism and government sector activities recently experienced in the region, it is certain that agriculture will continue to play a key role in these economies. What is less certain is the structure and nature of the agriculture that is likely to evolve in response to the changing political relationships in the region, the shifting world market demand for traditional export crops, and the social effects of expanding non-agricultural activity.

2. Changing Role of Agriculture

The fundamental issue regarding agriculture in the Eastern Caribbean is rooted in the changing political status of the Caribbean states from colonies to self rule and independence. Under colonial status, the policies promoted a narrowly based agriculture designed to supply a few raw commodities, sugar and cotton being two of the principal crops. Hence, the technology, institutional support, social policies and economic incentives developed to achieve the narrow objectives of a colonial power are simply not appropriate to the development of a more diversified agriculture required by independent countries. Thus, the task of promoting agricultural development in the Eastern Caribbean must address the questions of how to modify the technology, institutions, social policies, and systems of economic incentives effecting agriculture, in light of the objectives of independent national states.

3. Food Production Emphasis

A major agricultural objective of the region's governments is to achieve the greatest possible degree of self-sufficiency in the production of food. This objective is set forth in the Regional Food Plan adopted by the CARICOM member countries including the LDCs. The achievement of this goal will require a significantly different set of production technologies, institutional arrangements, and economic policies than were needed to support an agriculture geared primarily to export crops. In general, the governments of the region appear to be willing to take the necessary steps to establish a diversified agriculture with a strong food

production component, but too frequently policy makers don't have sufficient information to determine specific policies or design particular programs to bring about this desired change. The Regional Food Plan is perhaps a good example of the current situation. The Regional Food Plan is fairly clear about WHAT is to be accomplished, but is extremely limited about HOW the objectives are to be achieved. The implementation of the Regional Food Plan will tax the individual and collective capacities of national and regional institutions to assess the current food production situation and design action projects to enable greater regional food self-sufficiency. It is anticipated that a wide range of problems will need to be addressed, including production technology, input and credit availability, marketing policy and infrastructure, and technical training in several fields.

The potential economic impact of increased food production in the region is significant. Indeed, the stimulus for adoption of the Regional Food Plan is the value of annual food imports estimated to be US\$450 million for all CARICOM countries. The LDCs of the region, with a population of about 500,000 persons, are thought to import at least US\$40 million worth of food and agricultural commodities. Undoubtedly, a large portion of this US\$40 million is spent on meat, dairy products, cooking oil, cereal grains and other commodities which are unlikely to be economically feasible for internal LDC production. Nevertheless, it is reasonable to assume that the LDCs could become virtually self-sufficient in fruits, vegetables, root crops, and edible legumes. In addition, production of small livestock, especially small ruminants can be expanded. Therefore,

a modest estimate of import substitution opportunity on the order of 12% would yield an annual foreign exchange savings of about US\$5 million in the LDCs.

The opportunity for increased agricultural exports is extremely difficult to estimate. Markets for traditional export crops, e.g. sugar, cotton, bananas, are limited. The possibilities of finding markets for certain spices, essential oils, and selected tropical fruits is better, particularly if costs of production can be held within the competitive range vis-a-vis other areas of production.

From the point of view of the LDCs, the larger MDCs of the Caribbean Basin are thought to represent a significant market opportunity for certain food crops. Venezuela, Trinidad/Tobago, Martinique, the British Virgin Islands, and Barbados all import substantial quantities of food - much of which is suitable to LDC production capabilities. For example, Trinidad processors are reported to import more than US\$2 million worth of peanuts annually from North America and Africa. It is estimated that the Trinidadian demand for peanuts could be supplied readily by several of the LDCs. Technically, the peanuts can be produced in the LDCs, the question of economic feasibility at competitive price levels needs to be investigated. The point to be noted here is, the LDCs should be able to supply, in short order, at least some of the US\$400 million worth of food commodities now imported annually by the MDCs of the English-speaking Caribbean. If only 2½% of this potential market in the MDCs was set as an immediate LDC target, this amounts to about US\$10 million annually. This modest proportion of the region's market for food is thought to be attainable

within existing constraints of transportation and marketing infrastructure. In other words, by modification and improvement in on-farm production techniques and management, the LDCs can make increased quantities of food available to the MDCs of the region at a price and quality competitive with alternative sources of supply.

Again, the exact magnitudes of economic benefits that might be realized through better on-farm production systems is extremely speculative. But to assume modest targets that might be quickly achieved in the LDCs over the next five years, as described above, could yield increases in annual agricultural production valued at US\$15 million.

TABLE 3
GROSS DOMESTIC PRODUCT AT FACTOR COST, 1976

	GDP at Factor Cost (US\$Million)		Agriculture's Share of the GDP
	<u>Total</u>	<u>Per Capita</u>	<u>(percent)</u>
Antigua	48.9	680	8
Barbados	334.4	1,350	13
Dominica	28.1	360	37
Grenada	40.0	390	22
Montserrat	10.0	820	n.a.
St. Kitts-Nevis-(Anguilla)	33.6	620	28
St. Lucia	48.7	430	21
St. Vincent	27.8	270	21
Total	571.5	730	-

Source: USAID Agriculture Survey Report

TABLE 4. CURRENT VALUE OF IMPORTS AND EXPORTS OF AGRICULTURAL AND FOOD PRODUCTS FOR
CARICOM COUNTRIES ^{a/}

(US \$ Millions)

1968		1969		1970		1971		1972		1973		1974	
Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
16.1	19.4	17.9	16.1	21.2	16.4	22.9	15.4	27.0	14.8	33.5	18.1	40.4	28.4
14.7	43.1	15.7	44.3	15.7	43.4	17.7	51.0	16.0	52.7	21.5	43.4 ^c	30.1	125.0
57.4	59.1	57.1	56.2	68.6	55.8	77.4	58.0	91.4	63.7	103.6	67.2	160.5	68.7
35.7	29.0	43.3	29.9	44.6	30.7	53.4	32.4	51.1	32.4	67.9	34.1	105.8	61.5
123.9	150.6	134.0	146.5	150.1	146.3	171.4	156.8	185.5	163.6	226.5	162.8	336.8	238.6
17.7 ^b	16.2	21.5 ^{/b}	21.0	24.5 ^{/b}	15.0	26.9 ^{/b}	13.9 ^{/b}	29.6 ^{/b}	12.9 ^{/b}	29.5 ^{/b,c}	18.2 ^{/c}	26.3 ^{/b,d}	16.9 ^{/e}
6.0 ^{/b}	8.0	6.3 ^{/b}	8.2	8.2 ^{/b}	9.1	9.4 ^{/b}	10.0	10.4 ^{/b}	10.8	10.1 ^{/b}	14.0	15.2 ^{/b}	30.5
147.4	174.8	151.8	175.7	182.8	170.4	207.7	180.7	225.5	187.3	266.2	195.0	378.3	331.0

- a Sections 0, 1 and 4 of SITC
- b Estimated
- c Excludes St. Vincent
- d Excludes Grenada and St. Kitts

4. Need For Research

The multiple cropping systems research project proposed here is designed to facilitate the growth of a more diversified agriculture consistant with the changing political and economic requirements of the LDCs in the Eastern Caribbean. The newly established emphasis on regional food production will most likely accelerate the relative shift in the structure of agricultural production from mono-cropping estates to multiple enterprise , small and medium sized farms. A research effort is needed to gain a better understanding of the biological and economic relationships of these modified agricultural systems aimed at food production.

5. Cost/Benefits And Effectiveness

The benefits likely to accrue to investments in agricultural research are, by definition, unknown. It is generally recognized, however, that research directed toward well defined problems, as is proposed here, is most frequently beneficial in both economic and human terms. Since a substantial reservoir of "basic knowledge" about agriculture is already available in CARDI and other regional institutions, the marginal cost of adapting this knowledge to small farming systems should be well worth the cost of the proposed project.

Assuming that the cost/benefit to adaptive research of the type proposed here is positive, a more important question perhaps is the cost/effectiveness of the proposed approach. The cost effectiveness of a regionally coordinated research effort, compared with the most reasonable alternative of individual country based research institutions appears superior by standards of common sense. That is, individual

LDC governments can not reasonably justify the full-time services of the wide range of professional scientists required to undertake a comprehensive investigation of multiple cropping systems. The small geographical size and limited national budgets of the LDCs argue for a cooperative approach to agricultural research as proposed in this Project, with specialized agricultural talent shared among several of the islands.

Moreover, the multiple cropping systems research project as proposed is the most cost effective alternative to reduce the period needed for adoption of research recommendations. The adoption of new technology developed on experiment stations (or on just one or two of the islands) is less rapid than technology developed on farms in the community of the intended clients. Delays in adoption of traditional experiment station developed research recommendations discounts the investments in that research. The on farm research envisioned in this project will shorten the period needed for adoption of anticipated CARDI recommendations and thus increase the cost effectiveness of this research investment.

B. Social Analysis

There has been a significant emigration from rural to urban centres, at least since World War II, attesting to the low status of agriculture as an occupation, its inability to provide a competitive income, and the attraction of urban life. These problems have been exacerbated by relatively high urban wages, even when there are few jobs relative to applicants. While this apparent migration reduces the total availability of labour in rural areas, it does not necessarily imply a departure from farming. Many taxi drivers, office and

hotel workers, and occasional labourers and their families continue to farm on a part time basis.

As a research project, the direct spread effects of the activity would tend to be limited to the cooperating farmers and their neighbours. However, three mechanisms are to be used to assure the application of research results: (1) The research will be conducted on typical farms to meet typical conditions, so that the recommendations which emerge from the programme should be adoptable by other small farmers. (2) Research results will be interpreted for and demonstrated to extension and credit agents through publications, reports and field days, thus enhancing the opportunity for the results to be incorporated in their respective lexicons. (3) A complementary AID funded project is now being designed for FY 79 to enhance the capacity of the extension services on these islands to extend this information. A part of that project fosters the direct and frequent association of the researchers and extension agents in performing this work.

The beneficiaries of this project will be typical small farm families in the project area. This will be accomplished by selecting representative families as the experimental units following a socio-economic survey, so that resource constraints and cultural values will be incorporated into the experimental design and ultimate recommendations.

The Project is also expected to have a significant impact on women and children, first because women and children frequently participate directly in the farming and marketing operations; and second, because women are often the head of households and principal decision makers with regard to farming operations.

The Project does not directly seek a change in levels of community participation by the target group. However, the potential for improved economic and social status contributed by the leverage of better technology should lead to a better life for this generally deprived class. It is worth noting that the political leadership on each island is very interested in and supportive of the small farm family. Therefore, the objectives of this Project are very much in agreement with the policies of these governments.

Negative consequences of the Project are not foreseen, either for the target group or for other groups. This possibility should be examined, however, through subsequent analysis as more data becomes available.

C. Technical Analysis

To understand the method chosen for this Project, i.e. farm-based multiple cropping research, requires a knowledge of the structure of Caribbean agriculture and an appreciation of the complexity of agricultural systems.

In the LDCs of the Eastern Caribbean, smallholder agriculture is a major source of national incomes, foreign exchange earnings, and government revenues. In addition, smallholder agriculture provides the primary opportunity for employment and income in the rural sector where most of the "poor majority" reside. It is this group which is of greatest concern to the national governments and AID. The large agricultural sector, and the opportunities for expanding employment on small farms, make it a most attractive arena for development efforts.

Notwithstanding the interest in and apparent development potential of the small-farm sub-sector, efforts to stimulate greater productivity have frequently been disappointing. Higher yielding production technologies developed through research have been slowly adopted; small farmer production credit programmes have been less than fully utilized; government offers to subsidize acquisition of equipment, e.g. sprayers, or installation of soil conservation measures, e.g. terracing, are not widely taken up by the small farmers. The conclusion to be drawn from the apparently poor effectiveness of these programs designed to stimulate small farm production is that these programmes are incorrectly aligned with the constraints and objectives as perceived by the smallholder.

Most technology was not developed with the small farmer in mind. Indeed, most agricultural research, in the Caribbean as elsewhere, has focused on improving a single commodity or livestock enterprise. This research approach is appropriate for large commercial farmers who generally practice monoculture. On the other hand, most smallholder farm systems in the Caribbean are more complex than larger commercial operations, in terms of both enterprises and objectives. Smallholders usually grow small quantities of several crops for sale and subsistence both sequentially and interplanted, and commonly maintain some livestock. Their objectives are equally complex, and frequently conflicting: profit maximization, risk avoidance, optimization of factor utilization, cash flow, nutrition. A major assumption of this project design is that the complexities of smallholder farming systems are not well known and too little understood. Therefore, research must be undertaken, in which the optimization criteria used in that research must fit the conditions, capacities, and circumstances of the small farmer. Existing technology

must be adapted to meet the needs and conditions of the small farmer. The needed adaptation must be culturally acceptable and attuned to real life situations, which may involve acceptance of different concepts of risks and rewards. Research personnel must know and understand the small farmers' traditional system in order to substitute within it or design improved alternative systems that will be both economically feasible and culturally acceptable.

There is little doubt that agricultural productivity can be significantly and economically expanded on small farms, and there is no fundamental reason why smallholder agriculture cannot achieve a level of productivity per unit area as good or better than that obtained by larger farms. A major goal of this project is to discover appropriately adapted technology that will help smallholders achieve greater levels of productivity.

The multiple cropping systems research project activities will be carried out, in the main, on operating farms and in cooperation with selected small farmers. Farm-based research activities are required for the resulting data to be valid. This is true, first to obtain accurate longitudinal data about the array of enterprises commonly incorporated in a smallholder system; and second to compare the results of experimental interventions with the farmers traditional activities.

The multiple cropping research activities, to be carried out in this Project, include three over-lapping stages:

- Data gathering and analysis of existing farming systems;
- Adaptation of existing technology to current systems to improve benefits and testing of adaptation;

-The synthesis of new systems which are more beneficial (in socio-economic terms) and their proof by on farm demonstration.

The knowledge resulting from this farm-based multiple cropping research effort will add a much needed technical information base for both small farmers and planners of government agricultural programmes. It is well recognized that governments do not make decisions that result in increased agricultural production, but instead it is thousands of individual farm operators whose decisions ultimately determine what and how much is produced. This Project is designed to develop farm proven technical recommendations useful for small farmers, and provide public policy makers with better information about the services and incentives that most influence decisions made by small farmers, each typically tending multiple crop and livestock enterprises.

D. Administrative Feasibility

The Caribbean Agricultural Research and Development Institute (CARDI) was established in late 1974, as a Regional Institution of the CARICOM Members, to perform agricultural research and development functions. CARDI was born from the distinguished lineage of the Imperial College of Tropical Agriculture and the Regional Research Centre. It survived the transition from colonialism to independence and is now receiving its direction and financial support from regional member states. Member states annually contribute an amount equivalent to U.S. \$1.1 million that sustains CARDI's recurrent core budget cost. CARDI's overall policies are determined by the Standing Committee of Ministers of Agriculture from member states, and more immediate programme policy is delegated to the Board of Directors composed of island Chief Agricultural Officers and Representatives from U.W.I., the Caribbean Development Bank, and the

CARICOM Secretariat. CARDI has received relatively modest financial project assistance from external donor agencies in the past. (See Annex J , Appendix 5). A.I.D. grant assistance in 1976 of \$141,000 and 1977 of \$144,000 was the major source of external funding in those years. This year, 1978, CARDI has received a grant of approximately \$644,000 from UNDP/OPEC to increase its outreach programmes in its MDC member states and Belize during the next three years. In addition, a 1978 grant of about \$1.5 million was received by CARDI from the European Development Fund (EDF) for certain capital improvements and equipment acquisition. A part of this EDF grant will be used to purchase vehicles and certain laboratory equipment required for the small farm multiple cropping research project proposed here. This project paper proposes an A.I.D. grant of \$2.2 million to CARDI that will support the major programme thrust for the LDC member states over the next four years.

CARDI is now undergoing an adjustment in objectives and organization to realign its programmes and staff orientation to better deal with the current problems of the region. Specifically, its work programme is expected to shift from a concentration on plantation agriculture directed to export crops to an emphasis on food crops produced by smallholders. The work orientation must be redirected from academic research in a centralized university setting to problem solving research decentralized to the client states.

This transition, accompanied at times by insecurity and lack of direction, has been difficult for the professional staff. CARDI is the only regional institution with the capacity to perform multi-cropping

systems research, but its uneven performance and lack of programme orientation have sown doubt among its clients and within itself. This problem, however, appears to be rapidly diminishing.

Within the past year, a man with extensive managerial and economic development experience was newly instated at CARDI as Executive Director. Since accepting this position, he has re-deployed staff to six field units in the Region; obtained significant external resources to expand CARDI's influence and provide a programmed focus for future research; reorganized the management structure to decentralize control in two staff and two line offices reporting directly to him; and obtained the plan for a management accounting system shortly to be implemented.

For the first time since its founding in 1974, CARDI's excellent scientific staff is orienting itself along objectively programmed lines. In the process they appear to be developing a renewed commitment to their work as they see the potential opportunities and additional resources before them. The twenty six professionals of their international, intercultural, interracial, interdisciplinary staff have impressive credentials, a scientific curiosity about multi-cropping systems research, and interest in the development of the Region. This Project has been carefully designed in collaboration with senior CARDI personnel. These individuals are expected to have key roles in the administration and technical direction of the projects activities. It should be successful.

E. Environmental Concerns

This Project seeks to investigate the characteristics of existing smallholder farming systems and to adapt known technologies to improve them, or to devise better farming systems to replace them. "Better" refers to the

capacity of the system to enhance the well-being of the farm family. Sustained use of the limited land resource of these islands is one of the most important aspects of the farm families' well-being and will be a continuing criterion used to assess each proposed intervention.

The Project's direct physical impact will be limited to small (0.125 acre) plots already used for agriculture on 150 small farms. Given the sustained use criterion, the project's direct impact is expected to be negligible and its ultimate indirect impact (i.e. after extension of results and adoption by farmers) is expected to be beneficial.

A negative determination is therefore recommended.

IV. FINANCIAL PLAN

This Project will use \$2.2 million of AID grant funds to support the establishment of six cooperative Country-CARDI on-farm research programmes in smallholder multicropping systems planned for the six Eastern Caribbean island countries of St. Lucia, St. Vincent, Dominica, Antigua, Montserrat and Grenada. These AID funds will complement the reprogramming of \$2.3 million of CARDI programme funds and \$0.36 million of cooperating country funds for a total project cost of \$4.8 million (Table 5).

The Project is expected to begin in October 1978 with initial planning, country reconnaissance and socio-economic surveys and the recruitment of additional personnel (see Implementation Plan). Multi-cropping systems research will begin on 25 selected smallholder farms on each of the islands of St. Lucia, St. Vincent and Dominica in June 1979; Grenada, Montserrat and Antigua, will be added to the experimentation programme in May 1980. AID funds will be disbursed at an annual rate of approximately \$555,000 per year over a four year period.

A. Costing of Project Outputs/Inputs

Outputs are costed in a somewhat arbitrary manner (Table 6) Approximately eighty percent of input costs are assigned to the creation of the six cooperative research programmes. Since this capability is expected to continue for many years, these startup costs will be gradually discounted by additional future outputs. The other project outputs are unit costed on the basis of the indicators chosen to represent the outputs.

Table 5: Caribbean Farming Systems Research Project

Funding Requirements By Source

And Year

(US\$000)

	<u>AID</u>	<u>CARDI</u>	<u>COUNTRY</u>	<u>TOTAL</u>	<u>PERCENT</u>
1978/79	648.0	522.5	50.8	1221.3	25.3
1979/80	584.5	560.8	93.8	1239.1	25.7
1980/81	505.1	530.4	101.6	1137.1	23.6
1981/82	473.1	641.2	110.4	1224.7	25.4
TOTALS	2210.7	2254.9	356.6	4822.2	100.0
PERCENT	45.8	46.8	7.4	-	100.0

(US\$000)

	OUTPUT NO. 1	OUTPUT NO. 2	OUTPUT NO. 3	OUTPUT NO. 4	
INDICATORS	Six Cooperative Research Programmes	Longitudinal Socio-Economic records for 525 farm years	Tests of 120 Crop/Systems applications (5.5%) 12 complete systems (5.5%) Recommendations	72 Extension Bulletins (2.5%) 42 Field days (2.5%)	
INPUTS	80% of Programme	4% of Programme	11% of Programme	5% of Programme	TOTAL
AID					
Personnel					619.4
Consulting Services					810.0
Training					105.0
Other Costs					<u>676.3</u>
TOTAL	1768.6	88.4	243.2	110.5	2210.7
CARDI					
Personnel					1783.2
Capital Costs					276.0
Other Costs					<u>195.7</u>
TOTAL	1803.8	90.2	248.0	112.8	2254.9
Countries					
Personnel					296.6
Other Costs					<u>60.0</u>
TOTAL	285.3	14.3	39.2	17.8	356.6
PROGRAMME TOTAL	3857.7	192.9	530.4	241.1	4822.2
	\$642,950 per co-operation programme	\$367 per farm year of socio-economic record	\$2,210 per crop system recommendation	\$1,674 per extension Bulletin	
	\$183,700 per country programme year		\$22,100 per system design	\$2,511 per field day	

B. Disbursements

CARDI suffers from a chronic cash flow problem caused by delays in receipt of individual country contributions. A reserve fund has been established to reduce the influence of these fluctuations. However, the beneficial effect of this reserve fund would be seriously diluted if CARDI must await reimbursement by external donors. It is proposed that AID initially disburse \$150,000 (approximately three months' expenditure). This fund would be replenished appropriately upon receipt of suitable evidence of expenditure. This amount of the outstanding advance would be reduced gradually over the last two years of the programme, reaching zero at its conclusion.

C. Financial Management Considerations

CARDI's past financial management capability was not good. The University of the West Indies (UWI) has provided accounting services as part of the joint agreement, but the timeliness and design of the situation reports have not been adequate either for routine management or financial planning. An analysis of past accounts by Peat, Marwick, Mitchell & Co., CARDI's independent auditors, has led to the design of a straightforward manual accounting system which can be operated directly by the CARDI administrative unit. This system is to begin operation in August or September. Peat, Marwick, Mitchell believes that this system will be entirely adequate for effective control of donors' funds and will meet their reporting requirements. It will provide CARDI management with timely reports for supervision and planning. The implementation of this accounting system will be a condition precedent to disbursement of AID funds. (See Annex J, Appendix 6 for a summary of proposed accounting system design).

D. Ability to Continue Project Activities

CARDI is obligated to provide the equivalent of \$2,260,000 over a four year period and then to continue the project at an annual cost of \$900,000. The direct impact on CARDI's core budget is much less, however, since much of CARDI's contribution represents re-programming of core budget or capital costs financed by other donors. The permanent new recurrent funding required from the core budget will amount to only \$300,000 at programme conclusion or approximately one third of the project's recurrent future budget. This appears to be well within CARDI's capability, assuming that CARDI's performance under this activity is satisfactory.

CARDI should have no difficulty in meeting its programme obligations over the next four years. A sizeable amount of the CARDI contribution represents the re-programming of existing resources or capital costs whose financing has been secured from other donors. The project's impact on CARDI's core budget is relatively small. Core budget requirements for the project never increase from one year to the next by more than \$90,000. Future contributions of \$300,000 a year (the accumulated annual impact of recurrent costs occasioned by this project) should be well within the capability of the member countries, assuming that they feel that this programme has been successful in meeting their research needs. (Sources of CARDI funding are presented in Annex J, Appendix 5).

V. IMPLEMENTATION PLAN

This project is planned for implementation over a four (4) year period on the six (6) LDC islands of St. Vincent, St. Lucia, Dominica, Antigua, Montserrat and Grenada. Work will be initiated in 1978/79 on the first three (3) and in 1979/80 on the last three.

May 1979, is the most critical date, since all plans must be made and personnel and equipment must be in place to begin operations in the three initial islands in May 1979, in order to initiate experimental activities with onset of rains in June 1979. The Implementation Plan therefore was developed around the May 1979 date and work towards the present to schedule early Year I activities, and beyond that date for late Year I through Year II actions.

Three (3) major chains of activities are defined:

1. Project Paper Submission and Approval, all in early Year I.
2. Organization and Management, all in Year I and early Year II.
3. Research Programme Development and Implementation which includes initial activities in Year I and Year II and cyclical activities in Year I, II, III and IV.

Events in each of these chains are listed in Table 7, illustrated in Figure I, and described in Annex K.

Table 7. Principal Events in Implementation Plan with Responsible Party and Critical Year 1 Dates

1. Project Paper Submission and Approval

<u>Date</u>	<u>Event</u>	<u>Responsibility</u>
7/78	A - Draft of Project	AID & CARDI
8/78	B - Mission Review, Completion and Submission	AID
8/78	C - AID Review and Programme Authorization	AID
9/78	D - Project Agreement	AID & CARDI

11. Organization and Management

<u>Date</u>	<u>Event</u>	<u>Responsibility</u>
10/78	A - CARDI Management Improvements	CARDI
10/78	B - Country Agreements	CARDI & COUNTRY
2/79	C - Country Programme Staff Identified or Recruited and Assigned	AID, CARDI & COUNTRY
2/79	D - Core Staff Additions	AID & CARDI
3/79	E - Procurement	CARDI & OTHER DONORS
12/78	F - Training Plan Prepared and Approved	AID & CARDI
12/78	G - Consulting Services Plan Prepared and Approved	AID & CARDI
	H - Evaluation	
7/80	1st Evaluation	
7/81	2nd Evaluation	
7/82	3rd Evaluation	

III. Research Programme Development and Implementation

<u>Date</u>	<u>Event</u>	<u>Responsibility</u>
10/78	A - Reconnaissance Survey	CARDI & COUNTRY
	1. Conditions Criteria and survey Design	
	2. Team Formation and Orientation	
11/78	3. Decision (geographic areas, target group characteristics)	
	B - Detailed Survey	CARDI & U.W.I.
10/78	1. Scope of Work	
	2. Contract	
	a. Base questionnaire preparation, approval and pretest	
11/78	b. Survey plans	
	c. Performance	
3/79	d. Data available	
4/79	C - Farm Selection	CARDI & COUNTRY
	1. Criteria	
	2. Selection	
	3. Agreement	
5/79	D - Experimental Plan (repeated annually for each country)	CARDI & COUNTRY
	E - Programme Execution (repeated annually for each country)	CARDI & COUNTRY
6/79	1. Introduction	
	2. Data Collection	
5/80	3. Analysis, evaluation, feedback	
8/80	F - Extension of Results	CARDI & COUNTRY & U.W.I.

VI. EVALUATION ARRANGEMENTS

Three evaluations will be performed during the life of the project, each evaluation based on field inspection and document review, and guided by this project paper, its annexes, and the Programme Design Summary included herein. Each of these evaluations will have the general objective of assessing progress, identifying and recommending correction of problems, and recommending re-programming of resources. In addition, successive evaluations will examine aspects appropriate to the particular stage of project development.

