FILE

A.I.D. EVALUATION SUMMARY PART I

(BEFORE FILLING OUT THIS FORM, READ THE ATTACHED INSTRUCTIONS)

IDENTIFICATION DATA

A. REPORTING A.I.D. UNIT: RDO/C (Mission or AID/W Office)

(ES# 538-87-05)

B. WAS EVALUATION SCHEDULED IN CURRENT FY ANNUAL EVALUATION PLAN? yes ☒ slipped ☐ ad hoc ☐

Evaluation Plan Submission Date: FY 87 Q 3rd

C. EVALUATION TIMING: interim ☒ final ☐ ex post ☐ other ☐

D. ACTIVITY OR ACTIVITIES EVALUATED (List the following information for project(s) or program(s) evaluated; if not applicable, list title and date of the evaluation report)

Project #	Project/Program Title (or title & date of evaluation report)	First PROAG or equivalent (FY)	Most recent PACD (mo/yr)	Planned LOP Cost ($000)	Amount Obligated to Date ($000)
538-0099	CARDI - Farming Systems Research and Development 11/86	83	09/88	7,550	6,570

ACTIONS

E. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

Action(s) Required	Name of officer responsible for Action	Date Action to be Completed
1. RDO/C to assess how external circumstances have impacted on the project and make appropriate adjustments regarding expected outcomes.	D. Harrington	04/30/87. (Completed)
2. RDO/C to ensure that CARDI reassesses priorities with a view to streamlining its work program for for the remainder of the project.	D. Harrington	05/31/87 (Completed)
3. RDO/C to obtain CARDI's agreement to (a) reduce duplication and achieve greater economies of scale through more net working, (b) implement monitoring and feed-back mechanisms and (c) integrate the socio-economic work with the systems agronomy.	D. Harrington	06/30/87 (Completed)

(Attach extra sheet if necessary)

APPROVALS

F. DATE OF MISSION OR AID/W OFFICE REVIEW OF EVALUATION: mo 12 day 14 yr 86

G. APPROVALS OF EVALUATION SUMMARY AND ACTION DECISIONS:

	Project/Program Officer	Representative of Borrower/Grantee	Evaluation Officer	Mission or AID/W Office Director
Signature				
Typed Name	Don Harrington	N/A	Darwin Clarke	James S. Holtaway
Date	12/14/87	Date	Date 12/30/87	Date

M. EVALUATION ABSTRACT (Do not exceed the space provided)

The project aims to assist the Caribbean Agricultural Research and Development Institute (CARDI) to develop an effective and sustainable Farming Systems Research and Development (FSR/D) program that is responsive to the agricultural needs of Eastern Caribbean countries. The project is being implemented by CARDI with the South East Consortium for International Development (SECID) as the major contractor. This interim evaluation was conducted by a three person team of external evaluators in three phases (during 03/31-07/11). The evaluation involved a review of project documents; finalizing of an evaluation plan with the participation of USAID, CARDI and SECID; field work, structured interviews and surveys. The purpose of the evaluation was to assess the viability of the project design, the appropriateness of the FSR/D methodology and to guide future directions of the project. The major findings and conclusions are:

- The project has made significant progress towards achieving its objectives in spite of adverse delays and institutional weaknesses.
- The FSR/D methodology appears to be valid for the Caribbean. It is being gradually refined with experience and offers promise for the future.
- The Project team, including the contractor has performed an effective job in the establishment of project capability to conduct relevant research in a complex environment.
- The sustainability of research started under the program is bound up with the future of CARDI. The project assumptions about sustainability of the program beyond this project were wrong.
- The potential impact of the project will be limited by the minimal capacity of the extension services to transfer technology developed by CARDI.
- It is recommended that AID should continue to support a research network in the Eastern Caribbean, pursue with other donors the objectives of a restructured CARDI, search for a more effective link with extension services and immediately reassess CARDI's priorities.
- An important lesson which arises out of the evaluation is that the design of an adaptive agricultural research project should allow for flexibility to accommodate shifting emphasis in crops or research thrusts.

COSTS

L. EVALUATION COSTS

1. Evaluation Team Name	Affiliation	Contract Number OR TDY Person Days	Contract Cost OR TDY Cost (US$)	Source of Funds
Collin Weir	DIMPEX	IQC PDC-1406-100-4097-00 Work Order No. 1	$94,710	Project
Thomas Carrol	DIMPEX			
James Henson	DIMPEX			

2. Mission/Office Professional Staff Person-Days (Estimate) 10

3. Borrower/Grantee Professional Staff Person-Days (Estimate) 15

A.I.D. EVALUATION SUMMARY PART II

1. SUMMARY OF EVALUATION FINDINGS, CONCLUSIONS AND RECOMMENDATIONS (Try not to exceed the 3 pages provided)
Address the following items:

- Purpose of activity(ies) evaluated
- Purpose of evaluation and Methodology used
- Findings and conclusions (relate to questions)
- Principal recommendations
- Lessons learned

Mission or Office: RDO/C Date this summary prepared: 09/15/87

Title and Date of Full Evaluation Report: CARDI Farming Systems Research and Development 11/86.

SUMMARY

The CARDI FSR/D project was designed to address the principal agronomic, organizational and institutional constraints to increasing agricultural productivity and production in the island states of the Eastern Caribbean. The goal of the Project is to improve the economic and social well-being of small and medium size commercial farm households in Caribbean Common Market (CARICOM) countries through an increase in the production of agricultural commodities and the generation of agricultural employment. The purpose of the Project is to develop an effective and sustainable Farming Systems Research and Development Program in CARDI that is responsive to the agricultural needs of the Eastern Caribbean countries. The Project has three comprehensive and mutually reinforcing elements - technology generation, technology transfer and institution building and was initiated as a major part of the Mission's agricultural strategy to foster agricultural development in the region.

The purpose of the evaluation was to determine the extent to which overall progress has been made toward the achievement of the Project's objectives; to assess the validity of the project design and the appropriateness of the FSR/D methodology; and to provide recommendations for the future direction of the Project. The evaluation methodology consisted of a review of project documents, the development of an Evaluation Plan (collaboratively by USAID, CARDI, and SECID), field visits, structural interviews and surveys.

Findings and Conclusions

General

The project has made significant progress toward realizing its outputs and objectives in spite of adverse circumstances, delays and institutional weaknesses in both CARDI and the participating governments. Effective administrative and financial procedures are in place. However the Project as designated is being implemented independently with a focus on the Eastern Caribbean LDC's and in isolation from CARDI headquarters. This has resulted in a lack of coordination between the FSR/D project and other CARDI activities within participating countries. Many factors external to the project have impacted negatively on its implementation. The most significant of these are: countries' inability to make payments of contributions on a timely basis; numerous staff changes among the project team; difficulties inherent in a new technology and lack of counterparts of CARDI in-country teams as called for in the Project paper. In spite of the foregoing, the portfolio of research thrusts by-and-large address important problems and promise a significant impact. The evaluators have concluded that the project is quite consistent with RDO/C strategy for agricultural assistance in the Eastern Caribbean.

Through improvements in production technologies, the Project should stimulate agricultural sector growth, thereby contributing to AID's overall assistance objectives. The Project will aslo complement other AID-funded agricultural project activities in the region.

Project Design

The evaluators have stated that the major design appear to have been sensible: (a) specifications for achieving a set of desirable outputs written a reasonable time; (b) provision of resources to complement a minimum but increasing level of government contributions; and (c) outside technical assistance to address institutional weaknesses. However at the time of this mid-term evaluation it appeared that the original design was too ambitious and too unrealistic, especially with regard to time frame, government counterparts and financial commitments, and sustainability. For example, lack of finance to support CARDI's in-country staff caused a considerable delay in start-up. Also both CARDI and USAID underestimated the difficulties inherent in working with an approach unfamiliar to most Caribbean agriculturalists and untried in the region. In particular, the introduction of a "bottom-up" style of research and development proved to be very slow in an environment used to a "top-down" style. Finally, the amount of development effort (as distinct from strictly research) needed to test and validate technologies was underestimated at the time of design. The research staff has very limited capacity to respond to such developmental demands on which the success of research ultimately hinges. The evaluators have stated that the original assumptions about the potential sustainability of the FSR/D project beyond the life of the current USAID support were wrong. CARDI is dependent on the MDC's for core support and they are not the primary beneficiaries of FSR/D.

FSR/D Methodology

The evaluators assert that the basic principles of the FSR/D methodology appear to be valid for Caribbean agricultural development. Many features of the FSR/D approach offer considerable promise and would be widely used. Foremost among these are generally participating style of research; on-farm testing to assure adaptability of new technologies to field conditions, the integration of research with marketing policy concerns; and the use of pre-research studies in which farm conditions influence research design. However not enough critical thought has been given to the identification of target groups. Also this methodology needs to be tested under a wider variety of Caribbean farming systems. Whether the present method with its multiple steps (ii) can be simplified to advantage needs to be examined. The evaluators conclude that the entire FSR/D methodology as originally conceived is unlikely to survive without modifications.

Technology Generation and Transfer

The evaluators noted that a great deal of technology is being developed by CARDI, but not all is relevant to the participating countries. In a few cases the results of technology development have been validated on-farm and are being adapted by farmers. The Technological Improvement File (TIF) as a dynamic repository of research information is an excellent idea. Forty-two TIFs are being developed and at the time of the evaluation many of these were done. However, better planning and more effective utilization by extension is required. Although some improved technology is being transferred and adopted by producers, the weak capacity of extension services will limit the impact of this project. CARDI, the evaluators conclude, should be more pro-active in examining and assisting in technology transfer.

Institution Building

The evaluation report states that for reasons mostly external to the project limited progress has been made with the institutional strengthening activities. Some of these external factors have been mentioned above. The identification and hiring of a dynamic and effective new Executive Director is of primary importance in strengthening CARDI's operations.

PRINCIPLE RECOMMENDATION

- USAID should make appropriate adjustments regarding expected outcomes. A reassessment of priorities should be undertaken in order to improve and streamline the work program for the remainder of the Project. A relatively simple methodology for estimating impact should be developed between the social scientists and agronomists as a tool for reviewing priorities.

- The FSR/D methodology with appropriate modifications should be continued. Greater involvements of producers is recommended for setting priorities and in evaluating interventions. Also appropriate mechanisms should be in place for feedback and refinement of the metholdogy based upon experience and lessons learned.

- The Project should examine and address technology transfer more explicitly and seek to ensure more effective linkages with extension services, private firms, and farmer groups to make available the information generated through the TIFs.

- A dynamic and effective new Executive Director for CARDI should be hired as a matter of priority. In addition emphasis should be placed on the implementation and management procedures already defined.

Lessons Learned

- For an adaptive agricultural research project to be successful, an effective extension service is necessary.

- The design of the Project should be flexible to allow for modifications to the research methodology in order to accommodate shifting emphasis in crops, research thrusts and target groups.

SUMMARY (continued)

54

ATTACHMENTS

K. ATTACHMENTS (List attachments submitted with this Evaluation Summary; always attach copy of full evaluation report, even if one was submitted earlier)

Evaluation Report

MISSION COMMENTS ON FULL REPORT

L. COMMENTS BY MISSION, AID/W OFFICE AND BORROWER/GRANTEE

The Mission considers the evaluation report to be comprehensive, informative and responsive to the scope of work. It systematically analyzes the overall progress towards the achievement of the project's objectives. It's comprehensiveness is reflected in the extensive coverage of all aspects of the project beginning with a discussion of design issues and ending with the evaluators perspectives about the merits of future assistance after this project is completed. The participatory nature of the evaluation plan is an outstanding feature and the report demonstrates a methodical approach to answering the questions posed in the Scope of Work.

The Grantee, CARDI, is satisfied with the report and has already appointed an Executive Director as recommended by the Evaluators. The Executive Director is spearheading the implementation of some of the other recommendations in a re-organization of CARDI.

The Mission will use the report as a guide for the design of future private sector research and extension initiatives under the High Impact Agricultural Cluster Project.

1466b

DIMPEX
ASSOCIATES, INC.

DRAFT FINAL REPORT

CARDI FARMING SYSTEMS RESEARCH AND DEVELOPMENT PROJECT EVALUATION

Submitted to

USAID - Regional Development Office - Caribbean
Contract No. PDC-1406-I-00-4097-00

Prepared by

T.F. Carroll, J.D. Henson, C.C. Weir
Members of the Evaluation Team

Management • Economics • Research • Education & Training
New York • Washington, D.C.

7

EXECUTIVE SUMMARY

CONCLUSIONS AND RECOMMENDATIONS

1.0 GENERAL CONCLUSIONS

1.1 The project has made significant progress toward realizing its outputs and purposes, in spite of adverse circumstances, delays and institutional weaknesses in both CARDI and in the participating governments. The project is judged to be satisfactory for continuation and support from US-AID, with appropriate attention to be given to problems identified and adjustments suggested.

1.2 The FSR/D methodology is undergoing gradual refinement and modifications as the project gains experience, a process that is viewed favorably and is encouraged by the Evaluation Team. The FSR/D principles offer promise and generally should continue to guide the project for the remainder of its life.

1.3 The Project Team, including the contractor, project manager, TA staff, project research and support staff, and cooperating country staff, are under competent leadership and have done an effective job in the establishment of project capability to conduct relevant research in a complex environment. The project

activities that have been completed form a good basis for the continuation and improvement of the project and for its potential incorporation into CARDI, to meet the regional research needs of the member states.

1.4 Project staff are generally well qualified, motivated, and understand what the project is about, and are making good progress in their work. At present, staff morale is negatively impacted by the uncertainty concerning the termination date of the project as well as the overall future of CARDI. The Evaluation Team strongly suggests that US-AID immediately indicate to CARDI, what are its plans for the FSR/D project beyond 1988. This would guide the initiation of future investigations, as well as how the project begins to wind down its activities.

1.5 The project should continue to adjust and focus its research priorities and activities; more effectively integrate activities between the country programs; strive to continue to improve the use of staff; and simplify research, planning, and management procedures to decrease time requirements and costs while maintaining and/or increasing effectiveness. Farmer slection should be systematized, while more on-farm experiments are advisable. The technology transfer system should be strengthened and better integrated

with the rest of the activities. A professional development plan needs to be devised and put into place.

1.6 The sustainability of the research started under the project is bound up with the future of CARDI as a regional organization. Putting CARDI on a sound financial basis defining its regional role (especially involving the MDC's) and acquiring enlightened and effective leadership at the top executive levels are keys to its future. While the CARDI Board, governments, and donors consider these factors, which are the main contextual parameters of this project, AID can play a most constructive role by assuring longer-term support for agricultural research in the Eastern Caribbean so that the valuable process started by this project can realize its potential and assure its impact.

2.0 PROJECT DESIGN ISSUES

2.1 CONCLUSIONS

(a) Midway through implementation, the project now appears too ambitious and too unrealistic, especially with respect to the time-frame, government financial and counterpart staff contributions, and sustainability.

(b) AID was well aware that relying on CARDI presented

some risk and tried to insulate the project against weaknesses at the Central CARDI level. This strategy has been successful in achieving accountability, but counter-productive in terms of institution building.

(c) Both CARDI and AID underestimated the difficulties inherent in working with an approach unfamiliar to most Caribbean agriculturists and untried in practice in the region.

(d) The technical aspects of the design were the results of collaboration between Dr. Robert Hart, an AID consultant who subsequently became the F/S advisor to the project, and a small CARDI staff group who had benefitted from the results of AID's previous multiple cropping project. However, the conclusions of the multi-cropping study, when translated into field research, were not found always useful. The great diversity of country conditions and the discrepancy between the original agro-ecologically determined clientele and the subsequent shift to market-oriented target groups were not foreseen.

(e) The whole FSR process is gradually being modified and improved, as the project gains experience. But the project design is linear and allows for little flexibility.

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(f) One of the major dilemmas in the design was the relationship with CARDI as a whole. For understandable reasons, the project was meant to be almost completely Eastern Caribbean, bypassing CARDI headquarters. Yet, through a parallel technical assistance component, CARDI headquarters was to be "strengthened" to the point when after five years it could absorb and take over management of the project activities. In actuality, the exclusion of the rest of CARDI from the project has further weakened the overall organization, while the assumptions underlying the "strengthening" activities were quite unrealistic, as detailed clearly in the ISNAR report.

3.0 IMPLEMENTATION HISTORY

3.1 CONCLUSIONS

(a) Despite serious delays in start-up, and the three amendments to the original Project Agreement, the project is being implemented and managed in a competent manner and good progress is being made. Effective administrative and financial procedures are in place. Adjustments and modifications for future implementation are pointed out in subsequent portions of this report.

(b) The project as designated is being implemented independently and in isolation from CARDI headquarters. This has created some resentment and concern among

senior staff at CARDI headquarters, as well as lack of coordination between the FSR project and other CARDI activities within countries.

(c) The project's implementation has been adversely affected by:

(i) unrealistic assumption in design

(ii) start-up delays

(iii) drastic reduction in project inputs

(iv) lack of sustained financial Core support from CARDI-member countries.

Total project funding and technical assistance inputs were significantly reduced one year after contract signing--yet the project outputs and EOPS remained unchanged.

(d) SECID, the technical assistance contractor, has so far fulfilled its contractual obligations, regarding provision of technical assistance and commodities. However, interviews with project staff indicate that the management training activities were not too effective, perhaps due to a lack of understanding of Caribbean conditions and CARDI's unique problems.

(e) Many factors external to the project have impacted negatively on its implementation. Among these are:

(i) Countries inability to make core payments on a timely basis;

(ii) Former image of CARDI;

(iii) Numerous staff changes among the project team;

(iv) Difficulties inherent in a new technology;

(v) Specific government actions in the area of pricing and marketing; and

(vi) MOA's inability to supply local counterparts to the country teams.

3.2 RECOMMENDATION

That US-AID fully recognize those external circumstances that have impacted adversely on the smooth implementation of the project, and make appropriate adjustments regarding expected outcomes.

4.0 RESEARCH PRIORITIES AND STRATEGY

4.1 CONCLUSIONS

(a) Within the major limitations facing Eastern Caribbean agriculture, and within the timespan of the AID project, the portfolio of research thrusts by-and-large address important problems and promise a significant impact. After the first year, the project staff has made a determined and largely successful effort to involve governments in the planning process.

(b) However, as experience accumulated, some of the initially established priorities may need to be modified. The Evaluation Team suggests that the payoff

from the food/legumne/cereal thrust is likely to be less than originally expected, while considerably better opportunities seem to exist in selected tree crops. The Team also suggests an increased attention to pasture/livestock systems, which show a greater potential in a number of islands.

(c) The number of activities should be reviewed and lines of work which are marginal or unpromising need to be reduced or eliminated. Currently, the project includes too many separate pieces of work, which threatens to spread resorces too thinly and to reduce the chance that enough of these activities could be brought to a meaningful conclusion.

(d) The streamlining of the current program requires urgent application of an ex-ante assessment of potential impact, which calls for a collaboration between the social scientists and the systems agronomists/biologists. The Evaluation Team recommends the immediate development of some relatively simple methodologies for assessing potential impact.

(e) The Team also suggests that in the evolution of priorities, greater consideration might be given to networking--i.e. that research which is relevant to more than one island should be favored and concentrated

at a central place. In order to tie in with the new HIAMP program, the networking concept also needs to be extended to UWI, CARDI headquarters, and to the French islands, so that more available expertise can be tapped.

(f) With increased commercial production the problems of disease and pest control are likely to assume much greater importance. Some thought should be directed to strengthen across-island capacity in these fields, with the possibility of giving the plant pathologist now assigned to St. Vincent, a broader regional responsibility.

4.2 RECOMMENDATIONS

* That immediate reassessment of priorities should be undertaken for the purpose of improving and streamlining the work program during the two remaining years of the project.

* That lines of work and activities which do not show a high probability of technically and economically promising results be phased out, those that do should be strengthened, and a limited number of new activities should be included.

* That the allocation of resources for animal production, especially for pasture and fodder systems and also for slected tree crops be increased, while the share of resources allocated to food legumes and cereals be decreased.

* that the social science staff in collaboration with the systems agronomists develop some relatively simple methodology for estimating potential impact.

* That in the planning for future work programs, the project move toward networking in which one country assumes a central place in a given research effort and services the rest, thereby reducing duplication and achieving greater economies of scale.

* That consideration should be given to assigning the plant pathologist currently working in St. Vincent, broader regional responsibilities, given the increasing importance of plant disease control in commerical technological development.

5.0 FSR/D METHODOLOGY

5.1 CONCLUSIONS

(a) The basic principles of the farming system methodology appear to be valid for Caribbean

agricultural development. However, the way in which the methodology is being applied varies among countries and as experience accumulates, certain portions of it are being modified and adjusted to the variable Eastern Caribbean circumstance.. The Evaluation Team encourages the project staff to further test and refine the methodology.

(b) Many features of the FSR approach offer considerable promise and would be widely used, without necessarily being considered part of a unique CARDI method. Foremost among these is a generally participatory style of research. The prominence given to on-farm testing in order to assure adaptability of new technolgies to field conditions and to applicability to micro-ecological areas is also important. Thirdly, the integration of research with certain policy concerns is a new, useful dimension--especially for market factors. Fourth, noteworthy is the novel use of pre-research studies, in which whole-farm conditions influence research design.

(c) The FSR/D approach has not, so far, become incorporated into non-project CARDI activities. In great part, this is due to the artificial separation between the project and the rest of CARDI. On the other hand, UWI, partly through the close collaboration

between the project and CAEP, is becoming involved in the systems approach. But much more needs to be done with UWI as the eventual spread and application of the FSR/D ideas will depend on the university's teaching staff and its students.

(d) The on-farm testing and identification of target groups are the most innovative, but also most difficult aspects of the FSR methodology. The selection of collaborating farmers has not yet been very systematic. Many problems have occurred in proper selection and in assuring that the on-farm experiements yield scientifically and operationally valid results. The supervision of scattered collaborators by the project staff is essential, but will stretch their capacity to the limit when the number of on-farm tests multiple. Country staffs are struggling with this issue but it needs to be addressed at the project level. Part of the solution may be more thorough station work prior to going to farmer fields, part of it involves "packaging" collaboration by already existing farmer associations or development projects such as CARDATS.

(e) Not enough critical thought has been given to potential target groups. At mid-term, agro-ecological considerations seem to be less important than market orientation. The Team believes that a greater linkage with organized farmer groups is needed.

5.2 RECOMMENDATIONS

* That the systems approach to research with appropriate modifications, borne out of experience, be continued. The Evaluation Team urges the staff to maintain a more flexible attitude toward the original methodology and to further test and refine those elements which appear useful.

* That the project continue to stress the involvement of producers throughout the research process. An appropriate feedback mechanism needs to be established.

* That a reassessment of the farmer selection and collaboaration process be undertaken.

6.0 TECHNOLOGY DEVELOPMENT

6.1 CONCLUSIONS

(a) Some relevant technology is being developed and the results in a few cases have been validated on-farm and are being adapted by farmers. A number of other technologies are at a stage where on-farm testing (Stage 9) can occur., The project is making progress in this regard.

(b) The TIF concept as a dynamic repository of research information, available to researchers, extensionists, etc., is an excellent idea. In practice, it seems, that the staff is not yet completely sure what the TIF really is and how to use it. There is a certain danger that it may become an end in itself, rather than a research and dissemination tool.