Evaluation No. 1 is scheduled for the period July - September, 1980, shortly after the second group of countries enters the programme. It will consist primarily of an examination of the way in which the various conditions of the programme have been met, the adequacy of inputs already supplied and plans for securing the remaining inputs, and the problems encountered in preparing initial experimentation plans. The evaluation team will consist of representatives of CARDI and the Regional Development Office of the Caribbean (RDO/C) and an independent evaluator. Estimated cost will be \$10,000.

Evaluation No. 2 is scheduled for July - September, 1981. By this time, all inputs should have been in place long enough to produce initial outputs and give evidence of the potential for achievement of end-of-project status. The primary objective of this evaluation, besides making this assessment, will be to recommend a re-programming of inputs, targets and methods based on programme experience to date. The evaluation will be performed by a team of independent evaluators which will include a biological research scientist (Agronomist), a cultural anthropologist or rural sociologist experienced in the Caribbean, and an administrator.

All must have had experience with small farm agricultural development.
Estimated cost will be \$35,000.

Evaluation No. 3 will take place at or near the completion of the project (July - September 1982) Its primary objectives will be to identify the programme's accomplishments and prospects and to review the conceptual basis of the project in light of subsequent operations and programme response to problems encountered. The intent will be to (1) provide CARDI management with guidance for future multi-cropping research and (2) document the experience of this programme as a guide to others engaged in or contemplating this type of research. The team performing this evaluation should include scientists and administrators who have had personal experience in farm-based research on smallholder multi-cropping systems or the utilization of recommendations from this source. Estimated cost of this evaluation is \$45,000.

PROJECT DESIGN SUMMARY LOGICAL FRAMEWORK

G O A L S

STATEMENT	OBJECTIVITY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
To increase value of agricultural production in the LDCs of the Eastern Caribbean through the improvement of small farm profitability, nutritional productivity and employment generation.	The dissemination to small farmers of improved farming systems developed as a result of this project will have been initiated by the six participating governments leading, therefore, to increased small farmer incomes, decreased reliance on food imports, and decreased rural unemployment and underemployment.	National and regional agricultural production statistics. External trade statistics. National employment statistics.	Extended periods of drought and other interruptions of natural phenomena do not occur. Supply distribution agencies, credit institutions, and marketing agencies take appropriate actions to accommodate implementation of research findings.

PROJECT DESIGN SUMMARY LOGICAL FRAMEWORK

P U R P O S E

STATEMENT	OBJECTIVITY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	ASSUMPTIONS
<p>To improve small holders' farming systems in the Eastern Caribbean through the development of management and production recommendations which small farmers will use, extension agents can and will explain, and credit institutions will finance.</p>	<p><u>END OF PROJECT STATUS</u></p> <ol style="list-style-type: none"> 1. The cooperative CARDI/Country farm-based, agricultural systems (multicropping) research method will be established as a continuing and productive programme on six Caribbean Islands. 2. Member country contributions to CARDI's budget will have increased to absorb all programme core and Country Field Team personnel required to sustain the multiple cropping research programme. 3. At least half of the cooperating farmers will be using CARDI recommended practices and systems on at least half of their suitable land area with evident economic benefit to the farm family. 4. Objective evidence can be found that some CARDI recommended practice or system is being used on at least twenty percent of the non-cooperating farms in the target ecological zone where the adapted research is conducted. 5. Credit will be offered on a preferential basis by the local credit institutions to farmers following CARDI recommended practices and systems. 	<ol style="list-style-type: none"> 1) CARDI Budget and CARDI/Country agreement. 2) Review of farm records, interviews with farmers and observations. 3) Interviews with farmers and observations. 4) Interviews with bankers. 	<p>Governments of the Region continue to place high priority on increasing food production to meet regional demand.</p> <p>Proposed AID "Improved Agricultural Extension" grant is authorized and implementation begun by mid-F779.</p>

PROJECT DESIGN SUMMARY LOGICAL FRAMEWORK

O U T P U T S

STATEMENT	OBJECTIVITY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	ASSUMPTIONS
<p>The expected outputs of this activity include:</p> <p>a) The establishment of co-operative Country/CARDI small farmer systems research programmes in six countries.</p> <p>b) The creation of a small-farmer socio-economic information base, obtained through surveys and onfarm research.</p>	<p>a) Assignment of CARDI and country personnel to country Field Teams; selection of 25 farmer participants; and operational work plans formulated for each country.</p> <p>b) Records, analyses and reports about the small holding farming system which reveal technical, economic and social characteristics of the farm family and farming systems and provide insights into the farmers objectives, limitations, resources and values.</p>	<p>CARDI research records, analyses and publications.</p> <p>Interviews with CARDI core staff and country project field teams and national and regional extension and credit personnel.</p> <p>AID project management projects and evaluations.</p>	<p>CARDI staff, Country Agricultural personnel and cooperating farmers are able to develop and sustain a harmonious working relationship. This will be a matter of continuous concern to CARDI management, the CARDI/AID Programme co-ordinator and the country Project Field Teams. All CARDI core and field personnel will receive instruction in the formal relationships involved in the collaborative mode and the limitations and sensitivities of farm based research.</p>
<p>c) The design of at least 12 significantly improved smallholder farming systems based on the integration of crop and livestock-specific proven technology with empirically based economic analysis that take into account profitability, cash flow, nutritional contribution and labour utilization characteristics.</p>	<p>c) Description, testing and economic assessment of technological packages of at least ten crops in at least two systems applications in each island.</p> <p>Description, testing and economic assessment of at least two multi-cropping systems on each island which represent significant improvement in terms of profitability and/or labour use and/or nutrition and/or risk reduction and/or cash flow pattern when compared with traditional patterns.</p>		
<p>d) The transmittal of smallholder characteristics and improved farming systems recommendations to extension officers, credit officers, planners, and other agricultural officials through publications, presentations and field-day activities.</p>	<p>d) Publication of a minimum of twelve extension Bulletins per island on technological packages and production systems in a form suitable for ready extension to farmers.</p>	<p>Organization of a minimum of eight field days per island (two per year) for extension credit and other personnel to demonstrate the programme and its benefits.</p>	

PROJECT DESIGN SUMMARY LOGICAL FRAMEWORK

I N P U T S

<u>STATEMENT</u>	<u>OBJECTIVITY VERIFIABLE INDICATORS</u>	<u>MEANS OF VERIFICATION</u>	<u>ASSUMPTIONS</u>	
	<u>(US\$000)</u>			
	<u>AID</u>	<u>CARDI</u>	<u>Countries</u>	<u>Total</u>
Personnel	619.4	1447.2	296.6	2363.2
Consulting Services	810.0	-	-	810.0
Training	105.0	-	-	105.0
Capital Costs	-	276.0	-	276.0
Other Costs	676.3	531.7	60.0	1268.0
	2210.7	2254.9	356.6	4822.2



ANNEX A

1 of 1

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

UNIVERSITY CAMPUS · ST. AUGUSTINE · TRINIDAD, W. I.

Cables: "CARDINST"
Port-of-Spain
Telephone: 662-5511

Reference: CT3/2

27th July, 1978.

Mr. Dwight Johnson,
Acting AID Representative,
Regional Development Office - Caribbean,
Bridgetown,
BARBADOS, W.I.

Dear Mr. Johnson,

As you know, imports of food and food products into the Eastern Caribbean have been increasing over the past few years, causing severe economic strains to most countries in the Region and especially to the seven so-called "Less Developed Countries". Many factors must be addressed by the various regional development Institutions, to move closer towards the regional goal of increasing the areas of agricultural production. One of these factors is to increase the production capacity of the many small farms in the Region.

To address this specific area, CARDI has formulated, in collaboration with USAID technicians, a programme which will develop farming systems designed especially to assist the small farmer increase the productivity and profitability of his or her level. The research will be conducted on small farmers' fields, located in six countries: Dominica, St. Lucia, St. Vincent, Montserrat, Antigua and Grenada.

The estimated cost of this project is approximately US\$4.6 million of which CARDI and the local Governments have resources to finance US\$2.8 million. At this time, I would like to request, on behalf of CARDI, a grant from the Government of the United States of America for US\$2.2 million to cover the remaining financial needs of the project which cannot be met by the Region at this time. The project is scheduled to run for four years which would mean assistance from USAID of approximately US\$500,000 per year.

With the confidence that you will favourably consider this request, I would like to take this opportunity to express CARDI's appreciation for the support and assistance supplied by your colleagues who traveled here from Washington and Barbados in designing this project.

We look forward to your continued cooperation in the future,

Yours sincerely,

J. A. Bergasse,
Ag. Executive Director.

JAB:mm.

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E.O. 11652: N/A

TAGS:

SUBJECT: CARIBBEAN FARMING SYSTEMS RESEARCH GRANT PID

1. SUBJECT PID WAS REVIEWED ON APRIL 5 AND APPROVED FOR FURTHER DEVELOPMENT. THE DAC REQUESTED THAT THE PP ADDRESS THE FOLLOWING CONCERNS:

-----A. PROJECT GOAL: THE PP SHOULD EXPLAIN THE RELATIONSHIP BETWEEN RESEARCH ON CROPPING SYSTEMS TO BE CARRIED OUT UNDER THE PROJECT AND INCREASED SMALL FARMER PROFITABILITY, EMPLOYMENT GENERATION AND NUTRITIONAL OUTPUT. THE THREE MAIN GOAL ASSUMPTIONS MADE IN THE PID COULD BE CRITICAL TO SMALL FARMERS ULTIMATELY BENEFITTING FROM THE PROJECT. HOW COULD CARDI ENSURE THAT THE FARMERS WILL IN FACT ADOPT THE NEW TECHNIQUES, AND THAT EXTENSION AND CREDIT WILL BE AVAILABLE ON A TIMELY BASIS?

-----B. RELATIONSHIP TO EXISTING CARDI PROJECT. THE PROPOSED PROJECT IMPLIES A BASIC SHIFT IN CARDI'S EMPHASIS AWAY FROM FUNDAMENTAL RESEARCH AND TOWARDS PACKAGED, PRACTICAL RECOMMENDATIONS. THE PP SHOULD CLARIFY HOW CARDI WILL IMPLEMENT THIS SHIFT. HOW WILL THE THREE STATISTICS ESTABLISHED UNDER THE EXISTING GRANT BE USED UNDER THE NEW PROJECT? TO WHAT EXTENT WILL RESEARCH BE CON-

TINUED IN CARDI; HOW DOES IT RELATE TO THE PROPOSED NEW ACTIVITIES? HOW WILL THE FUNCTIONS OF THE EXISTING STAFF CHANGE?

-----C. CARDI'S ROLE IN REGION. THE MAIN THRUST OF THE PROJECT IS TO ENABLE CARDI TO WORK DIRECTLY WITH SMALL FARMERS IN THE REGION. THE PROJECT TEAM SHOULD ENSURE, HOWEVER, THAT BOTH PROJECT DEVELOPMENT AND PROJECT IMPLEMENTATION INVOLVE JOINT EFFORTS BY CARDI AND THE LEGS IN DESIGNING ISLAND PROGRAMS AND EXPANDING CARDI'S ACTIVITIES.

-----D. RESEARCH PROGRAM DESIGN. (I) AGRONOMIC CONCERNS: PROJECT DEVELOPMENT TEAM SHOULD EXAMINE THE FEASIBILITY OF AND NEED FOR INCLUDING ASSISTANCE FOR CASH CROPS AND LIVESTOCK IN ADDITION TO BASIC FOOD CROPS AND INCLUDE IN THE PP THE RATIONALE FOR THE FINAL GROUP OF CROPS AND ANIMALS TO BE STUDIED BY CARDI. THE TEAM SHOULD BE AWARE THAT POLICY RESTRICTIONS MAY APPLY TO CERTAIN CROPS (E.G., CITRUS, SUGAR, PALM OIL). AID/M WILL BE PROVIDING FURTHER GUIDANCE ON THESE POLICIES. (II) NON-AGRONOMIC: THE PP SHOULD SPECIFY THE FUNCTIONS OF THE AGRICULTURAL ECONOMISTS AND HOW THEIR ANALYSIS WILL BE INCORPORATED INTO RECOMMENDATIONS TO SMALL FARMERS. WHAT EFFECT/BENEFITS CAN BE EXPECTED TO RESULT FROM THESE RECOMMENDATIONS, IN THE FACE OF EXISTING MARKETING AND PRICING CONSTRAINTS. HOW COULD THESE CONSTRAINTS BE ADDRESSED IN THE PROJECT?

-----E. CAPACITY OF CARDI. SUPERVISION AND COORDINATION OF THE INTERDISCIPLINARY TEAMS ON SIX ISLANDS WILL REQUIRE SUBSTANTIAL MANAGEMENT RESPONSIBILITIES ON THE PART OF CARDI. THE DAC AGREED THAT IT IS IMPORTANT TO DIRECTLY INVOLVE THE CARDI DIRECTOR AND MANAGER IN PROJECT DEVELOPMENT AND DESIGN.

-----F. RECURRING COSTS. THE PID PROPOSES TO GRANT-FUND SALARIES AND TRAVEL OF NEW PERSONNEL FOR PROJECT-SPECIFIC ACTIVITIES. IT IS EXPECTED THAT CARDI WILL ASSUME AN INCREASING PORTION OF THESE COSTS. BY WHEN? IN DEVELOPING THE PROJECT, THE TEAM SHOULD ALSO ARRIVE AT FIRM ESTIMATES OF THE COSTS TO BE BORNE BY EACH PARTICIPATING COUNTRY.

-----G. PROJECT DEVELOPMENT. THE DAC AGREED, AFTER CONSULTATION WITH THE TITLE XII DIFAD, THAT THE TEAM SHOULD INVESTIGATE THE POSSIBILITY OF USING UNIVERSITY EXPERTISE DURING IMPLEMENTATION RATHER THAN DELAY ACCELERATED PROJECT DEVELOPMENT BY ATTEMPTING TO USE THE TITLE XII COLLABORATIVE METHOD. IT IS EXPECTED THAT EXPRESSIONS OF

INTEREST WILL BE SOLICITED FROM UNIVERSITIES AT THAT TIME. THE PROJECT DEVELOPMENT TEAM WILL INCLUDE AN ORGANIZATION MANAGEMENT SPECIALIST, AN AGRONOMIC RESEARCH SPECIALIST WITH MULTIPLE CROPPING EXPERIENCE, AND A SENIOR GATIE PERSON, IN ADDITION TO THE EARLIER TEAM MEMBERS. THE TEAM IS EXPECTED TO FINALIZE PP IN JUNE.

-----H. IEE. SUBMISSION OF AN IEE IS EXPECTED PRIOR TO PP SUBMISSION. CHRISTOPHER

ZT
#3313

UNITED STATES
OF AMERICA

MAY 4 8 08 AM '78

BRIDGETOWN

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ANNEX B 1 of 1

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PROJECT AUTHORIZATION AND REQUESTFOR ALLOTMENT OF FUNDS

Name of Entity: Caribbean Agricultural Research and Development
Institute

Name of Project: Small Farm Multiple Cropping Systems
Research

Project Number: 538-0015

Pursuant to Part I, Chapter I Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Grant to the Caribbean Agricultural Research and Development Institute (CARDI) of not to exceed six hundred forty eight thousand united states dollars (\$648,000) the authorized amount to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph.

The project consists of a small farm multiple cropping research programme designed to adapt known technology through farm-based systems research to obtain recommendations about improved farming systems which farmers can use, extension agents can explain and credit institutions can finance (hereinafter referred to as the "Project").

I approve the total level of A.I.D. appropriated funding planned for this project of not to exceed two million two hundred ten thousand seven hundred united states dollars (\$2,210,700), including the funding authorized above during the period FY 1978, through FY 1981. I approve further increments during that period of Grant funding up to (\$1,562,700) subject to the availability of funds in accordance with A.I.D. allotment procedures.

I hereby authorize the initiation of negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and delegations of authority subject to the following essential terms and covenants and major conditions; together with such other terms and conditions as A.I.D. may deem appropriate.

A. Source and Origin of Goods and Services

Except for ocean shipping and except for technical assistance goods and services financed by AID under the Project shall have their source and origin in Geographic Code 000 and the member countries of CARDI, except as AID may otherwise agree in writing. Consulting for planning, training and research consultation financed under the grant shall have their source and origin in Geographic Code 940 and the member countries of CARDI. Ocean shipping financed under the Grant shall be from Geographic Code 935.

B. Conditions Precedent to Initial Disbursement

Prior to any disbursement or to the issuance of any commitment documents under the Project Agreement, CARDI shall furnish to AID, in form and substance satisfactory to AID:

- i) a legal opinion of the General Counsel of CARDI or other legal counsel acceptable to AID to the effect that the Project Agreement has been duly authorized and/or ratified by the Board of Directors of CARDI executed on its behalf and that it constitutes a valid and legally binding obligation of the Caribbean Agricultural Research and Development Institute in accordance with all its terms; and
- ii) a certified statement of the name of the person(s) authorized under the Project Agreement to act as CARDI representative(s) under the Agreement with authenticated specimen signatures of said representatives.
- iii) evidence that it has adopted, put into place and implemented accounting procedures sufficient to control AID funds and meet AID reporting requirements.
- iv) evidence that an administrative order has been issued, formally assigning staff personnel to the project and specifying the level of effort of each.
- v) evidence that funding from other donors for project capital costs has definitely been committed to the project.

C. Conditions Precedent to Disbursement for other than Technical Assistance

Except as AID may otherwise agree in writing, prior to any disbursement or to the issuance of any commitment documents under the Project Grant Agreement to finance other than technical assistance, CARDI shall furnish to AID in form and substance satisfactory to AID:

- i) a training programme for core staff and Country Field Team personnel.
- ii) a cooperative agreement between CARDI and the country in which project activities are to occur, specifying the respective responsibilities and obligations for carrying out Project activities in that country.

D. Covenants

Project Evaluation. The Parties agree to establish an evaluation programme as part of the Project. Except as the Parties otherwise agree in writing, the programme will include, during the implementation of the Project and at one or more points thereafter:

- a) evaluation of progress toward attainment of the objectives of the Project;
- b) identification and evaluation of problem areas or constraints which may inhibit such attainment;
- c) assessment of how such information may be used to help overcome such problems;
- d) evaluation to the degree feasible, of the overall development impact of the project.

Annual Experimental Work Programme. Before each year's work in each Country, CARDI will prepare and discuss with A.I.D. and that Country an annual experimental work program.

E. Waivers

The following waivers of A.I.D. regulations are hereby approved:

- i) waiver of Geographic Code 000 for A.I.D. financing of shipping costs to Geographic Code 935.
- ii) waiver of 50-50 shipping requirement.
- iii) waiver of Geographic Code 000 source of services to Geographic Code 940 and member countries of CARDI.

5C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights? Yes
2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? No
3. FAA Sec. 620(a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba? No
4. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement? There is no evidence that the Caribbean governments are controlled by the international communist movement.
5. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government? There is no evidence of any such debt owed to a U.S. citizen by a contributing member government.
6. FAA Sec. 620(e) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? There is no evidence that any such action has been taken by a contributing Caribbean government.

- A
7. FAA Sec. 620(f); App. Sec. 108. Is recipient country a Communist country? Will assistance be provided to the Democratic Republic of Vietnam (North Vietnam), South Vietnam, Cambodia or Laos? No
 8. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? No
 9. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? No
 10. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason? Not Applicable
 11. FAA Sec. 620(o); Fishermen's Protective Act, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters,
 - a. has any deduction required by Fishermen's Protective Act been made? Not Applicable
 - b. has complete denial of assistance been considered by AID Administrator? Not Applicable
 12. FAA Sec. 620(q); App. Sec. 504. (a) Is the government of the recipient country in default on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds, unless debt was earlier disputed, or appropriate steps taken to cure default? Neither the Caribbean Agricultural Research & Development Institute (CARDI) nor any of the six national governments are in default on interest or principal on any AID loan covered by this act.
 - *13. FAA Sec. 620(s). "If contemplated assistance is development loan (including Alliance loan) or security supporting assistance, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the amount spent for the purchase of sophisticated weapons systems?" (An affirmative answer may refer to the record of the taking into account, e.g.: "Yes as reported in annual report on implementation of Sec. 620(s)." This report is prepared at the time of approval by the Administrator of the Operational Year Budget.* Not Applicable

* Upward changes in the Sec. 620(s) factors occurring in the course of the year, of sufficient significance to indicate that an affirmative answer might need review should still be reported, but the statutory checklist will not normally be the preferred vehicle to do so.)*

14. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?
- No such action has been taken by a contributing Caribbean government.
15. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?
- No contributing Caribbean government is in arrears on its U.N. obligations.
16. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism?
- No contributing Caribbean government has granted sanctuary to an international terrorist.
17. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA?
- No. CARDI does not discriminate on the basis of race, religion, national origin or sex.
18. FAA Sec. 669. Has the country delivered or received nuclear reprocessing or enrichment equipment, materials or technology, without specified arrangements on safeguards, etc.?
- No contributing Caribbean Government is engaged in such activities.
19. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate?
- No Caribbean government has taken such action.
- B. FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

a. FAA Sec. 102(c), (d). Have criteria been established, and taken into account, to assess commitment and progress of country in effectively involving the poor in development, on such indexes as: (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution, and (5) unemployment.

CARDI and contributing countries have established criteria to involve the poor in development activities.

b. FAA Sec. 201(b)(5), (7) & (8); Sec. 208; 211(a)(4), (7). Describe extent to which country is:

- (1) Making appropriate efforts to increase food production and improve means for food storage and distribution.

CARDI Caribbean governments and other regional institutions (e.g. the University of the West Indies and the Caribbean Development Bank) are supporting and carrying out programs to increase food production, processing and storage. The Project increases this effort.

- (2) Creating a favorable climate for foreign and domestic private enterprise and investment.
- (3) Increasing the public's role in the developmental process.
- (4) (a) Allocating available budgetary resources to development.
(b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations.
- (5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.
- (6) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

c. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made?

d. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance, or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs?

2. Security Supporting Assistance Country Criteria

a. FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? Is program in accordance with policy of this Section?

b. FAA Sec. 531. Is the Assistance to be furnished to a friendly country, organization, or body eligible to receive assistance?

c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

- (2) In general while governments in the region are seeking control over their own natural resources, the climate for foreign and domestic enterprises and investment is favourable in the region.
- (3) Development programs in the region at both the national and regional level are generally aimed at increasing the public's role in the development process.
- (4) a) The Caribbean governments have been allocating considerable available budgetary resources to both national and regional development.
b) Military expenditure by the governments of the region are minimal.
- (5) Caribbean governments are making progress toward improved tax collection and land tenure arrangements, recognition of the importance of individual freedom, initiative and private enterprise, and respect for the rule of law, freedom of expression and of the press.
- (6) The Caribbean governments are currently making efforts towards economic cooperation and integration as a measure of self-help.
c) The Caribbean region is among the 40 countries in which development assistance grants may be made.

No.

The Caribbean governments have not engaged in gross violations of internationally recognized human rights.

Yes.

Not Applicable.

5C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT.1. App. Unnumbered; FAA Sec. 653(b)

(a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project;
(b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure plus 10%)?

The project was not included in the FY 1978 congressional presentation. Therefore Congress will be notified of the FY 1978 funding of this project.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

Yes.

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

No further legislative action is required.

4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?

Not Applicable.

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

Not Applicable

A.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multi-lateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multi-lateral organizations or plans to the maximum extent appropriate?

Project is regional in nature and will be executed on a regional basis.

7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

The project will conduct adaptive, farm based research geared to increasing the production capacity of small farmers. This increased production potential should encourage increased trade and development of agricultural development.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

Private U.S. individuals or firms will be invited to submit proposals for providing consulting technical assistance to be financed under the grant.

9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

CARDI's core budget is financed by member country contributions. Approximately 80% of the total project cost will be incurred within the region in local currencies.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?

No.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?

Project is designed to conduct adaptive agricultural research on small farmers' fields to develop farming systems which the farmer can use, extension agents can promote and credit institutions can finance. Favourable impact upon small holders will be substantial and direct.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: [include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

- (1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;
- (2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;
- (3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;
- (4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:
 - (a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;
 - (b) to help alleviate energy problem;
 - (c) research into, and evaluation of, economic development processes and techniques;
 - (d) reconstruction after natural or manmade disaster;
 - (e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;
 - (f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

Primary purpose of project is to develop improved small farmer farming systems which will lead to increased productivity and increased family income. Research effort will begin by examining actual needs of small farmers through base line surveys. This information will then be used to design an adaptive research effort.

(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

Since this is grant funds to a regional institution providing service to member countries section 110 (a) does not apply.

Yes.

This project will develop through on-farm research trials, farming systems which seek to enable the small farmer increase his/her food production which will directly assist the region meet its food needs. Special attention will be paid to womens' participation in the family farming systems which will be developed

CARDI as an institution, is designed to respond to the goals and needs of its member country. The project calls for the utilization of local i.e. intellectual resources wherever possible. Only limited amounts of foreign technical assistance will be required at the beginning of the project and this only for professional positions not found in the region.

B1

g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(8). Does the activity give reasonable promise of contributing to the development: of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

Yes.

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

The proposed grant will have a negligible effect on the U.S. econy.

2. Development Assistance Project Criteria (Loans only)

Not Applicable

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

3. Project Criteria Solely for Security Supporting Assistance

Not Applicable

FAA Sec. 531. How will this assistance support promote economic or political stability?

4. Additional Criteria for Alliance for Progress

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

Not Applicable

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

Not Applicable

5C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by exclusion (as where certain uses of funds are permitted, but other uses not).

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

- | | |
|--|---|
| 1. <u>FAA Sec. 602</u> . Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed? | U.S. small businesses will be afforded the opportunity to participate in the furnishing of goods and services under this grant. |
| 2. <u>FAA Sec. 604(a)</u> . Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him? | Yes. |
| 3. <u>FAA Sec. 604(d)</u> . If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed? | Yes. |
| 4. <u>FAA Sec. 604(e)</u> . If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? | Not Applicable |
| 5. <u>FAA Sec. 608(a)</u> . Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items? | Yes. |
| 6. <u>MMA Sec. 901(b)</u> . (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. | The grant agreement will require usage of U.S. flag vessels to the extent that such vessels are available. |
| 7. <u>FAA Sec. 621</u> . If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized, | Yes. |

[P]
A

are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

8. International Air Transport. Fair Competitive Practices Act, 1974

If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

Yes.

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?

Not Applicable

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

Not Applicable

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million?

Not Applicable

C. Other Restrictions

1. FAA Sec. 201(d). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?

Not Applicable

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?

Yes

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-Bloc countries, contrary to the best interests of the U.S.?

Yes

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U.S. or guaranty of such transaction?