(c) In some countries, the process of technology development (including priority setting, etc.) is fairly well coordinated and/or jointly carried out with full knowledge and participation of MOA staff and with other projects. The relationship between project and CARDI activities and the country MOA staffs, other donors and projects should continue to be emphasized and strengthened.

(d) Project country staff are limited in their access to and use of research station facilities to carry out on-station testing. The low level of on-station research activities will have an adverse effect on the quality of future "on-farm" trials. There is a tendency to initiate too many "on-farm" experiments when some could have been carried out "on-station"--more efficiently and cheaper. This rush to get "on-farm" with trials can be premature and defeat the purpose of FSR/D.

(e) Socio-economic work is promising and has already shown good results, especially in marketing. The rapid survey methods are also useful. However, the socio-economic staff needs to work better together (marketing with production economics) and the socio-economic team must be better integrated with the agonomists and biologists. The socio-economists have also a crucial role to play in priority reassessment as suggested earlier.

(f) The Evaluation Team did not have the opportunity to review in depth the quality of the technical work, but it judges the general capability and preparation of the staff as excellent. Most of CARDI's work in the Eastern Caribbean is correctly of an adaptive nature, stressing introduction of new varieties, seeds, testing them under field conditions, as well as in the identification of crops and animal constraints and their elimination. The project has made a determined effort to equitably distribute responmsibilities, technical expertise and specialized skills throughout the participating countries. It is, however, the Evaluation Team's feeling that the existing staff could be deployed more effectively among islands and between research programs. The Grenada program, for example, needs strengthening.

6.2 RECOMMENDATIONS

* That the development of TIFS be continued, but that the information contained therein and the interface of the research staff and the TIFS information with extension, be better planned and effectively utilized.

* That every effort be made to accomplish more on-station screening prior to on-farm testing. This issue should receive high priority by CARDI and by AID if present financial rules do not permit the proposed shift.

* That the socio-economic work be more closely integrated with the systems agronomists, and that together they undertake an assessment of the potential economic impact of proposed activities prior to the conduct of the research, rather than only at the completion of the research.

* That the marketing component of the project be more closely linked with the research planning process and with the work of the production economists.

* That the FSR/D program in a few countries, in particular Grenada, be reviewed and strengthened, and that some consideration be given to possible redeployment of technical specialist(s).

7.0 TECHNOLOGY TRANSFER

7.1 CONCLUSIONS

(a) The capacity of the extension service in most countries to transfer technology and to assist in farmer adoption is minimal and will limit the potential impact of the project.

(b) CAEP and other projects and activities are attempting to improve the effectiveness of the country-extension services, but limitations of staff, training, and resources are difficult to overcome. If the CARDI Farming Systems Project is to have the maximum impact it should be more pro-active in examining and assisting in technology transfer.

(c) Many of the expected 42 TIFS are now under development with a considerable amount of improved technology already being tranferred and/or adopted by producers. The Evaluation Team suggests that the project interface more effectively with existing extension services, private firms, farmer groups, and others to make available the information being generated by the project.

(d) The above does not mean that the project should in any way replace or carry out the responsibilities of the extension service. Therefore, the Evaluation Team

recommends that AID give consideration to the establishment of one or preferrably two positions as technology transfer liaison officer(s), to work directly with the FSR/D project through CAEP. Such an individual(s) would work with the researchers, compile the information, assist in development of TIFS, develop material to provide to the extension services, and work with the extension agents in training and information transmittal.

(e) In the last stages of the project, ways should be found to involve the extension staff in the MOA's at all stages of the FSR/D activities, to stimulate their participation, create ownership, and to enable them to understand the technology generation process as well as the results, in order to improve their capability for technology transfer potentials.

7.2 RECOMMENDATIONS

* That the project examine and address technology transfer more explicitly and examine ways in which it can link more effectively with extension services, private firms, farmer groups, and others to make available the information generated by the project.

* That the US-AID/RDO(C) give consideration to the establishment of one or preferably two positions as technology transfer liaison officer(s) to work directly with the FSR/D and CAEP projects.

* That the project considers the development and implementation of a monitoring and feedback mechanism to assess progress and provide feedback into the research and technology transfer mechanism.

8.0 INSTITUTIONAL STRENGTHENING

8.1 CONCLUSIONS

8.1.1 CARDI STRENGTHENING

(a) For reasons mostly external to the project, the implementation of the strengthening activities designed to improve CARDI management and operational effectiveness has been limited. The Evaluation Team suggests that during the remaining LOP, emphasis should be placed upon the implementation of the operational and management procedures and activities that have already been defined and/or put in place, rather than continuing to develop additional ones.

(b) Additional attention needs to be placed on the development of an overall strategy for CARDI

in terms of its operation and role in the Eastern Caribbean. This has many ramifications which will impact upon and determine the effectiveness of CARDI and its support by donors and member states.

(c) The identification and hiring of a dynamic and effective new executive director is of primary importance in the strengthening of CARDI as a whole, administratively and operationally. The Evaluation Team believes that the search to identify and hire such leadership be given the highest priority, and that the implementation of additional institutional strengthening activities should await the appointment of the new executive director.

8.1.2 PROJECT STRENGTHENING

(a) Numerous project specific strengthening and training activities have been carried out effectively. Much progress has been made in the start-up and implementation of the project to date, but continued emphasis needs to be placed on planning, management, and implementation procedures to improve performance while decreasing cost and time requirements of the staff.

(b) The project has made great strides in improving the relationships between the country

activities and the resident MOA's and staffs. These relationships need to continue.

(c) The shift in priorities, research procedures, called for in this report, perhaps even in the geographic distribution of staff during the next project phase, will imply the weighing of alternatives and will undoubtedly require management assistance to implement these changes. The Team urges SECID to assist the project management in achieving the recommended shifts without sacrificing efficiency of the ongoing program.

(d) The project should develop mechanisms for staff professional development and improvement through the initiation of staff improvement plans. These plans could address such topics as short-term training opportunities, accessibility of relevant literature to staff, improved communications and linkages with other organizations.

8.2 RECOMMENDATION

8.2.1 CARDI STRENGTHENING

* That the implementation of additional institutional strengthening activities should await the appointment of the new executive director.

* That during the remainder of the LOP, emphasis should be placed on the implementation of operational and management procedures already agreed upon and initiated.

8.2.2 PROJECT STRENGTHENING

* That future management assistance give preference to the issues identified in this report, and more particularly on the carrying out of shifts in programs as on re-focusing research procedures.

* That the project management develop mechanisms for staff professional development and improvement through the initiation of staff improvement plans.

* That a monitoring and evaluation plan and data collection system be developed and utilized for measuring progress toward the achievement of project outputs and purpose and for the end-of-project evaluation.

9.0 LINKAGES

9.1 CONCLUSIONS

(a) A significant feature of agricultural research and development in the OECS is the fragmentaton and lack of

coordination among the various organizations providing these services. The fragmentation and poor coordination in Caribbean agricultural R/D activities should be a permanent concern to CARDI and donor agencies.

(b) Linkages with CARDATS are good and should be extended, in view of the similar approaches and complementarities of the two organizations. However, most other institutions/organizations working in the Eastern Caribbean use a straight commodity or narrowly focused methodology, which does not facilitate collaboration.

(c) The Evaluation Team believes that linkages need to be developed soon between the current project and AID's newest project in the Eastern Caribbeanm--the High Impact Agricultural Marketing and Production Project.

(d) The FSR/D project may need to shift some emphasis away from import substitution-type activities to more export-oriented programs. This would result in establishing closer ties with AID's HIAMP project as well as with the Tree Crop Industries of the Windward Islands.

(e) During the remaining LOP, positive steps should be made to involve UWI Faculty of Agriculture actively in

the project. For example, it is desirable that use be made of appropriate UWI professionals as short-term consultants in areas such as Root Crops and Grain Legumes production, Soil-Water Management/Conservation, Soil Fertility and Fertilizer Usage, etc., and also of graduate students for dissertation researcch.

9.2 RECOMMENDATIONS

* That CARDI take advantage of existing forums in the CARICOM region to convene regular meetings of its principal donors to ensure better linkages and coordination between the current FSR project and donor-funded agricultural R & D activities in the sub-region.

* That during the remainder of the project, positive steps be taken to bring UWI-FOA more actively into the project.

* That during the next two year, the FSR/D project should shift some of its emphasis from "import substitution" type enterprises to more "export oriented" program activities, in order to tie in more with AID's new project, HIAMP.

10.0 SUSTAINABILITY

10.1 CONCLUSIONS

(a) The original assumptions about the potential sustainability of the FSR/D project beyond the life of the current AID support were wrong. Neither CARDI, as a regional organization, nor the OECS will be able to sustain an applied FSR effort after 1988.

(b) It is not too clear at this stage what components of the FSR methodology will ultimately prove to be sustainable. Such aspects as farmer involvement in testing alternative technologies, targeted research to a market-oriented clientele, and research sensitive to and coordinated with agricultural price or trade policies, have a good chance to become widely adopted in the future.

(c) At mid-point it appears that the most important and potentially lasting contribution of the project is the creation of indigenous applied research capacity in the Eastern Caribbean region, especially in the form of attracting and motivating a group of younger Caribbean agricultural scientists who would otherwise have to seek employment elsewhere.

(d) Because of the smallness and dispersion of island economies, a long-term regional scientific presence

seems to be required. This presence may be envisaged as a three-tier system:

(i) NATIONAL CAPACITY to carry out simple testing and adaption of already existing technologies, as well as to interact with field extension personnel.

(ii) INTER-COUNTRY EASTERN CARIBBEAN CAPACITY: to service a sub-region of about half-a-million population to work on common problems, interchange experiences, provide a common information system, and provide networking.

(iii) REGION-WIDE CAPACITY: to perform more sophisticated research and high level advisory services, tied to the Caribbean academic community and linking it to the international research establishment.

The FSR/D has made a good start toward (i) and (ii), but has moved only slowly toward (iii). Level (i) is the only one which may eventually be sustainable by governments; with levels (ii) and (iii) requiring long-term external assistance. The three levels are interdependent.

(e) The Team deplores the tendency of donors to rely on extra-regional technical assistance for the solution of research problems, rather than to use and build

regional Caribbean capacity. In this sense, the current project has definitely helped to mobilize and further develop indigenous human resources.

(f) Among the many reasons why technical assistance will be needed beyond 1988 are the following:

(i) Much of the expected payoffs from ongoing research investments will take longer than the formal project period.

(ii) Feedback from actual practices will accumulate only during the last two years of the project.

(iii) New problems are likely to arise, especially pest and diseases outbreaks.

(iv) Changing economic conditions will present new opportunities.

(v) HIAMP will generate new demands for technology generation and transfer.

(g) US-AID is faced with a number of alternatives for dealing with longer-term agricultural research in the Eastern Caribbean. The main choices appear as follows:

(i) Terminate technical assistance after FSR/D project is over (i.e. in 1988).

(ii) Fund research in individual countries separately,

with specific technical assistance targeted for identified programs.

(iii) Select a major U.S. university or group of universities to provide long-term support to the Eastern Caribbean region.

(iv) Continue to support Eastern Caribbean sub-regional research network, but with clear ties to WINBAN and other private sector organizations.

(v) Seek international donor coordination for a re-structuring of CARDI, place Eastern Caribbean system within framework of Caribbean-wide research network, with closer ties to UWI. Seek agreement with other donors to change piecemeal-type assistance to long-term institutional support.

The Evaluation Team does not recommend any of the first three alternatives. Instead, it prefers alternatives (v) and (iv) or a workable combination of both.

10.2 RECOMMENDATION

* That long-term sustainability issue should receive high priority by AID and by CARDI. AID should continue to support an Eastern Caribbean agricultural research network possibly with ties to WINBAN and other private sector research institutions, while seeking international donor coordination for a re-structured CARDI at the Caribbean-wide level.

CARDI-MEMBER COUNTRIES

CHAPTER ONE

I.0 INTRODUCTION

1.1 PURPOSE OF THE EVALUATION

In March 1986, the Agency for International Development (US-AID), contracted with Dimpex Associates to carry out a Mid-Term Evaluation of the CARDI Farming Systems Research and Development Project (No. 538-0099), in the Eastern Caribbean, on behalf of US-AID's Regional Development Office of the Caribbean.

The purpose of the mid-term evaluation was to determine the extent to which "overall progress has been made toward the achievement of the project's objectives." The detailed scope of work for the evaluation is given in APPENDIX 1.

In discussions with US-AID officials in Barbados, it was confirmed that the Evaluation Team should interpret its mandate broadly. The Team was instructed, not only to evaluate the project's progress to date, but also to provide recommendations on whether and how the project ought to be extended or an appropriate follow up provided, taking into account both AID's on-going projects and the new major initiative through HIAMP.

The Team was also asked to provide comments and possible recommendations regarding US-AID's future relationship with CARDI, in particular the potential approaches US-AID could consider for providing funding to CARDI.

EVALUATION TEAM: The Evaluation Team consisted of Collin C. Weir, Agronomist and Team Leader; Thomas Carroll, Agricultural Economist; and James B. Henson, Livestock Specialist, and Research Management Specialist. Because of the complexities and inter-relatedness of the project's components, the evaluators shared responsibilities for all of the technical aspects of the project.

1.2 PROCEDURES

The evaluation methodology consisted of three separate team visits to the Eastern Caribbean, plus one team visit to meet the Technical Assistance Contractor, the South East Consortium for International Development (SECID) in Washington DC.

(a) DEVELOPING EVALUATION PLAN--April 1-12

Details of the Evaluation Plan are given in APPENDIX 2, and a list of the countries visited and people interviewed are shown in APPENDIX 3. An oral presentation was made to AID-RDO(C) officials prior to the Team's departure on the 12th of April.

(b) PRESENTATION OF EVALUATION PLAN--May 7-10

The leader of the Evaluation Team, Dr. Collin C. Weir attended the third Annual Project Planning Workshop in St. Kitts from May 7-10, to present his Team's plan for carrying out the evaluation of the FSR/D

Project. Attending the workshop were all of the Project Country Team Leaders and some of their team members, Project Administrative Staff, SECID's two technical project advisors, CARDI's Director of Research and Development, and a US-AID representative from Barbados. At this workshop, the Evaluation Team Leader distributed questionnaires to country team leaders for their completion and submission to the Team before their scheduled return to the Caribbean on June 23rd.

(c) DISCUSSIONS WITH TECHNICAL ASSISTANCE CONTRACTOR--SECID

On June 4, the Evaluation Team met with SECID, the technical assistance contractor, at their head office in Washington DC. Representing SECID were Harry Wheeler and William Levine, Project Coordinator for the project and the Director of SECID's Washington office respectively.

(d) FIELD WORK, INTERVIEWS, AND SURVEYS --June 23-July 11

Details of the three week field evaluation are given in APPENDIX 4, showing countries visited and key personnel interviewed. In each country, the Team conducted a series of interviews with government officials, representatives of other development agencies (international and regional), local agricultural

agencies, and farmers participating in the project. Because of the need to complete the field work in all eight countries within three weeks, it was not possible for each member of the Evaluation Team to visit every country. Two or three members visited the larger countries, while only one team member visited Montserrat, St. Kitts and Nevis.

(e) METHODS OF DATA COLLECTION

A wide range of data collection methods could be used, ranging from simple observation to complex survey designs. Each has implications in terms of cost, time and accuracy, but because of the nature of the project and the need to visit eight countries in a three week period, the Team chose to use a practical and reliable method which utilized existing records, along with personal interviews. Key eliciting questions were prepared beforehand for all interviews. These are shown in APPENDIX 2, ATTACHMENT 2.

In order to ensure that the Evaluation Team had accurate information available on project status and progress indicators, a questionnaire was designed for completion by each country team leader prior to the arrival of the Evaluation Team. The information provided in response to the questionnaire was of mixed quality. Some country teams provided thoughtful and

detailed replies, while others were more perfunctory. Details of this questionnaire are shown in APPENDIX 2, ATTACHMENT 3.

1.3 CIRCUMSTANCES THAT LED TO CURRENT PROJECT

SMALL FARM MULTIPLE CROPPING PROJECT

The current FSR project grew almost directly out of the former AID-funded Small Farm Multiple Cropping Project (SFMCP). Because this latter project was only partially successful, AID decided to implement the present FSR/D project, hopefully to achieve what the SFMC project failed to accomplish in its four years of operation (1978-82).

The SFMC project was initiated in 1978 to develop a cooperative CARDI/Country on-farm research capability in eight states in the Eastern Caribbean. The purpose of the project was to develop recommendations for improved farming systems through adaptive farm-based research. The central feature of the project was its emphasis on "on-farm" based research, which was part of a broad program of agricultural research designed to improve the production and economics of small farmers. The SFMC project, however, proved to be over-ambitious by expecting CARDI to transform itself from a traditional research institution to one based on carrying out adaptive on-farm research. In addition, the project expected CARDI to develop a functioning on-farm research

program in most of the Eastern Caribbean states in four years!

It became clear, during the project implementation, that CARDI did not possess the necessary crucial management and financial control systems to adequately administer the project. The need to strengthen CARDI's capacity in terms of research planning by evaluations conducted by organizations external to CARDI. Foremost among these was the "Mangement Audit to assess and review CARDI," conducted by AGROCON Ltd (Jamaica), in February 1983. Subsequent evaluations of CARDI have also confirmed the critical need for improved management operations with CARDI. Examples include, "Report on financial Systems of CARDI," by Price Waterhouse, December 1984, "Analysis, Evaluation and Poposals to Strengthen CARDI's Regional Capacity" by ISNAR, August 1985, and others.

Based on these identified technical and management weaknesses, AID agreed to implement the current FSR/D project, incorporating both a productivity and an institutional strengthening focus. The assumption being made by US-AID is that CARDI is fully committed to "on-farm adaptive research," a committment that will give the FSR/D project a high probablity of success. The validity of these assumptions will be borne out in the following chapters of this report.

CHAPTER TWO

2.0 PROJECT DESIGN ISSUES

2.1 US-AID REGIONAL STRATEGY

AID/Barbados deserves high marks for its willingness to commit considerable resources to a regional and novel approach to Eastern Caribbean agricultural research, in the light of unfavorable and risky circumstances. The Evaluation Team commends the AID/RDO staff for having approved an important but difficult undertaking and for having played a sensitive and supporting role in negotiating necessary changes as the project unfolded. The major design concepts appear to have been sensible: (a) specifications for achieving a set of desirable outputs within a reasonable time; (b) provision of resources to complement a minimum but increasing level of government contributions; and (c) outside technical assistance to address insitutional weaknesses and to supplement regional human resources.

The project is quite consistent with RDO(C) strategy for agricultural assistance in the Eastern Caribbean. Through improvements in production technologies, the project should stimulate agricultural sector growth, thereby contributing to AID's overall assistance objectives. The project will also complement other AID-funded agricultural project activities in the region.

2.2. TECHNOLOGY DEVELOPMENT & TRANSFER

However, midway through implementation it now seems that the original design was too ambitious and too unrealistic, especially with respect to time frame, government counterparts and financial commitments, and sustainability. Some of these discrepancies between expectations and actual outcomes are inherent in the "project format" which is not very suitable for this sort of activity, some are due to the weak institutional basis on which the project was built (both in CARDI and in the participating governments), and some can be attributed to the highly innovative but experimental nature of the Farming Systems approach itself. It should be pointed out that such design problems are not unique to this project but are a recurrent feature of many others.

When the Small Farm Multi Cropping Systems project terminated and before disbursements under the new project were actually available, there was a gap in financing CARDI's Eastern Caribbean research staff. This gap has had a negative influence on the smooth transition between the earlier project and its successor and also caused a considerable delay in start-up. For example, the first year's workplans were essentially done in the Central Project Office because there was not yet any money for travel or for organising workshops with government personnel. In

general, CARDI needed the project for its survival and hence agreed to carry it out in a form that was acceptable to AID, even though the core staff in St. Lucia was conscious of some of the unrealistic design features. AID, for its part, was well aware that relying on CARDI presented some risks--it therefore tried to insulate the project against deficiencies at the central CARDI level. This strategy has been successful in acieving accountability, but counter-productive in terms of institution building.

Both CARDI and AID believed that the FSR/D approach, while experimental, would prove to be more applicable and productive than conventional research methods. However, they both underestimated the difficulties inherent in working with an approach unfamiliar to most Caribbean agriculturists and untried in practice in the region. In particular, the introduction of a "bottom-up" style of research and development proved to be very slow in an environment used to a "top-down" style, for which CARDI itself was no exception.

The technical aspects of the design, featuring a systems (rather than a pure commodity) approach, as well as a participatory style of research, were the results of collaboration between Dr. Robert Hart, an AID consultant who subsequently became the F/S Advisor to the project, and a small CARDI staff group who had benefited from the results

of AID's previous multiple cropping project. However, the conclusions of the multi-cropping study (largely descriptive) when translated into field research, were not found always useful. The original ideas for the FS methodology employed had their origin in Central American experiences, especially through CATIE. It appears to the Evaluation Team that Caribbean conditions were sufficiently different to Central American to warrant adjustment in the methodology. Also, the great diversity of country conditions and the discrepancy between the original agro-ecologically determined clientele and the subsequent shift to market-oriented target groups were not foreseen.

The whole FSR process is gradually being modified and improved, as the project gains experience. But the project design is linear and allows for little flexibility. One of the major contradictions involves shifting emphasis in crops or research thrusts. To bring any one activity to its conclusion during the life of the project, the methodology called for a progression of pre-established steps from identification to validation/diffusion. If new ideas or variants for research arise in mid-project, how could these be accommodated in the design? Another matter under-estimated at design was the amount of development effort (as distinct from strictly research) needed to test and validate technologies. CARDI provides not only seeds or planting

materials, but often also fertilizer, pesticides, and other inputs, etc. If there are no suitable arrangements for machinery service, spraying equipment, marketing, the validation process is impaired. Yet, the research staff obviously has very limited capacity to respond to such developmental demands on which the success of research ultimately hinges. The design also implied that the FS methodology would become diffused and eventually accepted in its entirety.

2.3 INSTITUTIONAL STRENGTHENING ASPECTS

One of the major dilemmas in the design was the relationship with CARDI as a whole. For understandable reasons, the project was meant to be almost completely Eastern Caribbean, bypassing CARDI headquarters. Yet, through a parallel technical assistance component, CARDI headquarters was to be "strengthened" to the point when after five years it could absorb and take over management of the project activities. In actuality, the exclusion of the rest of CARDI from the project has further weakened the overall organization, while the assumptions underlying the "strengthening" activities were quite unrealistic, as detailed clearly in the ISNAR report. The main interlocking problems of CARDI as a whole were clearly identified as the following: (a) lack of effective, dynamic leadership; (b) lack of clear research strategy, especially for the MDC's;

(c) unwillingness of the MDC's to comply with their financial obligations; (d) redundancy in the senior staff at Trinidad HQ; (e) poor relations with UWI; and (f) low managerial and financial performance. The FS project addressed only the last item. Without substantial changes in the other factors, management training and better accounting practices cannot make a major inpact in the overall situation. For example, what is the utility of having a manual on planning and programming procedures when the individuals assigned to the new planning office are non-functional?