Yes

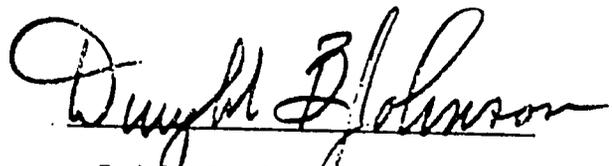
5. Will arrangements preclude use of financing:
- a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions? **Yes**
 - b. FAA Sec. 620(g). to compensate owners for expropriated nationalized property? **Yes**
 - c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs? **Yes**
 - d. FAA Sec. 662. for CIA activities? **Yes**
 - e. App. Sec. 103. to pay pensions, etc., for military personnel? **Yes**
 - f. App. Sec. 106. to pay U.N. assessments? **Yes**
 - g. App. Sec. 107. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending). **Yes**
 - h. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress? **Yes**

Certification Pursuant
to
Section 611 (e)
of the
Foreign Assistance Act
as amended

I, Dwight B. Johnson, Acting AID Representative of the Agency for International Development, Regional Development Office, Caribbean do herewith certify that in my judgement the Caribbean Agricultural Research and Development Institute, (CARDI) has both the financial resources and financial capability to maintain and effectively utilize the proposed Small Farm Multiple Cropping Systems Research Project.

This judgement is based upon the facts developed in the Project Paper for the proposed grant of \$2,210,700, AID's analysis and evaluation of agricultural development in the Eastern Caribbean, November 1977, and a careful review of the financial assistance previously provided in the Caribbean Region for related programs in agriculture.

DATE: August 4, 1978



Dwight B. Johnson
Acting AID Representative
Regional Development Office/
Caribbean

ANNEX F

NATURE, SCOPE AND MAGNITUDE
OF ENVIRONMENT IMPACTS

A. DESCRIPTION OF PROJECT

This project focuses upon development of economic and technical cropping recommendations suitable for adaption by the small farmer. These recommendations are the expected result of a four year programme of on-farm research conducted on up to 150 farms on six islands in the Eastern Caribbean.

A detailed project description can be found in the body of this project paper, but principally the project will enable CARDI by conducting on farm research in cooperation with the island governments to:

1. determine the various cropping systems currently being used by limited resource farmers in each island; and
2. determine the cropping practices which would improve the traditional cropping systems.

The research would be aimed at increasing the income of the small farmer, increasing his nutritional productivity and improving labour utilization. On-farm research would be conducted on small, closely monitored plots of land already used for agriculture which normally would not be more than one-eighth acre for each farm unit, for a total land area to be utilized in the project of approximately 20 acres.

The research technique to be used is one where currently known and acceptable cultural practices for selected crops would be introduced into the traditional system being practiced by the small farmer. New rotations or combinations of crops and livestock may be tested, but only on these small, carefully monitored plots.

As these new crop rotation and combination trials are carried out, however, new pest problems may develop. Special emphasis, therefore, will be placed on designing adequate pest management systems which can be used by the smallholder to meet the needs created by these new cropping systems. The project is designed to enable CARDI

to augment its current capabilities in this field by securing outside expertise in a wide range of pest management systems - biological, chemical, physical, etc., - as required by the particular pest.

To insure that pesticides incorporated into the development of these pest management systems are environmentally safe, CARDI will be required to secure authorization from A.I.D. before any A.I.D. monies can be used to procure or administrator a specific pesticide. Authorization will be based on determining whether 1) sufficient toxicological and environmental data are available to ensure the safety of research personnel and the quality of the environment, and 2) appropriate tolerances have been established by EPA or FAO/WHO and that these practices are being followed if treated crops are to be used for human or animal consumption.

Since many of the traditional farming systems involve the production of crops on hillsides or on lands where soil erosion is a major problem, the research programme will seek to develop farming systems which not only meet the proposed criteria but which avoid erosion and permit sustained use of the land.

The scope of this project only includes the development of improved farming systems for the small farmer and not the dissemination of these systems. Dissemination is the responsibility of island governments to be assisted by a follow-on USAID project which will be designed to improve the agricultural extension services of the islands. However, since the research to be conducted under this current project will be done on farmers' fields, its demonstration effect may induce some neighbouring farmers to adopt some of the practices being tested. However, since no effort will be made in this project to encourage this effect, dissemination by this method can be assumed to be minimal.

B. IDENTIFICATION AND EVALUATION OF ENVIRONMENTAL IMPACTS

Since this project contemplates only carefully monitored research on small plots dispersed throughout the region, no facet of the project can be expected to cause any significant impact to the environment. In addition, chemicals proposed for use in pest management systems will be carefully evaluated to ensure environmentally safe applications. This project seeks to investigate the characteristics of existing smallholder farming systems and

to adapt known technologies to improve them or to devise better farming systems to replace them. "Better" refers to the capacity of the system to enhance the well-being of the farm family. Sustained use of the limited land resource of these islands is one of the most important aspects of the farm families' well-being and will be a continuing criterion used to assess each proposed intervention. Thus, the project's direct impact is expected to be negligible and its ultimate indirect impacts (i.e., after extension of results and their adoption by farmers) is expected to be beneficial.

11. RECOMMENDATION OF ENVIRONMENTAL ACTION

A negative determination is recommended for this project.

IMPACT IDENTIFICATION AND EVALUATION FORM

(F) 4 of 6

Impact Areas and Sub-areas 1/

Impact
Identification
and
Evaluation 2/

A. LAND USE:

- 1. Changing the character of the land through:
 - a. Increasing the population _____ N
 - b. Extracting natural resources _____ N
 - c. Land Clearing _____ N
 - d. Changing soil character _____ N
- 2. Altering natural defenses _____ N
- 3. Foreclosing important uses _____ N
- 4. Jeopardizing man or his works _____ N
- 5. Other factors
Small (up to 1/8 of an acre) plots used to
conduct research on new crop varieties and
cropping patterns _____ N

B. WATER QUALITY:

- 1. Physical state of water _____ N
- 2. Chemical and biological states _____ N
- 3. Ecological balance _____ N
- 4. Other factors

1/ See Explanatory Notes for this form.

2/ Use the following symbols: N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

IMPACT IDENTIFICATION AND EVALUATION FORM

(F. 5 of 6

C. ATMOSPHERIC:

- | | | |
|--------------------------|-------|---|
| 1. Air additives _____ | _____ | N |
| 2. Air pollution _____ | _____ | N |
| 3. Noise pollution _____ | _____ | N |
| 4. Other factors _____ | _____ | |
| _____ | _____ | |
| _____ | _____ | |

D. NATURAL RESOURCES:

- | | | |
|--|-------|---|
| 1. Diversion, altered use of water _____ | _____ | N |
| 2. Irreversible, inefficient commitments _____ | _____ | N |
| 3. Other factors _____ | _____ | |
| _____ | _____ | |
| _____ | _____ | |

E. CULTURAL:

- | | | |
|--|-------|---|
| 1. Altering physical symbols _____ | _____ | N |
| 2. Dilution of cultural traditions _____ | _____ | N |
| 3. Other factors _____ | _____ | |
| _____ | _____ | |
| _____ | _____ | |

F. SOCIOECONOMIC:

- | | | |
|--|-------|---|
| 1. Changes in economic/employment patterns _____ | _____ | N |
| 2. Changes in population _____ | _____ | N |
| 3. Changes in cultural patterns _____ | _____ | N |
| 4. Other factors _____ | _____ | |
| _____ | _____ | |
| _____ | _____ | |

IMPACT IDENTIFICATION AND EVALUATION FORM

(F' 6 of 6

G. HEALTH:

- | | |
|---|---------------|
| 1. Changing a natural environment _____ | _____ N _____ |
| 2. Eliminating an ecosystem element _____ | _____ N _____ |
| 3. Other factors _____ | _____ |
| _____ | _____ |
| _____ | _____ |

H. GENERAL:

- | | |
|-----------------------------------|---------------|
| 1. International impacts _____ | _____ N _____ |
| 2. Controversial impacts _____ | _____ N _____ |
| 3. Larger programme impacts _____ | _____ N _____ |
| 4. Other factors _____ | _____ |
| _____ | _____ |
| _____ | _____ |

I. OTHER POSSIBLE IMPACTS (not listed above)

_____	_____
_____	_____
_____	_____

See attached Discussion of Impacts.

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

Project Location: Caribbean Regional

Project Title: Small Farm Multiple Cropping Systems
Research

Funding: \$2,211

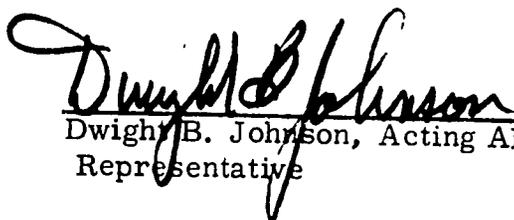
Life of Project: Four years, starting FY 1978 after signing
of Grant Agreement.

IEE Prepared by: T. H. King, IDI/Agricultural Economist

Date: August 2, 1978

Recommended: A Negative Determination. (No Environmental
Assessment or Environmental Impact
Statement Necessary).

Concurrence:


Dwight B. Johnson, Acting AID
Representative

August 5, 1978
Date

Assistant Administrator's Decision: AA/LAC

Approval of Environmental Action
Recommended

Date

Disapproval of Environmental Action
Recommended

Date

A. SOCIOCULTURAL SETTING OF SMALL FARM AGRICULTURE
IN THE EASTERN CARIBBEAN

1. STRUCTURAL CHARACTERISTICS OF PRODUCTION
AGRICULTURE

There are two main systems of agriculture in the Eastern Caribbean - the plantation and peasant farms. Plantations are located in more desirable areas, while peasant farms are generally found on hillside land of relatively poor soil. Small farm agriculture has been largely ignored in the past despite the fact that it provides most of the food for local consumption and small farms occupy a large proportion of the cultivated area. Small farmers use traditional methods within fairly diversified farming systems where they frequently create considerable soil erosion, obtain poor yields and receive low incomes.

The exploitive relationship between landed elites on plantations and small farm agriculture which is typical in some countries in Central and South America is not a serious problem in the Eastern Caribbean. Labour laws, including a relatively high minimum wage for agricultural labour results in labour being utilized in peak seasons for certain high value export crops. In fact, the imposed high cost of agricultural labour has resulted in some privately owned plantation lands to become idle. Some of these lands have been acquired by the government and divided among small holders. Furthermore, because of high labour costs some traditional plantation crops, such as bananas on the Windward Islands, are in fact largely grown by small farmers.

2. ETHNIC GROUPS AND FAMILY STRUCTURE

In the six islands of the Eastern Caribbean covered by this project, the predominant ethnic group within small farm agriculture are blacks who are descendants of African slaves who were brought to the West Indies to work the plantations. In certain windward islands there is a small proportion of small farm families who are descendants of East Indians who were brought to the Eastern Caribbean as indentured labourers.

The family structure of the black Caribbean is matrifocal which refers to the centrality of the mother's role in the kinship system. In matrifocal societies there is usually little difference between women and men in regard to initiative, assertiveness, autonomy and decisiveness. The women usually have some degree of control over available economic resources and children grow up feeling close to their mothers.

A high percentage of the work on small farms is shared by both men and women in the Eastern Caribbean. In the Small Farmer Survey of the region, it was found that women in the 15 - 64 age group outnumber men by approximately 50% in this sector of society. According to the 1974 Agricultural Census of St. Lucia women constitute over 40 percent of persons employed in agricultural work.

Due to rural-urban and external migration of young people (to be discussed later) the small farm family tends to be made up of older adults and younger children. The mean age of the small farmers in the region is 52, with each family having an average of six persons living in a household.

3. TYPES OF AGRICULTURAL CROPS AND THE ROLE OF MEN & WOMEN IN SMALL FARM AGRICULTURE

Most farms grow crops that are distinguished on three levels -

- 1) subsistence,
- 2) internal exchange and
- 3) export.

The subsistence crops consist mainly of yams and other root crops. Crops for internal exchange include many of the vegetable crops such as pigeon peas, tomatoes and beans. The export crops include bananas, cacao and citrus. Men generally have control over the production of and income from export crops, while women tend to control the internal market crops and both supposedly share in the farming and returns from subsistence crops.

Many of the farming tasks, especially for the men, are done through reciprocal labour. The labour of men and women is usually segregated

with women doing much of the planting, weeding and harvesting of food crops, while men do more of the heavy agricultural work and tend to the higher value cash crops. There is also direct exchange of agricultural work between two men or two women as they take turns cultivating each others holdings. Participation in these labour exchange systems enhances one's reputation for community spirit and should be considered by the project team, both in understanding existing farming systems and in designing new cropping systems. Another element to be aware of is that livestock tends to be individually owned by different members of a household.

In reference to farming systems employed, soil erosion is one of the major long term problems confronting small farmers. Soil conservation measures have tended to be directed toward men (Jamaica), but it is the women who are in charge of annual food crops which result in more erosion than the tree and banana crops tended by men.

4. ROLE OF WOMEN IN MARKETING FOOD CROPS

In marketing farm crops it is generally the women who takes care of the food crops for internal exchange in the local markets and the women tend to control the money from these transactions. Generally she prefers to use the money for household and personal purchases, while the men obtain less frequent, but larger amounts from export cash crops and he tends to use these for future production expenses and for personal consumption.

Since most small farms have insufficient food crop production on any one one day to justify a trip to the market, the country "higgler" or "traficier" buys the produce from several farm women and takes it into town to be marketed. The majority of these "higglers" are farm women.

5. RURAL-URBAN AND EXTERNAL MIGRATION

Schooling is viewed as the primary means for social and economic mobility of young people. The formal education system in the Caribbean has been primarily geared to the needs of the middle classes and reinforces the prevailing social structure and its values. Until recently

young people of both sexes who were able to get an education frequently emigrated outside the region, particularly to the United Kingdom and to a lesser extent to the United States. This phenomena has at least three important dimensions. First it was effective in stabilizing or slowing population growth. Second, these emigrants send back remittance to relatives back home which supplement cash incomes; and thirdly, external migration served as a safety valve in providing opportunities for young people who had been able to obtain education.

In the past few years external migration has become increasingly difficult as industrialized nations have restricted immigration from the West Indies. The result is increased pressure among young people for economic opportunity which tends to result in frustration for rural young people who either are unable to obtain sufficient education or to find suitable employment in urban areas. An apparent symptom of this growing frustration is the growing subculture of young people who are moving into rural areas. Frequently these young people lack agricultural skills and rather than farm for themselves, cause difficulty for small farmers.

B. SPREAD EFFECTS: THE DIFFUSION OF INNOVATIONS

1. RESEARCH PROJECT - NO DIRECT ATTEMPT TO DIFFUSE RESULTS

As indicated earlier this is a research project aimed at developing appropriate cropping or farming systems technology for small farm agriculture. The target population will be small farm families who generally cultivate less than five acres. In the 4 year period covered by this project, the expectation is that each project team, in the six islands, will work with approximately 25 small farm families.

No direct or systematic attempt will be made during the 4 year term of this project to diffuse or extend the cropping system technology that is expected to result from this project. It will take at least the three main growing seasons covered within the project period to understand existing farming systems and then to develop and test alternative systems of modifications on farmers' fields. Therefore, it is expected that new, tested cropping systems technology will be coming available at the end of the project. Of course it should be recognised that since this research will be carried out on farmers' fields there will undoubtedly be a demonstration effect. However, systematic extension of project outputs

will be the direct responsibility of national extension programmes. Recognizing that these extension programmes are relatively weak, USAID personnel are giving serious consideration to a subsequent project to upgrade extension programmes in these islands.

2. SELECTING TYPICAL SMALL FARMERS IN EACH PROJECT AREA TO FACILITATE DIFFUSION EFFORTS

It should be noted that the subsequent diffusion of cropping systems technology will partially depend on the selection of typical small farm families in the project area. After the initial reconnaissance survey to select the project area(s) on each island, a random sample of approximately 100 small farm units (on each island) will be surveyed to determine the general agronomic, cultural, economic, physiographic and social features by the target area and population. By conducting this survey it will be possible to characterize the features of a typical small farm unit. These features then will be used to select the 25 small farm units that will be systematically studied during the first cropping season to fully understand existing farming systems in the project area. These same 25 small farm units will be subsequently used to test modifications in existing cropping systems. By following this approach, new technology and systems that result from this research should be readily transferable to other small farms in the project area.

C. SOCIAL CONSEQUENCES AND BENEFIT INCIDENCE

1. SMALL FARM FAMILIES AS DIRECT BENEFICIARIES

The direct beneficiaries of this project will be typical small farm families in the project area. It is important that the family be the unit of analysis in this project because of the structure of small farm agriculture in this region. Because of the low social status of agriculture within the culture, men particularly prefer off-farm employment in the towns. Where off-farm employment (or employment on plantations), is possible, it tends to be seasonal or occasional in nature, but does contribute to the cash income of the family. Therefore, new cropping systems must reflect the actual availability of labour to the farming unit throughout the year. In short, the project may need to develop cropping systems for so called "part-time farmers" in-so-far as men are concerned.

2. RURAL FARM WOMEN AS BENEFICIARIES

This project can have important, positive social consequences for farm women, particularly because of the significant role of the woman in small farm agriculture in the Eastern Caribbean. First, women grow the majority of the food crops for home consumption and for sale on local markets. Furthermore, it is not uncommon for women to head households in this region.

It is extremely important, when selecting the 25 small farm families on each island, that female headed households be represented - if they are common in the project area. Furthermore, the types of modifications made in cropping systems will have an impact on the use of the women's labour. Furthermore, as pointed out earlier, the type of crops produced will probably determine to some extent who will market the crop and control this income. Since this project will be concerned with all types of food crops for internal markets as well as food and cash crops for regional and external markets, it is expected that the project will have a positive impact on the economic status of the small farm family, including the woman. This increased level of income to the small farm family should tend to stabilize family relationships.

3. CHILDREN AS DIRECT BENEFICIARIES

In addition to increasing family incomes, new cropping systems, which extend food crop production through much of the year, should result in a positive impact on the nutrition of children and pregnant women within small farm households. At the same time, however, to fully benefit from existing and expanded/extended food crop production it will be necessary to reach the farm family with improved nutrition education. This problem area might also be covered through a programme to up-grade extension services in the respective islands.

D. CHANGES IN POWER AND PARTICIPATION

1. POTENTIAL FOR INCREASED ECONOMIC POWER AND PARTICIPATION OF SMALL FARM FAMILIES

This project seeks only to understand existing cropping systems and to develop and test modified or new cropping systems which will be appropriate for small farm families. Therefore, no immediate changes are expected to occur by the 4th year regarding the power and participation of the small farm family.

What is expected, however, is the potential for small farm families to participate more fully in the economic life of each island will exist. As these new cropping systems are diffused within each island, family income will be expected to increase and make possible increased participation in community activities. One expected outcome will be increased educational opportunities for children. Other outcomes will be improved housing and health care.

It should be noted that the political leadership on each island is quite interested in and supportive of the small farm family. Therefore, the objectives of this project are very much in agreement with and supportive of the policies of the respective national governments.

Given the limited information available when this project was designed, it was not possible to determine if this project would have negative consequences for other social, economic or political groups on the respective islands. While it would appear that the project would not have negative consequences for other groups in the society, during the initial surveys and subsequent analyses this potential should be examined.

CHARACTERISTICS OF THE TARGET
AREA AND POPULATION

This research project will be directed toward small farm families in the Eastern Caribbean. Due to the lack of attention given to this group in the past, only limited information is available to describe the characteristics of this group and their farming systems. In fact a major objective of this project during the first year will be to accurately describe the agricultural and social setting of small farm agriculture in the Eastern Caribbean. Therefore the following statement on the characteristics of the target area and population is less than a precise description of small farm agriculture in the region.

A. GENERAL CHARACTERISTICS OF THE TARGET GROUP

Several important considerations have been taken into account in arriving at the target group for the purpose of this project. The basic considerations of paramount importance in arriving at the minimum range of farm size are:

1. Provision of a reasonable state of living where farmers are able to provide and/or maintain for themselves and their family adequate nutritive food, clothing and hygenic dwelling house, as well as, other basic and important needs for a peaceful life.
2. Provision of adequate income from the farm so as to make the enterprise competitive with the possible alternative opportunities in other sectors.
3. Provision of maximum opportunities for the utilization of family labour and least dependence on hired labour.

The project proposes to work with small farm families which are already in farming and where the farm unit offers scope for improvement. Based on current wages for unskilled labour in industry in the

LDC's it is envisaged that farming enterprises should have the capacity to provide incomes of at least EC \$4,000 per annum. This income level would be competitive with the opportunities in industry, even though such off-farm employment opportunities are very limited.

Small farm families in rural areas, with 1 to 5 acres of agricultural land, constitute the target group for this project. In areas having very fertile land coupled with controlled irrigation and market opportunities for high return crops, a farm unit of one acre could be adequate to meet the above goals. On the other extreme, farmers with land of medium and low fertility, entirely dependent on rainfall and with limited market opportunities could still meet the goals of this project by growing crops like corn, dry grain, legumes and peanut on farming units of up to 5 acres. Farms with units below one acre may not constitute a viable unit to meet the aforementioned goals.

The general production system pursued by the target group differs from island to island as well as in different parts of the same island. The range of crops is largely dictated by climate, soil and topography. The final choice of crop is determined by two important considerations. First, farmers grow crops needed for home consumption. This usually includes ground provision like sweet potato, yam, dasheen, tannia and some cassava as well as a range of vegetables including tomato, cabbage, snap bean, etc. The predominance of a particular type of ground provision depends on the tradition and food habit in a given island e.g. sweet potato in St. Vincent, dasheen and sweet potato in St. Lucia. Surplus food crops are sold on the local market for cash. Second, farmers grow other crops for regional export e.g. sweet potato, carrot and peanut in St. Vincent; vegetables and peppers in Montserrat. Traditionally, most farmers grow a few trees of tropical fruits, e.g. mango, coconut, banana, citrus, avocado. A few trees of bay in Dominica and nutmeg in Grenada are popular with such small farms.

The sub-region comprising the LDC's displays a wide divergence of rainfall. Within Dominica, the rainfall varies from over 300 inches in the interior to 50 on the Leeward coast. In Montserrat, rainfall ranges from 38 to 70 inches per annum. Rainfall plays an important role in determining cropping patterns since most crops are grown rainfed.

However, during the rainy season the production of high return vegetable crops is generally poor due to the predominance of pests and diseases. During the dry season the crops are partly or entirely irrigated. Irrigation facilities, however, are limited and production is restricted to areas in close proximity of the source of water (ponds, streams and rivers). In the dry season, high levels of vegetable production can be achieved with irrigation.

Farmers in the target group usually keep some animals on the farm. Chicken and pigs are commonly found. They are generally 'raised' on by-products of the farm. A significant part is consumed by the farmer and the remainder is sold. Other animals including sheep, goat and cattle are not so common.

Animal drawn tillage and cultivation equipment are not used in LDC's. Donkeys and horses are used for transportation particularly in remote areas of a few islands. Public and private transport (trucks, vans, pick-ups) are utilized for transportation of agricultural inputs and produce on hire basis in majority of the cases.

The Ministries of Agriculture in all the islands operate tractor pools which provide ploughing, harrowing, discing and banking services at subsidised rates. The use of such facilities, however, is restricted to farmers in the vicinity of the pool headquarters. The use of tractor is restricted to flat and slightly undulating land. Farmers who cultivate on steep slope and narrow contours generally use hand operated equipments like fork, hoe, spade and cutlass for land preparation and interculture. Harvesting of the crop is not mechanised. Some farmers in the target group either own or have access to hand-operated sprayers. Limited spraying services are made available by the Ministries of Agriculture at subsidised rates. Further, several farmers may share spraying equipment among them.

Facilities for primary school education are being improved in all the territories. Secondary school facilities, however, are inadequate. In Montserrat (the smallest of the LDC's) 67 percent of the population received primary education. Corresponding figures for sub-primary and secondary education were 11 and 2.5 percent respectively in 1970. A majority of the farmers in the target group have the 3 R's and at least one member in the farm family is likely to have full primary education.

Co-existence of high unemployment and agricultural labour scarcity is a feature of the region. Agriculture labour is declining as labour shifts to urban areas in search of employment where higher wage rate prevails. The opportunities for such off-farm employment are limited. Despite the declining trends, the agricultural sector still employs a high percentage of the population, sometime the highest of the labour force; and estimated mode for the LDC's would be 30 percent. In the region, industrial labour market is characterised by high wage rate and poor employment capacity; whereas employment opportunities in agriculture are very high but wages rates are low.

A level of target group income upward of EC \$4,000 per annum from the farm is believed to be competitive with the best opportunities offered by industry to non-skilled workers.

Sources of off-farm income for members of the target group are extremely variable. Farmers in the costal area may engage in fishing, mainly for home consumption. From time to time farmers do the retail selling of their produce in the local market. Cottage industry is generally poorly developed in the region but in some territories, like Dominica and St. Vincent, items like mats, baskets, etc. are made by members of the target group. In some territories where tourism is important, a few farm families engage in part-time taxi-driving. Some farmers sell their labour to neighbouring farms and to government agencies in charge of rural road repair work. These off-farm activities are more prevalent among farmers within the target group who own their farms. It is difficult to estimate the income from such sources but it does help the farmers, particularly during periods when the produce from the farm is not available for sale. It is envisaged that farmers and members of their family could engage themselves in several cottage industry activities on the farm itself. Such involvement could be planned for best utilization of labour in off-hours and off-seasons.

Generally, the house of the target group consists of wooden walls and floor and corrugated galvanize sheets on the roof. The house is supported some 2 - 3 feet from the ground on concrete blocks. There are one or two bedrooms approximately 10 ft x 8 ft each and a living area just large enough to accomodate simple sitting and dining arrangements. Cooking is done in a shed attached to the main house or seperate from it. Kerosene, gas and sometimes wood are the sources of cooking fuel. Latrines are generally of the water-closet types and are walled and covered. The bathroom is walled in by galvanize on 3 sides with

a make-shift door, and without roof. There may be a small pen for a few pigs near the house. The goats will sleep under the house. So would the dog.

Water taps on the holdings are rare and only farmers in the vicinity of towns and paved all-weather roads would have access to pipe borne water. Small farm families may have to carry water long distances for drinking, etc. Other farmers without such facility would use water from streams and rivers. Some farmers store rain water for domestic use in 40 gallon used oil drums.

Electricity is rare. The majority depend on kerosene lamps or candles. Battery operated radios are common, especially among the young members of the family.

B. SIZE OF TARGET GROUP

The number of holdings in the target group is given below: In some cases the only available data includes holdings below one acre, and in the case of Antigua, which is dry, up to 25 acres.

TABLE 1. Number and Importance of Target Group Farms

<u>Islands</u>	<u>Montserrat</u>	<u>Antigua</u>	<u>Dominica</u>	<u>St. Lucia</u>	<u>St. Vincent</u>	<u>Grenada</u>
Farm size (Range in acres)	1 - 5	0 - 25	0 - 5	1 - 5	1 - 5	0 - 5
No. holdings	496	5,551	6,405	3,825	10,098	12,510
% of Total holdings	39.8	96.6	73.9	36.7	89.0	88.7

There is a direct movement of labour from primary to secondary activity as the trend toward urbanisation continues to increase. There has been a general decline in the area under agriculture production and a reduction in the proportion of the work force employed in this sector.

In Montserrat labour in agriculture, as a percentage of the total labour force, declined from 46% in 1960 to 20% in 1970 and in St. Lucia from 53% in 1960 to 39% in 1970. A similar trend is seen in the other territories. The greatest use of labour in the agricultural sector is by target group farms under 5 acres. In St. Lucia, of a total agricultural labour force of 33,012, some 23,781 persons were employed in the small holdings. In all six (6) territories these small holdings have the capacity to employ the largest number of people. In Montserrat, this sector having 39% of the holdings but only 16% of the land area employs the majority of the agricultural labour. Consequently displacement of labour to other sectors e.g. service, installations etc. is primarily at the expense of labour used on the holdings ranging from 0 - 5 acres.

The 9,060 holdings in the 0 - 5 acre range group in St. Lucia employ 23,781 persons but only 1,549 were paid. This indicates that the greater part of the labour was provided by the family. This may very well typify the pattern of labour participation in the target group in the other territories as well.

C. COMMUNITY SERVICES

Schools of the primary level are accessible to the target group and there are several externally funded school-building programmes underway. Secondary schools are insufficient and located in the towns or the capital.

Good hospitals are available in the cities and larger towns while clinics will be found in the rural areas. Private medical practitioners are present but their rates are high. Specialist medical service is limited in the islands though available in the region.

Police stations are located in all towns. Community centres are located in the rural areas and more are being built. These form one of the meeting points of the group. The local village shop and liquor store is perhaps the most important meeting point.

As they become better educated the families aspire to learn more for improving the facilities (house & furnishings) on the farm. They seek employment in sectors like commerce, services, buildings where wages are higher. Some aspire to live in towns in order to take best advantage of opportunities and facilities that are offered. Some, however, genuinely seek to improve the farm and its output.

Church groups are quite active in the community not only preaching the word of God, but also in assisting in areas like agriculture, fishing, child care and nutrition. Such groups are not very numerous. The majority of the farmers are Christians, Methodists, Anglican, Roman Catholic, etc.

D. MARKETING OUTLETS

Marketing practices vary somewhat from country to country. In general the small farmer consumes some of his produce and sells the residue to higglers who act as middlemen. Where some sort of contract farming is done as in Montserrat or where the Marketing agency has adequate collection points as in Dominica, the farmers sell directly to the Marketing agency. In Grenada many farmers also sell much of their produce at retail markets.

In St Lucia, growers traditionally sell in bulk to vendors or higglers who debulk and retail. Local retail markets are mainly in the towns. The Marketing Board functions as a residual buyer. It also seeks to stabilise prices through minimum guaranteed price buying operations. The Board has only one outlet in each country and farmers or middle-men have to transport produce to this single buying point.

In Montserrat, a Development Finance Marketing Corporation has replaced the old marketing board. It provides credit and other inputs to farmers, identifies projects for financing, markets agricultural produce and seeks markets for trade expansion. It has a staff of 14, including four civil servants seconded from Government. It has a small refrigerated storage capacity of $7\frac{1}{2}$ tons. The major crops handled by the corporation are vegetables. There is a single marketing depot in Plymouth so that farmers must hire or find other ways to bring their produce to the depot. Consequently, higglers who buy produce at the farm compete effectively with Boards purchasing role.

In Antigua, the Central Marketing Corporation is a Statutory Organisation and is headed by a General Manager. The Corporation is a major buyer of vegetables, mainly from the Government Stations. It also sells agricultural inputs such as pesticides, fertilizers, etc. The majority of peasants, however, sell their produce to higglers.

In Grenada the market for non-export commodities is poorly organised. The bulk of vendors (mainly women) dispose of vegetables, root-crops and fruit from small stalls or as itinerants. There is also some centralised marketing (in terms of physical facilities) in the city.

The Agricultural Marketing Board in Dominica is very much like that of Montserrat. It has less space for storage, but it has several depots for purchase of produce.

The St. Vincent Marketing Board purchases the bulk of the exported produce. Guaranteed prices, contract farming, credit, grading of produce and granting of subsidies are all assigned to this board. The single depot is in Kingstown and farmers must transport their produce to this depot.

Generally, therefore, the system is deficient in that there are insufficient collection points, poor market intelligence, lack of guaranteed (supply of produce), poor and insufficient storage and packaging facilities in all the territories.

On the regional scene the Agricultural Marketing Protocol (AMP) has put quotas on several commodities like oils and fats, carrots, onions, etc. which is a sort of guarantee of purchase to the producing island and a commitment to buy for the purchasing island. There is some Market Intelligence Service in the region but it can be improved. Transportation both in country and among islands, remain the biggest limitation to marketing.

E. DIETS

A wide range of starchy roots, mainly sweet potato, dasheen and tannia, provide the basic food of the majority of the farmers. These are produced on their holdings. Fish in some form or another is widely used especially in coastal areas. The CFNI report (1976) lists the sources of energy, fat and nutrients in the average household diet of St. Lucia as consisting of brown sugar, wheat flour, white bread, cooking oil, rice, dasheen, coco, taro, green bananas and margarine. Of these items, sugar, flour, cooking oil, rice and margarine have to be bought and are available at the village shop in most cases. Items of clothing have to be purchased in the town, as do medical supplies and all agricultural inputs.

F. INPUTS AVAILABILITY

The range of agricultural inputs - fertilizers, seeds, pesticides, etc. is extremely small. In Montserrat and Antigua the Marketing Corporations sell the largest amount of agricultural inputs. In other territories, private dealers form the main source. Small agricultural implements - fork, cutlass, hoe, spades, etc. - are available in the towns. A small range of sprayers would also be available. Heavier equipment as well as a wider range of chemicals, seeds, etc. can be purchased from Trinidad and Barbados. Trinidad has a fertilizer factory (a subsidiary of Grace) and formulating plants for some pesticides.

G. CREDIT

In Montserrat, the three commercial banks - Barclays, Royal Bank of Canada and Chase Manhattan - and the D. F. M. C provide agricultural credit. Total outstanding value of agricultural loans of the commercial banks was EC \$335,000 in June, 1975. The majority of such loans are short term. Loans to the agricultural sector represent about 3% of total bank loans and advances. The D. F. M. C provides agricultural credit under the CDB's farm improvement credit scheme.

In Antigua, the commercial banks are the major lenders. In 1975 the outstanding loans totalled EC \$2,339,000 and formed 3.2% of the total commercial loans. Some loans, particularly to small farmers, are available from the agricultural extension service. This source loaned \$66,273 in 1974.

In Grenada, the CDB has provided money to the Grenada Agricultural Bank through its Farm Improvement Credit Scheme. This latter organization has traditionally provided loans to commodity organisations like cocoa and nutmeg and a very significant amount to the small farmers.

Dominica has an Agricultural and Industrial Development Bank (established 1971) in addition to several commercial banks. Loans are available for periods of 2 to 10 years at rates of $5\frac{1}{2}$ to 8% per annum. However, little or no credit is available to the small farmer. The CDB provides credit lines to the Bank.

The Agricultural and Co-operative Bank of St. Vincent is the main source of credit in that island. Loans are available from 3 to 10 years.

In general, agricultural credit in the region can be obtained from money lenders, but at very high interest rates and thus is unpopular. Commodity organisations, credit unions, commercial banks, and agricultural banks are available. In several cases where agricultural banks are established, the CDB provides credit lines. Credit, however, hardly reaches the small farmer in the target group. In many cases these farmers cannot qualify for loans or do not wish to use it when available. Production subsidies which are available for some of the major export commodities are a partial substitute for credit.

TECHNICAL ANALYSISA. THE SIGNIFICANCE OF MULTICROPPING SYSTEMS RESEARCH

An understanding of the method chosen for this project, i. e. adaptive research into smallholder farming systems, including multi-cropping research, requires an appreciation of the complexity of agriculture as a system. The agricultural sector is comprised of many sub-systems and sub-sectors. Each commodity line or farm enterprise can be considered as a sub-system, as can each of the input and output delivery systems. Sub-sectors are represented by different target groups. This last division is particularly important to AID, which has been required by Congress to concentrate its resources on improving the lot of the "poor majority" in the LDC's. This target group is largely rural and agricultural, including small farmers and their families and landless farm labourers.

The foundation of the rural economy is the primary natural resource industries - agriculture, forestry, fisheries, minerals - with agriculture, particularly the subsistence-oriented small farming sub-sector, normally dominating all others. Whether subsistence or commercial, agriculture also dominates the labour market. The sheer size of the sector, and the opportunities for expanding employment on small farms, make it a most attractive arena for development, particularly considering the area's potential requirements for food and fiber.

There is no longer any doubt that agricultural production can be significantly and economically expanded on small farms and that this expansion can provide employment for some of the surplus labour seasonally available in rural areas. The design problem lies in correctly assessing the status and inter-relationships among the primary factors of production (land, capital and labour) and devising ways to optimize their use in the agricultural sector relative to conditions in other sectors.

In these LDC islands, smallholder agriculture is a major source of national income, foreign exchange and government revenues. Of particular importance, smallholder agriculture provides the primary opportunity for employment and income in the rural sector where most of the poor majority reside.

Here as elsewhere, agriculture also tends to be one of the most neglected sectors, and this is particularly true of that sub-sector which is variously called traditional, subsistence, or smallholder*. Government agricultural budgets are small, and although this has changed, the service they finance were historically concentrated on a relatively few progressive, large scale commercial farms which dominated the commercial and export markets. Some of this historical concentration was justified by economics of scale and macro-economic considerations but reflects the ignorance of appropriate methods for dealing with smallholder agriculture. There is no fundamental reason why small holder agriculture cannot achieve a level of productivity as good or better than that obtained by larger farms. However, if governments are to help smallholders develop this productive capacity, they must understand the nature of the smallholder systems which they seek to influence.

The governments do not make the decisions which result in increased productivity, product and income. These decisions are made by thousands of individual farmers whose livelihood and even survival is staked on those decisions. The best that government can do is to influence those decisions through a combination of services and incentives. This is a terribly weighty responsibility when dealing with small holders. A large commercial farmer is an entrepreneur who is capable of weighing risks and rewards and who can usually start over if his judgement is wrong. A smallholder has a weaker base of knowledge and resources. If his judgement is faulty, he may lose his land and his livelihood, and he and his family will face certain deprivation. It is small wonder that governments have chosen to concentrate on commercial rather than smallholder agriculture.

It is also understandable that conditions, services and incentives developed for entrepreneurial agriculture have not been very effective in stimulating smallholder development. Although any agricultural system includes common elements - technology, productive inputs, accessibility of inputs, and incentives - the relative importance of these elements, the way in which they are delivered, and the way in which they are integrated into the farming operation are significantly different in a smallholder system than in a commercial/entrepreneurial system.

* Throughout this paper, "smallholder" is used to designate the traditional and modernizing small farm which does not provide, under current practices, an adequate livelihood for its occupants.

Although some smallholders practice monoculture, most smallholders farming systems are more complex than larger commercial operations, in terms of both enterprises and objectives. Smallholders usually grow small quantities of a large number of crops for sale or subsistence both sequentially and interplanted, and commonly maintain a variety of classes of farm livestock. Their objectives are equally complex, and frequently conflicting: risk avoidance, profit maximization, optimization of factor utilization, cash flow, nutrition.

Traditional agricultural and economic research tend to isolate and evaluate variables individually, and tend to optimize for individual qualities, such as yield or profit. The problem of integrating these results into a particular farm's system is left to the farmer, assisted by the agri-business salesman or the extension agent. This procedure may work well for the commercial farmer who has direct access to the research information, the interested assistance of both the salesman and the extension agent, and generally pursues an entrepreneurial profit maximization objective. Few smallholders have access to the research, or the interest of competent advisors to help them interpret it in light of their complex objectives. The result is reluctance by many others who do accept it. The technology may be "good" but not useful in the context of the farmer's system and objectives.

The growing awareness of this problem has recently stimulated a good deal of survey research to determine the characteristics of small-holder farming systems and some agricultural technological and economic research directed at improving those systems rather than just the individual commodity lines or enterprises which the system include.

Most technology - agricultural or otherwise - was not developed with the small farmer or the rural resident in mind. Existing technology must be adapted through additional research and development, and new technology created to meet the needs and conditions of the rural poor. Appropriate technology means a good deal more than small size. The changes which one seeks and the incentives to induce change must be culturally acceptable and attuned to real life situations. This may involve acceptance of different concepts of risks and rewards. A technology which promises a hundred dollar profit on a fifty dollar investment sounds good but not if possible crop failure would result in loss of land or severe privation. One must seek out alternative technologies which limit risks or substitute a farm-produced input like manure for a purchased input such as chemical fertilizer.

The optimization criteria used in research must fit the conditions, capacities and systems of the small farmer. Recommendations must be based not only on high yield but on economic return, labour availability, availability and cost of inputs, and nutritional values. For example, a farmer may sacrifice yield in order to plant earlier and obtain a higher price. He may accept a lower yield and price by planting one crop too early so that a second crop may be planted on the land. The two crops make fuller use of available labour and provide a higher total income.

Technology must be related to the farming system as well as to a particular crop. Most small farmers follow time-honoured traditional system, because they cannot afford to experiment. Few are able to independently obtain a new technology and incorporate it in the traditional system, much less develop a new system which may be required to exploit a more radically innovative advance. Research and extension personnel must know and understand the farmers' traditional system in order to substitute within it and to design and test alternative systems which will be both economically feasible and culturally acceptable.

B. THE RESEARCH TECHNIQUES

Multiplecropping systems research includes three overlapping stages:

1. Data gathering and analysis of existing farming systems;
2. Adaptation of existing technology to the current cropping system to improve output of that system and field testing of the adaptation; and
3. The synthesis of new systems which are more productive (in socio-economic as well as agricultural terms) and their proof by farm research.

All three activities require direct intervention on operating farms to be valid, first to obtain accurate longitudinal data about the array of enterprises the farmer incorporates in his system, and second, to compare the results of interventions with his traditional activities. For this reason, nearly all of the research activity to be financed by this project is to be farm-based.

CARDI researchers opine that six replications will be sufficient to account for variability within a particular area and cropping system, permitting up to four systems and/or interventions with the twenty-five farms included in each country programme. Areas of concentration will be determined by a reconnaissance survey of each island. Cooperating farmers will be chosen after a detailed socio-economic survey has provided information which can be used to typify the model small farmer.

CARDI researchers are also convinced that a considerable "shelf" of suitable technology exists and awaits testing within farming systems. The primary initial concern is to obtain the economic, cultural and systems data needed in order to appraise and select the most promising interventions, and this is contemplated in the longitudinal data collection operation.

Interventions will be applied to 0.125 acre plots taken from within the same field that the farmer is cultivating with traditional methods so that that serves as a check. No intervention will be applied until it is determined that the farmer could do the identical task within the resources available to him and that he would be willing to do it.

It is recognized that some additional experiment station research will be required to deal with problems for which no existing technology may be found, and in the synthesis of new systems and their trial before they are field tested on a smallholding enterprise. Research of the first type will be performed by Core Staff outside the terms of reference of this programme, since CARDI will continue to perform more traditional types of research. The second type of research will probably require work on "satellite" experiment stations in the individual countries. Such experimental sites exist in each country. Funds are included within the CARDI contributions for capital improvements and equipment to assure their suitability for this role. This type of research will be an integral part of the smallholder Multicropping Systems Research Project, to be performed by the Country Field Teams and the Core Staff in collaboration with the Field Units.

INSTITUTIONAL, MANAGERIAL
AND ADMINISTRATIVE ANALYSIS

The Caribbean Agricultural Research and Development Institute (CARDI) was established in late 1974, as a regional institution of the CARICOM members, to perform agricultural research and development functions in support of their development. CARDI's institutional roots are much older, however, and have contributed to its current status.

HISTORICAL DEVELOPMENT OF CARDI

CARDI's institutional roots go back to the earlier part of this century when the Imperial College of Tropical Agriculture (ICTA) was established in Trinidad in the early 1920's. ICTA was unequalled in its reputation as the foremost centre for agricultural teaching and research in the tropical world. However, ICTA's research concentrated on export crops like sugarcane, cocoa and banana.

In 1955, the Regional Research Centre (RRC) was established by Governments of the Commonwealth Caribbean to pursue research on a wide range of food crops. It was conceived that such a regional centre would achieve the best utilization of limited resources, including agricultural scientists in conducting research based on the needs of the region. The headquarters of the RRC was St. Augustine, Trinidad. There was also an outstation in Jamaica. Research on all aspects of crop improvement, e. g. plant breeding, pest, disease and weed control, land use, etc., was conducted on a range of crops including yams, sweet potato, cassava, maize, pigeon peas, tomato and other vegetables. The animal production programme was geared to investigating local feeds and feeding systems. A range of services such as soil and plant analysis and statistical services were provided to the member states and research teams in the region. Cocoa research continued throughout this period. The need for more concerted research on commodities like citrus and banana led to the formation of specialised independent units.

Around 1966, the Regional Research Centre ceased to function as a separate school of agriculture and was integrated into the new Faculty of Agriculture of the University of the West Indies, also located at St. Augustine. Though integrated, RRC staff members were designated as Research Fellows with a mandate to do fulltime research, with very limited teaching responsibilities. RRC budgets were separated from

UWI's and some conditions of service were different from those of their University counterparts, but they worked on the same research programme.

In 1971/72, the major programmes were the Root Crops Programme, the Grain Legume Programme, the Regional Field Experimental Programme, (started with the soils section in 1966), the Forage Legume Programme, Soils Programme, Livestock Programme, Economics Programme, and Extension Programme.

In 1974, following a 2-year study and re-organization exercise, the Caribbean Agricultural Research and Development Institute was formed as the successor organization to the Regional Research Centre. Several major changes distinguished CARDI from the RRC. These are:

1. CARDI became an autonomous regional organization, but is still affiliated with the University of the West Indies.
2. All member states of CARICOM became financing members of CARDI.
3. Linkages were established with relevant regional organizations and member states with a Board of Directors consisting of representatives from:
 - (i) Member States;
 - (ii) University of the West Indies;
 - (iii) CARICOM Secretariat;
 - (iv) Caribbean Development Bank;
 - (v) University of Guyana.
4. Besides research, development was added as an integral function, requiring an outreach capacity to the territories of the member states, particularly the LDC's.
5. Teaching functions of CARDI staff were restricted to the supervision of post-graduate programmes relevant to the research needs of the member states.

6. Research programmes were re-organized on a commodity basis with a multi-disciplinary team approach to suit the developmental needs of the region.

CARDI's initial work programme was devised after considering the following factors:

1. The needs of the region for increased production, import substitution and the development of non-traditional export commodities,
2. Requests from Member States for research and services,
3. Current research interest of the Faculty of Agriculture, UWI to avoid duplication and encourage complementating. For example, pigeon pea was excluded from CARDI's work programme since the Faculty of Agriculture had a comprehensive programme on this commodity. Further, CARDI's work on yam was restricted to investigations on virus diseases to complement other efforts by the Faculty of Agriculture on this crop.
4. Current research efforts which are being carried out by International Institutes and other centres of excellence (e.g. cassava, bean, corn, soybean, peanut, cowpea, etc.) CARDI is expected to make best use of the materials and methods by these institutions.

ANALYSIS

1. LEADERSHIP

CARDI was borne from the distinguished lineage of the International College of Tropical Agriculture and the Regional Research Centre. It survived the transition from colonialism to independence and is now undergoing an adjustment in objectives and organization to realign its programmes and staff orientation to deal with the problems of the region.

Specifically, its work programme is expected to shift from a concentration on plantation agriculture directed to export crops to an emphasis on food crops produced by small holders. The orientation must be redirected from academic research in a centralized university setting to problem solving research decentralized to its client states. These changes were mandated in the re-organization of the Regional Research Centre to form CARDI which followed an in depth study of that organization. The transition imposes severe psychological as well as organizational trauma.

The uncertain management which characterized the RRC association with UWI continued in its rebirth as CARDI. However, over the last year noticeable improvements have accrued, thanks to the CARDI leadership structure. CARDI's overall policies are determined by a Standing Committee of Ministers of Agriculture from the member states. More immediate policy and programme direction is delegated by them to a Board of Directors composed of the countries' Chief Agricultural Officers or equivalent. The Chairman of the Board of Directors is Lewis Campbell, Chief of the Agriculture Division of the Caribbean Development Bank and the man who led the study which stimulated the formation of CARDI. The current Executive Director (the central management figure) is Joe Bergasse, a St. Lucian who has had a distinguished career in the Canadian Government. Mr. Bergasse was selected for his management and development experience with the specific purpose of leading CARDI into its new role. He is a nonsense, management-by-objective executive, with a wealth of development programme experience amassed as Director of Development, Northwest Territories of Canada's northwest territories. His appointment has provided CARDI with the senior management talent which it lacked in the past.

2. STRUCTURE

Since its inception, CARDI's authority has been concentrated in the Executive Director and the Chief Scientists who all report directly to him. The first major delegation of authority (other than to committees) was the March, 1978, deployment of staff to Field Units in Barbados, Guyana, Jamaica, Belize, Windward Islands and Leeward Islands, with designation of a Head of Field Unit in each location. A second type of delegation was achieved when Project Coordinators were named to head the UNDP/OPEC and AID-funded programmes.

A third and final delegation will be made in August 1978 through a re-organization of management activities. This re-organization will establish two staff and two line offices (Figure 1) whose heads will direct all CARDI activities and will report directly to the Executive Director.

Finance and Administration will provide accounting, personnel, logistic, and housekeeping functions.

The Information Service will provide library, publishing and public relations functions.

The Director of Technical Operations will head the unassigned Resource Group and the various laboratories and will manage staff training.

The Director of Programme Operations will control and supervise the Fields Units and Programme Coordinators.

The CARDI/AID Programme Coordinator will be directly responsible for the management of the Country Field Teams who will be responsible for carrying out the cooperative Country/CARDI Multicropping Systems Research Programmes. However, these Teams will look to the Field Unit Head for administrative support and for assistance in initial liaison with the local Ministry of Agriculture. Field Unit Head and Programme Coordinator are expected to be capable of working out an effective modus operandi with reasonably clear functional responsibilities. In case of some irreconcilable difference, the Director of Operations, to whom they both report, will adjudicate the dispute.

This organizational structure appears to be eminently suitable for the overall direction of coordination of CARDI and its programmes, and specifically for the management of the CARDI/AID Multicropping Systems Research Programme.

3. ROLE AND COMMITMENT

As indicated by the foregoing comments, CARDI's role is in transition and commitment to change is not uniformly shared within the staff. Some staff members may never be able to adjust and will seek other positions. However, CARDI's new act is to be played on a

broad stage with many geographic and functional settings and a diversity of roles which require many types of actors. Continuing the analogy, the Executive Director must integrate this diversity through a number of plots to achieve a coherent whole.

Among these plots are the deployment of a significant number of the staff to Field Units in the member states, re-organization and assignment of responsibilities, the acquisition of additional resources, and the design of programmes whose objectives are clear.

CARDI's initial reluctance to accept and inability to perform in its new role were due primarily to the insecurity of the transition and a lack of understanding of how to set priorities and move towards them. The principal mechanism being used to overcome this lack of orientation is programming, brought about through new resources. The UNDP/OPEC activity of the CDB concentrates a significant portion of CARDI's Core Staff and deployed personnel on the resolution of a few problems in the MDC's. AID's Smallholder Multicropping Systems Research programme accomplishes the same objective in the LDC's.

It is of course too soon to state an outcome definitively in terms of staff commitment. We believe that the commitment will grow and this project will contribute significantly to that growth.

CARDI's long term future depends in large part on its ability to meet the technological requirements of agricultural producers in the Member States. If agricultural production is to increase and this sector to be economically viable, new technology must be forthcoming. CARDI's task, therefore is to mobilize and organize the resources at its disposal to achieve this primary objective.

The research tradition that CARDI inherited from its predecessor institutions tended to emphasize the expansion of knowledge about tropical agriculture, rather than concentrating on technology development per se. The extensive list of research publication produced by CARDI personnel, while they were still in the RRC, attests to their success (Appendix A). However, the application of knowledge to achieve a technological solution to important production problems requires a different research orientation and function. Scientists must be knowledgeable about the problems confronted by producers and be professionally committed to their solution.

The policy shift to research and development, when CARDI was organized in 1974, was a clear statement by the Member States that "knowledge generation" was not enough. However, shifting the policy and changing the professional behaviour of research scientists are two different issues. Research scientists who have enjoyed the professional freedom of a university, to select and pursue their own research interests, may not take kindly to imposed research objectives, especially those that are intended to develop technology for poor, illiterate farmers who cultivate less than 5 acres. So CARDI's leadership is presently confronted with the problem of institutional change.

This project, aimed at developing cropping systems technology for smallholders, is aimed at making available the resources necessary for CARDI scientists to become fully knowledgeable about the problems faced by small farmers and to develop and test new cropping systems or modifications in existing systems. This project should provide the necessary stimulus and incentive for CARDI scientists to shift their orientation and behaviour to address problems of small farmers. Therefore, the resources will be in place to enable CARDI to carry out its mandate.

4. RESOURCES

The primary resources of an institution are its people. CARDI has an international, intercultural, inter-racial, inter-disciplinary professional staff numbering 26 with authorized positions for 8 more. This staff has achieved considerable academic attainment and research experience in tropical agriculture (APPENDIX B). Twelve members of the professional staff are headquartered in Trinidad, with the remainder deployed in groups of two to seven throughout the region. They are supported by a clerical, administrative and technical staff of sixty at the Trinidad headquarters and laboratory complex. More than half have been with the organization for ten or more years.

Facilities on the UWI campus include dispersed office space and laboratories for agricultural chemistry and soils, entomology and pest control, plant pathology, and greenhouse and plant growing sheds. All laboratory and office space is to be consolidated in a new CARDI building, funded by AID through UWI for which bids have just been received. CARDI has no experiment station of its own in Trinidad, but has been granted use of the land of a private estate for field trails. In other countries it uses national facilities. Through an earlier AID

project, it has developed experiment stations in Belize and St. Kitts and St. Lucia.

CARDI has a core budget of TT \$2.5 million (US \$1.1million) from annual member state contributions and grants from international donor agencies, foundations and associations (see Financial Analysis).

5. OUTSIDE ADMINISTRATIVE ENVIRONMENT

Like most research establishments, CARDI is viewed by its member governments in several ways of pride in its intellectual quality and mistrusts because of its sophistication and uncertainty about its goals and values. This is complicated by the diversity of its client states in size, prosperity and development and by the fact that it is one of a number of regional organizations contributing to agricultural development.