The sustainability issue and some of the essential learning processes which are ocurring in technology generation and diffusion, will be taken up in more detail in subsequent sections of this report, where appropriate recommendations will be made.

CHAPTER THREE

3.0 IMPLEMENTATION HISTORY AND PRESENT STATUS OF REPORT

3.1 DELAYS IN START-UP

In some respects the implementation of the FSR/D project was viewed as an extension of the previous AID-supported project, in terms of the continued collaborative team process. At the time of Grant Agreement signing (June 1983), CARDI country teams were already partly organised in the participating countries--carrying out selected aspects of the FSR methodology. Because of the fact that the proposed project would support and build on on-going CARDI activities, it was essential that there would be no undue delays in implementation. Unfortunately as things turned out there were fairly serious delays in start-up.

The projected start-up date was mid-1983, but actual start-up was delayed by almost one year, with the initial project workshop being held in St. Lucia in January 1984. It is also significant to point out that no funds were released by AID for this workshop. Consequently, the 1983/84 workplan was initially developed by only a few CARDI staff. Since then, the procedure for developing workplans has involved participation from Ministries of Agriculture (Extension and Research), and all FSR project staff--with

workshops in Barbados (1984), Antigua (1985) and St. Kitts (1986); following various in-country and sub-regional consultations.

Signing of the contract for Technical Assistance between US-AID and SECID was also delayed by approximately nine months--meaning that SECID's FSR Advisor did not arrive in St. Lucia until August 1984--instead of January 1984. This, of course, meant that the development of the FSR Methodology (Technology Generation and Transfer) was also delayed.

3.2 STAFFING, ORGANISATION, MANAGEMENT

APPENDIX 5 shows the current technical staff list for the CARDI FSR/D Project in June 1986. There were a total of 19 Country Team staff, plus 5 Technical Specialists, 2 Technical Coordinators (one for the Leeward Islands and the other for the Windward Islands), and the Project Director, who has overall responsibility for supervising, monitoring, and reporting on relevant project related activities. Supporting these technical staff members, there are a total of 13 administrative staff spread over the 9 islands.

The 2 sub-regional project support units have been established in St. Lucia and Antigua. Sub-regional FSR/D Technical Specialist staff are assigned to each unit--at the current time there are 4 Technical Specialists in St. Lucia and 1 in Antigua.

At the country level, CARDI has country teams (CTs) headed by a CT Leader (CTL) and supported in most cases by only another Country Team Member. In the Project Paper it was assumed that CTs could be comprised of a CTL, supported by one more CT member, and several research support staff, including a Counterpart staff from the local Ministry of Agriculture. In no country was this organisation observed. For example, Government Counterpart staff were an active part of the FSR project in only 5 of the 8 countries.

3.3 PROVISION OF INPUTS

3.3.1 US-AID

The original Grant Agreement of the FSR/D Project called for increasing CARDI contributions for personnel and operating expenses--whereby CARDI would fund an increasing proportion of these expenses starting in Year 2, and would fund regional travel beginning in Year 3. In addition, CARDI would fund the operational costs of the field stations throughout the life of the project.

However, after one year of operations, it was found that CARDI was experiencing serious difficulties meeting its full share of FSR/D Project costs, due primarily to the failure of CARDI-member governments to meet their regular payments to CARDI's core budget. Arising out of this, CARDI and AID renegotiated the

original Grant Agreement to allow for a lower CARDI contribution to the overall project costs. Through this Amendment (No. 4), dated June 12, 1985, CARDI's contribution was reduced from $4.72m to $2.03m, consisting mostly of personnel costs reduction APPENDIX 6). In this new Agreement, AID would fund total personnel costs of Country Teams, management support staff, and accounts clerks during the LOP. AID would also fund total technical specialists costs during the first 4 years, with CARDI providing funds for Year 5.

AID and SECID also renegotiated the Technical Assistance contract. Amendment No. 3 of this contract, dated May 13, 1985, reduced the level of effort from 165.5 to 134.5 person months, or a reduction of about 20 percent. The contract was also decreased from $2.847m to $2.044m or about 28 percent (APPENDIX 7).

Consequences of the Amended AID-SECID Contract

In effect there was a 28 percent reduction in funding between the original Technical Assistance contract and the renegotiated one. In addition the level of technical assistance inputs was reduced by about 20 percent. The assumption which was made by CARDI/AID was that the project could be carried with fewer

resources (inputs) than originally projected, and still meet the original goals, purposes, and outputs. This assumption was based on the fact that because of the one year delay in getting the Technical Assistance, the renegotiated budget was, in effect, actually quite close to the annual funding level originally envisioned.

In spite of the above assurances, there is much concern among the Project Team, particularly in relation to the significant reduction in the inputs of the FSR Advisor. In the original Grant Agreement, 42 personnel months (pm) were allocated for the FSR Advisor in the new Agreement, this was reduced to 28 pm. At the present time the FSR Advisor has just completed (May 1986) his resident period of 22 months, thereafter, until the end of the project, he will make periodic short-term site visits totalling 6 months. Although the full impact of his departure has not yet been realised, there are many Project Team members who are very concerned about the effects of the Advisor's departure on subsequent technology generation/ transfer.

3.3.2. CONTRACTOR PERFORMANCE

The South East Consortium for International Development (SECID) has recently completed 2 years of

providing Technical Assistance to the CARDI-FSR/D Project. Collaborating with SECID in providing the Technical Assistance is the University of Maryland, Clemson University, Southern University, Virginia Polytechnic Institute, and Winrock International. Apart from Technical Assistance, SECID also is responsible for the procurement of equipment and supplies. To date, SECID has fulfilled its contractual obligations in the provision of Technical Assistance and commodities, although the results are for various reasons uneven.

(i) Technical Assistance

SECID has so far supplied 22 months of a long-term FSR/D Specialist from Winrock International (Dr. Robert Hart) and 11 months of a short-term Research Management Specialist from the University of Maryland (Dr. Marcus Ingle). In addition SECID provided 13 months of additional short-term assistance, of which 82 percent was for Institutional Strengthening and 18 percent was for Technology Generation/Transfer.

(ii) Farming Systems Research Advisor

The FSR Advisor was on duty in the Caribbean from August 1984 to June 1986. The overall responsibilities

of the FSR Advisor during this 22-month resident phase were to:

(a) Assist the country Teams and the sub-regional support staff in the design and implementation of FSR/D activities;

(b) Assist the CARDI Project Director in the centralized project activities of planning, budgeting, and evaluating;

(c) Assist in identification of short-term Technical Assistance requirements; and

(d) Participate and contribute in the project workshops and seminars.

The Evaluation Team reviewed the various FSR/ activities for relevance, quality and potential impact, in all of the participating countries. Although the FSR activities undertaken by the Project Team appear to be generally acceptable, there are a few cases where the activities chosen were marginal and the potential for impact quite doubtful. There appears to be overall support for the appropriateness of the FSR approach in the Eastern Caribbean. All Ministry of Agriculture officials interviewed, as well as many local, regional, and international agencies expressed varying support for the methodology. However, there was some concern

over the complexity and partly theoretical/academic emphasis of the current methodology being implemented. More detailed comments will be made on this point later in the Evaluation, but it appears that some modification of the methodology might be needed in order to increase its relevance and practicabity for Caribbean agriculture.

(iii) Research Management Specialist (RMS)

The overall responsibility of the RMS advisor (Dr. Marcus Ingle) is to assist CARDI in implementing the institutional strengthening component of the project. The RMS carried out most of his duties, albeit with varying degrees of success.

In as much as the institutional strengthening of CARDI by the project, has not been too successful, the reasons for this are mostly due to the unrealistic assumptions made during the project design. Thus failure to implement CARDI's new financial, personnel, and management systems, as well as the Program Planning and Evaluation unit, is due to factors mostly beyond Ingle's control. Foremost among these is the protracted delay (over 1 year) in the appointment of the Director of Finance and Administration. However, the RMS has provided pragmatic support to CARDI's internal

Task Force on O & M, in their attempt to implement the complex proposals for strengthening CARDI's organisation.

With regard to the remaining duties of the RMS, much assistance has been given to the Executive Director and the Director of R/D in the formulation of Annual Workplans, identification of short-term specialists, and in the establishment of a Research Advisory Board. However, interviews with the Project Team indicate that the short-term management training activities were not too effective--perhaps due to the unfamiliarity of the professionals with Caribbean conditions and CARDI's unique problems.

3.3.3 CARDI

After the renegotiated Project Grant Agreement in July 1985, CARDI's financial obligations to the project were reduced to provide:

1. Salary of Project Director-5 years,
2. Salaries for Technical Specialists in Year 5, and
3. Operating expenses of Field Stations.

The Evaluation Team found that there was a rather low level of research activity on CARDI's field stations which was primarily due to the unavailability

of funds from CARDI's Core budget. In all cases, the land being used for CARDI's Field Station was donated by the local government, while the infrastructural developments (buildings and equipment) in many cases, were donated by other international development agencies, in particular, the European Development Fund. Very little evidence of genuine FSR technology development activities were observed on the Field Stations. One Country Team Leader commented, "The lack of adequate physical support, such as research station facilities and laboratory facilities has significantly restricted development within the project." Another remarked that, "...limited back-up field station activity has been conducted because of no financial resources." The wisdom of funding the Field Station operating expenses out of CARDI's core budget has already been commented on. Suffice it to say that the low level of technology development activities on the Field Stations will undoubtedly have an adverse effect on future "on-farm" activities (Steps 9 and 10). The Evaluation Team recommends that both AID and CARDI give urgent attention to this aspect of the project activities--making whatever modifications are deemed necessary and feasible.

3.3.4 MINISTRIES OF AGRICULTURE (MOAs)

Financial obligations by the MOAs toward the FSR project involve providing:

1. Salaries/benefits of Counterparts on country teams; and
2. Office space used by Country Teams in Antigua, St. Kitts/Nevis and Montserrat

Of the 8 participating countries in the FSR/D project it appears that only 5 have provided continuous Counterpart staff for the local FSR Country Teams. the Evaluation Team could not confirm the sustained involvement of MOA counterpart staff in Grenada, Dominica, and St. Kitts.

The Project's assumption that each MOA could supply one counterpart to the local Country Team is somewhat unrealistic. In some of these countries there is no Research Officer within the MOA--so providing a counterpart for the FSR Project was certainly not feasible.

3.3.5 EXTERNAL FACTORS

Many factors external to the project have affected the implementation of the project--some in a positive way--others adversely. One of the most significant factors is changes that have occurred in the Project Team. The composition of nearly all of the Country

Teams has undergone significant changes during the 2.5 years of the project life. Antigua has been the country that suffered the most, and since the start of the FSR Project there have been 4 different CTLs in Antigua. This lack of continuity in project personnel has undoubtedly adversely affected the progress toward the project's objectives.

The presence of other donor agencies in the region has had some positive effects on the progress of the project.

The FSR Project is working fairly closely with other regional and international agencies--in both technology development and transfer. Perhaps the most significant relationship is that with CARDATS (Caribbean Agricultural and Rural Development Advisory and Training Services) and FTC (French Technical Cooperation), both in the area of technology transfer. Some positive linkages in technology development have also been established with IICA and EDF. Details on these relationships will be examined in a forthcoming section on "Linkages."

3.4 PROGRESS IN RELATION TO PROJECT'S OUTPUTS, PURPOSE, EOPs

If the present FSR Project is assessed in terms of the stated Purpose, Outputs, and EOPS (as given in the Project

Paper, pages 18-20), then it does appear that the project will not meet all of these objectives. But partly because of the unrealistic nature of the Project Design and partly because of the significant reduction in project inputs, the project should not be expected to achieve some of these rather arbitrary and even questionable benchmarks.

As far as the 3 main outputs are concerned, viz. technology generation/transfer, and institutional strengthening, there is too much emphasis being placed on the development of 42 TIFs--"economically viable, farm tested and validated." It is difficult to conceive these being achieved in any project in 4 years! Thus the project should not be adversely assessed for failure to meet this criterion.

3.5 RECOMMENDATION

(a) That US-AID fully recognize those external circumstances that have impacted adversely on the smooth implementation of the project, and make appropriate adjustments regarding expected outcomes.

CHAPTER FOUR

4.0 RESEARCH PRIORITIES AND STRATEGY

4.1 ESTABLISHING PROJECT'S ORIGINAL PRIORITIES

Priority setting and planning of an applied research strategy within the FSR project has been more rational and systematic than in most other research activities in the Caribbean, including CARDI headquarters. This has been duly noted by the ISNAR evaluation. The lengthy first phase with island and farm-level studies has contributed to the knowledge of key crop/animal production systems and to the identification of constraints to higher levels of productivity.

The FSR methodology itself embodies a built-in way by which priorities are selected and periodically re-defined. The staff, with assistance from SECID, has also made efforts to establish criteria for priority setting, although it is the Team's impression that these were not applied in any systematic way. After the first year, the project has made determined and largely successful efforts to involve government staffs in the planning process, although, as will be discussed below, such involvement has mixed results on the effectiveness of the planning process.

AID officials have expressed their concern to the Evaluation Team about the correctness of CARDI's priorities,

i.e. whether or not the project is working on the "right" cropping systems and if it is addressing non-trivial problems. On this issue the judgement of the Team is that while none of CARDI's research thrusts can be said to imply a major breakthrough for Caribbean agriculture, taken together, the portfolio of research topics does address important problems and promises a good impact. The original priorities identified in the project document are still in place. These were directed mainly to the predominant agricultural systems, a combination of home consumption and sales, in which the vast majority of small farmers functioned. Thus, these priorities reflected a combination of criteria based on the expansion of urban demand, food security and import substitution.

4.2 MODIFICATIONS IN PRIORITIES AND ACTIVITIES

It is the Team's view that as experience accumulates, some of the initially established priorities may need to be modified. For example, the pay-off from the food legume/cereals thrust is likely to be less than originally expected, while considerably better opportunities exist in selected tree crops. (Some work on these is already planned in Dominica.) The Team also feels that in spite of the limited tradition for commercial cattle farming in the region, there exists a much greater potential for pasture/livestock systems, as shown by some of CARDI's

DRAFT FINAL REPORT

CARDI FARMING SYSTEMS RESEARCH AND DEVELOPMENT PROJECT EVALUATION

Submitted to

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Members of the Evaluation Team

EVALUATION OF US-AID/CARDI

FARMING SYSTEMS RESEARCH AND DEVELOPMENT PROJECT

TABLE OF CONTENTS

TABLE OF CONTENTS, continued

TABLE OF CONTENTS, continued

TABLE OF CONTENTS, continued

APPENDICES:

ACRONYMS

ADP	Agriculture Development Project (St. Vincent)
AID	Agency for International Development
AVRDC	Asian Vegetable Research and Development Centre
BDD	British Development Division
Bds	Barbados
CAEP	Caribbean Agricultural Extension Project
CARDATS	Caribbean
CARDI	Caribbean Agricultural Research & Development Institute
CARICOM	Caribbean Community & Common Market
CATIE	Centre for Research & Training in Tropical Agriculture
CATCO	Caribbean Agricultural Trading company
CDB	Caribbean Development Bank
CGIAR	Consultative Group in International Agricultural Research
CIAT	International Centre for Tropical Agriculture
CIDA	Canadian International Development Agency
CIMMYT	International Maize & Wheat Improvement Centre
CIP	Centro Internacional de la Papa
CTL	Country Team Leader
CTO	Chief Technical Officer
ECIAF	Eastern Caribbean Institute of Agriculture & Forestry
EDF	European Development Fund
EEC	European Economic Community
E.C.	Eastern Caribbean
EOPS	End of Project Status
FAO	Food & Agriculture Organisation
FOA	Faculty of Agriculture
FSR/D	Farming Systems Research & Development
FTC	French Technical Cooperation
HIAMP	High Impact Agricultural Marketing & Production
IARC	International Agricultural Research Centre
ICRISAT	International Crops Research Institute for the Semi Arid Tropics
ICTA	Imperial College of Tropical Agriculture
IICA	Inter American Institute of Agriocultural Cooperastion
ISNAR	International Service for National Agricultural Research
LDC	Lesser Developed Country
LIAT	Leeward Islands Air Transport
LOP	Length of Project
MDC	Medium Development Country
MOA	Ministry of Agriculture
MUCIA	Midwest Universities Consortium for International Activities

ODA	Overseas Development Agency
OECS	Organisation for Eastern Caribbean States
ORD	Organisation of Rural Development (St. Vincent)
R and D	Research and Development
RDO/C	Regional Development Office--Caribbean
RRC	Regional Research Centre
SECID	South East Consortium for International Development
SFMCP	Small Farm Multiple Cropping Program
TIF	Technological Improvement File
TREDU	Training Research Extension Development Unit (Dominica)
UNDP	United Nations Development Program
UWI	University of the West Indies
US-AID	United States Agency for International Development
WINBAN	Windward Islands Banana Association

initial work. Hence, a certain realignment of overall priorities for the second half of the project seem indicated. This should be reflected in the budgetary shares allocated to the various program items: animal production, which is currently 14.8 percent of the total, should go up, while food legumes and cereals, which are 14.4 percent, should diminish. Tree crops and ornamentals are now only 4.2 percent of the total and pasture/energy banks only 4.0 percent. Both should be increased (see Table I).

The suggested reassessment should not be restricted to the relative importance given to cropping systems--it should also be extended to what research is to be done within each system. For example, there may be greater need to stress pest and disease control rather than fertilizer or weed control in specific cases.

The mid-project period is also a good opportunity to carefully review the number of activities and to reduce or eliminate lines of work which are marginal or unpromising. Currently, the project includes too many separate pieces of work, especially in cultural practices relevant to newly introduced plant varieties or crop combinations. While it is understandable that the project staff wants to develop specific sets of recommendations for different agro-ecological domains, the multiplication of these separate experiments threatens to spread resources too thinly and to

reduce the chance that enough of these activities could be brought to a meaningful conclusion.

TABLE I.

RESOURCE ALLOCATION IN CARDI-FSRD PROGRAM ACTIVITIES

1986-87

CATEGORIES	AMOUNT (000) (US$)		PERCENT
Food legumes and cereals	213.0		14.4
Roots and tubers	269.8		18.2
Vegetables	319.6		21.5
Animal Production:	219.7		
Management and systems/parasites		4.4	
Agriculture byproducts/animal feed		0.3	14.8
Root crops as feed		6.1	
Pasture/energy banks		4.0	
Agro-Socio-Economic Studies:	294.4		
Market analysis		10.2	
Production economics		4.2	19.8
Mapping production systems		5.4	
Other Activities:	168.0		
Water resource management		3.9	
Crop protection		3.2	11.3
Tree crops, ornamentals		4.2	
TOTALS	$1,484.5		100.0

The streamlining of the current program requires urgent application of an ex-ante assessment of potential impact which calls for a collaboration between the social scientists and the system agronomists/biologists. The Evaluation Team recommends the immediate development of some relatively simple methodologies for assessing potential impact, based on already available data, as a tool for continuously re-evaluating priorities. Such an assessment could combine estimates of the potential pay-off (foreign exchange savings, export demand) profitability estimates and some notion of the likelihood of adoption by realistically composed target groups. On these criteria, for example, the carrot work on St. Vincent would rate very highly, while the corn/pigeon pea experiments on Grenada would score rather low.

If one adopts a market-led strategy of research, the crops which have assured domestic markets, plus a Caribbean inter-island market, offer the most assured pay-off. If only half of the existing demand for onions, cabbages, carrots and sweet potatoes could be satisfied within 3 to 4 years, the entire project investment would be amply justified by these crops alone. It is interesting to note that the evaluation report of the Small Farm Multi-Cropping Project came to similar conclusions with respect to priority criteria, in 1982, and also about the relevant selection of target farmer groups, which will be discussed later.

4.3 INTER- AND INTRA-ISLAND RESEARCH STRATEGIES

An additional consideration in priority realignment should be the possibility of networking. Research which is relevant to and useful for several islands should be favored over research topics which have only narrow applicability. The CARDI staff has indeed tried to apply such a criterion, but the Team feels that there is still too much dispersion (and some duplication) of effort. Much could be gained by concentrating some of the research on a single island, which could then become the lead country and the hub of a network. This may also require some reassignment of staff. In order to tie in with the new HIAMP program, the networking concept also needs to be extended to UWI, CARDI headquarters, and to the French islands, so that more available expertise can be tapped.

There is clearly a potential conflict between a realignment and narrowing of research priorities and the need to be responsive to governments' requests. The Team feels, however, that the very process of regular consultation and review now established in each country should be a good opportunity to demonstrate to government staffs why some lines of work are more worthwhile to pursue than others, especially if the previously mentioned socio-economic data can be persuasively presented. The networking idea should also prove helpful, as each country could, in

some respects, become a leader in one or more research areas, without necessarily losing budgets, even if some activities are cut or reduced.

The Team is also aware that shifting priorities in mid-stream may disturb the finely crafted sequence established by the FS methodology. Yet, even now, some new activities enter the system at Stage 9 or 10, and can achieve significant results after only two season's work. On the other hand, even if some research is phased out at Step 9, the work already performed (if well documented) can still have value. What needs to be avoided is that research whose payoff is highly problematical remains in the testing phases year after year, with inconclusive results. In general, it strikes the Evaluation Team that project leadership (including the resident advisor) has been more concerned during the past years with the question of "how" than with the question of "what." This situation was also exacerbated by the lack of a macro-economist with practical research experience. Now that a computerized data management system is in place, and the socio-economic staff has been reinforced, there is a good opportunity to redress this imbalance.

With increased commercial production, the problems of disease and pest control are likely to assume much greater importance. Some thought should be directed to strengthen across-island capacity in these fields, with the possibility

of giving the plant pathologist now assigned to St. Vincent a broader regional responsibility.

4.4 RECOMMENDATIONS

(a) That immediate reassessment of priorities should be undertaken for the purpose of improving and streamlining the work program during the two remaining years of the project.

(b) That lines of work and activities which do not show a high probability of technically and economically promising results be phased out, those that do should be strengthened and a limited number of new activities be included.