CARDI is an essential institutional component in the Regional Food Plan of the CARICOM countries (the English speaking Caribbean) which was formulated in 1975. This food plan is an attempt to integrate the various regional organizations into a well organized and coordinated effort to increase food production. The different regional institutions that will be mobilized to implement the Food Plan, in addition to CARDI, include:

1. Caribbean Food Corporation (CFC) is expected to be the central agency with responsibility for the implementation of the Food Plan.
2. Caribbean Community and Common Market (CARICOM) is the major mechanism for regional integration in the Commonwealth Caribbean.
3. Caribbean Development Bank (CDB) is the development bank in the region which is expected to provide a substantial part of the loan component for the financing of projects in the Food Plan.
4. Eastern Caribbean Common Market (ECCM) serves as a coordination and integration mechanism for trade and industrial development in the Leeward and Windward Islands.

5. Faculty of Agriculture, University of the West Indies (UWI) is responsible for training of agriculturists at the professional level and carries out limited research involving various aspects of agricultural development.
6. Caribbean Investment Corporation (CIC) is responsible for promoting industrial development, including the development of agro-based industries and of integrated agricultural and industrial complexes in the LDC's.
7. Caribbean Food and Nutrition Institute (CFNI) assists member states by collecting, analyzing and interpreting data on the food and nutrition situation, and advising governments of food and nutrition policy.
8. Caribbean Industrial Research Institute (CARIRI) is financed solely by the Trinidad and Tobago government, but is available to carry out research and development to relevant agro-industry in the CARICOM region.

Within this setting, CARDI is responsible for undertaking and coordinating agricultural research and development in the CARICOM region. Given declining agricultural production in the region, CARDI's task is to produce technological innovations that will help farmers increase productivity and/or reduce production costs and will help place agriculture in the region on a sound scientific, technological, and economic foundation.

6. GRASS ROOTS MANAGERIAL CONSIDERATIONS

CARDI's initial deployment to Field Units established a CARDI presence in the larger countries and country clusters of the region, specifically in order to establish a close collaborative effort with each country's Ministry of Agriculture and to participate in their programmes. The smallholder multicropping systems research programme builds on this relationship to establish operational Country Field Teams to gather information on small holder problems, resources and systems, to test ways to adapt existing

technologies to these systems and to design more effective systems.

A major element in this work is to translate these findings into information which the extension service will be able to explain, programmes which bankers will be able to finance, and farmers willing to adopt. This will be done through both written extension material and field days held each year for extension and credit agents.

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ANNEX I
APPENDIX 2

(I: APDX.2) 1 of 3

LIST OF SCIENTIFIC AND PROFESSIONAL STAFF
AS AT 1st APRIL, 1978

BERGASSE, Joseph. A.	B. Comm. (Lond.), MA (Durham)	Ag. Executive Director
⁵ ADAM, Jasmeed	B.Sc. (UWI)	Research Assistant
ALI, Aziz	B.Sc. (Lond.), M.Sc.(CNAAB)	Pesticide Chemist
¹ ALAM, Muhammed M.	B.Sc., M.Sc. (Lyallapur)	Entomologist
⁴ ARYA, Lalit M.	B.Sc., M.Sc. (UP), Ph.D.(Minn.)M.A.	Soil Physicist
* ⁶ BUCKMIRE, Kenneth U.	B.Sc.(Lond.), MI Biol.	Agronomist
CAREW, Richard	B.Sc., M.Sc.(Alberta)	Agricultural Economist
⁹ CHARLES, Winston B.	MSA (UBC), DICTA	Plant Breeder
³ DAISLEY, L.E.A.	B.Sc. (UWI)	Agronomist
FORDE, St.Clair M.	BSA, MSA (UBC), Ph.D.(Ibadan)	Agronomist
¹ GREEN, Brook A.	B.Sc. (new Mexico), M.Sc.(Florida) Ph.D. (Cornell)	Farm Management Specialist
² HAMMERTON, John L.	B.Sc. (Reading), Ph.D. (Wales)	Agronomist
³ HARRICHARAN, Haymchal C.	B.Sc.(McGill), M.Sc.(Cornell), Ph.D.(UWI)	Animal Scientist
HAQUE, Syed Q.	B.Sc., M.Sc.(Bihar), Ph.D.(LARI)	Virologist
¹ JEFFERS, Hugh F.McK.	DICTA, B.Sc., M.Sc., Ph.D (McGill)	Animal Productionist
* ⁵ KIRTON, Noel	B.Sc., M.Sc. (mcGill)	Agronomist
LALLO, Cicero H.O.	B.Sc. (UWI)	Research Assistant
LEWIS, Errol T.	B.Sc., BSA, M.Sc. (Manitoba)	Agricultural Economist
² LOWERY, Jennifer	B.Sc	Agronomist
⁵ MADRAMOOTOO, Chandra A.	B.Sc. (McGill)	Agricultural Engineer
MORRIS, James B.	B.Sc. (UWI)	Analytical Chemist
⁸ OSUJI, Pascal O.	B.Sc. (Nig.), M.Sc., Ph.D. (Aberdeen), MI Biol.	Animal Nutritionist

PARASRAM, Samsundar	B.Sc., M.Sc. (Delhi), Ph.D. (LARI)	Entomologist
⁴ PAYNE, Horace W.	BSA (UBC), M.Sc. (Cornell)	Agronomist
PHELPS, Ralph H.	BSA, MSA (UBC), Ph.D. (Wisc.)	Plant Pathologist
* ⁴ PRENDERGAST, Norman W.	DICTA, M.Sc. (UWI)	Agronomist
⁴ RAO, Murali M.	B.Sc. (Hyder), M.Sc. (Jabalpur), Ph.D. (Pantnagar)	Agronomist
SANCHEZ, Joan	B.Sc. (UWI)	Statistician
¹ SARGEANT, Vernon A.L.	D.I.C.T.A., B.Sc. (McGill) M.Sc.	Agronomist
³ SINGH, Nain D.	B.Sc. (Allahabad), M.Sc., Ph.D. (Iowa) (Ohio)	Nematologist
TAYLOR, Graham	B.Sc. (Surrey), M.Sc. (UWI)	Statistician
* ¹ WALMSLEY, Donald	B.Sc. (Kings Coll.), M.Sc., Ph.D. (Lond.)	Soil Chemist
⁷ WALTER, Carle J.	M.Sc. (UWI), Ph.D. (Adelaide)	Agronomist
WILLIAMS, Darwin B.	M.Sc. (Iowa), Ph.D. (Calif.), DICTA, FEDI	Plant Breeder

¹ Barbados	⁵ St. Lucia	* Head of Field Unit
² Belize	⁶ St. Kitts	
³ Guyana	⁷ Antigua	
⁴ Jamaica	⁸ On Qualified Secondment to UWI/McGill Sugarcane Feeds Centre	
	⁹ On Secondment to FAO. Algeria.	

Special Projects

¹ BREWER, Alan	B.Sc. (Edin.), M.Sc. (Reading)	Statistician
¹ LAUCKNER, Frank B.	B.Sc. (Leeds), AIS, FSS	Statistician
¹ MANTELL, Sinclair H.	B.Sc. (Brist.), M.Sc., DIC (Lond.), DTA (UWI)	Plant Pathologist

Peace Corps Volunteers

⁴ BLAND, William	B.Sc.
² GRUNTHANER, Linda	B.Sc.
² MURPHY, Sheila	B.Sc.
⁴ WILSON, Carl	B.Sc.

PERSONAL RESUME

of

J. A. BERGASSE

INTRODUCTION

J. A. Bergasse is a familiar and respected figure in Canada's economic/industrial development community.

For the past 23 years he has been involved in a diverse range of development projects in various regions of Canada.

From shipbuilding, sawmills and fisheries on the east coast, to establishment of small industries, tourism and petroleum resource development in Canada's north, Mr. Bergasse has offered significant input to the development of the economy of Canada.

In the financial field he has supervised the appropriation of capital funds to entrepreneurs in Prince Edward Island and has chaired northern loan boards. And in the human resources field he has been responsible for extensive employment programs for northern and native people.

His knowledge of the field is evident not only in the success he has achieved in his day-to-day duties, but also in the materials he has produced on the subject. A book written by Mr. Bergasse on industrial development as well as a number of papers are used in North American universities, and in the accreditation course for industrial developers.

CAREER HISTORY

DEPARTMENT OF ECONOMIC DEVELOPMENT AND TOURISM
GOVERNMENT OF THE NORTHWEST TERRITORIES 1969 - 1977

Position:

- Director March 1976 - April 1977
(equivalent to Deputy Minister in federal or provincial government)
- Assistant Director 1969 - 1976
- Chief of Industrial Development
February 1969 - November 1969

Duties:

- As director was responsible for developing a healthy and expanding economic base in the N.W.T., comparable with northern life styles and ensuring maximum benefits to territorial residents from entrepreneurial opportunities in the N.W.T.

This was carried out:

- by facilitating the establishment and development of industries and services operations in the N.W.T.
- increasing the contribution of the fish, forest and agricultural resources to the N.W.T. economy while preserving and protecting traditional life styles
- to a set extent, promoting the development of non-renewable resources
- developing and promoting the utilization of a resident labour force throughout the N.W.T.
- developing tourism in the N.W.T.
- administering a \$14,000,000 budget and a staff of 250 people

CAREER HISTORY CONTINUED

Credits in These Positions:

- As director, reorganized and decentralized the department's entire method of program delivery, making the programs more accessible to the people. This system is now being used as a prototype for the entire government reorganization program.
- Responsible for the establishment of a furniture manufacturing factory and pre fab housing plant in Hay River.
- As chairman of the Small Business Loan Fund, liberalized the approach to granting funds, thereby enabling more local businesses to pursue activity in the north.
- Assisted in the establishment and chaired the N.W.T. Water Board. Brought the board to the position where it is a viable and credible group highly regarded by the N.W.T. public. This board is unique in Canada, since it provides for public input through public hearings.
- Assumed responsibility for the Hire North program and assisted in streamlining it to the needs of northerners.
- As assistant director, co-ordinated and supervised the day to day operations of the department and was responsible for departmental policies and planning. Also as assistant director, acted as superintendent of Fish and Wildlife Service for two years while that service was being reorganized.

CAREER HISTORY CONTINUED

INDUSTRIAL ENTERPRISES, INC. (PROVINCIAL CROWN CORPORATION)
CHARLOTTETOWN, P.E.I. 1967 - 1969

Position:

- Assistant General Manager

Duties:

- Promoted growth of P.E.I. with a \$300,000 operating budget and \$20,000,000 loan capital for potential entrepreneurs.
- Established and streamlined existing problems in Industrial Development Program.
- Put together input for manufacturing, marketing and industrial development segments of the Comprehensive Development Plan that was being negotiated with Ottawa.

Credits in this Position:

- Rationalized fishing, food processing and dairy industries with reports forming the basis for parts of the development plan that was later signed by the Federal Government.
- Initiated a successful marketing operation to sell P.E.I. products in the New England States.

CAREER HISTORY CONTINUED

AREA DEVELOPMENT AGENCY (forerunner of DREE)
DEPARTMENT OF INDUSTRY, OTTAWA 1964 - 1967

Position: - Regional Co-ordinator
(selected from over 600 applicants
in national competition)

Duties and Credits: - Responsible for New Brunswick and
Prince Edward Island to co-ordinate
the activities of the federal gov-
ernment to maximize their impact on
areas of slow economic growth.

- Worked closely with New Brunswick
Development Corporation and was
instrumental in establishing several
new industries in that province.

DEPARTMENT OF TRADE AND INDUSTRY
PROVINCE OF NOVA SCOTIA 1954 - 1964

Position: - Development Officer

Duties and Credits: - Was responsible for all aspects of
economic development in half of the
province.

- Instrumental in establishing the con-
cept of Voluntary Economic Planning;
the streamlining of the boat building
industry; expansion of several exist-
ing industries and the setting up of
many new ones.

- My survey and recommendations on the
pulp chip industry resulted in this
being started in Nova Scotia as a
joint venture between the paper com-
panies and the sawmilling industry--
it gave a new lease on life to the
sawmilling industry.

CAREER HISTORY CONTINUED

CEYLON AND INDIA TEA DISTRIBUTORS
TORONTO, ONTARIO 1947 - 1954

Position: - Assistant Manager

Duties and Credits: - Trading in commodities -- sold the first carloads of Belgian Congo and East African to enter Canada.

APPOINTMENTS/ACHIEVEMENTS

In his most recent position as director of the Department of Economic Development and Tourism, Mr. Bergasse also held a wide range of outside, related positions including:

- Chairman, N.W.T. Water Board
- Chairman, Small Business Loan Fund
- Member, Eskimo Loan Fund Credit Committee
- Director, Canadian Arctic Producers
- Director, Freshwater Fish Marketing Corporation
- Chairman, Fisherman's Loan Approval Board
- Member, Federal/Provincial Freshwater Fisheries Committee
- Member, Federal/Territorial Lands Advisory Committee
- Director and Executive Committee Member, Industrial Developers Association of Canada
- Chairman - Sub Committee on Organization and Management Task Force on Personnel, Government of N.W.T.
- Chairman, Committee on Prefab Housing for N.W.T.
- Chairman, Task Force on Great Slave Lake Fisheries
- Member, Board of Directors of Slave River Sawmills, Dene Mat Construction Co.
DEH - CHO Sawmills Ltd.

During his career in industrial development he has also greatly assisted the profession in the following ways:

- written several papers on industrial development which now form part of the accredited course for industrial developers.
- written a book -- "Organizing Your Community for Industrial Development." This was done for the Province of P.E.I. and is now accepted as a standard work for industrial developers. A copy is now in the Congressional Library in Washington. Permission was given to two American universities to use it as a basis for their courses in economic development
- a founding member of Canadian Association of Industrial Developers. In 1968/69, was considered one of the leading exponents in Canada of economic and, specifically, industrial development.

ANNEX I
APPENDIX 4

CURRICULUM VITAE

(I: APDX. 4 1 of 8

NAME : SAMSUNDAR PARASRAM

CHILDREN: 1 Son - Virinder

CITIZEN OF TRINIDAD & TOBAGO

MARITAL STATUS: Married - Ahjanny

- QUALIFICATIONS:
- 1953 - Cambridge General School Certificate
1st Grade Certificate
 - 1957 - Teacher Training Diploma (Govt. T & T)
(2 year course)
 - 1962 - B.Sc. (Hons) Zoology - Delhi University
First Position in University with First
Class in Zoology
 - 1964 - M.Sc. Zoology - Delhi University
(Special Subject - Entomology)
First Position in University
 - 1977 - Ph.D (Entomology) - Indian Agricultural
Research Institute, New Delhi 12, INDIA
Grade Point (3.75/4)
Major: Stored Products Entomology
Minor: Genetics and Plant Breeding

AWARDS OR SCHOLARSHIPS:

- 1956 Trinidad Government Scholarship to Training
College
- 1959-64 Government of India Cultural Scholarship
- 1962-64 University of Delhi Post Graduate Science
Scholarship
- 1960
- 1961 Faculty of Science Exhibition Prizes -
- 1962 Delhi University
- 1973 Commonwealth Fellowship - Govt. of India/Trinidad

MEMBERSHIP OF SOCIETIES:

(I: APDX.4 2 of 8)

Member Entomological Society of America
Entomological Society of India
International Organisation of Biological Control
International Root Crops Society

EXPERIENCE: 1954-59 Primary School Teacher
1959-64 Undergraduate & Postgraduate Studies - University of Delhi
Sept. 1964 - Secondary School Teacher
Nov. 1964
Nov. 1964 - Economic Entomologist, School of Agriculture, St. Augustine 1966
1966-73 Economic Entomologist, Dept. of Crop Science, U.W.I., St. Augustine
1975-Present Entomologist C.A.R.D.I., U.W.I., St. Augustine
Part-time Department of Extra Mural Studies
Lecturer (U.W.I.) in G.C.E.: Adv. Botany (1966-68)
Adv. Zoology (1964-66)
Adv. Biology (1964-71)
Hindi/Sanskrit (1967-72)
1974-76 Post Graduate Studies Indian Agricultural Research Institute, New Delhi 12
1978 Short Course in Food Systems Development (McGill/CARDI)
1978 Short Course in Senior Business Management (MIRCON/TRINIDAD)

TEACHING ACTIVITIES: U.W.I.

Participation in the teaching programme (1966-73) of the B.Sc. (Agric) - involved 27 hours of lectures/year in:-

1. DTA course in Tropical Agriculture
2. B.Sc. (Agric) course 314 - Year III
3. B.Sc. (Agric) Practical Skills course - Year I

Lectured to Extension Personnel at the In-Service Training School organised by the Faculty of Agriculture (Dept. of Extension) in:

Barbados & St. Lucia	December, 1965
Antigua	May, 1967
St. Vincent & Barbados	July, 1967
Dominica	April, 1969
Montserrat & St. Lucia	March, 1970
1st Plant Protection Workshop held at U.W.I. St. Augustine (2 weeks)	July, 1970
St. Vincent	February, 1971
Nevis	April, 1972
Grenada	May, 1972
Montserrat	1973

Several lectures delivered to annual Pastors courses (CADEC) on aspects of Agriculture; also to Farmers' group in Trinidad & Tobago

POST GRADUATE RESEARCH SUPERVISION:

- (a) Was examiner of a DTA thesis entitled "An Investigation into the preparation and use of Rogor & Phosdrin against Heliothis Zea (Bodie) and Diatraea spp" by Rodney Webb (May 1967).
- (b) Supervised a DTA thesis entitled "Biology, Distribution and Parasites of the Pepper-bud moth Gnorimoschema capsicum" by P. Alexander (May 1970).
- (c) Supervised M.Sc Reading Project: "Assessment of Crop losses due to insects with special reference to stored products" (P. Abgoade 1978)

RESEARCH EXPERIENCE:

- (1) Studies on the Behaviour of 2 stored products insects conditioned on wheat varieties:- Submitted for Ph.D Thesis

- (2) Surveys:-
- (a) Vegetable Pests in Barbados
 - (b) Pigeon pea pests in Windwards & Leewards particularly those of pods
 - (c) Pests of Phaseolus spp. (Red Bean) in Jamaica
 - (d) Fruit-flies on Mango in Montserrat
 - (e) Cholus zonatus on Coconuts in St. Lucia - extent and nature of damage and distribution
 - (f) Insects causing damage to bananas with special reference to fruits (St. Lucia)
 - (g) Sweet-Potato pests in Trinidad

(3) Evaluation of pesticides to control:-

- (a) Pests of cabbage, cauliflower, cucurbits, tomato, pepper and egg plant
- (b) Pests of Papaya
- (c) Pests of Pigeon peas, Cowpea and Soya-beans
- (d) Major pests of Sweet potato

DEPARTMENTAL RESPONSIBILITIES:

1. In charge of departmental (Crop Science) visitors 1969-71
2. In charge of departmental (Crop Science) greenhouse facilities 1969-71
3. Administrative Responsibility - Crop Science - July 15-Sept. 7, 1970
4. Representative on Fac/Agric Excursions Committee 1970-71
5. CARDI's Representative on Trinidad & Tobago Bureau of Standards (Pesticide Section)
6. Member of CARDI's Monitoring Committee and Advisory Appointments Committee

OTHER ACTIVITIES:

1. Chairman - Agronomy Sub-Committee - Texaco Food Crops Demonstration Farm (1970-1973)
2. Member - Faculty Committee on Increasing Student numbers (1971-72)

- 3. Lecturer in Hindi to S.P.I.C. group, U.W.I., St. Augustine
- 4. Member of Technical Committee of Association of Caribbean Universities - Plant Protection Group

VISITS:

Visits were made to Entomological laboratories at:

- (a) USDA, Beltsville, Maryland
 - (b) Rothamsted - Harpenden
 - (c) Shell Woodstock Station, Sittingbourne, Kent
 - (d) Bayer Research Laboratories, Leverkusen, Germany
 - (e) INIA, CIMMYT, and Puebla Project in Mexico
 - (f) Univ. of California - Riverside
 - (g) Univ. of Florida - Gainesville and research stations at Bradenton, Immokalee and Homestead
 - (h) Vero-Beach Laboratories - Bayer
 - (i) Univ. of N. Wales - Bangor
 - (j) Rothamsted Expt. Station U.K.
 - (k) IPO at Wageningen, Holland and Research Stations at Alkmaar and Naaldwijk
 - (l) Guatemala, Honduras, Belize, El Salvador (FAO Survey)
 - (m) CIAT (Colombia) IBYAN Workshop
 - (n) Costa Rica (CATIE), Guatemala, Honduras El Salvadore (Small Farmer Cropping Systems)
- 1968
- 1971
- 1977
- Jan 1978
- June 1978

(Several visits have been made to all islands in the Caribbean including Guyana)

SPECIAL VISITS:

- (1) At the request of Govt. of St. Lucia to "Investigate a beetle attacking coconuts" - December 1969.
- (2) At the request of WINBAN Research to "Investigate insect pests of ~~bananas~~ bananas in St. Lucia and to advise on an entomological programme for WINBAN" - April 1972.
- (3) At the request of Govt. of Montserrat to "Investigate the problem of fruit-flies on mango" - June 1972.
- (4) With a Faculty team to Jamaica (1966) and INIA and CIMMYT in Mexico - May 1971.

PUBLICATIONS:

PARASRAM, S. Control of Cabbage Budworm Hellula phidelialis (Hulst) (Pryalidae) on cabbages in Trinidad. Tropical Agriculture, Vol. 46, No. 4. October 1969, pp. 343-347.

PARASRAM, S. & F. MEDERICK. Damage to Coconuts by a beetle of the Cholus zonatus complex. Tropical Agriculture, Vol. 48, No.2. April, 1971.

HAQUE, S.Q. & S. PARASRAM. Emprasca stevensii, a new vector of Papaya Bundry top Plant Dis. Rep. Vol. 57 No.5, pp.412-413

PARASRAM, S., (1973) Pigeon-pea pod borers in the Caribbean Proceedings Caribbean Food Crops Society Vol. XI pp. 320-30.

PARASRAM, S. (1973) The Pepper Flower Bud Moth in the Caribbean (an Evaluation)
Proceedings Caribbean Food Crops Society Vol. XI pp. 466. 70.

PARASRAM, S. (1973) Cabbage pests and problems of their control in Trinidad. J. Agric. Soc. Trinidad & Tobago 73(3) 316-323.

PARASRAM, S. (1978) Some problems in the control of stored products insects 77(3) 190-205.

ARTICLES/BULLETINS:

PARASRAM, S. Insect Problems at Texaco Food Crops Demonstration Farm. Agricultural Supplement of Texaco Star. September, 1966.

PARASRAM, S. & J. SEEYAVE. Hazards and Precautions in use of Pesticides. Department of Crop Science, Departmental Paper No. 2, May, 1969.

PARASRAM, S. The Scarabec - A Major Pest of Sweet potato in the Caribbean. Caribbean Farming, Jan.-March, 1970, pp. 18-19.

PARASRAM, S. Pesticides in common use in the Caribbean - 1. Department of Agricultural Extension. Bulletin No. 3.

PARASRAM, S. Control of Insect pests of some food crops in the Caribbean, Dept. of Agricultural Extension Bull. No. 7.

PARASRAM, S. & V. KUMAR (1972) Distribution of Vegetable Pests of Barbados. Department of Crop Science, Departmental Paper 9.

REPORTS

PARASRAM, S. Report on a visit to Jamaica, October, 1967. Survey of Pests of Red Beans. Unpublished. Cyclostyled.

PARASRAM, S. Survey of Pigeon Pea Pod borer in Windward Islands and Trinidad & Tobago. Annual Report. Department of Crop Science 1966/67. Unpublished.

PARASRAM, S. Report on a Survey of Insects affecting bananas in St. Lucia, West Indies. July 13, 1972. (pp. 10 & i) - Department of Crop Science.

PARASRAM, S. Report on a visit to St. Lucia for Investigations on a beetle attacking coconut palms. Dec. 12, 1969. (pp.10) 8 plates - Department of Crop Science.

BOOK REVIEWS:

(a) Pests of Sugar-cane edited by J.R. Williams, J.R. Metcalfe, R.W. Montgomery & R. Mathes. (Tropical Agriculture, Volume 47, No. 1, 1971)

(b) Pests of Rice - Grist, H.D. & Lever, R.J.A.W. (Tropical Agriculture, Vol. 47, No. 1, 1970).

- (c) The major insect pests of Rice (Symposium at IRRI) (Tropical Agriculture, Vol. 45, No. 3, 1968).
- (d) Pest Management - Beirne (Tropical Agriculture)
- (e) Agricultural Zoology in Fiji - G. Swain (Tropical Agriculture)

Reviewed the "Insecticides" Section of Wood's "Tropical Notebook"

SCIENTIFIC PRESENTATIONS:

- (1) Crop Protection at U.W.I. - a Review - Agricultural Research Conference - Jamaica 1966.
- (2) Entomology in the Caribbean - University of Florida - Gainesville - Seminar Group 1971.
- (3) Major Insect Pests of 8 Vegetable in the Caribbean - Meeting of Technical Committee of UNICA - Nov. 1971 - Jamaica.

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21 OCT 1975

CENTRAL ANALYTICAL LABORATORY
CARDI

ANNEX I
APPENDIX 5
1 Of 4

To : Executive Director-CARDI
From : Dr. St.C.M. Forde
Subject: Ref: Your Circular C/188/75 of 15 October 1975

PERSONAL DETAILS

Name : St. Clair McDonald Forde
Date of Birth : [REDACTED]
Place of Birth : Trinidad
Nationality : Trinidadian
Address : Central Analytical Laboratory
University of the West Indies
St. Augustine, Trinidad.
Marital Status : Married, three children

QUALIFICATIONS

B.S.A. (1959) Brit. Columbia
M.S.A. (1961) Brit. Columbia
Ph. D. (1968) Ibadan

EXPERIENCE AT UNIVERSITY

1956 and 1957. During summer periods was attached to the Soil Survey Team of the Canada Department of Agriculture, British Columbia.

1958 to 1961. Worked as Research Assistant at the University of British Columbia under Dr. J. Clarke.

1959. Submitted thesis entitled "The fixation of phosphorus in calcareous soils", in partial fulfilment of the requirements for the degree of Bachelor of Science in Agriculture.

1961. Submitted thesis entitled, "Ionic reactions in calcareous soils", in partial fulfilment for the degree of Master of Science in Agriculture.

1961. Worked on problem of magnesium supply in New York soils, under the direction of Dr. Michael Peech.

1968. Submitted Ph.D thesis entitled "The dynamics of soil potassium in relation to the nutrition of the oil palm".

CAREER

1961 - Joined Nigerian Institute for Oil Palm Research (NIFOR) as Scientific Officer and became head of Soil Chemistry Division.
1964 - Promoted to rank of Senior Scientific Officer, Soil Chemist.
1967 - Promoted to grade of Principal Scientific Officer and appointed Acting Deputy Director of the Nigerian Institute for Oil Palm Research.
1969 - Joined the staff of the University of the West Indies, as Research Fellow, and appointed to the position of Leeward Islands Agronomist with responsibility for the Leeward Islands and Dominica.
1974 - Assumed position as Head of the Central Analytical Laboratory, University of the West Indies, Trinidad.