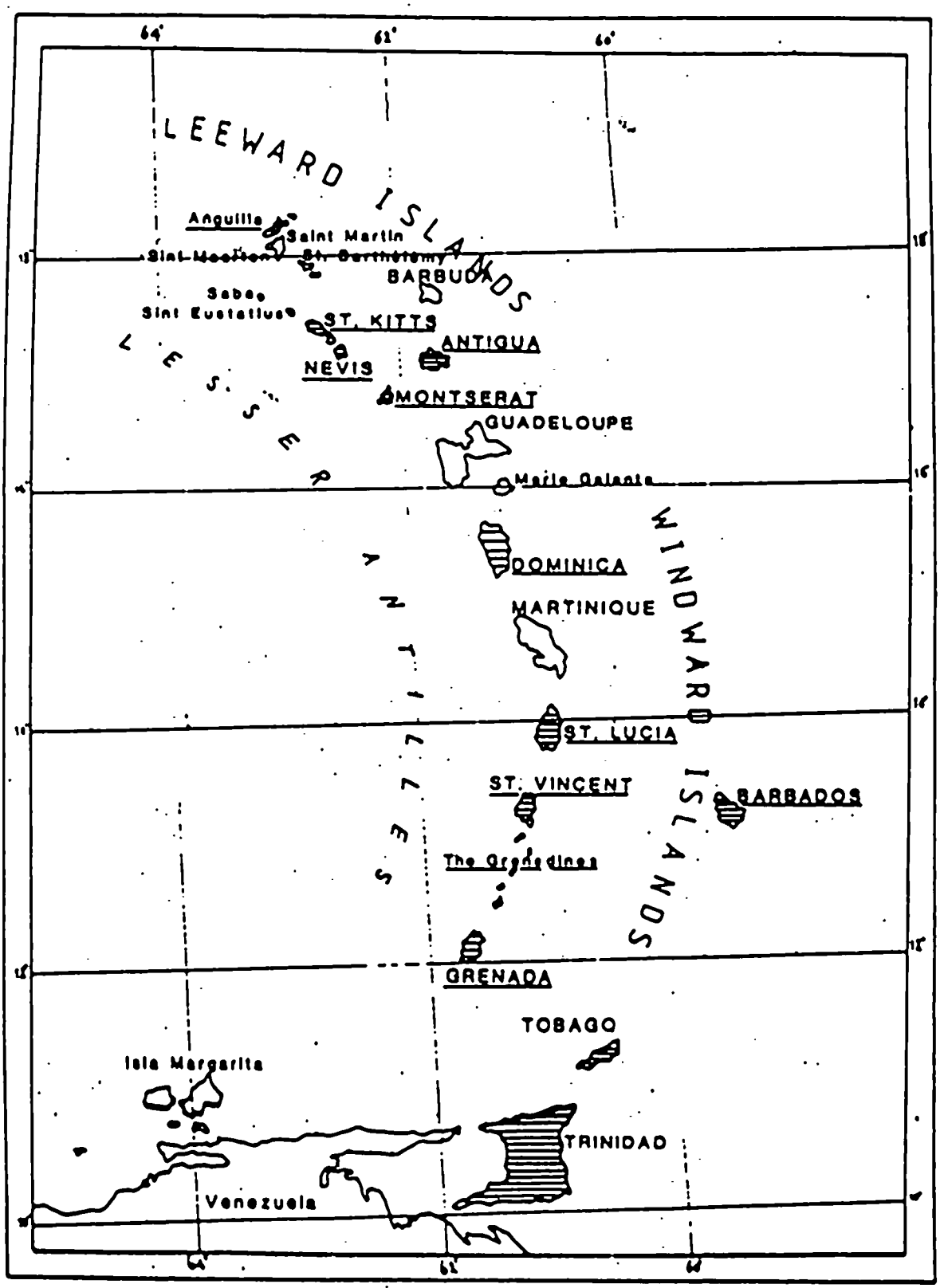
(c) That the allocation of resources for animal production, especially for pasture and fodder systems and also for selected tree crops be increased, while the share of resources allocated to food legumes and cereals be decreased.

(d) That the social science staff in collaboration with the systems agonomists develop some relatively simple methodology for estimating potential impact, based on available data, as a tool for continuously reviewing priorities.

(e) That in the planning for future work programs, the project move toward networking in which one country assumes a central place in a given research effort and services the rest, thereby reducing duplication and achieving greater economies of scale.

77

CARDI-MEMBER COUNTRIES IN THE EASTERN CARIBBEAN



CHAPTER FIVE

5.0 FSR/D METHODOLOGY

5.1 BACKGROUND INFORMATION

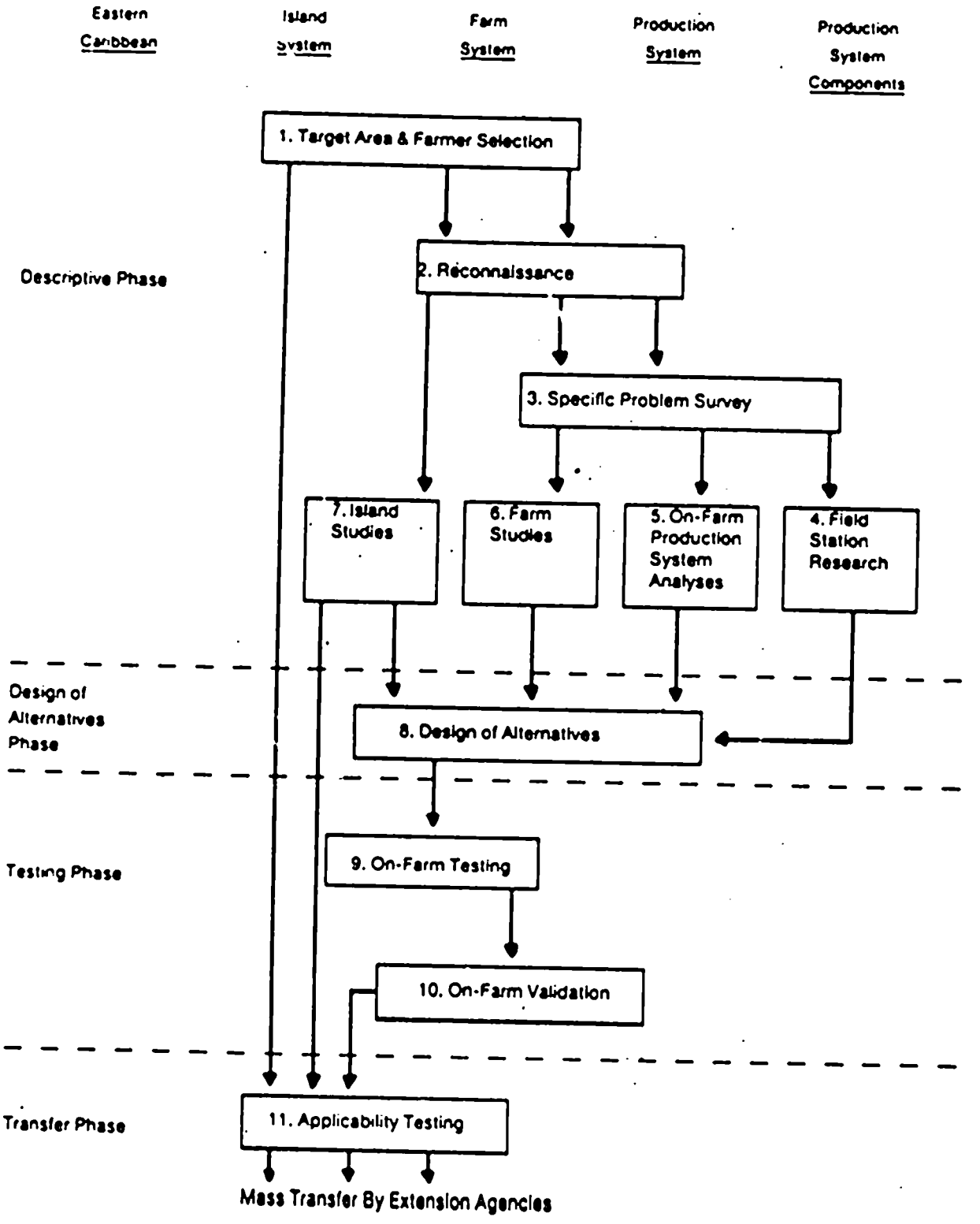
The CARDI/US-AID Small Farms Multiple Cropping Systems Research Project (538-0015) preceeded the present project and was a four-year effort beginning in September 1978 and ending November 1982. This project carried out fairly extensive baseline surveys addressing agriculture in the project countries with the present CARDI Farming Systems Project being a follow-on. Thus, the Small Farms Multiple Cropping Systems Research Project developed a considerable amount of basic information that was utilized in planning the current project. Some of the current staff including the Project Manager, served on the Multiple Cropping Project. An end-of-project evaluation of the latter indicated that the project had carried out little research activities and in essence was composed of the collection of background information. Discussions with the current CARDI Farming Systems Project staff indicates that the results from the previous project have provided a great deal of information that was fundamental to the design and as background data for the current project activities.

5.2 PROJECT FSR/D METHODOLOGY

A detailed description of the methodology being used by the project is provided in Annex E of the project paper. This Annex is included as APPENDIX 8 of this report. FIGURE I, which is taken from the PP provides an overview of the 11-step farming systems methodology being utilized by the project. Because of the details provided in the PP and in APPENDIX 8 of this report, the concept will not be described in complete detail here.

The methodology, as indicated above, includes 11 steps. Steps 1-3 address area and target farmer selection, initial reconnaissance surveys and specific problem focus surveys to obtain additional details. Steps 4-7 include field station research to develop or assess technology that is already available, on-farm testing to identify the best way to improve existing production systems to understand the effects of physical, biological, social, and economic factors on the performance of the production systems including the screening of technologies, etc. Step 6, Farm Studies, is designed to gain a better understanding of the farming systems and their dynamic nature with Step 7, Island Studies, designed to identify alternative systems that can have an impact on the island's agricultural sector at the island level. Step 8 is directed to the design of alternatives and will further address constraints, prioritization of constraints, identification and prioritization of

FIGURE I: CARDI FSR/D METHODOLOGY



Source: CARDI - FSRD project

intervention, and the rating of technology that can be tested for potential impact on the farming system(s) in the target area.

Step 9 involves on-farm testing of alternatives that are researcher-managed. Step 10 addresses on-farm validation in which the technologies are validated on the farmer's fields under farmer-managed trials. Close cooperation with extension agent to determine acceptability by the farmers is included. In Step 11, on-farm applicability testing under farmer conditions and control is carried out.

An important part of the methodology is the development of technological improvement files (TIFS) which are designed to provide information and summarize the research results addressing production systems and the ecological and socio-economic environment where the technology was generated, the technical improvements and a description of the technical justification for recommending the improvements. These technology improvement files are provided to country extension staff for use in the preparation of extension information and technology transfer. The project paper and the local framework indicate that 42 TIFS will be completed during the LOP. These are addressed further in Section F - Technology Development.

The FSR Methodology being used by this project is more complex and more formal than most. The division into 11 steps makes it more difficult for those not intimately associated with the project to understand it. This is true of extension staff, MOA researchers, and administrators.

5.3 IMPLEMENTATION

The methodology is being implemented as designed by project staff. The FSR methodology appears appropriate for the Caribbean situation, but it needs to be tested under a much wider variety of Caribbean farming systems before it could be recommended as the vehicle for developing and transferring technology appropriate for agricultural production in the Region. Whether the present method, with its multiple steps, could be simplified to advantage needs to be examined. The method has not been modified since project inception.

The backgrounmd data collected during the previous project is being used, but the primary information used to define recommendation domains uses agro-climate zones. Background information continues to be gathered on various islands.

5.3.1 TARGET AREAS AND GROUPS

Probably the most nebulous aspect of FSR Methodology is the identification of potential target

groups to whom the research would be relevant and who would form the basis of the eventual impact of adoption. The Evaluation Mission has not been able to obtain consistent and reliable figures of the number of farmers who potentially would represent the target for a certain set of technologies. In a way, this is not surprising as in the Eastern Caribbean the concept of the "Small Farmer" is imprecise and the notion of the "Progressive Farmer" who is a reasonably full-time cultivator and who would be willing to innovate or take risks for higher profits is even more so. For example, Antigua is supposed to have 5,000 small farmers, but only 500, or 10 percent, can be considered full-time farmers, in the sense of deriving the major share of their income from agriculture. However, the Team was told that only 75 units account for 70 percent of the total commercial output. The target population for cotton research in Antigua is estimated at 200+. In Nevis, out of an estimated total of 500 farmers, only 25 may be full-time. The target population for cotton on Nevis was given as 350. On St. Kitts, out of about 1,000 farmers, the CT estimates that no more than 50 are full-time farmers. A further complication is that on most islands, tree crops, field crops, and some vegetables are all grown together, with the cash

portion of the income generated by various proportions of the mixed enterprises. While the SFMC project field surveys indentified and mapped major cropping systems, in practice, these have proved to be unreliable for purposes of pinpointing target groups, except perhaps in basic food crops such as yams, used mostly for home consumption.

In general, what emerges from the first two years experience is that the realistic target groups for commerical crops are much smaller than originally foreseen. This is dictated not only by the relatively small numbers of market-oriented growers, but also by the narrowness of the market itself. For example, St. Kitts can be self-sufficient in peanuts from 40 acres. CARDATS has estimated that for Antigua, the domestic market for tomatoes can be met by planting 70 acres, for onions 65 acres, and for cabbages 62 acres. Only for sweet potatoes does the acreage rise to 236. Assuming an average planting of 1/2 acre per farmer, the maximum target groups for vegetables are between 120 and 150 farmers, with the realistic potential for CARDI technology probably not more than two-thirds of these numbers.

The Evaluation Team saw little evidence that semi-subsistence or part-time farmers are motivated to adopt

technological innovations even though they appear to be low cost (in cash outlays and extra labor) and prima facie profitable. The potential adapters appear to be mostly younger entrepreneurs who are full-time producers for the market and eager to try out new technologies that look promising. Interestingly, a number of these younger producers do not own their own land. but lease it, generally from the government.

The smaller target populations do not detract from the importance of CARDI's research, but it should sharpen the analytical capability for priority setting, for the selection of on-farm collaborators, and for collaboration with the extension services. The Team also feels that in the remaining project period, CARDI should move more toward working with already organized farm groups and toward collaborative arrangements with other organizations, (such as CARDATS or ORD (St. Vincent) both regional and national, which work with a set of cultivators. Working with organized farm groups or commodity associations, would greatly facilitate OFT and would contribute a ready-made target group for potential impact.

5.3.2 ON FARM TESTING

On-farm testing (OFT) is the most innovative but also most difficult and resource-intensive component of

the research process. The following problems were observed by the evaluators:

(a) So far, there has not been a systematic selection process for cooperating farmers. In some countries, the first phase study sample was used for selection, in others the extension service was relied on. The former is helpful for baseline information, but is likely to be misleading for market orientation. The latter may include friends of extensionists who want free inputs but may not be leaders eager to innovate.

(b) Managing OFT is an arduous task, and often yields unreliable data. There were many stories of untended experiments, plots choked by weeds, damaged by livestock and pests, or harvested all at once by mistake. Extension agents cannot always supervise these plots and the capacity of the CARDI's field staff is limited. While the hazardous conditions reproduce real life situations, the experimental results may be impaired.

(c) There was a disagreement with the biometrician at CARDI headquarters over field experimental design and analysis. The project staff has by now selected its own software, designed its own

spreadsheets, and has acquired a greater capacity to analyze field data and to communicate with Trinidad better. However, some questions about the reliability of the data remain.

(d) There is a dilemma about returning to the same set of farmers for several seasons or to select a new set of collaborators. The issue of "free inputs" may cause envy of neighbors and could undermine the idea that collaborators should be selected on the basis of having the confidence of others.

(e) As the various activities move through the FSR/D Steps, the number of OFTs will multiply and this will intensify the pressure on the staff. To move beyond what is now considered the maximum number of farmers the field CT's can personally supervise, (espcially at harvest) is risky.

The above problems of OFT need to be addressed at a project-wide level, together with the issue of greater amount of on-station work, discussed elsewhere. The Dominican CT has developed its own criteria for farmer selection*, perhaps these could be

*The criteria for Dominica are : (1) own land, (2) committed to improvements, (3) established stable farmer, (4) commercial orientation, (5) interested in research, innovation, (6) a leader who neighbors are likely to follow.

discussed and in some form applied more generally. They imply a much more intimate knowledge of local farmers than either the CARDI CT's or most of the extension staff possess.

5.3.3 DIFFUSION OF METHODOLOGY

There is limited evidence that the FSR/D methodology has been adopted by non-project CARDI staff. Some CARDI staff are interested and some MOA staff pay lip service to the methodology, but appear to be using it only slightly. Also, available MOA research staff are generally quite limited. The methodology appears to have some relevance for the Caribbean as indicated above, and it may be possible to modify it since MOA staff, extension agents, and MOA administrators do not appear to understand it fully due to its complexity. Regardless, the method and especially on-farm testing are viewed by most as positive. Commonalities between islands in terms of recommendation domains need to be investigated further.

The research has almost completely ignored work on perennial crops, which are the primary foreign exchange earners. The limited time frame of the project and pressure on the project to demonstrate success (TIFS, etc.) are reasons for this.

5.4 PROJECT STAFFING

Project CT research staff are limited with a deficiency of support staff. There is a concentration of research staff in St. Lucia. The project goals might be better served by the distribution of the technical specialists to other islands. In particular, consideration should be given to redeploying one of the Technical Specialists (preferrably an Agronomist) to Grenada, in order to strengthen R/D activities there.

Agricultural economics input is not as strong as needed. Economics staff is limited and one of them is serving as temporary CTL for Antigua. This aspect of the research program merits further strengthening.

Project scientific staff understands the methodology, are well trained, and appear to work well together. Project review and planning process encourages interdisciplinary interactions, but limited country team members in locations other than St. Lucia, prevent true interdisciplinary team research activities.

5.5 RELATION TO OUTPUTS/EOPS

The methodology will enable the development of the needed technology and the indicated TIFS. The output regarding 50 percent of the MOA research staff having a proper knowledge of FSR by EOP does not mean much, since MOA research staff are very limited. Equally unrealistic is the

expectation that non-Eastern Caribbean research institutes will adopt the CARDI/FSR Methodology. Otherwise, the methodology is considered appropriate to the achievement of project outputs and EOPs.

5.6 RECOMMENDATIONS

(a) That the FSR/D Methodology with appropriate modifications, be continued by the project, however, the methodology needs to be tested more and assessed on a wider variety of Caribbean farming systems before it could be recommended as the vehicle for developing and transferring technology appropriate for agricultural production in the Eastern Caribbean.

(b) That the project address the greater involvement of the producers in setting priorities and in evaluating intervention.

(c) That a reassessment of the farmer selection and collaboration process be undertaken.

(d) That appropriate mechanisms should be in place for feedback and refinement of the methodology, based upon experience and lessons learned.

CHAPTER SIX

6.0 TECHNOLOGY DEVELOPMENT

6.1 TECHNOLOGY DEVELOPMENT, PROCEDURES, AND ACCOMPLISHMENTS

The FSR Methodology described in Chapter 5, has been utilized in the generation of technology. Other factors are also important if the process is to be effective. Due to the nature of the regional and island specific research activities, it is important that the appropriate individuals associated with the Ministries of Agriculture and other government agencies on the individual islands participate and feel ownership in the process. The setting of priorities and the participation of government representatives in such priority settings are also very important. The process for planning activities and establishing budgets are important considerations as is the effective implementation of the agreed plans to generate the technology needed as defined in the priority setting process. Reporting, monitoring, evaluation, andfeedback for replanning are important components of the total process.

The participants in the technology development process spanning the sequence of activities from planning and priority setting to technology development and testing, involve the MOA research, extension, and appropriate

administrative staffs; project country team members; project subject matter specialists, project administrative staff in St. Lucia, CARDI headquarters, staff and specialist; other CARDI researchers and scientists; and staff of cooperating projects, in which the project works collaboratively or exchanges information.

The project being evaluated plays an important role in the CARDI presence and activities in the Eastern Caribbean with the project budget approximately one third of the total CARDI operating budget. As a result, the project and CARDI should be a single entity, although as pointed out elsewhere, there is a diverse separation between the project and other CARDI staff and activities. In addition, the project is inescapably caught up in the perceptions and attitudes of the participating countries in terms of CARDI's role and effectiveness.

Discussions with individual and government officials in host countries indicate a perception that CARDI, in the past, has not addressed the high priority needs of the participating countries. Further, there is a perception that CARDI research activities were directed by the interest of the researchers rather than needs of the countries. Whether or not such is true has not been investigated, but the perceptions are evident. Previously ineffective communication and coordination of research activities

between CARDI and participating countries have resulted in attitudes that have been detrimental to CARDI, and to the level of financial contributions by the participating countries.

Discussion with government representatives in most of the countries indicated that they feel that CARDI must play an important role in meeting their research needs. Limited resources and research capacities of the countries at present and in the foreseeable future dictates this need. Thus, the importance of CARDI's regional research activities was repeatedly reinforced. Most government representatives indicated, however, that effectiveness of the research-activities could be improved by focusing on high priority needs of their countries.

Discussions with Ministry representatives indicated that the relationship between the Ministry representatives and the project (CARDI) had improved considerably over the last two years. Ministry representatives want to participate in the priority and planning processes, want to play an important role in decisions regarding priorities, and want to have an opportunity to provide input into these efforts during their actual development and not after the fact. As a result, each of the country project staff work with Ministry representatives to discuss and set priorities. This process appears to be working reasonably well, but is

fraught with difficulties associated with changing priorities of governments based upon short-term needs, rather than focusing on the long-term needs and potentials for research and agricultural production in the individual countries. Considerable effort has been made on the part of the project to establish closer liaison and communication with representatives of the participating countries. This appears to be working fairly effectively but must continue to be emphasized and fostered because of this critical interface of CARDI with the participating countries.

Some countries have allocated host country counterparts who spend considerable time, and in a few instances are full-time with the project. In other countries there is very limited time spent by counterparts in direct association with project staff.

6.2 RESEARCH PLANNING AND PRIORITIES

The research planning and prioritization process has evolved during the tenure of the project. Each of the islands is divided into agro-climate zones which in essence serve as recommendation domains. The research program on each island and for the project as a whole emphasized a large number of activities at the beginning. The number is decreasing as the project focuses its activities. The planning and priority setting process is beginning to involve more individuals, to incorporate socio-economic

input and to become more effective. However, the socio-economic input into research planning and process is inadequate, although project staff currently involved in these socio-economic activities are working diligently to provide more economic input. Two of the staff have been with the project only a short time and one other is serving as an interim country team leader, which decreases his time to participate as an economist.

Project scientific staff conducting research include the country teams and specialists resident in St. Lucia and Antigua. The latter are to supply expertise for all the islands, but most of their time is spent on research in their country of residence. It does not appear that the resident capabilities of the country team members are used widely among islands.

During the tenure of the present project, a mechanism for research planning has been established and is continuing to be improved. These activities include the development of research priorities and plans by the country teams for their respective countries, meetings to discuss these proposed plans with input from specialists and in some cases the counterparts. Later, meetings between the country team leader and/or team members and individuals representing the Ministry occur to review the previous year's results, discuss priorities and to agree on research to be carried

out during the current year. This is followed by regional meetings in the Windwards and Leewards and later by a project-wide research, review and planning meeting. The research and planning process utilize specifically designed research activity sheets, proformas, and other documents.

Examination of the planning process itself by the Evaluation Team suggests that is is improving over time and is becoming more effective. The research is becoming more focused and the interactions between the research program and the priorities of the Ministries are becoming more congruent. As a result, the Ministry representatives with whom we talked appeared to be more satisfied with the process and their participation in it.

The role of the producer in determining priorities and in providing input into the evaluation process appears somewhat limited. The assessment of farmer constraints as an on-going process is playing less of a role than it perhaps could. This does not mean, however, that the priorities that have been established are not relevant. In addition, the Evaluation Team is of the opinion that the planning process, although becoming more effective, is extremely time consuming and expensive. There is a question whether such a process can be sustained after the end of the contract. Alternatives to the approach should be examined at this time, but the planning endeavors are in

fact taking place and are becoming more effective. The selection of target groups and recommendation domains in terms of numbers of potential beneficiaries needs to be further assessed, given the fact that there are a limited number of producers in each of the countries.