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APPENDIX 5

EXPERIENCE
(Administrative)

2 Of 4

General:

Head of a Division in a large Research Organization with direct oversight of the work of several professional and sub-professional staff.

Experience in writing quarterly progress and annual reports. Preparation of Research Programme, and advising regional governments in agricultural developmental programmes connected with a major economic crop (oil palm).

Preparation of estimates

Supervision of indenting to Grown Agents

As Acting Deputy Director, responsible for editing of Annual Reports of NIFOP and Journal of NIFOR.

As Deputy Director (NIFOP) responsible for co-ordinating and directing research activities of several scientists in the Institute.

As Leeward Islands Agronomist (UWI) responsible for the running of a University Unit and functioning as Faculty Representative in the Leeward Islands.

Committees and seminar activities:

Member Board of Tenders

Member Board of Survey

Member of Committee for Interviewing candidates for employment

Member Junior Staff Promotions Committee

Delegate to the international Biological year

Contributor to seminars at University of Ibadan

Member Technical exchange visit to I.R.H.O. in the Ivory Coast in 1967

Represented NIFOR at the 2nd Soils Fertilizer Conference of the F.A.O. in Dakar, 1965

Delegate to Eight Reunion of Caribbean Food Crops Society in 1965, Dominican Republic

Delegate to Tenth Meeting of Caribbean Food Crops Society in Puerto Rico, 1972

Member Committee on Land-Use Planning, Antigua 1972

Member Committee for drawing up Five-Year Development Plan, Antigua, 1972.

Participation in Training:

General training of junior staff in the soils laboratory

Lecturer to visiting students from the Schools of Agriculture, Nigeria

Lecturer in radiochemistry to Laboratory Technologists

Specialist lecturer to final year students at the University of Ibadan

Lecturer In-Service Training Courses for R.F.E.P. junior staff in the Leeward Islands

Specialist lecturer in In-Service Training Courses sponsored by Department of Extension, U.W.I. and Land-Use Planning Courses sponsored by the Lands Resources Division of ODA.

Supervision of post-graduate student on project leading to M.Sc. degree, U.W.I.

EXPERIENCE
(Research)

- (1) Factors that affect the availability of phosphorus in soils, and the chemical reactions governing the release of phosphorus in calcareous soils.
- (2) Studies on the phosphorus status of West African soils, its availability and role in the nutrition of the oil palm.
- (3) The role of potassium in the nutrition of the oil palm. Studies on forms in which it occurs in West African soils, its fixation, release from non-exchangeable sources, factors that govern its uptake, its role in determining yields, and methods of accessing critical levels both in soils and plants.
- (4) The trace element status of soils and the importance of certain micronutrients in the crop nutrition.
- (5) The effects of dry season drought on physiological activities of the oil palm and the study of soil moisture characteristics using neutron hygrometry and gamma-ray densitometry.
- (6) Uptake studies by the use of radio-active ³²P tracer methods.
- (7) Determining mineral deficiencies in crops by soil testing and foliar diagnostic procedures.
- (8) Soil fertility studies in the Leeward Islands and Dominica, for the assessment of the need for NPK on the major soil types in these islands.
- (9) A comprehensive programme of research on vegetable production in the Leeward Islands. Research has been of an applied nature with a view towards solving problems that would clear the way for agricultural development in these territories.
- (10) Work on varietal assessment, seasonality, crop protection, plant nutrition and soil fertility, water requirements of tomatoes, cucumbers, onion, cabbage and sweet peppers.
- (11) Work on systems of vegetable productions and their economics.
- (12) Development of laboratory methods for estimating the availability of micronutrients to various crops.

PUBLICATIONS:

- FORDE, ST.C.M.(1959). The fixation of phosphorus in calcareous soils. D.S.A. thesis, University of British Columbia.
- FORDE, ST.C.M.(1961). Ionic reactions in calcareous soils. M.S.A. thesis, University of British Columbia.
- FORDE, ST.C.M.(1965). The phosphorus status of some soils in West Africa. Proc. 2nd Meeting on Soil Fertility and Fertilizer Use in West Africa, Dakar, Senegal, TOME 11 p. 9-14.
- FORDE, ST.C.M., LEYRITZ, M. J-P and SLY, J.M.A.(1965). The Importance of Potassium in the Nutrition of the Oil Palm in Nigeria. Proc. 2nd Meeting on Soil Fertility and Fertilizer Use in West Africa. Dakar, Senegal. TOME 1 p.119-141.
- FORDE, ST.C.M. and LEYRITZ, M. J-P (1968). A Study of Confluent Orange Spotting. J. Nig. Inst. for Oil Palm Res. 4: 371-380.
- FORDE, ST.C.M. and LEYRITZ, M. J-P and SLY, J.M.A. (1968). The role of potassium in the nutrition of the Oil Palm in Nigeria. J. Nig. Inst. for Oil Palm Res. 4: 333-369.

PUBLICATIONS:

- FORDE, ST.C.M., (1969). The trace element nutrition of Oil Palm seedlings. J.Hig.Inst. In Oil Palm Res. 5: 77-88.
- FORDE, ST.C.M., (1968). The dynamics of Soil potassium in relation to the nutrition of the oil palm: Ph.D thesis, University of Ibadan.
- FORDE, ST.C.M., (1970). The Evaluation of tomato varieties in the Leeward Islands. (Paper presented at Eight Reunion of Caribbean Food Crops Society, Dominican Republic).
- FORDE, ST.C.M., (1963). Eleventh Annual Report of WAIFOR pp.98-104.
- FORDE, ST.C.M., (1964). Twelfth Annual Report of WAIFOR pp.85-93.
- FORDE, ST.C.M., (1965). First Annual Report of NIFOR pp.96-106.
- FORDE, ST.C.M., (1966). Second Annual Report of NIFOR pp.109-121.
- FORDE, ST.C.M., (1967). Third Annual Report of NIFOR pp.116-126.
- FORDE, ST.C.M., (1972). Factors affecting the production of Tomatoes in the Leeward Islands (Tenth Meeting of the Caribbean Food Crops Society, Puerto Rico).
- ✓ FORDE, ST.C.M., (1972). Effects of dry season drought on uptake of radioactive phosphorus by surface roots of the Oil Palm. (Elaeis guineensis Jacq.) Agron. Journal 64:622-623.
- FORDE, ST.C.M., (1972). Vegetable production guides:
1. Vegetable Production Guide - Planting Dates and Varieties.
 2. Vegetable Production Guide - Control of Insects and Disease Pest.
 3. Vegetable Production Guide - Onions.
 4. Vegetable Production Guide - Tomato
 5. Vegetable Production Guide - Egg plant
 6. Vegetable Production Guide - Sweet pepper
 7. Vegetable Production Guide - Cucurber.
- FORDE, ST.C.M. (1972). Evaluation of cucumber (Cucumis sativus) varieties in the Leeward Islands. Eleventh meeting of the Caribbean Food Crops Society. Barbados. Mimeo 1-7.
- FORDE, ST.C.M. (1973). Influence of planting density on sweet pepper (Capsicum annuum) yields in St.Kitts. Eleventh Meeting of the Caribbean Food Crops Society. Barbados. Mimeo 1-6.
- FORDE, ST.C.M. (1973). The evaluation of cabbage (Brassica oleracea var capitata) in the Leeward Islands. Eleventh Meeting of the Caribbean Food Crops Society, Barbados.
- FORDE, ST.C.M. (1975). Yield responses of maize (Zea mays L.) in NPK fertiliser trials in some islands of the Commonwealth Caribbean. Thirteenth Meeting of the Caribbean Food Crops Society - St. Augustine, Trinidad. Mimeo 1-20.
- FORDE, ST.C.M. (with D. Walsley and H. Payne) 1975. Fertility assessment of some soils of Antigua, Montserrat, St.Kitts and Dominica from maize (Zea mays) field trials. Dept. Soil Sci., Rept. 10, pp.99, University of the West Indies, Trinidad.

CURRICULUM VITAE

Name: Wilfred Norman Prendergast

BEST AVAILABLE COPY

Nationality: Jamaican

Present Office Address: Director, Plant Production Division,
Ministry of Agriculture,
Hove,
WIMBORSTON 6.

Qualifications :

- 1) Senior Cambridge School Certificate
 - 2) Diploma in Agriculture: Jamaica School of Agriculture
Three (3) years course in Agriculture
 - 3) Diploma, Imperial College of Tropical Agriculture
 - 4) Master of Science (M.Sc.) Agriculture, University
of The West Indies.
- 1948 Senior Cambridge School Certificate - Spanish, Maths, Botany,
Literature, Zoology, History, English.
- 1949 Awarded Island £90 Scholarship, tenable at the Jamaica School
of Agriculture for three years.
- Apprenticed to Manager, Caymanas Estates Ltd.
- 1954 Granted Scholarship to Imperial College of Tropical Agriculture
to pursue Diploma Course.
- 1957 Awarded Diploma (D.I.C.T.A.), selected to pursue Associateship
Course.
- 1960 Attended IV Cocoa Course, I.I.C.A. Costa Rica 3 months.
- 1963 Awarded Government In-Science Training Scholarship to Faculty
of Agriculture, U.W.I., Trinidad, to pursue a course of study
leading to the Master of Science Degree in Agriculture.
- 1965 Awarded Master of Science Degree, Agriculture, Winner Texaco
Agricultural Prize and Currie Memorial Prize for 1966.
Main subjects - Plant Physiology and Plant Pathology.

Experience :

- 1949 - 1952 Employed on Caymanas and Bernard Lodge Estates in field. Bananas and Sugar Cane major crops.
- 1952 - 1954 Assistant to Agronomist on both above-mentioned estates. Involved in Field experimentation and laboratory work.
- 1957 Appointed Agricultural Officer in the Ministry of Agriculture. Assigned to Cacao work, in charge of expansion of propagation facilities.
- 1959 Transferred to Crop Agronomy Division, Hope, as Officer-in-charge, Cacao Research work. Assigned to initiate and conduct research in cacao, i.e., establishment of statistical Fertilizer and Pruning Trials, Production of Hybrid crosses, and establishment of these into Progeny Rows. Staff Training, etc.
- 1959 - 60 In addition to above acted as Miscellaneous Fruit Trees Specialist. This involved maintenance of Guava, Pimento, Avocado, Mango etc. Trials and advisory work on these crops.
- 1960 Attended IV Cacao Course held at the Inter-American Institute of Agricultural Sciences, Turrialba, Costa Rica three months.
- 1960 - 63 Continued as Officer-in-Charge, Cacao Research.
- 1963 - 65 University of the West Indies, Trinidad, M.Sc. Course.
- 1965 Appointed Agronomist and Officer-in-Charge, Orange River Agricultural Station, (302 acres).
- 1968 Pursued 2 months USDA/AID Horticulture Observation Course based at the Sub-Tropical Station - University of Florida.
- 1969 Attended the Third International Cacao Research Conference - Accra, Ghana
- Nov. 1972 Transferred to Crop Research Department, Hope, as Officer-in-charge of Plant Production Stations and Horticultural Research.
- Sept. 1973 Appointed Chief Agricultural Officer, Crops and Soils Division
- April 1974 Appointed Director, Plant Production Division.

Publications :

- 1) Prendergast, W.N. and Snence, J.A. Contribution to the study of resistance of Theobroma Cacao L. to Phytophthora palmivora (L.) B. Proc. Conf. Int. Rech. Agron. Cacao Abidjan, 1965, 1967 pp.212-216.
- 2) Prendergast, N.W. Grow your own tree crops. Tree Crops Seminar. Crops and Soils Department. January 1975.

Lecture :

1957 - 75.

- (a) To Extension Personnel on Cacao Research and Extension, ~~ca~~ Vegetables, Fruit Trees etc.
- (b) To Jamaica Agricultural Society Meetings on Subject at ...
- (c) To Secondary Schools : Career opportunities in Agriculture.

Professional Bodies:

Member : Jamaica Agricultural Society
Caribbean Food Crops Society

Other

Member :
" Bauxite Rehabilitation Committee
" : Jamaica School of Agriculture, Old Boys Association.
" : Civil Service Association

Emoluments

Salary : \$11,000 p.a.
+ Car upkeep 1,200 p.a.
Official Travelling: ^{15¢} per mile
Subsistence: \$10 per day.

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FINANCIAL ANALYSISFINANCIAL PLAN

This project uses \$2.2 million of AID grant funds to support the establishment of six (6) cooperative Country-CARDI smallholder multicropping system onfarm research programmes in the six (6) Eastern Caribbean Island countries of St. Lucia, St. Vincent, Dominica, Antigua, Montserrat and Grenada. These AID funds will complement the reprogramming of \$2.3 million of CARDI programme funds and \$0.36 million of cooperating country funds for a total programme cost of \$4.86 million, (Table1).

The programme is expected to begin in October, 1978 with initial planning, country reconnaissance and socio-economic surveys, and the recruitment of additional personnel (see Implementation Plan). Multi-cropping systems research will begin on twenty-five selected smallholder farms on each of the islands of St. Lucia, St. Vincent, and Dominica in June 1979, with the onset of the rainy season. Grenada, Montserrat and Antigua will be added to experimentation programme in May 1980. AID funds will be disbursed at an annual rate of approximately \$555,000 per year over a four-year period.

The inputs which are expected to be purchased with these funds are summarized in Chapter 11, Project Description. A proforma budget details the assumptions made in arriving at the expected AID, CARDI and Country contributions (see Appendices 1, 2, 3, 4, and 5 of this Annex). The detail of these budgets and of the implementation plan reflects the care which went into determining the costs and administrative feasibility of this activity. Even so, the project is exceptionally complex and one must expect inevitable contretemps. We expect this budget to be administered with considerable managerial flexibility. Control is expected to be exercised in four ways:

1. Frequent contact between the Aid Project Monitor and the CARDI Programme Coordinator.
2. CARDI submission and AID approval of a Training Plan, Consulting Services Plan and annual Experimental Plans for each country.

3. Three project evaluations performed jointly by AID, CARDI and a neutral party scheduled to coincide with major programme implementation stages so that recommendations can be incorporated into plans for reprogramming remaining resources.
4. Suitable accounting, disbursement and auditing procedures.

DISBURSEMENT

CARDI is the Implementing Agent. It suffers from a chronic cash flow problem caused by delays in receipt of individual country contributions. CARDI has established a reserve fund to reduce the influence of these fluctuations. However, the beneficial effect of this reserve fund would be seriously diluted if it must await reimbursement by external donors. It is proposed that AID initially disburse \$150,000 to be periodically replenished upon acceptance of suitable evidence of expenditure. The amount of the outstanding advance would be reduced gradually over the last two (2) years of the programme, reaching zero at its conclusion.

FINANCIAL MANAGEMENT CAPABILITY

CARDI's past financial management capability was not good. As the Regional Research Centre, its personnel, functions and facilities were commingled with those of the University of the West Indies. UWI has continued to provide accounting and fiscal management services to CARDI (as had been the practice with RRC within the "common services charge" of 20% assessed on all of CARDI's funds handled by UWI. The timeliness and adequacy of the situation reports provided by UWI have been inadequate either for routine management or financial planning. The books for 1975/76 were closed on May 31, 1978 by an audit by Peat, Marwick, Mitchell and Company, following several months of analysis.

The Peat, Marwick, Mitchell analysis has resulted in the design of a straightforward manual accounting system which can be operated directly by the CARDI administrative unit. This system is to begin operation in August or September. Peat, Marwick, Mitchell is confident that this system is entirely adequate for effective control of

donors' funds and will meet their reporting requirements, and will provide CARDI management with timely reports for supervision and planning. The implementation of this accounting system will be a condition precedent to disbursement of AID funds.

FINANCIAL PROJECTIONS

At the time this project paper is being drafted, the latest audited annual report is for the fiscal year ended June 30, 1976. A report on the fiscal year ended June 30, 1977, is expected within weeks if not days. The available report is a model of clarity but there is little utility in performing further analysis on such limited information. Table 2 summarizes CARDI's expenditure for two (2) years cited in the audit. The proportions among the items are reasonable for an institution of this type. However, the drastic decline in travel between 1975 and 1976 must be a negative influence on the performance of a regional institution.

NOTE:

Table 2 should be expanded to include 1977, as soon as the audit becomes available. However, not even this report will reflect the impact of the recent wage and salary agreement negotiated for CARDI by UWI. This raise and other inflationary pressures have eliminated the cushion which formerly went into reserves and expenditure now exceed receipts from member Government contributions. It is anticipated that Government contributions will be raised in 1979, to meet these additional costs.

ABILITY TO MEET PROGRAMME COMMITMENTS

CARDI is obligated to provide the equivalent of \$2,260,000 over a four year period, and then to continue the project at an annual cost estimated to be \$900,000 in 1982/83 (Appendix 2). These figures include an annual inflation factor of ten percent per year. The direct impact of the programme on CARDI's core budget is much less, however. Approximately \$1,370,000 of CARDI's contribution represents reprogramming of current staff, while \$276,000 is provided by other donors outside the core budget. Thus, the additional outlays directly attributable to the project which must come from CARDI's core budget amount to less than \$650,000 over a four year period.

Similarly, the direct new recurrent costs of the programme amount to \$295,000 out of the \$900,000 programme costs estimated for 1982/83, even after applying the inflation factor. CARDI's 1978/79 budget from member state contributions is TT \$2,713,311 or US \$1,179,700. If that budget is inflated at the rate used for planning this project, i. e. ten percent per year, the annual additional recurrent costs of this programme would amount to 17 percent of the core budget. This increase appears to be well within CARDI's grasp, particularly for a programme as important to CARDI's future as this one. Furthermore, the increase is programmed to take place over four years, with CARDI's core budget contribution never increasing by as much as \$90,000 in any one year. Finally, nearly all personnel assigned to the project and all to be picked up by CARDI will be West Indian.

CARDI is not obliged to rely exclusively on member country contributions. In addition to these contributions which form CARDI's core budget, the international donor community appears to be willing to finance virtually all of CARDI's capital costs, relieving the need to use the core budget for investment. A third source of income is work performed under contract for the Caribbean Development Bank, United Nations Organizations and other public and private organizations in the region.

Our belief that CARDI can pick up the recurrent costs of this project rests on three assumptions:

1. that West Indian Governments and donor agencies will continue to accord adaptive research a high priority;

2. that West Indian Governments will be able to meet their financial commitments; and
3. that the project will fulfill its purpose and thus emphasize CARDI's role in agricultural development of the Caribbean Region.

The best evidence to support the first assumption is the following quote from the concluding statement by the Chairman, Caribbean Group for Cooperation in Economic Development at a meeting held this year at the World Bank Headquarters in Washington:

"Among the agreements reached with respect to regional sector issues, the following were of most significance:

"First, priority should be given to agricultural research. The agricultural research organization CARDI, should become an international research centre associated with the Consultative Group for International Agricultural Research, and all Caribbean countries that are members of the group should benefit from its work".

The Governments are close to fulfilling their annual contributory obligations to CARDI. The level of their past contributions to CARDI has been adequate to meet continuing costs and to establish a significant reserve against possible future delays in receipts. CARDI's reserve fund is large enough now to withstand reasonable delays in receipt of individual country contributions.

However, costs have been rising rapidly and the West Indian Government contribution must rise to meet them. This will work a hardship on countries such as Jamaica and Guyana which are in serious financial straits. Foreign exchange problems have led both countries to impose stringent limits on the extra-territorial use of their contributions. Trinidad and Tobago, on the other hand, is very strong financially and has not only been a consistent and selfless supporter, but has provided extraordinary assistance to CARDI and UWI.

Our tentative conclusion is that the Governments, with their economic diversity, will manage to meet any reasonable increase in CARDI's obligations, including those imposed by inflation, as long as CARDI demonstrates its importance.

We feel that this project offers CARDI the best opportunity to demonstrate to participating governments the unique contribution which research can make to the resolution of their problems. The method chosen virtually assures a concentration of research on farmers' problems, while the knowledge gained will not only provide a direct response to those problems, but will contribute to national policy formulation and the planning of national rural development programmes.

Caribbean Farming Systems Research Project

Funding Requirements By Source

And Year(US\$000)

	<u>AID</u>	<u>CARDI</u>	<u>COUNTRY</u>	<u>TOTAL</u>	<u>PERCENT</u>
1978/79	648.0	522.5	50.8	1221.3	25.3
1979/80	584.5	560.8	93.8	1239.1	25.7
1980/81	505.1	530.4	101.6	1137.1	23.6
1981/82	473.1	641.2	110.4	1224.7	25.4
TOTALS	2210.7	2254.9	356.6	4822.2	100.0
PERCENT	45.8	46.8	7.4	-	100.0

Capacity to Absorb Funds and Continue ProjectCARDI Recurrent Expenditures
(TT\$1000)

	<u>1975</u>		<u>1976</u>		<u>1977</u>	
	<u>\$</u>	<u>%</u>	<u>\$</u>	<u>%</u>	<u>\$</u>	<u>%</u>
<u>SALARIES & WAGES:</u>						
Professional	483	32.8	499	31.2		
Sub-professional	<u>531</u>	<u>31.1</u>	<u>656</u>	<u>41.1</u>		
SUBTOTAL	1014	68.9	1155	72.3		
<u>PAYROLL RELATED COSTS:</u>						
Professional	57	3.9	47	2.9		
Sub-professional	<u>41</u>	<u>2.8</u>	<u>56</u>	<u>3.5</u>		
SUBTOTAL	<u>98</u>	<u>6.7</u>	<u>103</u>	<u>6.4</u>		
Sub-total Personnel	1112	75.6	1260	78.9		
Office & General	111	7.5	149	9.3		
Travel	122	8.3	60	3.8		
Other (Maintenance and repaid, supplies, labour freight, etc.)	<u>127</u>	<u>8.6</u>	<u>128</u>	<u>8.0</u>		
Sub-total Support	<u>360</u>	<u>24.5</u>	<u>337</u>	<u>21.1</u>		
SUBTOTAL - Operations	1472	100.0	1597	100.0		
Common Service Charge*	<u>353</u>	<u>24.0</u>	<u>331</u>	<u>20.7</u>		
TOTAL COSTS	1825		1928			

* The common service charge is applied to all funds including extraordinary reserves and transfers to reserves at the rate of 20%.

Source: Peat, Marwick, Mitchell & Company. Auditors Reports 5/31/78 and

APPENDIX 1. PROJECT BUDGET BACKUP - AID CONTRIBUTION

	Assigned Quarters/Yr.	Months in Programme	PROGRAMME YEAR				4 - Year Programme Total	
			1978/79	1979/80	1980/81	1981/82		
<u>CORE STAFF</u>								
Agric. Econ. (Marketing)	(1500)	4	40	(9) 13.5	(12) 19.8	(12) 21.8	(7) 14.0	
Agric. Econ. (Farm Mgmt.)	(1500)	4	40	(9) 13.5	(12) 19.8	(12) 21.8	(7) 14.0	
Cult. Anthropologist	(5000)	4	27	(9) 45.0	(12) 66.0	(6) 36.3	-	
Agricultural Communications	(2500)	4	24	(9) 22.5	(12) 33.0	(3) 9.1	-	
Biological Scientist	(1500)	4	40	(9) 13.5	(12) 19.8	(12) 21.8	24.0	
Programme Commitment			171	108.0	158.4	110.8	52.0	429.2
<u>COUNTRY FIELD TEAM</u>								
Field Team Leader	(1300)	4	45	(9) 11.7	(12) 17.2	(12) 18.9	(12) 20.8	
" " "	(1300)	4	45	(9) 11.7	(12) 17.2	(12) 18.9	(12) 20.8	
" " "	(1300)	4	36	(9) 11.7	(12) 17.2	(12) 18.9	(3) 5.2	
Programme Commitment			126	35.1	51.6	56.7	46.8	190.2
Total Personnel			297	143.1	210.0	167.5	98.8	619.4
<u>CONSULTING SERVICES</u>								
Baseline Survey	-	-	-	130.0	-	-	-	130.0
CATIE Cooperative Agreement	4000	35	35	38.0	44.0	44.0	24.0	150.0

CONSULTING SERVICES continued

Multicropping Systems Advisor	6000	24	35.0	70.0	35.0		140.0
UWI Cooperative Agreement	2500	35	37.5	25.0	20.0	17.5	100.0
Evaluations (3)	-	-	-	10.0	35.0	45.0	90.0
Short term consultants	7000	30	63.5	52.5	42.0	42.0	200.0
Total consulting services			304.0	201.5	176.0	128.5	810.0

TRAINING

Orientation Seminars (6)	-	-	25.0				25.0
IRRI Multicropping Course (6)	5000	-	15.0	15.0	-	-	30.0
Observation Travel (20 trips)	2500	-	10.0	15.0	15.0	10.0	50.0
Total Training			50.0	30.0	15.0	10.0	105.0

OTHER COSTS

Intra Regional Travel			60.0	59.9	65.7	64.4	250.0
Experimental Material			14.2	15.0	15.0	26.0	70.2
Supplies and Maintenance			17.8	15.0	20.0	15.0	67.8
Total Other Costs			92.0	89.9	100.7	105.4	388.0

PROGRAMME TOTAL

			589.1	531.4	459.2	342.7	1922.4
General and Administrative (10%)			58.9	53.1	45.9	34.3	192.2
Contingency (5% of Programme)						96.1	96.1
TOTALS			648.0	584.5	505.1	473.1	2210.7

APPENDIX 2. PROJECT BUDGET BACKUP-- CARDI CONTRIBUTION

	Assigned Quarters per year	Months in Programme	PROGRAMME YEAR				4 - Year Programme Total	1982/83	
			1978/79	1979/80	1980/81	1981/82			
<u>CURRENT CORE STAFF</u>									
Executive Director	(2257)	1	12	6.8	7.4	8.2	9.0	31.4	
Chief Programme Operations	(1909)	2	24	11.5	12.6	13.9	15.2	53.	
Chief Technical Operations	(1909)	2	24	11.5	12.6	13.9	15.2	53	
Project Coordinator	(1909)	4	48	22.9	25.2	27.7	30.5	106.3	
Biometrician	(1267)	2	24	7.6	8.4	9.2	10.1	35.3	
Analytic Chemist (Soils)	(1604)	2	24	9.7	10.6	11.6	12.8	44.7	
Agric. Economist (Farm Mgmt.)	(1607)	3	36	14.4	15.9	17.5	19.2	67.0	
Plant Breeder	(1909)	2	24	11.5	12.6	13.9	15.2	53.2	
Entomologist	(1909)	2	24	11.5	12.6	13.9	15.2	53.2	
Virologist	(1909)	1	12	5.7	6.3	6.9	7.6	26.6	
Agricultural Economist	(1604)	3	36	14.4	15.9	17.5	19.2	67.0	
Agronomist (Vegetables)	(1604)	4	48	19.2	21.2	23.3	25.6	89.3	
Agric. Engineer (St. Lucia)	(1604)	1	12	4.8	5.3	5.8	6.4	22.3	
Agric. Economist (Antigua)	(1267)	3	36	11.4	12.5	13.8	15.2	52.9	
Agronomist (St. Lucia)	(1604)	2	24	9.6	10.6	11.6	12.8	44.7	
Agronomist (Antigua)	(1604)	2	24	9.6	10.6	11.6	12.8	44.7	
Animal Scientist (Small Animals)	(1604)	3	36	14.4	15.9	17.5	19.2	67.0	
Current Staff Commitment			516	215.5	237.3	261.0	286.6	1000.5	315.3