6.3 THE BUDGETARY PROCESS

The operational budgets are dictated by the contract budget with limited impact from the CARDI core budget. The contract budget has been declining somewhat over the last year with some restrictions on the operational budgets of the country teams. The country teams submit proposed budgets each year that are assessed by the project manager and decisions made concerning the availability of funds. The budgetary process appears to be functioning reasonably effectively. Some country teams are augmenting budgets with funds from other sources.

Backstopping of CT programs by Technical Support Staff is not as effective as it might be, and part of this problem is a budgetary one. The current practice calls for country teams to pay for travelling by HQ advisory staff, and some CT's prefer to spend their funds on other more urgent matters than on HQ specialists.

There are also some complaints in the field about the slow budget approval process. In general the project suffers from a chronic liquidity crisis--the Team was told

that in some places there is a delay of up to 90 days before a project check, already issued, can be cashed, as the AID A/C cannot go into overdraft. Under these circumstances the CT's had to borrow funds from other accounts to continue project operations.

6.4 REPORTING, MONITORING AND EVALUATION

The reporting, monitoring, evaluation and feedback mechanisms in place generally relate to the required reporting activities for the donor and the assessment of the previous year's research results for planning of the next year's activities for each individual country program and for the project as a whole. These processes involve CARDI headquarters and staff to a limited degree. The previously described review and planning procedures provide feedback of the results into the priority setting and planning activities for country research programs.

There is a need for the project to establish data collection and monitoring and internal evaluation procedures to assess progress of the project in the realization of the EOPS, outputs, etc. Appropriate data will also be needed for end of project evaluation.

6.5 RELATIONS TO PROJECT OUTPUTS

It appears that the technology development processes being implemented have the potential for realization of the

EOPS related to technology. The project paper indicates that a total of 42 TIFS will be developed. Assessment of the TIFS files at project headquarters revealed a number in various stages of development with emphasis being placed on TIF development by project staff. The number of TIFS under development and likely to be developed by country are given in Table 2. The number of TIFS that have progressed sufficiently to be used by extension personnel for technology transfer cannot be determined now.

TABLE 2: TECHNICAL INFORMATION FILES

COUNTRY	NO. OF TIFS CLOSE TO COMPLETION (at Jul 1986)	NO. LIKELY TO BE DEVELOPED BY EOP
Barbados	1	2
Grenada	1	4
Antigua	1	5
Dominica	3	6
St. Lucia	3	6
St. Vincent	3	5
St. Kitts	1	3
Nevis	1	3
Montserrat	2	4

The Evaluation Team is of the opinion that TIFS have potential benefits, but their actual effectiveness will depend upon quality of the information and its format. At the present time, few TIFS have been transferred to extension staff for their use. Researchers should work with extension staff for the most effective translation of TIF data into optimally useful information for extension agents and potential adoption by the producers. The TIF concept is a useful one and should be continued.

A great deal of technology is being developed by the country teams. It would appear, however, that some of these technologies are not of the highest priority, while others are relevant not only to a given country, but to several of the countries.

6.5 RECOMMENDATIONS

(a) That the development of TIFS be continued, but that the information contained therein and the interface of the research staff and the TIFS information with extension, be better planned and effectively utilized, if the TIFS concept is to be optimized.

(b) That a revision of the original target groups be undertaken, utilizing both ecological considerations and marketing orientation. In addition, the Evaluation Team recommends a greater linkage with already

organized farmer groups or those with common interests such as CARDATS, ORD in St. Vincent, and FTC in the Windward Islands.

(c) That research station facilities to carry out on-station testing be remedied with the provision of the station facilities for use by the project. The low level of on-station research activities will have an adverse effect on the quality of future "on-farm" trials.

(d) That socio-economic inputs be better integrated and strengthened and an assessment made of the potential economic impact of proposed activities prior to the conduct of the research, rather than only at the completion of the research.

(e) That the marketing component of the project be more integrated with the rest of the research process and with the work of the production economists.

(f) That more effective utilization of project staff among islands and between research programs that encompass several of the islands be immediatley addressed.

(g) That the FSR/D program in a few countries, in particular Grenada, be reviewed and strengthened, and

that some consideration be given to possible redeployment of technical specialist(s).

CHAPTER SEVEN

7.0 TECHNOLOGY TRANSFER

7.1 INTRODUCTION AND BACKGROUND

Technology transfer is an essential component in the whole process of agricultural production improvement in the Caribbean. There are, however, deficiencies in the extension capabilities of the various MOA's, which militate against effective technology transfer. Foremost among these are the number of extension staff, the level of training, support capabilities including transportation, operational funds, etc., and other factors which impact in a very negative way on the ability of the country extension services to meet their needs. Since the transfer of technology is so essential, the FSR project has included in its methodology (see previous section), efforts to facilitate the documentation of necessary information for extension use. The Technological Improvement File (TIF) is an information mechanism to carry out the compilation and transfer process which allows the extension staff to have access to the necessary information for use in development of technology transfer mechanisms such as preparation of bulletins, publications, development of recommendations, etc.

US-AID and the various countries in the Eastern Caribbean have recognized the need for improvements in the

extension services to farmers. The result has been donor funded activities such as the US-AID Caribbean Agricultural Extension Project, which has been designed and is being implemented to increase the capabilities of the country extension services. Other projects and activities also address the transfer of technology to the producers. Projects such as ADP in St. Vincent and others, are addressing this issue. Thus, a deficiency in the extension capabilities to meet the needs of the island states is recognized and is being approached. The current status of the extension capabilities, however, suggests that this deficiency will adversely impact on the utilization of technology being developed by the FSR project.

7.2 FSR TECHNOLOGY TRANSFER, ACTIVITIES AND ACCOMPLISHMENTS

As indicated in other sections of this evaluation report, the concept of the TIF has been incorporated into the Farming System Project activities. The TIF files are to provide information and justification of proposed technology in a format that will be useful to the extension services in terms of their use in transfering the information to producers. As indicated elsewhere, it is anticipated that the proposed number of TIFS will be generally realized, but whether the results will in fact be adopted by producers remains to be seen. In discussing the TIF concept with FSR project staff, the Evaluation Team is of the opinion that

the completion of TIFS can be taken as the end product in terms of FSR project responsibilities, rather than the adoption of the technology per se. Based upon these considerations and intrinsic capabilities of the extension services in the countries, the FSR project must take a more proactive and explicit role in addressing the technology transfer question. If this is not done effectively, the potential impact of the research that is being carried out, even if appropriate, will not be realized. Such an approach is incorporated in the conclusions and recommendations below.

Visits to the various countries and interactions with extension agents, administrators, and project staff indicate a varying degree of involvement of country extension services in project activities. In some countries there was practically no invôlvement of extension agents, while in others, the agents only participated to a limited degree in project activities. In other countries, a closer working relationship has been established between project staff and extension activities. In most cases, however, it appears that the extension agents and administrator have been involved to a limited degree in the actual planning of research. There is a prevailing perception on the part of these individuals that they are called in to participate in the process only when on-farm testing and supervision by extension agents is needed.

In some countries such as St. Vincent, Dominica, and Montserrat, technology is being transferred and is being adopted by producers. This has resulted from the close working relationship between project staff and extension agents. It would appear that farmer to farmer information transfer and adoption is also occurring. It appears, however, that the farmer to farmer mode and the direct working of project staff with farmers is playing a more important role in transfer than is the involvement of the extension service per se.

7.3 MASS TRANSFER OF TECHNOLOGY--RELATIONS WITH CAEP

The Evaluation Team met with CAEP staff and discussed the relationship between CAEP and the project. In addition, the Evaluation Team examined published evaluation reports and other documentation of CAEP to further understand the relationship between the two projects.

It appears that there is an on-going relationship between the two projects which have carried out joint endeavors. However, the relationship between the two could be strengthened with benefits to both. The Evaluation Team is of the opinion that the project and CAEP administrators should discuss this and explore potential avenues for establishing closer working

relationships for benefits to the producers in the Eastern Caribbean.

One weakness in the original design of the FSR project was a lack of consideration for the necessary mass transfer of technology. This, again, should involve the extension services of the various countries. If any meaningful mass transfer is to take place during the next two years and thereafter, it is necessary that planning begin for the inclusion of CAEP and the country extension services in the transfer process. This will undoubtedly require a proactive stance on the part of the project to transfer information to the extension services, train extension agents and become more involved in the actual technology transfer per se. How this can be done without detracting significantly from the time and the resources of the FSR project in terms of addressing research needs to be defined.

The Evaluation Team is of the opinion thaat significiant accomplishments have occurred in terms of technology transfer. Technology is being utilized by the farmer as evidenced by such technologies as intercropping of tannia and lima beans in St. Vincent, the adoption of cut and carry livestock production and milk production systems in Dominica and others. The

country extension agents and administrators are involved in varying degrees depending upon the country. The TIFS are moving forward, as addressed elsewhere in this report, with several of them containing considerable significant information that will be of value in the preparation of information by extension agents and specialists. Regardless, technology transfer is not being addressed adequately. This is not necessarily due to inadequacy on the part of the FSR project, but rather on the present circumstances in the Eastern Caribbean regarding the resident research and extension capabilities in the member states. Based upon these considerations, the evaluation team makes the following recommendations in terms of technology transfer.

7.4 RECOMMENDATIONS

(a) That the project examine and address technology transfer more explicitly and examine ways in which it can interface more effectively with extension services, private firms, farmer groups and others to make available the information generated by the project.

(b) That extension staff in the MOA's become more involved at all stages of the FSR/D activities, to stimulate their participation, create ownership and to enable them to understand the technology generation process as

well as the results, in order to improve their capability for technology transfer.

(c) That the US-AID/RDO(C) give consideration to the establishment of one or preferably two positions as technology transfer liaison officers to work directly with the FSR/D and CAEP projects. Such individuals would work with researchers, compile information that is designated to be incorporated in the TIFS, assist in the development of TIFS, develop materials to provide to the extension services and work with extension agents in training and transmittal.

(d) That the project considers the development and implementation of a monitoring and feedback mechanism to assess progress and provide feedback into the research and technology transfer mechanism to continue to improve its effectiveness.

(e) That the project and its staff continue to improve working relationships with the extension services in the member states, and involve the extension agents and administrators in planning, implementation and evaluation activities associated with the research program of the FSR project.

CHAPTER EIGHT

8.0 INSTITUTIONAL STRENGTHENING

8.1 BACKGROUND INFORMATION

Based on the results of previous external evaluations of CARDI, US-AID agreed to the incorporation of an institutional strengthening component in the present FSR/D project, to address both CARDI and the project itself. The result has been a number of activities directed to strengthening the capacity of CARDI to plan and manage research, finance, personnel and project related endeavors. Project strengthening activities included research planning and management, financial management, personnel and others. The strengthening activities for both CARDI headquarters and the project itself include short-term TDY's, workshops, evaluation studies by outside consultants, SECID consultants, the development of operations manuals and proposals for strengthening a variety of CARDI and project relevant activities. These will be addressed below for (1) CARDI; (2) project specific activities; and (3) Ministries of Agriculture and associated governmental components. This section will address the inputs and outputs, their relationship to the expectations of the project, and recommendations.

8.2 CARDI HEADQUARTERS

The contract has provided a number of inputs addressing CARDI headquarters' strengthening including consultants, TDY's workshops, training with specific individuals or small groups of CARDI staff and the provision of written material, manuals, etc. These activities have covered a spectrum of subject matter areas and include fiscal management, personnel, strategic planning, project and program planning and management, internal audit, communications, evaluation of the use of computers and professional writing.. The inputs are summarized in TABLE 3. This table is arranged according to subject matter, type of input, who provided the input and the product.

The outputs resulting from the activities funded under the contract have been numerous and have covered a wide range as indicated in the previous section. The provision of these outputs has been effective and it would appear that they have addressed some of the needs of CARDI headquarters. These are summarized in TABLE 3.

The position of Director of Operation and Management has been filled and is funded for the first year by the contract. This position was recommended to provide needed leadership in the finance and operations areas. Additional staff positions have been identified and one for staff development officer has been advertised. At the time of the

evaluation, the Director filling this position has only been on the job for a short time so it was not possible to assess accomplishments and effectiveness of the position at this point.

Examination of the activities and their outputs revealed the provision of a number of products (outputs) that are relevant to meeting the need of CARDI headquarters. "Systems Incorporated" (Barbados), prepared a set of four manuals addressing Communications, Personnel, Project Management, and Internal Audit, but these have either not been or have been minimally implemented. The various workshops identified in TABLE 3 appear to have accomplished what they were set out to do with the potential for having a positive impact on the operations and management effectiveness of CARDI. In fact, however, the iputs have had minimal impact at this time. Individuals have benefited from training and participation in workshops and interacting with consultants. These are likely to have increased potential improvements. It is evident that the manuals prepared by Systems Incorporated have not been implemented and the functions of the PPE unit are limited. These points are elaborated further below.

As a result of the above, the Evaluation Team recommends that during the next two years, emphasis should be placed upon implementing those operations and management

procedures etc. which have been defined, rather than continuing to develop additional ones. There are, however, certain other activities for which additional inputs may be required during the remaining LOP. An example is the full implementation of the PPE. This unit, if properly implemented, could assist considerably in the planning and evaluation of CARDI activities. There has been insufficient time to completely implement the PPE, but it is the perception of at least one of the CARDI headquarters staff appointed to this unit, that there is a lack of support by central management for the PPE. In addition, the Deputy Director of CARDI serves as the Head of the PPE, but this individual is physically located in St. Lucia with the other two unit members located in Trinidad. This constrains the discussion and interactions that are required at this early stage of the definition and implementation of the PPE and its activities.

8.3 PROJECT

The activities under this subheading will address project specific activities that have been carried out to strengthen the operations and effectiveness of the project. It should be noted that a number of the previously mentioned activities under the above sub-heading directed to CARDI headquarters, also involve varying numbers and activities relevant to the project per se. These project specific activities are given in TABLE 4.

TABLE 3: CARDI-WIDE INSTITUTIONAL STRENGTHENING ACTIVITIES

ACTIVITY	INPUT PROVIDED BY/DATE	ACCOMPLISHMENTS
1. Accounting Procedures and Manuals	Price Waterhouse/ Aug-Sept 1983	Accounting Procedures established and manuals prepared
2. Accounting Workshop	Price Waterhouse/ Nov 27-29, 1983	Trained Administrators and staff in accounting procedures
3. Financial Planning, Budgeting and Control System	SECID, Mr. A. Morgan/ Oct 1984	Management procedures in terms of meeting conditions, president addressed
4. Strategic Planning Workshop	SECID, Dr. Harrison S. Burns and Mr. Schmidt	Development of Concensus and additional information around strategies, purpose, trends, and external and environmental factors influencing CARDI and its activities
5. Research Advisory Committee Established	Apr 22-24, 1985	CARDI-wide research advisory committee with widespread representation from donors and international centers and private firms established and one meeting held
6. Operational and Management Study carried out and manuals produced	Systems, Ltd./ Mar, 1985	Systems report addressed personnel procedures communications, project planning and implementation and internal audit prepared and submitted to CARDI

TABLE 3, continued

ACTIVITY	INPUT PROVIDED BY/DATE	ACCOMPLISHMENTS
7. Project Planning and Evaluation Unit	SECID Consultants and CARDI administration	Established PPE unit to provide input to the Executive Director
8. Director of Finance and Administration	SECID/ during project renegotiations Mar 1986	Established and filled position
9. Several Workshops covering a variety of topics	Consultants, Management Specialist, others/on several dates	CARDI headquarters staff participated in workshops
10. Services of Research Management Specialist	Dr. Ingle, SECID	Provided training and consultancies in planning, management and operational procedures at both CARDI and project levels

TABLE 4: PROJECT SPECIFIC INSTITUTIONAL STRENGTHENING ACTIVITIES

ACTIVITY	INPUT PROVIDED BY/DATE	ACCOMPLISHMENTS
1. Accounting Workshop	Price Waterhouse/ Nov. 27-29, 1983	Trained project and country support staff in accounting procedures
2. Project Outline Workshop	SECID/ Jan 19-21, 1984	Establish agreement on objectives, purposes, outputs, strategies, etc. for project
3. Project Management Implementation Workshop	SECID, Drs. Kettering and Ingle, and Ms. Isman	Phases One and Two implementation of management methodology for country plans
4. FSR/D Methodology Course	SECID and others/ Dec 3-10, 1984	Wide range of participants trained in FSR/D Methodology
5. Introduction to Microcomputers	SECID, Mr. Smith and Mr. Hinerman/ Dec 10-14, 1984	Introduced country and project staff including support staff in use of microcomputers
6. Technical Writing Workshop	CAEP/ Sep, 1985	Training in technical writing
7. Livestock and Crop/ Livestock Production Systems Workshop	SECID and Winrock International/ Nov 25-29, 1985	Training and planning for livestock and crop/livestock research
8. Use of Supercalc III	Consultants	Training in the use of Supercalc III and in the analyses of research data
9. First Annual Review and Planning Workshop	Project Staff/ Jul 9-12, 1984	Reviewed first year's activities and planned second year's activities

TABLE 4, continued

ACTIVITY	INPUT PROVIDED BY/DATE	ACCOMPLISHMENTS
10. Second Annual Review and Planning Workshop	Project Staff/ Apr 30-May 3,1985	Review of second year activities and planning for third year
11. Third Annual Review and Planning Workshop	Project staff/ May 6-9, 1986	Review of third year activities and planning for fourth year
12. Farming Systems Specialist	SECID Long-term assignment of Dr. Hart	Services of FS Specialist provided long-term basis
13. Research Mangement Specialist	SECID/Multiple short-term assignments of Dr. Ingle	Services of Dr. Ingle on variety of topics provided
14. Team Planning Meeting	SECID, Project, CARDI, and US-AID/ Aug 7-10, 1984	TPM with various stake holders held to plan and organize project activities

Workshops, training in operations and management procedures, FSR/D and others indicated in TABLE 4, have been carried out. Some of these activities also relate to CARDI-wide strengthening as well. These have covered a spectrum of activities which have included accounting, project planning, management, methodology and its application, use of microcomputers, data analysis procedures, FSR/D methodologies for addressing livestock and crop/livestock research needs of the projects and others. These inputs have been provided by project staff, SECID consultants and by consultants hired directly by the project (Systems Ltd. and Price Waterhouse).

As a result of these project strengthening activities, the project has strengthened staff capabilities and has defined and implemented procedures for operations and management. These have been implemented by project headquarters in St. Lucia and by the country teams.

The project planning activities have evolved over time becoming more effective as the project staff have gained experience over the duration of the project. This is also emphasized by the preparation and distribution by project headquarters of detailed procedures for the preparation of information and the conduct of the annual review, project review and planning workshop held in 1986 in St. Kitts. These review and planning activities involve a large number

of project staff and activities. They include a review and planning exercise in each of the countries, one for the Windward and Leeward activities and finally a project-wide review and planning workshop. This results in a large number of people being involved, considerable amount of travel, a fairly complex procedure and great expense. Management and operational procedures are located in St. Lucia with minimal involvement including budget matters of CARDI headquarters staff.

The services of a Farming Systems Specialist (Dr. Robert Hart) were provided long-term. Dr. Hart played an important role in strengthening project capabilities, worked effectively with project management and staff, and contributed significantly to project success to date.

The services of a Research Management Specialist (Dr. Marcus Ingle) were provided for multiple short-term assignments. Dr. Ingle carried out planning and management training and design effectively. He worked closely with the FSR Specialist and project management. He also worked closely with CARDI headquarters staff.

8.4 MINISTRY/GOVERNMENTS

Strengthening activities have involved the Ministry/Governments to a minimal degree although some representatives have participated in project-wide strengthening activities. Each year, prior to the annual review and

planning workshops, each country team meets with representatives of their respective governments as well as other projects and organizations to establish priorities and discuss results and other details. This process fosters participation by Ministry staff and has strengthened CARDI's presence in the various countries. It has served to allow input by country representatives and has resulted in the improvement of the relationship between CARDI and the host governments. In addition, a small number of country representatives have participated in the other workshops listed in TABLE 4.

8.5 RELATION TO PROJECT OUTPUT AND PURPOSE

The project is to assist CARDI through technical training and technical assistance to strengthen many of the management support system deficiencies identified in the administrative audit and other evaluations referred to previously. The project is to strengthen CARDI's ability to perform farming systems research in the Caribbean which includes the development of appropriate organizational management systems within the CARDI FSR program. The project is also to develop and strengthen organization and management systems which are needed to support CARDI's technical programs generally. Lastly, the project is to strengthen CARDI's international image and install a high degree of professionalism among CARDI's staff.

The Evaluation Team's conclusions and recommendations concerning strengthening activities are given below. Generally speaking, the project has carried out activities that are directed to strengthening in the areas of management of support systems and FSR research in the Caribbean. CARDI's image has been improved in most countries where the FSR project has activities. Professionalism has been improved in the FSR project staff, but such is not the case for CARDI generally.

Project implementation was delayed because of delays in negotiating and finalizing the contract and the necessity to reassess and renegotiate the contract based upon CARDI's inability to provide the operational inputs that were originally defined in the project paper.

The project paper indicates the need for a monitoring, reporting, and evaluation plan. Monitoring and evaluation have been incorporated from a programmatic sense and are addressed in the project review and planning workshops and associated activities in which the country, regional, and project-wide activities are reviewed and planned. In addition, the country team leaders submit monthly reports of activities to the Project Manager. The latter also prepares reports on project activities for US-AID and CARDI headquarters.

The project paper (page 62) defines seven key evaluation issues and identified decision makers related to project implementation. This evaluation team has addressed those key evaluation issues. An evaluation of planning workshop per se, as called for in the project paper, was not held, but evaluation was included in the project management workshops and is addressed in various project activities indicated above. The project has not, however, developed the necessary procedures and data collection systems that can assist in the evaluation of project progress. The Evaluation Team is of the opinion that the data provided the team did not, in many cases, clearly define progress that the project has made. This suggests that the data collection and evaluation procedures have not been implemented by the project. This topic is further addressed below under Recommendations.

8.6 RECOMMENDATIONS

8.6.1 CARDI

(a) That during the remaining LOP, emphasis should be placed upon the implementation of the operational and mangement procedures and activities that have already been defined and/or put in place, rather than continuing to develop additional ones. It is also recommended that the program planning and

strategy development be continued, assuming that CARDI headquarters can assign competent staff to these functions.

(b) That additional attention be placed on the development of an overall strategy for CARDI in terms of its operation and role in the Eastern Caribbean. This has many ramifications which will impact upon and determine the effectiveness of CARDI and its support by donors and member states. Emphasis should be placed upon the continued improvement and support of CARDI by member states.

(c) That the identification and hiring of a dynamic and effective new Executive Director be considered of primary importance in the strengthening of CARDI administratively and operationally. The Evaluation Team recommends that the search to identify and hire such leadership be given the highest priority.

(d) That the PPE unit be supported and operationalized with the Head of the Unit located in Trinidad.

(e) That the post of Director of Finance and Administration be continued with the necessary support

to implement relevant financial and administration procedures.

8.6.2 PROJECT

(a) That the project examine the more effective utilization of technical capabilities of its specialists and staff to meet overall project needs, on both national and regional levels.

(b) That the project continue to develop its planning, management and implementation procedures to improve effectiveness while decreasing cost and time requirements of the staff.

(c) That the project develop mechanisms for staff professional development and improvement.

(d) That a monitoring and evaluation plan and data collection system be developed and utilized for measuring progress toward the achievement of project outputs and purpose and for the end-of-project evaluation.

CHAPTER NINE

9.0 LINKAGES OF PROJECT WITH US-AID AND OTHER AGENCIES

9.1 INTRODUCTION

A significant feature of agricultural research and development in the OECS is the fragmentation and lack of coordination among the various organizations providing these services. There are international development agencies, regional and sub-regional institutions, Ministries of Agriculture, farmer organizations, private sector groups, and others--all operating independently to deliver services to the local farmers. The activities of these various agencies lack any national coordination, and only in Dominica is there any attempt made by the local MOA, to superimpose some coordination on activities of these various funding agencies--in order to achieve some degree of efficiency in the national agricultural system, in areas of planning, services, and resource allocation.

In spite of the existence of CARDI and other regional and international agricultural research agencies, there are no effective agricultural research networks in the Caribbean which could assist in diffusing expertise, material, and information. Although there are some notable exceptions, technology generation, testing, and diffusion are still

operated mainly on a country by country basis in the sub-region.

9.2 RELATIONS WITH AID AND OTHER AID-FUNDED PROJECTS

AID's role in the FSR/D project includes assisting CARDI with procurement arrangements, approving annual work plans, participating in evaluations, assuring financial accountability, and helping in other ways agreed upon by both parties.

To date the overall management of the project has been effective and responsive to AID's requirements and interest. Program monitoring and reporting schedules are being done on a timely basis, with quarterly technical reports being submitted to US-AID and CARDI headquarters, and financial reports to AID, on a monthly basis.

Part of the success in the effective management of the project must be credited to the considerable support given by RDO(C), in the initial stages, and throughout the project, to assure that implementation keeps to agreed-on schedules.

The FSR/D project is quite consistent with RDO(C) strategy for agricultural assistance in the Eastern Caribbean. By improving production technology and stimulating agricultural sector growth, the project should contribute to AID's overall assistance objectives and complement,

to some extent, other AID-funded project activities in the region.

AID's agricultural strategy includes both regional and bilateral projects. When problems are common to most Caribbean states and when adequate institutional capacity exists, AID assistance is implemented through appropriate regional institutions. Bilateral assistance is used to complement regional projects, enabling AID assistance to be focused on specific high priority needs of individual countries.

9.2.1 CARIBBEAN AGRICULTURE EXTENSION PROJECT

The FSR/D project was designed to have a direct and important relationship with AID's Caribbean Agriculture Extension Project (CAEP), being implemented jointly by the Mid-West University Consortium for International Activities (MUCIA) and the University of the West Indies. The FSR/D project staff has established fairly close working relationships with the CAEP staff. CARDI staff has participated in CAEP's Technical Joint Action Committee, while CAEP's staff are involved with CARDI-sponsored workshops for the FSR/D Project Planning and Implementation, as well as the Annual Review and Planning Workshop. In addition to the FSR project, the staff has contributed signifi-

cantly in the initiation of the first SONDEOS conducted by CAEP in Antigua, Grenada, and St. Vincent.

In spite of these initiatives however, CARDI, FSR/D, and CAEP have not yet worked out the required mechanisms needed for mass transfer of the FSR/D project's developed technologies. As this is one of the key outputs of the present project, the project staff must take the initiative to get CAEP's collaboration in this regard. A proposal for dealing with this issue was given in Chapter 7.

9.2.2 HIGH IMPACT AGRICULTURAL AND MARKETING PRODUCTION PROJECT--(HIAMP)

In July 1983, US-AID initiated the current CARDI-FSR/D Project,. the goal of which was to improve the economic and social well-being of both small and medium sized commerical farm households in the Eastern Caribbean, through an increase in the production of agricultural commodities. In addition, overall focus of the project was geared towards food security and import substitution and to a lesser extent on export earnings!

AID's latest project in the region, the HIAMP, is geared towards export agricultural commodities (in particular, perennial tree crops) and to large scale commercial operators. It is thus clear that there are

some significant differences between the goals of both projects. However, while the FSR project was originally import-substitution oriented, it is building local research capacity, which can eventually shift and support HIAMP. In fact, one of the assumptions made in designing the HIAMP project is that the region's research and extension capacity has already been improved through AID's CAEP and FSR projects.

Since the HIAMP project will be implemented very shortly, the current FSR/D project should make some adjustments in the next two years, by including in its activities some enterprises which are more relevant to the HIAMP. In addition, if the FSR/D project is continued in some form for another term, then significant modifications in the project design would be needed to make these two AID projects more complementary.

9.3 RELATIONS WITH OTHER INTERNATIONAL DONOR ACTIVITIES

9.3.1 EUROPEAN DEVELOPMENT FUND PROJECT

Apart from US-AID, the three international donor agencies most active in agricultural development activities in the Eastern Caribbean are the European Development Fund (EDF), the British Development Division (BDD), and the International Institute for Cooperation in Agriculture (IICA).

The CARDI-FSR/D project has developed important linkages with agriculture activities in the region, funded by the EDF. The EDF's major project of US$4.2 million includes 3 components:

(1) Forage Seed Production;

(2) Soil-water Conservation and Management; and

(3) Increased Production of Aroids.

Of these three sub-projects, there has so far been much interfacing and linkage between the FSR/D project and the Forage Production and Aroids activities. In Dominica and St. Vincent, Grass/Legume combinations for "cut and carry" livestock systems are being evaluated using data accumulated from the EDF study with the FSR/D approach. In addition, technology developed on the EDF funded "Burning Disease of Tannias" project has formed the basis of numerous on-farm trials in Grenada and Dominica.

In Grenada and St. Lucia, sufficient work has been carried out in the EDF project, on the use of the leguminous shrub-Leucaena-in "protein banks" for on-farm testing, using the FSR approach.

9.3.2 BRITISH DEVELOPMENT DIVISION--TREE CROP DEVELOPMENT PROJECT

In contrast to the EDF project, there is virtually no linkage between the FSR/D project and the BDD-funded

Tree Crop Development project in the Windward Islands--Dominica, Grenada, St.Vincent, and St. Lucia. The BDD project was started in the late 1970's. Since this development project is based on an attempt to diversify tree-crop activities away from the predominant bananas into crops such as mangoes, citrus, and avocadoes, it is unfortunate that FSR/D activities did not include some aspects of this program in its activities. To be of maximum value to Caribbean agriculture, the FSR/D project must focus more at the interface between perennial/annual cropping systems and crop/livestock farming systems.

9.3.3 FRENCH TECHNICAL COOPERATION

Apart from CARDATS, the French technical cooperation (FTC) group is the only other agency in the Eastern Caribbean using an approach to technical generation/transfer that is closely related to FSR/D. The FTC is involved in technical assistance in all of the Windward Islands--St. Lucia, St. Vincent, Dominica, and Grenada.

In Dominica, the FTC started operations in 1981 and are now a part of the MOA's "Training Research and Extension Development Unit (TREDU)" in La Plaine. There are currently three resident FTC agronomists in Dominica. Their cooperation with the FSR/D project in

Dominica is mostly with the Livestock Management System and the Yam Technology Development/Transfer Studies.

In Grenada, joint activities have been developed between the FTC and FSR/D--especially in the area of corn/sweet potato intercropping and the supply of planting materials.

9.3.4 INTER-AMERICAN INSTITUTE FOR COOPERATION IN AGRICULTURE (IICA)

IICA currently has collaborative agricultural research activities with the MOA's in all of the OECS, in particular the Windward Islands. Some working relations have been developed with the FSR/D project on "Agricultural Production Systems" in Grenada. With only a modest staffing in the Eastern Caribbean, IICA does not get too involved in fundamental or basic types of research--but rather in "applied" technology generation. For example, virus-free tested yams supplied by CARDI have been tested on farms in various countries by IICA. In addition, vegetable seeds from the Asian Vegetable Research and Development Centre (AVRDC) have also been utilized by IICA for regional field experimentation.

9.4 LOCAL AND REGIONAL INSTITUTIONS

9.4.1 ROLE OF THE PRIVATE SECTOR

While the FSR/D project has been successful in developing linkages with public sector agencies in the region, not much effort has so far been made to create links with the private sector. These efforts, if undertaken will greatly complement those relating to universities, government ministries and regional/sub-regional agencies.

Strong, effective, local institutions are crucial to the technology development and transfer process. These institutions may be governmental, such as research and extension services or they may be private, such as Crop Commodity Research/Extension Scheres, farmers' organizations, cooperatives or small scale rural industries. While farmers' organizations are not highly developed in the region, the existing private sector groups play a major role in the creation, adaptation, and dissemination of technologies. As indicated elsewhere in the report, CARDI should seek closer ties to farmer and commodity groups.

9.4.2 PUBLIC SECTOR INSTITUTIONS

(i) UNIVERSITY OF THE WEST INDIES--FACULTY OF AGRICULTURE (UWI-FOA)

CARDI's relations with the University of the West Indies have always suffered from the way the institute grew out of the former Regional Research Centre (RRC) over a long transitional period. In recent years, relations between the two institutions have deteriorated at the institutional and administrative levels--although it must be noted that most of the staff in both institutions individually maintain good working relationships. It was, therefore, not surprising to find that there is little official collaboration or linkage between the FSR/D project and the UWI-Faculty of Agriculture (FOA). In contrast, UWI was an integral part of AID's Small Farm Multiple Cropping Project, and presently co-implements with MUCIA, AID's Caribbean Agricultural Extension Project (CAEP).

In as much as the FSR/D project is concerned with the potential introduction of a new methodology for agricultural technology development/transfer, it is unfortunate that only

a very limited attempt was made in the project design to bring UWI-FOA into the implementation. It must be emphasized, however, that before there can be any serious institutionalization and sustainability of FSR/D in the Eastern Caribbean, the FSR methodology should be accepted by UWI-FOA and other agricultural colleges in the region, since these are the institutions which are producing the trained graduates who will eventually work in the region's MOAs. During the remainder of the project, some attempts should be made to involve the faculty of agriculture in the project implementation.

(ii) CARIBBEAN AGRICULTURAL AND RURAL DEVELOPMENT, ADVISORY AND TRAINING SERVICE (CARDATS)

Very good relations have been maintained between CARDATS and the FSR/D project. This is particularly true for those countries in which CARDATS plays a significant role in agricultural development--Montserrat, Antigua, Nevis, and Grenada.

CARDATS, unlike FSR/D, is not involved with technology generation, but rather with technology transfer and commercial production of its targeted

farmers. In addition, both CARDATS and FSR/D use the on-farm approach, although CARDATS is more concerned with "whole farm" production, whereas FSR/D is currently working primarily with specific components of the "whole farm" system.

The working principle of CARDATS is quite close to FSR/D's since both deal with targeted farmers and both work closely with the MOA Extension Departments in the transfer of technology.

In Montserrat, Dominica, and Antigua, the Evaluation Team observed excellent linkages between CARDATS and FSR/D where technology packages are made available to CARDATS by the FSR/D Project Team.

At the institutional level, a Memorandum of Understanding has already been worked out between CARDI and CARDATS regarding the mechanism of their cooperation in the Eastern Caribbean.

9.5 RECOMMENDATIONS

(a) That CARDI take advantage of existing forums in the CARICOM region to convene regular meetings of its prinicpal donors to ensure better linkages and coordination between the current FSR project and other

donor-funded agricultural R & D activities in the sub-region.

(b) That during the remainder of the project, positive steps be taken to bring UWI-FOA more actively into the project, for example, by using appropriate UWI professionals as short-term consultants in areas such as production of root-crops, grain legumes, soil/water management, conservation, etc.

(c) That during the next two years, the FSR/D project should shift some of its emphasis from "import substitution" type enterprises to more "export oriented" program activities, in order to tie in more with AID's new project, HIAMP, and the tree crop industries of the Windward Islands.

(d) That CARDI strengthewn its assoctiation with those IARC's having FSR/D programs of relevance to the region, acting in this regard on behalf of the LDC's of CARICOM.

CHAPTER TEN

10.0 SUSTAINABILITY

10.1 ORIGINAL SUSTAINABILITY ASSUMPTIONS

The original assumptions about the potential sustainability of the FSR/D project beyond the life of the current AID support were wrong. Neither CARDI nor the OECS will be able to sustain an applied FSR effort after 1988. CARDI's ability as a regional organization to sustain research in the LDC's is dependent on its core finances being guaranteed by the MDC's, as in part, a contribution toward operations in the LDC's. All of the LDC's are now looking to CARDI to carry on their agricultural research, and with the exception of a few international teams, they will continue to place reliance on CARDI. National research capacity beyond bananas and sugarcane is likely to remain sub-minimal during the 80's and 90's. The recurring research share of the total agricultural budgets in the Eastern Caribbean islands is between 0 and 7 percent and it is not rising.

It is not clear at this stage what components of the FSR methodology will ultimately prove to be sustainable. The entire package, as originally conceived, is not likely to survive without modifications, but it appears that such aspects as farmer involvement in testing alternative

technologies, targeted research to a market-oriented clientele, and research sensitive to and coordinated with agricultural price or trade policies, have a good chance to become widely adopted in the future. However, for this to happen, the project activities will have to become more closely linked to CARDI headquarters and to the UWI, as stressed throughout this report.. The Evaluation Team doubts that some of the technologies which now appear to be successful (e.g. Irish potatoes in Montserrat) are sustainable without further attention to key components of the system, such as seed, fertilizers, storage, diseases, marketing. While some of these elements are not strictly research problems, but "development" and service issues, the governments do not have the capacity to deal with them by themselves.

10.2 NEED FOR EXTERNAL TECHNICAL ASSISTANCE

Because of the smallness and dispersion of island economies, a long-term regional scientific presence seems to be required. This presence may be envisaged as a three-tier system:

(a) NATIONAL CAPACITY: to carry out relatively simple introduction, testing, and adoption of already existing technologies, as well as to interact with field extension personnel, commerical farming groups and agricultural policy makers. Country

capacity is also needed to analyze sim
experiments.

(b) INTER-COUNTRY EASTERN CARIBBEAN CAPACITY: to service a sub-region of about half-a-million population to work on common problems, interchange experiences, provide a common information systems and provide networking in those aspects where economies of scale prevail. Regional networking is also indicated for common problems in similar agro-ecological zones.

(c) REGION-WIDE CAPACITY: to perform more sophisticated research and high level advisory services, tied to the Caribbean academic community and linking it to the international research establishment.

The FSR/D project has made a good start towards (a) and (b), but has moved only slowly towards (c). For example, the regional and sub-regional workshops made possible through AID financing have greatly facilitated inter-country communication and diffusion of information. Level (a) is the only one which may eventually be sustainable by governments; with levels (b) and (c) requiring long-term external assistance. The three levels are interdependent.

The Team deplores the tendency of donors to rely on extra-regional technical assistance for the solution of

research problems, rather than to use and build regional Caribbean capacity. In this sense, the current project has definitely helped to mobilize and further develop indigenous human resources. Furthermore, it has provided funds for facilitating the mobility of researchers both within the region and also for the attendance of international meetings and short courses for self-improvement. This project appears, therefore, far more sustainable than those AID projects which place too heavy reliance on U.S. consulting firms or universities (e.g. ADP in St. Vincent).

The Evaluation Team found much evidence of research capacity building among MOA's staff which was directly attributable to the FSR/D project. However laudable this may be, the effects will be ephemeral unless the FSR methodology is fully absorbed within CARDI as a whole, and becomes the "modus operandi" of their research and development activities. Research capacity built on the basis of FSR methodology cannot be achieved unilaterally through one five-year funded project such as the current FSR/D project. Permanency and sustainability of the methodology within the MOA's of the Eastern Caribbean countries, will only be achieved if regional agricultural development institutions (other than CARDI) such as UWI and WINBAN, as well as the internationaal donor agencies, accept and promulgate some aspects of the FSR/D approach.

The prospects for future research-capacity building are very dependent on whether or not, and in what form, US-AID will continue to provide funding for technical assistance for the Eastern Caribbean states.

There are good reasons why external technical assistance will be needed beyond 1988:

(a) To achieve the expected pay-offs from ongoing research investments the last stages of the process, especially validation, will take longer than the formal project period.

(b) Feedback from actual practices will accumulate only during the last two years of the project, thus necessitating further work either on persistent problems or on new unforeseen ones. This is also true for linkages to CAEP, as discussed earlier.

(c) New problems are likely to arise, especially pest and disease outbreaks, for which the national systems are unprepared.

(d) Changing economic conditions will present new challenges and opportunities.

(e) HIAMP will generate new demands for technology generation and transfer.

(f) Export-oriented agriculture will have to be part of an ecologically balanced system and will have

to be carefully integrated with production for domestic and regional needs. The Evaluation Team observed a number of instances in which specialized export products competed with and were harmful to domestically-oriented small commercial farmers.

All of the above considerations point to the need for a longer-term regional research effort. The Team does not wish to imply that the entire project, as it is currently organized, should continue indefinitely, nor that the maintenance of several high level agricultural scientists on every island is justified. But the Team strongly urges that regional research support be maintained as a necessity.

10.3 OPTIONS FOR STRENGTHENING CARDI'S REGIONAL CAPACITY

The Evaluation Team believes that US-AID is faced with the following alternatives in considering assistance to longer-term agricultural research in the Eastern Caribbean:

(a) Terminate technical assistance after FSR/D project is over (i.e. in 1988).

(b) Fund research in individual countries separately, with specific technical assistance targeted for identified programs.

(c) Select a major U.S. university or group of universities to provide long-term support to the Eastern Caribbean Region.

(d) Continue to support an Eastern Caribbean sub-regional research network, but with clear ties to WINBAN and other private sector organizations.

(e) Seek international donor coordination for a restructuring of CARDI, place the Eastern Caribbean system within framework of Caribbean-wide research network, with closer ties to UWI. Seek agreement with other donors to change piece-meal-type assistance to long-term institutional support.

The Evaluation Team does not recommend any of the first three alternatives. Instead it prefers alternatives (e) and (d) or a workable combination of both. The Team's interviews with WINBAN officials indicated a keen interest on WINBAN's part to collaborate with CARDI. To the extent that some of the future research would be profitable to groups of commerical farmers, some of it could be financed through assessments or subscriptions, especially if, on the WINBAN model, research could also be combined with some specific sets of services. Among the potential donors, the Inter-America Development Bank should be approached, as a potential source of resources, to be channeled directly, under alternative (e) or through the CDB under alternative (d).

APPENDICES 1 - 8

PAGES 102 - 175

STATEMENT OF WORK

I. PURPOSE

The purpose of this contract is to evaluate the AID funded Farming Systems Research and Development (FSR/D) Project No. 538-0099 to determine the progress being made towards the achievement of project objectives.

II. BACKGROUND

The FSR/D project was authorized in July 1983 and amended in December 1984 to provide a total of US$7.55 million to the Caribbean Agricultural Research and Development Institute (CARDI). The goal of the project is to improve the economic and social well being of small and medium commercial farm households in CARICOM countries through an increase in the production of agricultural commodities.

The purpose of the project is to develop an effective and sustainable FSR/D program in CARDI that is responsive to the agricultural needs of the Eastern Caribbean. The purpose has both a productivity focus and an institutional focus. To achieve the productivity objectives, CARDI is expected to concentrate its efforts on selected systems of major importance or potential on eight participating countries. Thus the FSR/D project is designed to address the most significant agronomic, organizational and institutional constraints to increasing agricultural productivity and production in the Eastern Caribbean. More specifically the FSR/D project comprises three components with specific objectives as follows:

(i) Technology Generation

The technology generation component focuses on the design, testing and validation of technological improvements (as adapted to the various country conditions) that can be tranferred readily to small and medium sized farmers. CARDI is expected to refine its farming systems research methodology (designed through the earlier small farmer multiple cropping Systems Project funded by AID) and develop a minimum of 47 economically viable farm tested and validated technological improvements in crops, livestock and crop/livestock combinations.

(ii) Technology Transfer

Under this component CARDI is required to develop and institutionalize a systematic approach for transferring economically viable farm level technological improvements to extension agents, selected private sector agencies and farmers. Functional linkages at the national level are therefore expected to be established between the FSR/D project and the AID funded Caribbean Regional Extension project.

(iii) Institutional Strengthening

This component seeks to strengthen CARDI's technical and administrative capability to effectively implement a decentralized FSR/D program which will on a continuing basis impact on agricultural production at the national level as well as to execute its other technical programs.

(III) SCOPE OF WORK

The contractor shall furnish the services of an evaluation team. In order to fulfil the purpose of this contract the evaluation team shall perform tasks including but not limited to the following:

A. Review the following documents concerning the project:

(1) Project Paper
(2) Project Grant Agreement
(3) Project Implementation Letters
(4) Any relevant information submitted by the Grantee including the ISNAR Evaluation Report.
(5) RDO/C Project Files
(6) Documents relating to RDO/C Agriculture Strategies
(7) Other related projects' documents including the High Impact Agriculture Project (HIAMP) Documentation.

B. Following review of the above documents and within the context of requirements described in III C below and the budgetary constraints of this contract, develop an evaluation methodology for review and approval by AID officials, which will facilitate to the maximum extent possible evaluation of the project. The evaluation will focus on the extent to which the objectives of the FSR/D project are being achieved. Specifically it will assess:

(i) the continuing validity of the assumptions underlying the project design, and whether the objectives of the project are achievable within that context.

(ii) The appropriateness of the FSR/D methodology to effect farm level improvements in order to increase production.

(iii) The viability of the FSR/D program for CARDI and the participating countries, its potential for responsiveness to the agricultural needs of the region and its value to respective Ministries of Agriculture.

(iv) The effectiveness with which CARDI is generating technological improvements for adaptation to individual country conditions.

(v) The degree of success with which CARDI is establishing an effective process for transferring technological improvements to farmers through functional linkages with individual country extension services and selected private sector agencies.

(vi) The potential of the process for ensuring the adoption of improved practices by farmers.

(vii) The cost effectiveness of the performance approach to institution strengthening.

(viii) The extent of improvements in CARDI's technical and administrative capability and their impact on CARDI's capability to effectively implement a productive FSR/D program as well as other technical programs.

(ix) The effectiveness of the project management system.

(x) How and with what success the FSR/D project fits into RDO/Cs current over-all strategy and its agricultural component.

C. The evaluation team will perform the services required in three phases as follows:

(i) Phase I

The duration of Phase I will be approximately two weeks. The evaluation team will be expected to become familiar with the project, determine the evaluation criteria, develop survey instruments and identify specific data and benchmarks for measuring project impact within an appropriate model. The evaluation team will visit three participating countries and interview project and RDO/C staff. At the conclusion of Phase I the evaluation team will submit an evaluation plan for RDO/C's approval.

(ii) Phase II

During Phase II the evaluation team will be expected to conduct field work and interviews over a three week period. The team will visit each participating country during this exercise and will interview CARDI Country Team leaders, Ministry of Agriculture officials and farmers.