APPENDIX 2. PROJECT BUDGET BACKUP - CAKDI CONTRIBUTION continued

	Assigned Quarters per year	Months in Programme	PROGRAMME YEAR				4 - Year Programme Total	1982/83	
			1978/79	1979/80	1980/81	1981/82			
<u>ADDITIONAL CORE STAFF</u>									
Anthropologist	(1600)	4	18	-	-	(6) 11.6	(12) 25.5	37.1	28.0
Agric. Econ. (Marketing)	(1500)	4	5	-	-	-	(5) 10.0	10.0	26.4
Agric. Econ. (Farm Mgmt)	(1500)	4	5	-	-	-	(5) 10.0	10.0	26.4
Agric. Communications	(2500)	2	9	-	-	(3) 9.1	(6) 20.0	29.1	20.0
New Core Commitment			37			20.7	65.5	86.2	100.8
<u>COUNTRY FIELD TEAM</u>									
Agronomist Team Leader	(1300)	4	45	11.7	17.2	18.9	20.8	68.6	22.8
" " "	"	4	36	-	17.2	18.9	20.8	56.9	22.8
" " "	"	4	36	-	17.2	18.9	20.8	56.9	22.8
" " "	"	4	-	-	-	-	-	-	22.8
" " "	"	4	-	-	-	-	-	-	22.8
" " "	"	4	9	-	-	-	(9) 15.6	15.6	22.8
New Country Field Professionals			126	11.7	51.6	56.7	78.0	198.0	136.8
Total Additional Professionals				11.7	51.6	77.4	143.5	284.2	237.6
Country Field Team Sub-professionals			252	19.6	43.2	47.5	52.2	162.5	57.4
Core Staff Support			504	72.4	79.6	87.6	96.4	336.0	106.0

APPENDIX 2. PROJECT BUDGET BACKUP - CARDI CONTRIBUTION continued

Assigned Quarters per year	Months in Programme	PROGRAMME YEAR				4 - Year Programme Total	1982/83
		1978/79	1979/80	1980/81	1981/82		
Capital Costs		177.0	99.0	-	-	276.0	-
Other Costs		26.3	50.0	56.9	62.5	195.7	184.7
Programme Commitment		522.5	560.8	530.4	641.2	2254.9	901.0
New Programme Costs		234.6	243.8	181.8	258.2	918.4	295.0
Met Outside Core Budget		177.0	99.0	-		276.0	
From Core Budget		57.6	144.8	181.8	258.2	642.4	295.0
Additional Core Budget Needed over previous year		57.6	87.2	37.0	76.4		36.8

PROGRAMME CONTRIBUTIONS EXPECTED FROM SIX LDC'S

	Assigned Quarters Per Year	Months in Programme	78/79	79/80	80/81	81/82	TOTAL
<u>PERSONNEL</u>							
Chief Agricultural Officers (3 @ 1800)	1	36	16.2	17.8	19.6	21.6	75.2
" " " (3 @ 1800)	1	33	-	17.8	19.6	21.6	59.0
Support Staff (3 @ 545)	4	144	19.6	21.6	23.7	26.1	71.7
Support Staff (3 @ 545)	4	108		21.6	23.7	26.1	71.7
TOTAL PERSONNEL	-		35.8	78.8	86.6	95.4	296.6
<u>OTHER COSTS</u>							
TOTAL PROGRAMME			50.8	93.8	101.6	110.4	356.6

Personnel estimated as:

½ of time of Chief Agricultural Officer
 full time of a sub-professional

Other costs include office and desk space and local travel of CAO

PROJECT BUDGET BACKUP BASIS FOR TRAVEL COSTS

TRAVEL

Travel is based on an average trip cost of \$425 composed of \$150 in air fares and 5 days at \$55 per diem. Core staff are expected to travel three times per quarter and Country Field Staff one time per quarter. A ten percent inflation factor is applied to trip costs. AID covers 75 percent of travel costs; CARDI covers 25 percent.

	<u>1978/79</u>	<u>1979/80</u>	<u>1980/81</u>	<u>1981/82</u>	<u>Total</u>
Trip Costs (each)	\$425	\$470	\$515	\$565	-
Number of Trips	187	170	170	152	679
	(US\$000)				
Annual Travel Cost	79.5	79.9	87.6	85.9	332.9
AID	59.6	59.9	65.7	67.4	252.6
CARDI	19.9	20.0	21.9	21.5	83.3

SOURCE AND AMOUNT OF FUNDING FOR CARDI BY YEAR
(US\$ 000)

Funding Source	1976	1977	1978	1979	1980
<u>MEMBER STATES</u>					
Contribution to Core Budget	1177	1177	1177	1177	1295
<u>USAID GRANT</u>					
(Agr. Field Stations)	141	144			
<u>CDB/AID GRANT</u>					
(Drip Irrigation)			99	38	39
<u>CDB GRANT</u>					
(Small Farm Accounting)			20		
<u>BARCLAYS BANK/BARBADOS</u>					
Sugar Producers Grant (Integrated Pest Control)		20	18	19	
<u>IDRC GRANT</u>					
(Forage Legume Study)		23	21	51	
<u>FORD FOUNDATION GRANT</u>					
(Professional Development)	12				
<u>GOVERNMENT OF ANTIGUA CONTRACT</u>					
Antigua Soil Survey			4		
<u>CDB GRANT</u>					
(Animal Feed Trials)			23		
<u>FAO CONTRACT</u>					
(Turks & Caicos Survey)			6		
<u>UNDP/OPEC/CDB GRANT</u>					
(Regional Food Plan Support)			258	258	128
<u>EDF GRANT</u>					
(Institutional Support)			500	500	500
TOTALS	1330	1364	2126	2043	1962



Peat, Marwick, Mitchell & Co.

Management Consultants

ANNEX J.

APPENDIX 6.

Union Club Bldg.,
P.O.Box 1328, 65 Independence Sq.,
Port of Spain, Trinidad, W.I.

Tel: 62-31031. Cable: "Veritasem"

8th June, 1978.

J. Bergasse, Esq.,
Executive Director (Ag.),
CARDI,
University of the West Indies Campus,
St. Augustine,
Trinidad, W.I.

Dear Mr Bergasse,

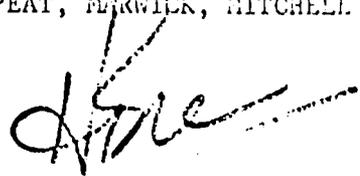
Please find attached, for your review and comment, our proposals relating to the accountability and reporting functions for CARDI's field project operations.

On the basis of the foregoing it is our intention to develop the Trinidad office accounting system around these reports and to mould a fully integrated system to deal with the Head Office expenditure.

You should also bear in mind our proposal that you maintain head-office controlled bank accounts in the relevant territories.

We look forward to receiving your reactions to our proposals.

Yours faithfully,
PEAT, MARWICK, MITCHELL & CO.



Hugh B. Williams
Partner

Encls.

DP/HBW/ck

H.B. Williams

Accounting ProceduresBudget Imprest Funds

- (i) Receive advice of bank deposit: either
 - (a) Telex or Cable from Head Office
 - (b) Bank Debit Note or
 - (c) Letter of Advice from Head Office
 - (ii) Record details of:
 - (a) Amount
 - (b) Date of Deposit
- under the heading of Budget Funds in Cash Book.

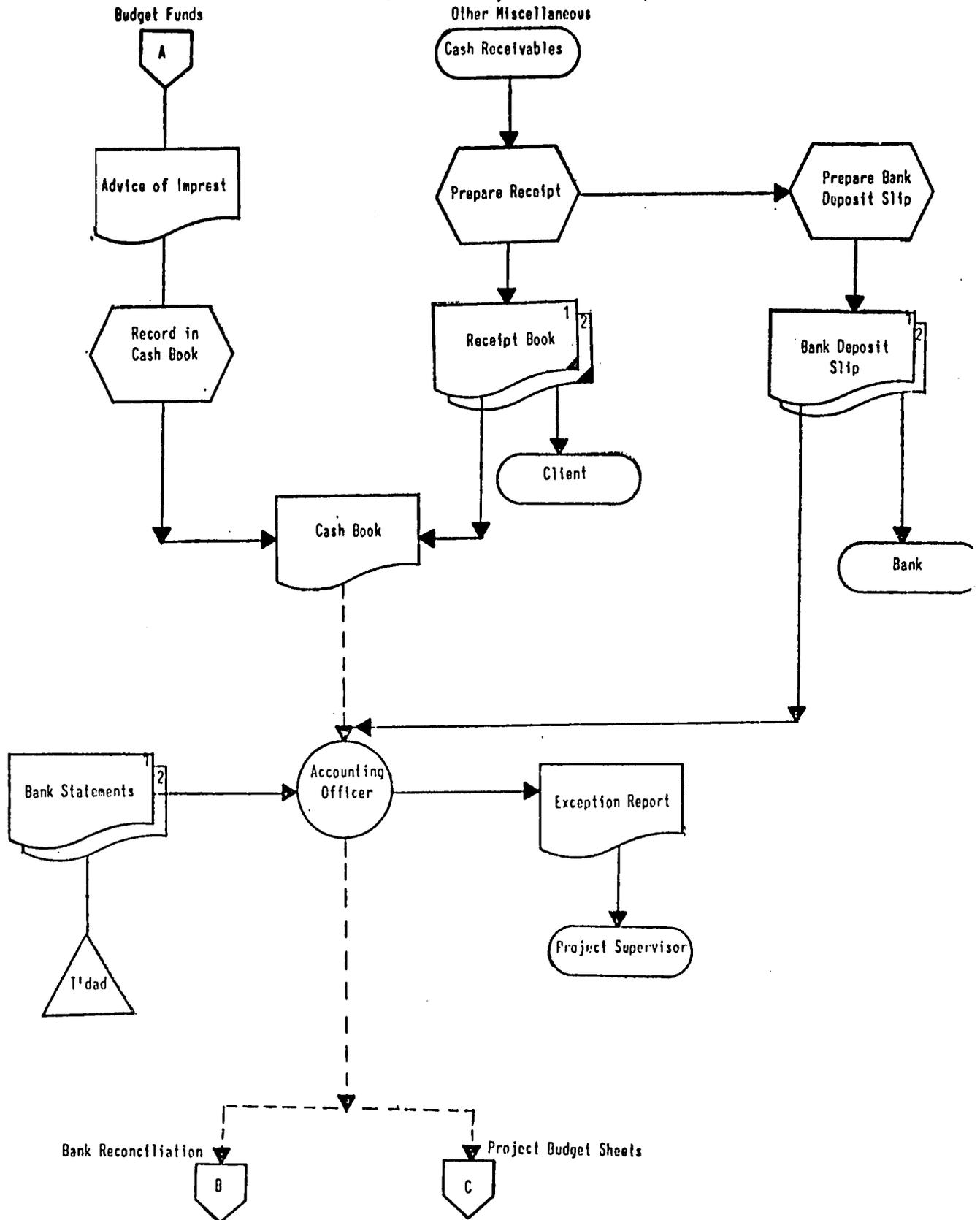
Other Funds

- (iii) Receive Cash or Cheque for services rendered
 - (a) Complete a cash detailed receipt from pre-numbered stock on hand, noting:
 - 1. Amount
 - 2. Date
 - 3. Client.
 - (b)
 - 1. Compare cash receipt with Project Supervisor's written instructions (technical or professional services) or
 - 2. Obtain Project Supervisor's signature on cash receipt.
 - 3. Receiving Officer signs the receipt.
- (iv) Hand or post the receipt to client.
- (v) Copy receipt book into cash book giving brief details of the receipt.
- (vi) At frequent intervals, a responsible official should compare:
 - (a) Cancelled bank deposit slips with cash book
 - (b) Receipt book with cash book
 - (c) Cash book with bank statements.

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

FIELD OFFICES - CASH RECEIPTS

Sale of Produce, Technical Services,
Other Miscellaneous



- (vii) Exception reports should detail, for the attention of the Project Supervisor, such things as, differences in exchange, exceptional bank charges, divergence of deposits from imprest request slip.

CASH DISBURSEMENTS

General

It is the joint responsibility of the Project Supervisor and the Counterpart Officer to ensure that Project Funds are properly used for the purchase of appropriate goods and services required in order to complete their work. It is the objective of this section of the accounting manual to ensure those expenses are both authorised and adequately recorded.

The area can be considered in two tiers:

- cheque disbursements and
- petty cash.

Cheque disbursements require the express or implied authority of both the Counterpart Officer and Project Supervisor by joint signature of all cheques which should be attached to supporting documents at the time of signature.

Petty cash, because of the difficulties of security over cash funds, control is most effectively exercised by restriction of the total balance held, and by limitation on the dollar amounts that can be paid by way of cash to individuals, and/or individual transactions.

In both areas, documentation to support the transactions is of the utmost importance, and every effort should be made to substantiate all claims with receipts and invoices produced by third parties.

Accounting Procedures

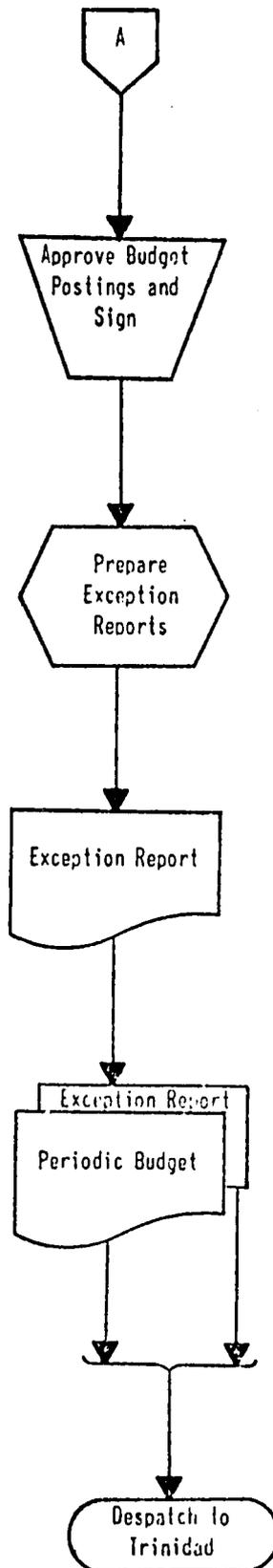
Cheque Disbursements

- (i) Clerk receives request for payment (Invoice, Expense Claim, Payroll Listing, etc.).
- (ii) Prepare Cheque Requisition Voucher in duplicate, excluding cheque number and date, from pre-numbered supply.
- (iii) Pass Requisitions and supporting documents to Project Supervisor for approval.
- (iv) Project Supervisor either approves the payment and initials the Requisition or rejects it and institutes an enquiry into the cause of the request.

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

CASH DISBURSEMENTS

PROJECT SUPERVISOR

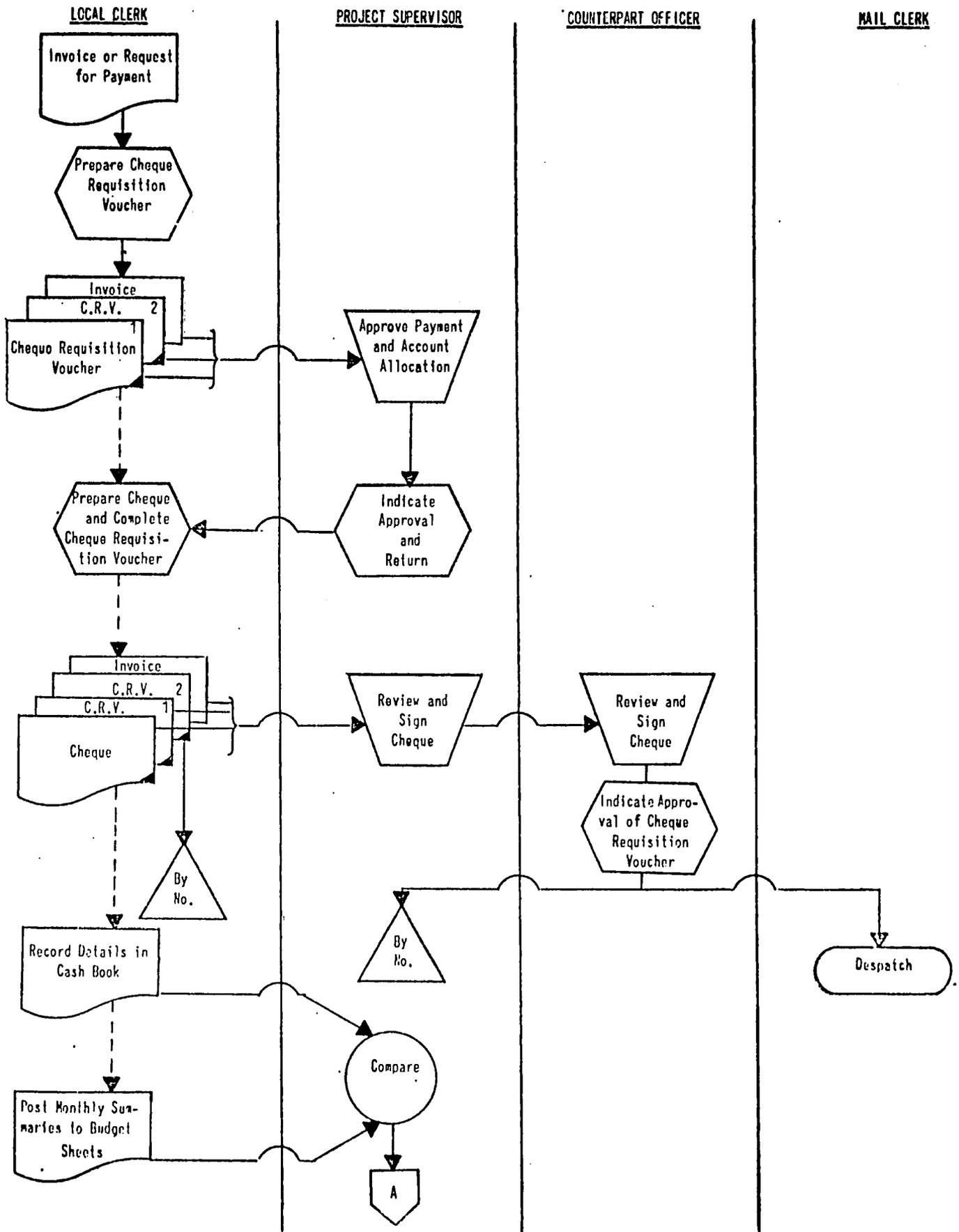


Explanations of significant divergence from budget should be detailed here.

Also requests for funds over and above the imprest requirement or modifications to budget.

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

CASH DISBURSEMENTS



- (v) If approved, Clerk makes out a Cheque from the stock of pre-numbered Cheques and completes the details omitted in step (ii). Stamps all documents paid. Records details in Cash Book.
- (vi) (a) Pass documents back to Project Supervisor for review and cheque signature.
- (b) File duplicate Requisition.
- (vii) Project Supervisor sends Cheque, original Requisition and supporting documents to Counterpart Officer for review and signature.
- (viii) Counterpart Officer then:
 - (a) Reviews Cheque Requisition Vouchers and supporting documents.
 - (b) Initials Cheque Requisition Voucher and signs Cheque.
 - (c) Returns all documents except Cheque to Project Supervisor for filing.
 - (d) Arranges for the mailing out of Cheque.

All incorrectly completed Cheques and Requisitions should be mutilated and kept on file.

Petty Cash

- (i) All petty cash payments to be supported by a Petty Cash Voucher and/or Invoices.
- (ii) Petty Cash Vouchers should be authorised by the Project Supervisor, or some other responsible officer.

FIXED ASSET REGISTER

General

Details of all postings to the capital section of the project budget should also be noted in a Fixed Asset Register. Up-to-date information with regard to capital equipment under the control of CARDI personnel will enable the more efficient budgeting of all projects, and avoid needless duplication of equipment. Every effort should be made to maintain an up-to-date Fixed Asset Register, additions and deletions being detailed in periodic exception reports with other budget information.

Recording of details should be of the form set out below for each category of asset:

<u>Date of Acquisition</u>	<u>Brief Description of Assets</u>	<u>Location</u>	<u>Qty.</u>	<u>Cost</u>	<u>Dates/ Disposal</u>	<u>Proceeds</u>
1.6.76	Leyland Massey 500 Tractor	St. Kitts	1	\$50,000	-	-
	"	Nevis	1	\$50,000	28.4.77	\$40,000

PROJECT PAYROLL

General

Project Payroll for casual labour would have to conform to local requirements with regard to statutory deductions, tax, NIS, etc.

Additionally, as a minimum, it should require:

- (i) Name of employee
- (ii) Gross pay
- (iii) Total deductions
- (iv) Net pay
- (v) Signature of employee for receipt of pay.

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

CHEQUE REQUISITION VOUCHER NO.

Send Cheque to:

Cheque No.

Date.

Payable To	Details of Payment	Accounts to be Charged	Amount

Requested by:.....CLERK.....Authorised by:.....PROJECT SUPERVISOR.....

Date:.....Checked:.....COUNTERPART OFFICER.....

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

ACCOUNTING PROCEDURES

TRINIDAD OFFICE

PROJECT REPORTING

General

The objectives of the various project budget and status reports are:

- (a) to enable the Executive Director to appraise the progress of the project in terms of achieving its stated objectives
- (b) to ensure that sponsorship funds are expended in accordance with the mandate under which they were drawn
- (c) to form the basis of reports issued by the Executive Director to:
 - (i) The Board of Directors in order for them to sanction the operations of CARDI projects, and to formulate budgets
 - (ii) Sponsorship Agencies to obtain a continued flow of funds for specific projects and to provide a track record on which to base forecasts for subsequent projects.

Procedures

- (i) Receive periodic budget sheet from project site; date stamp on receipt.
- (ii) Collate all reports for specific projects and transfer details on to Monthly Summary Request Sheet.
- (iii) Executive Director reviews the Summary Sheet by:
 - (a) Comparison of expenditure in individual locations.
 - (b) Comparison of total expenditure to budget.
 - (c) Reference to report comments on each report.Approval indicated by signature.
- (iv) Executive Director prepares covering letter to sponsor organisations, to attach to request sheet.
- (v) Total expenditure is posted to Project Vote Card.
- (vi) Copy Summary and specific reports filed in chronological order.

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

STATUS REPORT ON THE PROJECT TO

Period covered from to Supervisor _____

Signed: _____
Project Supervisor

Signed: _____
Counterpart Officer

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

PROPOSED PROJECT BUDGET SHEETS

Project Budget Sheet
Project _____
Location _____
Code Ref: _____

Supervisor _____

Duration: From _____ to _____

Budgeted Cost \$ _____ US/TT/B'dos/ECC

Project Self Financing \$ _____

Grants Required \$ _____

Period Expenditure

Total Budgeted

1. From - To

2. From - To

REPORT COMMENTS

Personnel Costs:

- Salaries
- Recruitment
- Housing
- Grants
- Superannuation
- National Insurance
- Other

Total personnel costs

Other Costs:

- Casual labour
- Travel and subsistence
- Grants
- Professional and technical services
- Materials and supplies
- Freight
- Communications, power and electricity
- Maintenance of vehicles
- Other

Total of other costs

Total expenses

Capital expenditure

Total this period

Total to date

Project Title: _____

Supervisor: _____

Duration: _____

Budget expenditure \$ XXXX

Total to date \$ XXXX

Estimate to completion XXXX

\$ XXXX

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

ACCOUNTING PROCEDURES

FIELD OFFICES

CASH RECEIPTS

General

(a) Budget Funds

All Budget Funds should be paid by way of imprest. To avoid undue disruption the imprest can be reimbursed on the basis of budgeted figures automatically at the end of each accounting period. Overage or underage can be adjusted subsequently on the payments made in the following period. Further easing of the cash flow problems inherent in an imprest system can be obtained by limited use of a carefully monitored overdraft facility. The imprest balance should be determined by agreement by reference to the budgeted expenditure.

(b) Other Funds

All Other Funds should be receipted on pre-numbered documents and deposited intact as soon as possible after receipt. Funds generated from the activities of the projects should be reported in the period of receipt, with the decision as to their ultimate disposition being in the control of the Executive Director.

The responsibility for all Cash Funds is that of the Project Supervisor. Consequently, he should be required to sign all imprest request sheets before submission. All other transactions relating to:

- (i) provision of technical or advisory services
- (ii) sale of produce
- (iii) sale of other assets

should have the express authorisation of the Project Supervisor in writing.

THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE
(ST. AUGUSTINE CAMPUS OF THE U.W.I.)

Auditors' Report

Financial Statements - 31st July, 1976

PEAT, MARWICK, MITCHELL & CO.

CHARTERED ACCOUNTANTS

PEAT, MARWICK, MITCHELL & Co.

CHARTERED ACCOUNTANTS

R. R. OTTLEY

D. A. MONTAÑO - MANAGER

UNION CLUB BUILDING
65 INDEPENDENCE SQUARE,
P.O. BOX 1328,
PORT-OF-SPAIN,
TRINIDAD.

TELEPHONE: 62-31081/4
CABLE: VERITATEM

AUDITORS' REPORT

To the Standing Committee
of Ministers responsible
for Agriculture

We have examined the balance sheet of The Caribbean Agricultural Research and Development Institute at 31st July, 1976 and the statement of receipts and expenditure for the year then ended and have obtained all the information and explanations we have required. Our examination included such tests of accounting records of the University of the West Indies at St. Augustine Campus and other supporting evidence as we considered necessary in the circumstances.

In our opinion, these financial statements give a true and fair view of the financial position of the Institute at 31st July, 1976 and of its revenue and expenditure for the year then ended.

Peat Marwick Mitchell & Co

Port of Spain, Trinidad
31st May, 1978

Chartered Accountants

THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

(ST. AUGUSTINE CAMPUS OF THE U.W.I.)

Statement of Revenue and Expenditure

Year ended 31st July, 1976
with comparative figures for 1975

	<u>1976</u>	<u>1975</u>
Revenue:		
Total contributions from Governments approved (Schedule 3 (2))	TT\$ 2,601,306	2,304,431
Less reduction in commitments approved	<u>(35,642)</u>	<u>(14,500)</u>
	2,565,664	2,289,931
Other contributions:		
American Cocoa Research Institute	(4,832)	101,330
Cocoa Alliance	<u>(3,213)</u>	<u>96,000</u>
Total other contributions	<u>(8,045)</u>	<u>197,330</u>
Excess of income over expenditure - Pesticides Unit	<u>23,126</u>	<u>-</u>
Sale of produce:		
CARDI	1,051	571
Las Hermanas	<u>-</u>	<u>15,000</u>
Total sales of produce	<u>1,051</u>	<u>15,571</u>
Total revenue	<u>2,581,796</u>	<u>2,502,832</u>
Expenditure:		
Recurrent expenditure (Schedule 1)	1,597,492	1,471,800
Regional Research Centre cocoa expenditure	-	302,044
Capital expenditure	6,526	3,210
Grant to Agricultural Extension In-Service Training Course	-	3,000
Expenses at Las Hermanas Estate Administration and common service charge (note 2)	-	80,272
	<u>274,395</u>	<u>352,686</u>
Total expenditure	<u>1,878,413</u>	<u>2,213,012</u>
Excess of revenue over expenditure	703,383	289,820
Amount allocated to Reserves and Provisions	<u>(40,000)</u>	<u>(285,421)</u>
Unallocated excess of revenue over expenditure	663,383	4,399
Unallocated excess of revenue over expenditure at beginning of year	<u>4,399</u>	<u>-</u>
Unallocated excess of revenue over expenditure at end of year	TT\$ <u>667,782</u>	<u>4,399</u>

See notes to financial statements.

THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE
(ST. AUGUSTINE CAMPUS OF THE U.W.I.)

Balance Sheet

31st July, 1976
with comparative figures for 1975

	<u>1976</u>	<u>1975</u>
<u>ASSETS</u>		
Due from The University of the West Indies	TT\$ 1,123,250	673,671
Contributions due from Governments (Schedule 3 (8))	141,352	140,189
Capital expenditure (contra account)	<u>451,815</u>	<u>377,141</u>
	TT\$ <u>1,716,417</u>	<u>1,191,001</u>
 <u>CAPITAL ACCOUNTS AND LIABILITIES</u>		
Commitments outstanding	TT\$ 23,864	72,896
Reserves and provisions (Schedule 2)	348,866	411,730
Contributions received in advance and overpayments (Schedule 3 (7))	224,090	324,835
Capital grants (contra account)	451,815	377,141
Unallocated excess of revenue over expenditure	<u>667,782</u>	<u>4,399</u>
	TT\$ <u>1,716,417</u>	<u>1,191,001</u>

Approved on behalf of the Board of Directors

_____ Director

_____ Director

See notes to financial statements.

THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

(ST AUGUSTINE CAMPUS OF THE U.W.I.)

Notes to Financial Statements

Year ended 31st July, 1976

1. Basis of Accounting

These statements have been prepared on the accrual basis of accounting with balances recorded for amounts receivable and payable by the Institute.

2. Administration and Common Service Charge

The administration and common service charge payable to the University of the West Indies has been calculated as follows:

	<u>1976</u>	<u>1975</u>
Recurrent Expenditure	TT\$ 1,597,492	1,471,800
Capital Expenditure - charged to Reserves	53,376	-
- charged to Expenditure	6,526	3,210
Grant to Agricultural Extension In-Service Training Course	-	3,000
Excess of revenue over expenditure allocated to Reserves	<u>-</u>	<u>285,421</u>
	TT\$ <u>1,657,394</u>	<u>1,763,431</u>
Administration and common service charge - 20%	TT\$ 331,479	352,686
Less adjustment of 1976 charge in respect of amount allocated to Reserves - 20% of \$285,421	<u>(57,084)</u>	<u>-</u>
	TT\$ <u>274,395</u>	<u>352,686</u>

THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE
(ST. AUGUSTINE CAMPUS OF THE U.W.I.)

Schedule of Recurrent Expenditure

Year ended 31st July, 1976
with comparative figures for 1975

		<u>1976</u>	<u>1975</u>
Academic Staff - Salaries and allowances	TT\$	498,647	482,511
- Superannuation and national insurance		46,699	56,749
Non-Academic Staff - Salaries and wages		656,494	530,672
- Pension and national insurance		55,740	41,027
Handymen and Messengers - Wages and cost of living allowance		21,773	27,522
Travelling, leave and appointments		60,226	122,086
Office and general expenses		148,879	110,989
Maintenance and repairs		43,483	36,070
Departmental supplies		49,970	53,440
Freight and handling charges		12,448	7,314
Contingencies		33	1,620
Audit fees		<u>3,100</u>	<u>1,800</u>
	TT\$	<u>1,597,492</u>	<u>1,471,800</u>

THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE
(ST. AUGUSTINE CAMPUS OF THE U.W.I.)

Summary of Reserves and Provisions

Year ended 31st July, 1976

	<u>Reserves and Provisions</u>				<u>Total</u>
	<u>Reserve for Capital Expenditure</u>	<u>Provision for Retrenchment Payments</u>	<u>Provision for Study and Travel Grants</u>	<u>Other Pro- visions</u>	
Balance at 31/7/75	TT\$ 218,675	96,791	33,627	62,637	411,730
Add additi- ons to Reserves and Pro- visions	-	-	-	40,000	40,000
Deduct Pay- ments	<u>(53,376)</u>	<u>(46,339)</u>	<u>-</u>	<u>(3,149)</u>	<u>(102,864)</u>
Balance at 31/7/76	TT\$ <u>165,299</u>	<u>50,452</u>	<u>33,627</u>	<u>99,488</u>	<u>348,866</u>
Additions for year ended 31/7/75	TT\$ <u>185,421</u>	<u>100,000</u>	<u>-</u>	<u>-</u>	<u>285,421</u>

CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

Schedule of Contributions from Governments

Year ended 31st July, 1976

Territory	Balances Receivable at 1/8/75	Approved Contributions due for year ended 31/7/76	Prepaid at 31/7/75	Cash received during year	Applications of Cash Received			Balances Receivable at 31/7/76
					For Prior Years	For Current Year	Prepayments/ Over- Payments at 31/7/76	
Barbados	TT\$ -	289,034.00	-	289,034.00	-	289,034.00	-	-
Guyana	-	289,034.00	116,012.50	173,022.00	-	173,022.00	.50	-
Jamaica	15,619.00	867,102.00	-	881,197.67	14,095.67	867,102.00	-	1,523.33
Trinidad & Tobago	115,368.00	867,102.00	-	1,206,560.00	115,368.00	867,102.00	224,090.00(b)	-
Montserrat	500.00	14,452.00	-	-	-	-	-	14,952.00
Antigua	8,702.00	39,226.00	-	44,693.30	8,702.00	35,991.30	-	3,234.70
Belize	-	39,226.00 (35,641.80)(a)	-	3,584.20	-	3,584.20	-	-
Grenada	-	39,226.00	-	-	-	-	-	39,226.00
St. Lucia	-	39,226.00	-	39,226.50	-	39,226.50	.50	-
St. Kitts	-	39,226.00	-	35,262.21	-	35,262.21	-	3,963.79
Dominica	-	39,226.00	-	-	-	-	-	39,226.00
St. Vincent	-	39,226.00	-	-	-	-	-	39,226.00
	TT\$ <u>140,189.00</u> (1)	<u>2,601,306.00</u> <u>(35,641.80)(a)</u>	<u>116,012.50</u> (3)	<u>2,672,579.88</u> (4)	<u>138,165.67</u> (5)	<u>2,310,324.21</u> (6)	<u>224,091.00</u> <u>(1.00)</u>	<u>141,351.82</u> (8)

\$ 2,565,664.20
(2)

\$ 224,090.00
(7)

(a) Reduction in contribution originally approved.

(b) \$216,775 prepaid, \$7,315 overpaid.

IMPLEMENTATION PLAN

This project will be implemented over a four year period on the six LDC islands of St. Vincent, St. Lucia, Dominica, Antigua, Montserrat and Grenada. Work will be initiated in 1978/79 on the first three and in 1979/80 on the last three.

May 1979 is the most critical date, since all plans must be made and personnel and equipment must be in place to begin operations on St. Lucia in May, 1979, so that experimental activities can be initiated with onset of rains in June 1979. Although seasonal rainfall patterns are less limiting on St. Vincent and Dominica, work should begin on these two islands at approximately the same time in order to overcome any start-up management problems and prepare for initiation of experimental work on Grenada, Antigua and Montserrat by June 1980.

Three major chains of activities are involved in this program:

- (1) Project Paper Submission and Approval
- (2) Organization and Management
- (3) Research Program Development and Implementation

I. Project Paper Submission and Approval

- A. The draft of this Project Paper will be prepared and submitted to RDO/C by CARDI and the AID Project Paper development field team in July, 1978. At the same time CARDI will submit a letter requesting the Activity to RDO/C.
- B. RDO/C will review and complete the draft and submit the Project Paper for its review in August.
- C. AID/W is expected to authorize the program in September.
- D. A Project Agreement will be drafted, negotiated and signed by AID and CARDI in September, 1978.

II. Organization and Management

Effective execution of this program will require a series of administrative or managerial actions to facilitate the execution of the research program. These include the following:

A. CARDI Management Improvements

The current CARDI Executive Director has identified a number of desirable management improvements which are believed to be essential for the effective management of the Institute and of this project. The organization must be realigned to provide for effective and efficient supervision of CARDI's diverse programs and dispersed staff. This will include a redistribution of responsibilities and the assignment of key personnel, including a CARDI/AID Program Coordinator, to fulfil these responsibilities.

UWI currently provides CARDI with accounting support within its "common services charge" of twenty percent. This accounting system is inadequate for the management and reporting needs of this project, and the charge is not uniformly applied to all users of UWI services. An effective accounting system has been designed by Peat, Marwick, Mitchell, CARDI's independent accountants, and is ready for implementation. CARDI is preparing to renegotiate its common services agreement with UWI. All of these actions with the possible exception of the UWI agreement should be effected by the end of October, 1978.

B. Country Agreements

Cooperative Agreements must be negotiated by CARDI with each of the countries involved in the program, defining the respective contributions of each before the work can be initiated on each island. Since this will be a condition precedent to disbursement of AID funds, it is important that CARDI initiate this process as soon as possible, hopefully signing agreements with the first three countries by the end of October, 1978, and with the others no later than June, 1979.

C. Country Field Team Personnel Identified, Recruited and Assigned

As a minimum, the professional and sub-professional personnel for the first three countries should have been recruited by February, 1979, since the three professionals are scheduled for IRRRI multicropping systems training in that month. It is improbable that all six professionals could be recruited in these initial months, but it would be desirable.

D. Additions to Core Staff

At least two of the four proposed social scientists additions to the Core Staff should have been recruited by February, 1979, with the others being added as they become available.

E. Procurement

In order to assure the availability of field equipment by the time the field program starts in May, 1979, it will be necessary to establish requirements and specifications in October, 1978 and to solicit, evaluate, and award bids by February, 1979.

F. Training Plan Prepared and Approved

The training plan must be prepared and approved by AID before training courses and orientation travel can be financed. Since the first course is expected to begin in February, 1979, the training plan must be developed and submitted to AID by December, 1978. The requirements and suggested contents of the training plan are appended.

G. Consulting Services Plan Prepared and Approved

The elements and approximate amounts of services to be obtained through consulting contracts are described in the "inputs" section. Some of these, such as the requirements for a baseline survey and evaluations are clearly specified. Others, such as the proposed CATIE and UWI Cooperative Agreements and individual consultants are not yet defined. The consulting services plan is not expected to be a rigid document, since the specialists required can hardly be identified before the work has started. However, a tentative allocation of available funds among classes of specialists should be possible. In particular, an early effort should be made to acquire an experienced Multi-cropping Systems Research Advisor who can assist the Project Coordinator for the first two years of the project. Such specialists are very rare and it is entirely possible that a suitable candidate cannot be recruited. If that is the case, it is the opinion of the program planners that these funds should be reprogrammed to provide an array of short term multi-cropping specialists so that the Program Coordinator has available to him a range of experience and conceptual approaches. This plan should be submitted to AID in November, 1978.

H. Evaluations

Chapter VII describes the project evaluation plan. Evaluations of different types are scheduled for July - September, 1980, October - November, 1981, and November 1982 - January 1983. At least three months prior to each evaluation, CARDI will prepare a scope of work for the evaluation and submit it to AID.

III. Research Program Development and Implementation

A. Reconnaissance Survey

The initial act of the research program will be to define the priority target areas on each island and identify the major farming systems currently used by target group smallholders. This survey will be performed by a team composed of CARDI and national Government personnel and the UWI Team Leader responsible for the socio-economic or baseline survey. This work must be planned and executed in October 1978, with the specific target areas identified by November 17 for the following Socio-economic Survey.

B. Socio-Economic Survey

As soon as the priority target areas have been defined, a socio-economic or baseline survey will be undertaken on a 100-farm sample on each island. Since the results of this survey will be used to select the twenty-five cooperating farms in each country and to provide information to guide the preparation of data collection instruments, preliminary reports of this work must be available to CARDI no later than March 30, 1979, for the first three islands and by March 15, 1980, for the next three. Because of the importance attached to these first two surveys, a more detailed implementation plan for each is appended.

C. Farm Selection

Twenty-five farms will be selected on the basis of criteria developed from the socio-economic survey. These farms will be representative of the farms in the target area and use the most common farming systems. These farms must be selected in April, 1979 and individual cooperative agreements prepared which define the terms of the experimental relationship. The selection process will begin a process of longitudinal data collection which will be essentially of four types: (1) Static Data, such as farm size, family composition and education; (2) Economic Data, which will include farm accounts and information about sources and prices of inputs and markets; (3) Social Data, on how the farm family occupies its time, where and with whom and to what ends; and (4) Experimental Data, which measures the impact of various interventions on the other three. All interventions in the farming system will be limited to small areas (about 0.125 acre) within a larger field cultivated by the farmer and which will provide the basis for comparison.

D. Experimental Plan

An experimental plan will be prepared each year for each country which details the experiments to be performed and the data to be collected on the twenty-five farms and how these may be subdivided within the group.

D. Experimental Plan Continued

The experimental content may range from simply collecting data on the existing systems in the first year, through testing of simple interventions in the next year, into system redesign and substitution in following years. An important aspect of the planning process is the integration of Country Field Team and Core Staff thinking with farmer and local Government realism.

E. Program Execution

Program will be implemented each year following the experimental plan. It is expected that individual specialists of the Core Staff will take technical responsibility for planning particular interventions and data collection instruments, will assist the Country Field Teams in performing the interventions, and will perform most of the data analysis. Country Field Team personnel, who are the most intimate link with both cooperating Government and farmer, must become intellectually involved in all three processes. They cannot and should not be simply executors of plans. The collected and analyzed results of each year's work must be fed back in to the experimental plan of the subsequent year.

F. Extension of Results

CARDI will not be responsible for extension of experimental results to farmers. However, it is responsible for assuring that these results are known to extension agents and credit personnel in a form that one can explain and the other will finance. To do this it is expected that CARDI will conduct two field days a year for extension and credit agents so these will be informed of the progress of the work. In addition, CARDI will prepare and circulate a report of findings upon completion of the analysis of each year's results.

DESCRIPTION OF EXPECTED TRAINING ACTIVITIES

The following outline is an overview of the type of training activities expected from the project, including both in-country orientation and on-job training and international training courses and orientation travel. A more specific and detailed Training Plan will be developed by CARDI and approved by AID in December 1978, making needed adjustments required by circumstances, e.g., to fit in with recruitment success. This more formal plan will also define the people who will design the training courses and do the teaching, who will be trained, the location of the training, and its costs. Like the other planning documents, this four-year Training Plan is expected to establish initial priorities and allocations which will be periodically recast by mutual accord in light of program experience.

Five types of training are anticipated:

- (1) Orientation of Core Staff and Country Field Teams in program concepts, administrative organization, administrative operations, program relationships, and farm selection procedures.
- (2) Orientation on the Research Plan for the First Cropping Season and the Second Cropping Season.
- (3) International Training Course in Multi-Cropping Research at IRRI for Country Field Team Leaders.
- (4) Seminars. Periodic seminars will be held for all project staff, rotating among the islands. It is expected that CATIE personnel will participate regularly in these seminars.
- (5) Orientation Tours for Senior Staff. These will include travel to IRRI in the Philippines and other Asian countries, and to Central America or other countries in the Americas where Multi-cropping Research is underway.

AID training funds in the amount of \$80,000 are provided for IRRI Multi-cropping Research Training Courses and for Orientation Tours. Travel funds were estimated taking into account the need for periodic seminars in the work zone.

I. Orientation of Core Staff and Project Teams (February, 1979 and June, 1980)

A. General Project Design

1. Project objectives
2. Strategy and methodology
3. Expectations through the life of the project and evaluation criteria

B. Administrative Organization of Project

1. Administrative organization of project within CARDI
2. Role and responsibilities of Core Staff and Project Staff
3. Procedures for clarifying roles and responsibilities

C. Administrative Operations at Project Sites (Project Team only)

1. Accounting procedures
2. Budget and approval procedures for major expenditures
3. Management and operation of project headquarters

D. Orientation to Project Sites and Program Relationships

1. General characteristics of project areas and population
2. Governmental programs and structure related to small farm agriculture

E. Training in Procedures to Follow in Selecting Cooperating Farmers

1. Briefing on socio-economic survey and details about when preliminary data will be available
2. Relationship of project team to national agricultural program staff in selecting cooperating farmers
3. Procedures to follow in soliciting farmers' agreement to cooperate

II. Training on the Plan for First and Second Cropping Season (May 1979 and April 1980)

The three project teams will be hired and project headquarters established on the initial three islands for the first cropping season. The expectation is that the team leader will have prior research experience (traditional research methods), but the two team members probably have no research experience. None of the team members will have experience in the type of multiple cropping research to be conducted in

this project. A second group will be employed for the next three islands. Both groups will go through research training in the first and second years.

A. First Year

1. Objectives

- (a) Upon completion of the training program each project team will know the overall objectives of the project to the satisfaction of the project coordinator, and
- (b) Each team member will understand the specific data collection procedures he will follow during the first year and how he will collect the following types of data:
 - (i) Crop and livestock production; including types and amounts of crops grown, cultural practices, etc., and the farmer's rationale for production decisions
 - (ii) Economic data; including source and cost of inputs used, credit availability and use, marketing data, etc.
 - (iii) Labor availability and use data
 - (iv) Nutrition data on family food consumption
 - (v) Sociological data on the family; including participation in community activities, etc., and
- (c) Each team member will understand the importance of his work and how it fits into the team and the project (i.e. to develop a feeling of esprit de corps).

2. Methodology

It is expected that a ten-day training program will be necessary with the first three or four days being devoted to lecture-discussions by the Core Staff (approximately $\frac{1}{2}$ day to each major type of data). This discussion will center on the data collection instruments and how they should be completed, etc. These discussions will probably be followed by 2 days of practice, interviewing farmers in Trinidad. Completed interviews schedules will be examined and discussed with core

staff to resolve potential data collection problems before the field research begins.

3. Training Follow-up

Approximately one month into data collection, each project will be visited by appropriate members of the core staff to ensure that data collection is proceeding smoothly and to resolve any new problems that may come up. It is anticipated that these follow-up visits would continue about every three months.

NOTE: Since the project team for the second set of islands (Montserrat, Antigua and Grenada) will probably not be selected at the same time as the first three teams, it will be necessary to repeat this type of training at a later date for these new teams.

B. Research Training Program for Second Cropping Season

It is not possible to predict the field research capability of the individual members of each project team. Therefore, it is not possible to detail the type of training that will be needed prior to beginning the second crop cycle. Since it is assumed that none of the project team members will have conducted research on farmer's fields, this will be one obvious area that will need to be covered. However, given the lack of both production and field research skills that is common among research workers in many countries, it is likely that some team members will need additional training during the slack season to improve both production skills and applied field research skills. Part of this additional training can be learned through in-service or on-the-job training. However, it will probably be necessary to send some individuals to an international center (such as the multiple-cropping training program at IRRI, which runs for about December through March) to acquire these basic production and research skills (see below). This training could be scheduled either before the beginning of the first or second cropping season and would be most appropriate for the project team leader on each island.

1. Objectives

Upon completion of the training program, trainees should know:

- (a) the types of initial modifications they will introduce to the farming systems of cooperating farmers;
- (b) how these changes should be introduced into and carried out on each farmer's field, and
- (c) what types of observations should be made on the experimental plots as well as on the farmer's regular fields.

2. Methodology

This type of training will be carried out in stages between the main cropping seasons. The stages include:

- (a) learning how to analyze experimental data from first year;
- (b) consideration and development of modifications in existing cropping seasons;
- (c) developing experimental plans for each or groups of cultivators, and
- (d) determining the types of data needed to test the modifications and learning how to collect this information.

This training will not consist of one or more formal training sessions but will be periodic sessions whereby the core staff will outline in detail a specific assignment to the project teams and then, after each team has had sufficient time to work on the assignment (could be up to several weeks), there would be extensive interactive sessions with the core staff. After these sessions the core staff would lay out the next assignment and the procedure would be repeated until each project team has its field research plans for the coming year fully developed (by April, 1980).

3. Trainee Follow-up

Prior to the start of the second cropping season, but after the project team had discussed the proposed modifications with the cooperating farmers, the core staff would meet with the project team in the field to further adapt experimental plans based on farmer feedback.

III. International Training Course in Multi-cropping Research

Multi-cropping research and agricultural systems research are relatively recent topics whose operational problems and techniques are known only to those working in such research programs in a few sites in Central America, Nigeria, the Philippines, India and Pakistan. IRRI/ the Philippines has prepared a three to four month training course on multi-cropping research which is given each year at Los Banos from January through April. The six Country Team Leaders should take this training course as soon into the program as such training can be arranged. The Project Coordinator and his leading assistant should take orientation travel to Los Banos towards the end of the training course so that they can help the Country Field Team Leaders to adapt their knowledge to the Caribbean.

IV. Periodic Seminars

It is anticipated that two or three day seminars would be held

quarterly, rotating among the different islands. The purpose of these seminars would be for each island team to take one day to explain and show the other teams their research program and for all teams to brainstorm on common problems. In addition to developing or sharing specific solutions to these problems, these sessions will also be important in building esprit de corps.

An annual seminar is planned (in conjunction with some phase of the second year technical training program) at the CARDI headquarters to review overall progress of the project, for presentation of individual team reports and for interaction sessions with CATIE consultants. Again these sessions will be designed to consolidate the effort and build esprit de corps.

V. Orientation Tours for Senior Staff

To keep appropriate members of the senior staff abreast of the most current research on multiple-cropping and on new crop technology that could be utilized in the Eastern Caribbean, it will be necessary for individual staff members to travel to international, agricultural research centers and other national or regional research programs. These orientation tours must be carefully organized in terms of objectives and timing to maximize inputs into the program with respect to materials, methodology and design considerations.

ANNEX K

APPENDIX 2

TENTATIVE OUTLINE OF IMPLEMENTATION PLAN FOR RECONNAISSANCE AND
SOCIO-ECONOMIC SURVEY OF TARGET REGIONS AND POPULATIONS

A. Reconnaissance surveys (to be completed by CARDI and respective national Government leaders, along with socio-economic survey team leader from UWI).

1. RECONNAISSANCE SURVEY NO. I

(a) Initiation:

Develop conditions and criteria for selection of target areas; team formation and orientation (period of October 2 - 20).

(b) Performance:

Reconnaissance survey, data collection and analysis and selection of target area on each of the three cooperating islands (October 23 - November 10).

(c) Decision:

Target areas finalized and communicated to UWI, regarding socio-economic survey (no later than November 17).

2. RECONNAISSANCE SURVEY NO. II

Reconnaissance survey and selection of target areas on second group of cooperating islands (approximately September 1 - 30, 1979).

B. Socio-Economic Survey (to be completed by UWI in collaboration with National Governments and in consultation with CARDI).

1. SOCIO-ECONOMIC SURVEY NO. I

(a) Scope of Work:

Develop scope of work and formal contract with UWI for socio-economic survey (to be completed by CARDI on or before October 2, 1978).

1. SOCIO-ECONOMIC SURVEY NO. I continued

(b) Instrument:

Develop socio-economic survey instrument, in consultation with CARDI; pretest, finalize and print instrument (October 2 - November 7).

(c) Data Collection:

(i) Data collection on first island (November 20 - December 20).

- . Establish base of operation, develop random sample of approximately 100 small farm families in target areas and train interviewers (one week).

- . Conduct interviews (2 - 2½ weeks).

(ii) Data Collection on second island (January 1 - 24).

(iii) Data collection on third island (January 29 - February 21).

(d) Preliminary Report:

(i) Data processing and analysis (January 1 - March 10).

(ii) Preliminary reports written and available to CARDI by March 30.

(e) Final Report:

Final reports on socio-economic survey of first three islands due July 30, 1979.

2. SOCIO-ECONOMIC SURVEY NO. II

(a) Data Collection:

On second group of islands (October 15, 1979 - January 22, 1980).

(b) Preliminary Report:

Data Processing and analysis (November 15, 1979 - February 5, 1980) with preliminary reports written and available to CARDI by March 15, 1980.

(c) Final Reports:

Due by June 30, 1980.

TENTATIVE BUDGET FOR SOCIO-ECONOMIC SURVEY

<u>A. PERSONNEL</u>	<u>Time Allocation</u>	<u>Costing Months</u>	<u>Unit Cost*</u>	<u>Total</u>
1. Project Director (1910/mo)				
October 1, 1978 - March 30, 1979	(50%)	3		
April 1, 1979 - July 30, 1979	(25%)	1		
September 1, - December 31, 1979	(50%)	2		
January 1, - June 30, 1980	(25%)	1½		
		7½	2005	15,040
2. Principal Field Investigator (1270/mo)				
October 1, 1978 - July 30, 1980	(100%)	20	1335	26,700
3. Two Research Assistants (at UWI) (545/mo)				
January 1, 1978 - June 30, 1979 (2 x 6 mo = 12)				
January 1, 1979 - June 30, 1980 (2 x 6 mo = 12)				
		24	575	13,800
4. Interviewers (2Extension Agents) (500/mo)				
For 3 week per island				
Year 1: 2 agents x 3 islands x 3 weeks		9	525	4,725
Year 2: 2 agents x 3 islands x 3 weeks				
5. Secretarial (670/mo)				
(10 months at 25%; 8 months at 50%)		6½	705	4,580
				<hr/>
				SUB-TOTAL - Personnel Costs
				64,845

2 year average based on current cost and 10% increase

B. TRAVEL AND PER DIEM

1. Air Travel - (2 persons to six islands) approx. 15 round trips
(8 trips @ 210, 7 trips @ 100: 2380)
2. Per Diem - 3 weeks per diem/island/person
(250 days @ 55 = 13750)
3. Ground Transportation for field interviews
(6 islands @ 500 = 3000)

Subtotal Travel	19,130
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C. RESEARCH COSTS

1. Instrument preparation 500
2. Computer analysis 5000

Subtotal Research	5,500
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D. OTHER RESEARCH COSTS

	3,525
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Total Direct Costs	93,000
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G & A 20%	18,600
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Total Survey Contract	111,600
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