(iii) Phase III

Phase III involves the analysis of findings and the preparation of the final Evaluation Report. It also includes the presentation by two members of the evaluation team of the Report at the project's annual planning and evaluation workshop in May 1986.

(v) The degree of success with which CARDI is establishing an effective process for transferring technological improvements to farmers through functional linkages with individual country extension services and selected private sector agencies.

(vi) The potential of the process for ensuring the adoption of improved practices by farmers.

(vii) The cost effectiveness of the performance approach to institution strengthening.

(viii) The extent of improvements in CARDI's technical and administrative capability and their impact on CARDI's capability to effectively implement a productive FSR/D program as well as other technical programs.

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(iii) Phase III

Phase III involves the analysis of findings and the preparation of the final Evaluation Report. It also includes the presentation by two members of the evaluation team of the Report at the project's annual planning and evaluation workshop in May 1986.

(IV) REPORTS

A. Following completion of the evaluation activities described in III above and prior to departure from the region, the evaluation team shall submit to RDO/C a preliminary report summarizing their findings.

B. Final Report and Recommendations

A final report shall be submitted to RDO/C no later than May 1986. The final report shall include the following:

(i) The results of the evaluation as focussed in III above including an identification of the constraints to project implementation and recommendations in the following areas:

a) for improving project implementation to ensure that project objectives are achieved.

b) for project modifications, as necessary, to maximize the project's contribution to the achievement of current strategy goals and objectives and to enhance its potential for synergistic interaction with the new MIAMP project.

c) for an appropriate model by which project impact can be measured.

(ii) An executive summary including the purpose of the evaluation, methodology used, findings, conclusion and recommendations, the development impact of the project and lessons learned.

(iii) An explicit description of the methodology and a copy of the Scope of Work.

(iv) A listing of the evaluation team, including host country personnel, their field of expertise and the role they played on the team.

(v) A clear presentation of the evaluation recommendations in a separate section of the report.

(vi) A discussion of any previous evaluations of CARDI reviewed with a brief discussion of the use made by the evaluators in the review of the project.

(vii) A separate section on the development impact of the project.

(viii) A separate section on lessons learned. This should describe the causal relationship factors that are proving critical to project success or failure.

V. Relationships and Responsibilities

Contractor personnel will be responsible to the Mission Director of RDO/C or his designee and will coordinate their activities with CARDI officials and appropriate host-country officials in each country.

VI. Personnel

It is anticipated that the performance of this evaluation will require the following technical specialties. Description of the qualifications are set forth below:

A. Technical Specialty	Level of Effort
1. Farming Systems Research Specialist	46 person days
2. Research Institution Strengthening Specialist	31 person days
3. Agricultural Project Evaluation Specialist	46 person days
TOTAL	123 person days

B. Description Qualifications

Farming System Research Specialist

Must be an internationally recognized expert on cropping systems and farming systems research with a Ph.D in a relevant discipline. This person should have experience in performing farming systems research in a developing country and preferably in connection with an international agriculture research center. Should be conversant with basic FSR concepts such as land equivalent ratios, cropping pattern trials, and recommendation domains. Should also have experience doing research on relieving constraints for small farmers utilizing limited purchased inputs. Finally, this person should have experience as an evaluation team member for other farming systems research projects.

Research Institution Strengthening Specialist

Must be an Agriculture Scientist with relevant Ph.D., who has first-hand knowledge of CARDI as a regional research and development institution, including its origins in the Regional Research Center, its establishment by CARICOM member countries, and its relationship to other agricultural research, credit and development institutions within and outside the Caribbean region. Should have experience in project management and institution building in an international context.

Agricultural Project Evaluation Specialist

Must be an Agricultural Scientist with a Ph.D. in a relevant discipline and recognized as an Evaluation Specialist. This person should have experience implementing and/or evaluating farming systems research projects in developing countries, preferably those involving more than one country. Should be conversant with methodologies being used to evaluate agricultural research projects.

APPENDIX 2

E V A L U A T I O N P L A N

FOR

C A R D I - F A R M I N G S Y S T E M S

R E S E A R C H A N D D E V E L O P M E N T

P R O J E C T

Submitted

to

US-AID - REGIONAL DEVELOPMENT OFFICE - CARIBBEAN

by

T. F. Carroll, J. D. Monson, C. C. Weir
Members of the Evaluation Team

DIMPEX Associates
New York City, New York 10016

INTRODUCTION

In March 1986, the Agency for International Development contracted with DIMPEX Associates, Inc., to carry out a Mid-Term Evaluation of the CARDI Farming Systems Research and Development Project (No. 538-0099) in the Eastern Caribbean on behalf of AID's Regional Development Office for the Caribbean. Essentially, the purpose of this mid-term evaluation is to determine the extent to which overall progress has been made toward the achievement of the projects objectives. The evaluation will be carried out in three (3) phases.

The purpose of this document is to present the Evaluation Team's draft plan procedures and criteria for carrying out the project's mid-term assessment.

DEVELOPING THE EVALUATION PLAN

The Evaluation Team visited the US-AID Mission office in Barbados and three participating project countries (St. Lucia, Montserrat, and Trinidad), between the period April 1 to 12, 1986.

In Barbados, the Team got the donor's views on the project, AID's regional strategy, and how the project fits into their overall strategy for the Eastern Caribbean. In St. Lucia and Montserrat the Team had the opportunity of meeting both the administrative and some of the technical field staff of the FSR/D Project, as well SECID's long-term technical advisor to the FSR

project. Of significance was the opportunity afforded the Evaluation Team of participating in an FSR Country Review and Planning Session in Montserrat.

Since the main purpose of this evaluation is utlimately to influence decisions in project management and execution, the evaluation plan has been designed according to the following model:

(1) Identification of the evaluation criteria issues, and the potential decisions necessary;

(2) Posing a list of appropriate questions that need to be answered in order to carry out the evaluation rationally. These questions will serve as a guide to the subsequent in-country field interviews, questionnaires, and surveys.

(3) Specifying the information and data which will be necessary to answer the questions posed; and

(4) Determining how to obtain the information needed, i.e. the most appropriate data collection procedures, schedules, and sources. A crucial input for the evaluation is a list of data to be supplied by the Project HQ <u>prior</u> to the evaluation.

The steps outlined above for developing the Evaluation Plan, are described in tabular form in ATTACHMENTS I and III. ATTACHMENT I

shows the format which will be used to organize the material and as a guide for content of the Final Report. ATTACHMENT II lists the key eliciting questions, the type of information and data needs, and suggested methods for obtaining the data.

ATTACHMENT III shows the type of data the Evaluation Team will need prior to their arrival in mid-June. In order to ensure that the Team has available accurate information on project status and progress indicators, the importance of this data-base cannot be over-emphasized. Because this is a mid-term evaluation with the implementation extending over 2.1/2 years, the Team is quite conscious of the problems of assessing "progress," when in most cases there is little measureable output--let alone impact. The Team will have to rely heavily on qualitative data, the insights of reliable informants, and on the team members' own intuitive judgements as the research and development process.

TIME SCHEDULING

ATTACHMENT IV outlines the preliminary time scheduling for the remainder to the FSR/D Project Evaluation. It is important to note that this schedule was drawn up on the basis of two over-riding time contraints:

(1) Due to CARDI's FSR/D work time-frame, the Project's Country Teams cannot accommodate the Evaluation Team before mid-June; and

(2) The US-AID Mission Office in Barbados requires the Final Evaluation Report on or before August 31, 1986.

COORDINATION AND PLANNING FOR PHASE II OF EVALUATION

Once the Evaluation Plan is accepted and approved by US-AID and CARDI, the Evaluation Team will finalize preliminary plans being made with the CARDI Project Office (St. Lucia) regarding the coordination and planning for executing Phase 2 of the Evaluation.

Current plans call for the finalizntion of all logistical details relating to data collection, questionnaire and survey preparation, travel plans, etc., at least two weeks before the scheduled arrival of the Evaluation Teeam to begin Phase 2 of the Evaluation.

ATTACHMENT I

FARMING SYSTEMS RESEARCH AND DEVELOPMENT PROJECT

DRAFT EVALUATION OUTLINE

A. INTRODUCTION AND PROJECT BACKGROUND

1. Purpose of the evaluation
2. Identification of project's objectives
3. Circumstances that led to current project

B. PROJECT DESIGN, CONCEPTS AND LOGIC

1. US-AID's regional strategy
2. Interests, expectations of stakeholders
3. Project design/redesign-realities

C. IMPLEMENTATION HISTORY AND PRESENT STATUS OF PROJECT

1. Stage of Project
2. Provision of inputs (US-AID, CARDI, Governments)
3. Overall progress
4. External factors
5. Implementation of work plans

D. RESEARCH PRIORITIES, STRATEGY AND PLANNING

1. Original priorities and rationale
2. Modification of priorities during execution
3. Planning methods and criteria

E. FARMING SYSTEMS, RESEARCH AND DEVELOPMENT

1. Original concept and rationale for FSR/D Methodology
2. The methodology in practice
3. Farmer participation
4. Target populations
5. Institutionalisation

F. TECHNOLOGY DEVELOPMENT

1. Current status
2. Economic viability and appropriateness
3. Farmer/producer acceptability
4. Quality of technology developed
5. Likelihood of meeting project's goals

G. TECHNOLOGY TRANSFER

1. Progress toward meeting project's goals
2. MOA extension participation
3. Potential impact on farming communities

H. INSTITUTIONAL STRENGTHENING

1. Instruments
2. Progress
3. Overall policy

I. LINKAGES

1. Relationship with US-AID, including other AID-funded projects
2. Relations with other international donors
3. Relations with International Agricultural Research centers
4. Relations with University of the West Indies--faculty of agriculture

J. RELATIONS WITH GOVERNMENTS AND REGIONAL RESEARCH CAPACITY

1. Collaboration with member Governments
2. Relations with CARDI as a whole
3. Regional research capacity building

K. SUSTAINABILITY OF FSR/D

1. Validity of original assumptions
2. Most sustainable elements of FSR/D
3. Capacity of countries to fund indigenous agricultural research
4. Long-term funding of regional agricultural research in LDCs
5. Time-frame of current FSR/D Project

L. CONCLUSIONS AND RECOMMENDATIONS

1. Progress and accomplishments
2. Suggestions for remaining life of project
3. Implications for long-term agricultural research in Eastern Caribbean
4. Future role of FSR/D in Eastern Caribbean

1614

ATTACHMENT II

EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
A. *INTRODUCTION/ BACKGROUND*	1. *What were the circumstances that anteceeded and led to the current project?* 2. *What were the deficiences and contribution of the first phase project?*	*Relevant elements in over-all CARDI background and strategy.* *Background on previous project (multi-cropping). How and why it led into the current one.*	*IU - CARDI HQ; Ex Dir; Proj Dir.* *RD .* *IU - Proj Dir; CARDI HQ; AID/RDO/C staff* *RD - Spring '82 Evaluation Report of First Phase*

KEY: IU = Interview - Unstructured
IS = Interview - Structured
Q = Questionnaire
RD = Review Documents
O = Field Observations
X = Special information prepared by CARDI for Evaluation Team (ET)

ATTACHMENT II

EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
B. PROJECT DESIGN, CONCEPT AND LOGIC	1. AID's Regional Strategy a. At project design - CDSS b. Changes since 2. Stakeholders Interests a. What are the different interests and expectations of the stakeholders? 3. Project Design Realities a. Who participated in the design process? b. What were the original ideas of designers? c. What were the different assumptions of the designers? d. How were the different interests reconciled/ compromised? e. With hindsight, how realistic was project design?	Oral histories of key participants in the design process. Documents leading up to Project Paper.	IU RD-AID/RDO/C staff IU (Members of original design team); AID Mission staff in '83; AID/W involved, CARDI leadership IU SECID-FSRD Project staff

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ATTACHMENT II

EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
C. IMPLEMENTATION HISTORY AND PRESENT STATUS OF PROJECT	1. Stage of Project a. What were the stages of the Project during implementation so far? b. How long did it take to become operational? c What were the major changes since the Agreement? d. What is the present status of implementation? In what respects is the Project on target? Delayed? Ahead?	Dates of key events. Explanation of sequence and timing of actual events. Date of first disbursement. Project amendments; reasons for changes. Comparison of actual progress with overall and annual work-plans.	Data and information sources for Topic C will consist of two types: A. The Evaluation Team will ask the CARDI Project Director to provide a brief narrative history of implementation, and a status report. (Details to be agreed between the E.T. and the Project Director) "X". B. Secondly, the E.T. will arrive at its own assessment of the Project's progress in mid-86, based on X, IU, RD, and O.
	2. Provision of Inputs a. What inputs were provided by whom and when? AID, SECID, Governments? (Actual, compared to expected) b. Has the level of inputs affected the timely generation of outputs? c. How and when were workplans prepared? Degree of actual implementation of workplans?	Funds received and spend by years; personnel hired and working by years; equipment purchased by years; long-term and short-term advisors; training workshops.	
	3. Overall Progress a What is current status and organization of project?	Actual deployment of resources, organizations chart, project HQ, country teams, qualifications and functions.	

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
C. IMPLEMENTATION HISTORY AND PRESENT STATUS OF PROJECT --continued	3. Overall Progress--continued		
	b. Is the current organization and deployment of resources appropriate to the task - and effective?	Opinion of project leadership; assessment of E.T.	IU Project staff IU SECID staff
	c. Is there significant difference in progress between countries? Why?	Progress indicators by country: --staff in place --compliance with work-plans --progress in technology generation and diffusion	X O - (team country visits)
	d. What, if any, lessons have been derived from the experience of the first 2½ years; which are now being used to improve the performance of the project?	Examples of feedback	X O-(team country visits)
	4. External Factors	Examples of contextual factors such as:	
	a. What are the external factors (beyond the decision power of the project) which impact on implementation?	--CARDI HQ situation --political events --macro-economic factors --weather/ecology	IU - Project staff

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ATTACHMENT II

EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
D. RESEARCH PRIORITIES, STRATEGY AND PLANNING	1. Original Priorities & Rationale		
	a. What were original research priorities and their justification?	Project paper and supporting documents	RD
	-- by countries? -- regionally?		
	b. How were priorities translated into the first year's workplans?	Workplans, staff recruitment and deployment	RD, IU- Project staff SECID advisors
	2. Modification of Priorities During Execution		
	a. What changes or shifts in research priorities occurred during implementation in the past 24 years?	Workplans, planning meeting records	RD, IU - Project staff
	b. What are current priorities, and how are these arrived at?		
	c. Who is involved in priority-setting? Are there conflicts, if so, in what respect?	Evidence of specific decisions and changes-- documented and undocumented	X IU - Project staff National staff: IS - (country teams)
	d. What are the reasons for shifts in emphasis? (i.e. economic, viability, change in government preferences, feedback from early research)		X IS-(country visits) O
	3. Planning Methods & Criteria	Explicit guidelines; Planning workshop reports; Comparison of planned criteria with actual priorities as expressed in workplans, resource allocation	X
	a. What criteria are being used to determine research priorities? Sector goals? Agri-systems? Field research needs?		RD, IU - Project staff IS -(country visits) O - (country visits)

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
E. *FARMING SYSTEMS RESEARCH AND DEVELOPMENT*	1. *What was the Original Concept and Rationale for the Systems Approach of FSR/D?*	*Project documents, staff papers* *Perception of project staff*	*RD* *IU*
	2. *The Methodology in Practice*		
	a. *What is the essence of the FSR/D methodology as practiced? How does it compare with that used by other projects, elsewhere?*	"	*RD* *IU*
	b. *How has the methodology been applied during the initial 2½ years? Is there much flexibility?*	*Workplans* *Specific country implementation experiences and case examples*	*IU Project HQ* *IS (by country visits)* *O (by country visits)*
	c. *What criteria were used to define target areas and groups? Recommendation domains?*	"	"
	d. *How has the background data collected during the first phase been applied? Was it useful?*	"	"
	e. *Is the background data continuing to be developed and/or updated? How and by whom?*	"	"
	f. *In what ways has the methodology become modified? Why? Is there a mechanism for feedback and change, based on experience?*	"	"
	g. *What is the relationship between FSR/D to CARDI's other research in countries? To non-CARDI research?*	"	" *Plus X*

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Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
5. *FARMING SYSTEMS RESEARCH AND DEVELOPMENT --continued*	3. *Farmer Participation*		
	a. *What role does the producer play in initial problem identification, priority-setting, testing, interpretation?*	*Examples of farmer involvement and non-involvement*	*IU HQ staff* *IS* } *Country visits by* *O* } *E.T.*
		Instances of organized farmer participation	*X*
	b. *What has been learned so far about the participatory aspects of the FSR/D process?*	*Case studies*	"
	4. *Institutionalization*		
	a. *Is there any evidence that FSR/D methodology is being used by MOAs? By other non-project researchers?*	*Concrete examples of changes in pevious practices*	"
	b. *Is the FSR/D approach viewed as a positive and effective research method by project staff, other CARDI staff, other professionals?*	*Opinions of different staff members--inside and outside the project*	"
	c. *What evidence is there for ELEMENTS of the FSR/D concept becoming incorporated into the ongoing research by CARDI and the Eastern Caribbean?*	*Evidence of acceptance of project-generated practices and ideas*	"

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
F. TECHNOLOGY DEVELOPMENT	1. Progress in Activities		
	a. How many TIFs have been completed?	Number of TIFs	X RD
	b. How many TIFs are likely to be completed by the end of the project?	Estimates of increase in number of TIFs during remaining period of project	IS (team country visits) O
	c. Which activities have been dropped since 1983, and why?	Present list of activities in each TIF with stage reached (1-11)	•
		Comparison of activities in 1986 with list of previous years	
	d. How many technologies have reached the field testing and validation stage?	Activities now or soon in steps 9-11	•
	2. Economic Viability/ Appropriateness		
	a. What evidence is there of viabilities of technologies entering last stages?	Farmer acceptance	•
	b. How valid are original assumptions in view of economic return calculations?	Evidence previously obtained by project staff	•
	c. To what extent has the technology and the level of farmer management been factors in the choice and planning of FSR/D?	Team's observations and interviews	
	d. Have crop - livestock systems, with their socio-economic justifications, been adequately addressed?		• •

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
F. *TECHNOLOGY DEVELOPMENT --continued*	3. *Degree of Collaboration with Host Countries* a. *Have local MOA staff particiated in the various stages of the FSR/D technology generation process?* b. *Have private farmers, agri-businesses, agri-commodity associations, been involved in the technol ny development?*	*Oral histories, written documents relating to FSR/D project Team activities in each participating country*	*IU* *IS* *O* *RD (Team visits)*
	4. *Quality of Technology Development* a. *What is the quality of the ongoing research under the project?* b. *Does the pressure to produce technically promising results within the project's time-frame influence the kind of ongoing research activities?*	*Sample of ongoing research sites on and off station* *Examination of selected publications and research reports*	*O (country visits)* *IU CARDI HQ staff* *Non-CARDI scientists* *RD*

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
G. *TECHNOLOGY TRANSFER AND IMPACT*	1. *Progress to Date and Transfer Mechanisms*		
	a. *Are there any technologies attributable to the project which have been transferred/ adopted so far?*	*Evidence of use of technology by farmers who have not been involved in testing phase*	X IS (country visits)
	b. *Will the number of technologies transferred (or to be transferred) be likely to meet the EOPS?*		
	c. *What is the degree and nature of participation of MOAs extension staff in ongoing work? Is the transfer process effective? What are the limitations?*	*MOA extension staff, evidence of collaboration, non-collaboration, overlap or division of extensionists territories*	IU with MOAs extension staff (sample) IS country teams
	d. *How will the final "mass transfer" to non-participating project farmers be effected? Have CARDI and MOA established the mechanism for rapid mass transfer of technologies?*	" "	
	2. *Potential Impact*		
	a. *How many farmers are directly or indirectly involved with FSR/D technology transfer?*	" "	
	b. *What are some of the ways the project has so far been effective in impacting farm families?*	" "	

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X 161

ATTACHMENT II

EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
G. TECHNOLOGY TRANSFER AND IMPACT --continued	2. Potential Impact, continued c. What are the prospects for impact by the end of the project ('88) in terms of: --number of farmers benefiting? --target groups by recommendation domains? --increase in output and yields? --impact on policy or sector level? d. What are key contextual factors which condition impact, i.e. price policies, trade policies, markets?	Estimates by project staff First-hand information from selected farmers participating in FSR/D project	X O

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
H. *INSTITUTIONAL STRENGTHENING*	1. *Instuments* a. *What have been the major institutional strengthening activities thus far?* *--directed to CARDI as a whole?* *--Project-specific?* b. *What methods had SECID chosen to address the various problems?* *--finance?* *--personnel?* *--organization?* *--administration?* *--planning?* *--information?* 2. *Progress* a. *What progress has been made toward improvement in structure, capabilities, and in performance? What are the indicators?* *--CARDI HQ?* *--Project?* b. *What improvements exist in overall research progress planning and management? Does CARDI have an improved research strategy in place?*	*Consultancy reports* *Periodic reports of long-term advisors* *PLUS: specific indicators of progress, i.e..* *--improved financial/ accounting procedures/ statements* *--new personnel policies in place* *--improved information storage/retrieval in place* *Role of Research Advisory Committee*	*RD* *IU SECID staff, CARDI leadership, Project HQ staff, AID RDO/C*

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
H. INSTITUTIONAL STRENGTHENING --continued	2. Progress, continued c. What is the assessment of the quality and effectiveness of SECID's contribution to the project? --long-term advisors? --short-term consultants? --procurement? --training, workshops?	Perception of CARDI executives Perception of CARDI staff Perception of AID RDO/C	IU CARDI, Trinidad CARDI, Project HQ IS Project country team AID RDO/C staff
	d. What has been the nature and degree of CARDI staff participation in the institutional strengthening activities?	Formal and informal participation in workshops, training activities. Staff reaction to consultant reports.	IU SECID staff CARDI HQ CARDI project AID RDO/C staff
	3. Overall Policy a. Has the SECID mode and operational structure presented some advantages and disadvantages from CARDI's point of view?		
	b. What have been the limitations of SECID's work due to CARDI's overall situation? And how might some of the impending policy changes expected to be taken by the Board affect future strengthening activities in '87-'88?	Procurement of consultants in USA vs from CARDI HQ or from region?	
	c. What additional strengthening activities are needed? How should these be supplied?		(Add members of CARDI Board)

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
H. *INSTITUTIONAL STRENGTHENING --continued*	J. *Overall Policy, continued* *d. Are there factors which will contrain CARDI's ability to institutionalize, sustain or continue to improve management and planning?*		

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
I. *LINKAGES*	1. *Relationship with AID* a. *What has been the project's relationship with AID/RDO/C?* b. *Has project leadership been responsive to AID's requests and interests?*	*Subjective opinions of parties, but reinforced with specific instances of collaboration.*	*IU AID/RDO/C Staff* *CARDI HQ* *CARDI Project staff*
	2. *Other AID-Funded Projects* a. *Relationship with CAEP* b. *Relationship with CATCO, Bilateral AID country projects* c. *Potential linkages to HIAMP*	*Evidence of collaboration, joint planning, cross-representation in coordinating and planning committees.* *Export-oriented research thrust or capabilities*	*IU CAEP HQ* *IU -CAEP country staff* *IS Project staff* *IU CARDI HQ Project staff* *IS*
	3. *Relations with Other Donors* *IICA, CIDA, EDF and others*	*Evidence of collaboration, parallel activity, assistance FSR project received from outside sources*	
	4. *UWI - Faculty of Agriculture*		
	5. *Relations with International and Regional Agric Research Centers* *--Virgin Islands Agric Experimental Station* *--Puerto Rico Agric Experimental Station* *--WINBAN, INRA (Guadeloupe, Martinique)* *--IITA, IICA, CIAT, CIP*		

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
J. *RELATIONS WITH GOVERNMENTS AND REGIONAL RESEARCH CAPACITY*	1. *Collaboration with Member Governments*		
	a. Has project had an impact on MOA Ag Research strategies, Research planning and management capabilities? If so, how?	*Evidence of linking CARDI's work to specific country policies, performance*	*X* *IU Project HQ* *IS Country teams MOA staffs*
	b. To what extent is FSR project seen as a complement, substitute, or duplication of MAO research? In East Caribbean? In MDCs?	*Evidence of good and poor relations. Factors responsible.*	
	c. What role has the project played in improving the capacity for research by MOA? What are the regional and national implications?		
	2. *Relations with CARDI as a Whole*	*Research services provided (or requested and not provided) by CARDI HQ*	
	a. At HQ in Trinidad?		
	b. In the various countries?	*Evidence on: How non-project CARDI activities in each country are integrated (or not) with project?*	*IU CARDI HQ* *Project leadership* *IS Country teams*
	--how does CARDI HQ view this relationship? *--how does the project staff?*		
	3. *Regional Research Capacity Building*		
	What is CARDI's future role in supporting Ag Research in the Eastern Caribbean? How does the project contribute to such a broader goal?	*Evidence of country capacity to take charge of their own research*	*IU Project HQ* *IS Country teams MOA staff*

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EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
K. *SUSTAINABILITY*	1. *Validity of Original Assumptions* *a. At farm level* *b. At country level* *c. At regional level* *How realistic were project expectations after tomination of project?*	*Any evidence of process of adoption in whole or in part, of technologies generated.* *Evidence of new or unforeseen problems, calling for renewed technological inputs.* *Evidence of country staffs collaborating and internalizing parts of FSR/D methodology* *Willingness of MDCs to provide resources for LDCs through CARDI*	*IU - Project HQ* *IS - Country visits* *project teams* *collaborating MOA staffs*
	2. *Most Sustainable Elements* *a. What elements of FSR/D appear to be most sustainable?*	*Portion of methodology most readily accepted and followed by MOA field staffs and perceived by them as useful.*	*PLUS X*
	3. *Capacity of Countries to Fund Agricultural Research* *a. What is the capacity of the countries to fund and carry out their own agricultural research by 1988?*	*Trends in national research budgets, personnel now in place or in training. Breakdown of budgets by major purposes*	*X* *IS - country visits*

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178

ATTACHMENT II

EVALUATION QUESTIONS AND SOURCES OF INFORMATION

Topics	Illustrative Questions	Information/Data Needs	Sources/ Evaluation Methodology
K. *SUSTAINABILITY --continued*	4. *Long-Term Core Funding of CARDI*		IU *CARDI HQ*
	a. *Are donors such as AID facing the long-term core funding of a regional research network such as CARDI, similar to that of the CGIAR system?*	*CARDI's budget situation of core funding*	*AID/RDO/C* *CARDI Board Members* *MOAs*
	b. *What are the disadvantages of piecemeal project by project external financing for LDC research in the Eastern Caribbean WITHOUT adequate core support?*	*Cost-effectiveness of national research*	
	c. *Is additional external support needed for ensuring sustainability? What kind of support? For whom? Additional TA needed?*	*Advantages/disadvantages of sustained regional network with higher level capability*	
	5. *Time Frame of Current Project*	*Estimation of the time needed to proceed through all phases of FSR methodology with appropriate feedback loops.*	IU *Project leadership* X
	a. *Is time allowed for implementation of AID-funded project sufficient to ensure some measure of institutionalization of the FSR/D process and/or major needed research thrusts? If not, what are the alternative strategies?*	*Time for staff to absorb essential elements of FSR process*	

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ATTACHMENT III

INFORMATION REQUESTED FROM PROJECT HEADQUARTERS

TO BE PROVIDED PRIOR TO TEAM ARRIVAL

Section	Information Required
B - Project Design (B-3.e.)	Viewed at mid-term, how does the project leadership feel about the project design? Was it realistic? If not, why and in what respects? To what extent can problems be attributed to the divergent interests of the designers?
C - Implementation (C-1 to 4)	What were the key events (with dates) in implementing project since the approval of the project paper? Include phases of negotiation, first disbursement, organization of country teams, key appointments, arrival of resident advisor, re-negotiations, project amendments, and other events considered important during the past 3 years. Provide explanations where appropriate. Expenditures per year, broken down by countries (plus Project HQ) and by major items, such as salaries, equipment, travel. Distinguish between AID project funds and other sources. How many annual workplans were prepared? When? What is the degree of actual implementation of workplans? Staffing and organization of project. Give comparison between 1983 and 1986. Briefly explain differences. Include distribution of staff (with qualifications and functions), lines of authority, collaborating personnel in each country, CARDI non-project staff in each country. If there are significant differences in overall progress among countries, please provide an explanation.

Implementation --continued

What are the lessons derived from the experience of the past 2.1/2 years, which are now being applied to improve the performance of the project?

What are some of the external factors that have impacted on implementation?

D. Research Priorities (D.2 to 4)

What are current project priorities region-wide and by countries, and how are they reflected in share of resources allocated? Have there been significant shifts in priorities during the past 2.1/2 years? If so, what were they and why?

Who is involved in priority-setting? Are there conflicts? Give examples of divergent preference by governments and by CARDI. Are there divergences over short-term vs long-term research approaches?

If possible, please provide for each TIF potential numbers of farm households to whom technologies being generated are applicable, if possible give size characteristics of target population.

What criteria are currently being used to determine research priorities? What is the appropriate weight of the following categories of research in the current program (allocation of personnel and funds):

(a) Sector objectives (nutritional needs, import substitution, export promotion, etc.);

(b) Agri-systems (food crops, industrial crops, tree crops, etc.); and

(c) Field research needs (variety selection, plant protection, soil/water management, etc.

E. Farming Systems Research and Development (E.2.f.g) (3.b) (4.b) (5.a.c)

What is the appropriate balance between field and station research--overall and by country?

What is the nature of the relationship between the FSR/D Project and other elements of CARDI's program in the Eastern Caribbean? Give examples of collaboration, parallelism or conflict.

What has been learned so far, about promoting meaningful farmer participation in the FSR/D process? Give some examples of successes and problems.

What evidence exists about elements of the FSR/D concept becoming incorporated into the ongoing research by CARDI as a whole, governments, and other organizations?

F. Technology Development (F.1-3)

Provide all prepared up-to-date TIFs, with an estimate of increase in number during the remainder of project period.

What evidence exists on the socio-economic viability of technologies being generated? Is there a feedback from participating farmers on feasibility and profitability of new practices over others?

G. Technology Transfer (G.1 and 2)

List any evidence for technology transfer, adoption beyond participating farmers.

Please provide estimates, based on trends in the work, of what extent the targets specified in the Project Paper would be reached by the end of '88. What are the most promising overall impacts expected?

What is the degree of participation of MOA extension staffs? Please give details by country and examples of good and poor collaboration.

K. Government Relations

Where are relations with host governments good and where not so good? Why? How and where is CARDI perceived by government staffs: As integral part of national research system? As complementary or in some instances as duplicative?

Please give any evidence of impact of project on host country's agricultural policies, planning and management capability?

L. Sustainability

Please provide data on collaborating country's research and extension capacity. By country, year (or multi-year periods), give total agriculture budgets, approximate share of research, extension, capital and operating expenses, number of professional research and extension staffs with educational levels.

In what countries has research/extension capacity become significantly improved during the past 3 to 4 years? What will be their capacity by 1988?

Please also provide by country, major non-project research funding sources from external donors, bilateral or multi-lateral.

APPENDIX :

ITINERARY OF EVALUATION TEAM VISITS

First Caribbean Visit--March 31 to April 12
b. Second Caribbean Visit--May 7 to May 10
c. Washington Visit--June 3 to June 4

DATE	PLACE	TEAM MEMBERS	PEOPLE MET
3/31-4/2	Barbados	Entire Team	Bill Baucom, Darwin Clarke (US-AID staff); J. Sorhaindo (CDB); Gerry Proverb (CARDI)
4/2-4/5	St. Lucia	Entire Team	Calixte George, John Hammerton, Ron Pilgrim, Bill Massiah, Roger Francis, Bob Hart (Project Team) Basil Williams, Frances Leonce (WINBAN); Philson Joseph, Hartle Joseph (Participating farmers)
4/5-4/7	Montserrat	Entire Team	Roland Fletcher, S. Weekes (Country Team); Franklyn Michael Claude Gerald (MOA); Barton Clarke, Charles Douglas, Brian Cooper, Vasantha Chase, Calixte George (Project Team)
4/8-4/9	Barbados	Entire Team	Bill Baucom, Darwin Clarke(USAID
4/10-4/12	Trinidad	Henson, Weir	Sam Parasran, St. Claire Forde, Saed Haque, Ashraf Ali, H. Harricharan, Pascal Osuji, Ralph Phelps, Don Walmsley (CARDI Head quarters); Laurie Wilson, T. U. Ferguson, Lloyd Rankine (UWI)
5/7-5/10	St. Kitts	Weir	Members of FSR/D Project Team attending Annual Regional Planning Workshop--including SECID's 2 technical advisors, Bob Hart and Marcus Ingle
6/3-6/4	SECID-HQ Washington DC	Entire Team	Bill Levine, Harry Wheeler, Elle Fenoglio (SECID)

APPENDIX 4

ITINERARY FOR MAIN FIELD EVALUATION--JULY 23 to JULY 11

DATE	PLACE	TEAM MEMBERS	PEOPLE MET
6/22-6/23	Barbados	Henson, Weir	Gerry Proverbs, Frances John (CARDI) (Project Team);
6/23-6/25	Trinidad	Henson, Weir	Sam Parasram, St. Claire Forde, Asraf Ali, H. Harricharam, S. Tross, (CARDI)Laurie Wilson, Lloyd Rankine, Tom Henderson (UWI-FOA)
6/25-6/29	St. Lucia	Entire Team	Calixte George, John Hammerton, Ron Pilgrim, Bernard Francois, S. Rao, Bill Mathias (Project Team); Reg. Pierre (IICA); Basil Williams, Errol Lewis (WINBAN); Clem Hennecart (St. Lucia Young Farmers); D.Demacque,A.Philgense, B. Charleton (MOA), E. Augustin, P. Joseph, M. Jouvel, F. Richards (Farmers)
6/29-7/2	Grenada	Carroll,Weir	Ken Buckmire, Reg. Andall (Project Team); Denis Noel, A. Campbell, George Otto (MOA); Jonathan Sleeper (USAID); Gilbert McSween, H. Singh (CARDATS); Theo. Roberts, Albert Mason, D. Brizan (Farmers)
6/30-7/2 7/2-7/5	St.Vincent	Henson Carroll	Harold Patterson, Frank McDonald (Project Team); Ashley Cain, Clarence Thomas, Charles Gunsan, Grafton Van Loo (MOA); Jethro Greene, Harold Jones (ORD Project) Leon Husser (ADP Project)
7/2-7/7 7/5-7/7	Dominica	Henson, Weir Carroll	Barton Clarke, W. Rolle, C. Austrie, M. Garver (Project Team); Colin Bully, Errol Harris, H. Clarendon, O. Grell (MOA); U. Martin (IICA); A. Whitewell (BDD); Tom Henderson (CAEP); Keith King (CARDATS); C. Castellanets (FTC); Wade Bell, B. Chasseau, A. Roger, Pep Bell (Farmers)

DATE	PLACE	TEAM MEMBERS	PERSONS MET
7/7-7/9	Antigua	Entire Team	Brian Cooper, Charles Douglas (Project Team); J. Spencer, Frank King, B. Harper, D. Yearwood, (MOA); Vernon Sargeant (CARDI-EDF Project); I. Ameen (CARDATS); N. Weste, N. Christian (Farmers)
7/9-7/11	Montserrat	Weir	Roland Fletcher, S. Weekes, F. Michael, Claude Cerald (MOA); A. Maloney (DFMC); Jamie Kuman (CARDATS); Olivia Kirwan, R. Green Emile Rogers (Farmers)
7/9-7/11	St. Kitts/ Nevis	Carroll	O. Liburd, Jenny Lowrey,
7/11-7/14	Barbados	Carroll, Weir	Bill Baucom, Don Harrington, Darwi: Clarke

APPENDIX 5

PROJECT STAFF LIST - CARDI FSR/D PROJECT - JULY 1986

LOCATION: ST. LUCIA

Mr. Calixte George	: Project Manager
Mrs. Patricia Prosser	: Administrative Assistant
Mrs. Alice Stephen	: Executive Secretary
Ms. Electra Alexis	: Secretary
Ms. Isaline Antoine	: Secretary
Mr. Rawle Trim	: Secretary/Accounts Clerk
Mr. Evans Eddy	: Computer Technician

TECHNICAL COORDINATION

Mr. Barton Clarke	: Technical Coordinator (Leewards)
Dr. John Hammerton	: Technical Coordinator (Windwards)

COUNTRY FIELD TEAMS

LOCATION: ANTIGUA

Dr. Brian Cooper	: Systems Agronomist (Technical Specialist)
Mr. Lennox Daisley	: Country Team Leader (On Study Leave)
Mr. Charles Douglas	: Agricultural Economist (Acting Team Leader)
Mr. James Spencer	: Team Member (Government Counterpart)
Ms. Angela Henry	: Administrative Secretary II

LOCATION: ST. KITTS

Dr. Osbert Liburd	: Country Team Leader
Mr. Austin Farrier	: Team Member
Mr. Charles Williams	: Team Member
Ms. Lynette Williams	: Secretary/Accounts Clerk

LOCATION: NEVIS

Ms. Jennifer Lowery	: Country Team Leader
Mr. Oral Williams	: Team Member
Mr. Kelvin Swanston	: Team Member (Government Counterpart)
Ms. Ruth Morton	: Secretary/Accounts Clerk

187X

LOCATION: MONTSERRAT

Mr. Rowland Fletcher	: Country Team Leader
Mr. S. Weekes	: Team Member
Mr. Claude Gerald	: Team Member (Government Counterpart)
Ms. Patricia Farrel	: Secretary/Accounts Clerk

LOCATION: DOMINICA

Mr. Barton Clarke	: Country Team Leader
Mr. Gregory Robin	: Team Member
Mrs. Lucille Corriette	: Secretary/Accounts Clerk III

LOCATION: ST. LUCIA

Mr. Ronald Pilgrim	: Country Team Leader
Mr. Roger Francis	: Team Member
Mr. William Massiah	: Team Member
Mr. Burnet Sealy	: Team Member (Government Counterpart)

LOCATION: ST. VINCENT

Mr. Harold Patterson	: Country Team Leader
Mr. Frank McDonald	: Team Member
Mr. C. Bynoe	: Team Member (Government Counterpart)
Ms. Dolores Smart	: Secretary/Accounts Clerk

LOCATION: GRENADA

Mr. Kenneth Buckmire	: Country Team Leader
Mr. Reginald Andall	: Team Member
Mr. Augustus Regis	: Team Member (Government Counterpart)
Ms. Ivy Bain	: Secretary/Accounts Clerk

TECHNICAL SPECIALISTS: ST. LUCIA

Dr. Vasantha Narendran-Chase	: Economic Anthropologist
Dr. John Hammerton	: Weed Specialist
Mr. Bernard Francois	: Agricultural Economist
Dr. Maddenenni Rao	: Systems Agronomist

LOCATION: BARBADOS

Mr. Gerry Proverbs : Animal Scientist

In addition, there are six (6) Peace Corps Volunteers working in the Project, namely:

Mr. Abhihit Karandikar	- St. Lucia
Mr. Neil Schuck	- St. Lucia
Mr. Mark Miller	- St. Lucia
Ms. Miriam Garver	- Dominica
Ms. Evelyn Smith	- Dominica
Ms. E. Eiley	- St. Kitts

PROJECT GRANT AGREEMENT

AMENDMENT NUMBER TWO

between

CARIBBEAN AGRICULTURAL RESEARCH
AND DEVELOPMENT INSTITUTE

and the

UNITED STATES OF AMERICA

for the

CARDI: FARMING SYSTEMS RESEARCH
AND DEVELOPMENT PROJECT

Date: June 29, 1984

FISCAL DATA

Appropriation No.	72-1141021.3
Allotment No.:	LDAA-84-25538-AG13
Amount Obligated:	US$236,000
Project No.:	538-0099

AMENDMENT NUMBER TWO

Date: June 29, 1984

Between

Caribbean Agricultural Research and Development Institute ("Grantee")

And

The United States of America, acting through the Agency for International Development ("A.I.D.").

The purpose of this second Amendment to the Grant Agreement is to add funding in the amount of Two Hundred and Thirty-six Thousand United States Dollars ($236,000) to continue Project activities under this Grant and to include Grenada in Project activities. This will bring A.I.D. Project funding to a total of Two Million Two Hundred and Thirty-six Thousand United States Dollars ($2,236,000).

1. In Section 3.1 of the Project Grant Agreement as amended, the words "Two Million United States ("U.S.") Dollars ($2,000,000)" are deleted and the following words are substituted in lieu thereof: "Two Million Two Hundred and Thirty-six Thousand United States ("U.S.") Dollars ($2,236,000)".

2. In Section 3.2(b) of the Project Grant Agreement, the number "$4,220,000" is deleted and the following number is substituted in lieu thereof: "$4,720,000".

3. In Annex 1, Section A, paragraph 1 of the Grant Agreement Grenada, is added to the list of countries where project activities will take place.

4. In Annex 1, Section C3, paragraph 3 is deleted in its entirety and the following is substituted in lieu thereof:

"3. Field Station Upgrading: CARDI's three field stations in St. Lucia, Antigua, and Grenada, will be upgraded. The field stations will also provide for the office space of the Country Teams in the three respective countries. AID will fund the cost of renovations to buildings and upgrading the facilities to make them compatible with FSR research needs. CARDI will fund the operational costs of the three stations."

5. In Annex 1, Section E, the Project Financial Plan including the Illustrative Budget, is deleted in its entirety and substituted in its place is the Section E, Revised Project Financial Plan including the Illustrative Budget set forth as Attachment I, hereto.

6. All other terms of the Project Grant Agreement remain unchanged.

In witness whereof, Grantee and the United States of America, each acting through its respective duly authorized representative have caused this Amendment to be signed in their names and delivered as of the date first above written.

Caribbean Agricultural Research & Development Institute

By: _____
Joseph A. Bergasse

Title: Executive Director

United States of America

By: _____
William B. Wheeler

Title: Director

PROJECT GRANT AGREEMENT

AMENDMENT NUMBER FOUR

between

CARIBBEAN AGRICULTURAL RESEARCH
AND DEVELOPMENT INSTITUTE

and the

UNITED STATES OF AMERICA

for the

CARDI: FARMING SYSTEMS RESEARCH
AND DEVELOPMENT PROJECT

Date: June 12, 1985

FISCAL DATA

Appropriation No.:	72-1151021.3
Allotment No.:	LDAA-85-25538-AG13
Amount Obligated:	-0-
Project No.:	538-0099

PROJECT AGREEMENT AMENDMENT

AMENDMENT Number Four, dated June 12, 1985 between the UNITED STATES OF AMERICA, acting through the Agency for International Development ("A.I.D.") and the Caribbean Agricultural Research and Development Institute ("Grantee").

WHEREAS, the Grantee and A.I.D. entered into a Project Grant Agreement, dated July 15, 1983, ("Agreement") which has been amended three times; and

WHEREAS, the Grantee and A.I.D. desire to amend the Agreement to change the total cost of the Project, change the distribution of costs between A.I.D., the Grantee and Host Governments, extend the Project Assistance Completion Date, and modify a covenant;

NOW THEREFORE, the parties hereto hereby agree that the Agreement shall be amended to read as follows:

I. In Section 3.2(b) the number "US$4,720,000" is deleted and the following number is substituted in lieu thereof: "US$2,032,000".

II. In Section 3.3(a) the words "The Project Assistance Completion Date (PACD), which is June 30, 1988" are deleted and the following words are substituted in lieu thereof: "The Project Assistance Completion Date (PACD), which is September 30, 1988".

III. In Section 5.7 the words "by July, 1984" are deleted and the following words are substituted in lieu thereof: "by July, 1985".

IV. In Annex 1, Section C, paragraph 1, the words "AID will fund the total cost of country team operations (with the exception of Ministry of Agriculture staff member salaries) during the first year of the Project. CARDI will assume a greater percentage of these costs during the life of the Project and will (with the exception of Ministry of Agriculture staff member salaries) fund all personnel and administrative costs for country teams by the end of the project." are deleted and the following words substituted in lieu thereof: "AID will fund the total personnel costs of country teams, management support staff, and accounts clerks during the life of the project. AID will also fund the cost of the Director of Finance and Administration for a period of twelve months. Thereafter, CARDI will meet the total costs of the Director of Finance and Administration."

V. In Annex 1, Section C, paragraph 1, the words "AID will fund the total cost of technical specialists during the first year of the Project. Each subsequent year, CARDI will fund an increasing amount of specialists' costs. By the end of the Project CARDI will fund the total personnel costs of all technical specialists associated with the CARDI FSR program." are deleted and the following words substituted in lieu thereof: "AID will fund the total cost of technical specialists during the first four years of the project. CARDI will fund the total personnel costs of the technical specialists in the fifth year of the project."

VI. In Annex 1, Section C, paragraph 4(a)i, the words "CARDI will conduct three workshop/seminars for research and extension personnel from other member countries and non-member countries. The purpose of these sessions will be to expose these individuals to the FSR/D methodology, program successes and specific technological improvements which may have region-wide applicability. These will enable CARDI to have a broader and more cost effective FSR/D program influence." are deleted and the following words substituted in lieu thereof: "CARDI will conduct one workshop/seminar for research and extension personnel from other CARDI member countries and non-member countries. The purpose of this workshop will be to expose these individuals to the FSR/D methodology, program successes and specific technological improvements which may have region-wide applicability. This will enable CARDI to have a broader and more cost effective FSR/D program influence."

VII. In Annex 1, Section C, paragraph 4(b)i, the words "It is expected that the contract will last for the duration of the Project and will provide for a) the services of a farming systems specialist for up to 42 months; b) the services of a research management specialist for approximately 27 months; and c) short-term assistance amounting to approximately 36 months to support CARDI in various technical and administrative areas." are deleted and the following words substituted in lieu thereof: "It is expected that the contract will last for the duration of the Project and will provide for a) the services of a farming systems specialist for up to 31 months; b) the services of a research management specialist for approximately 23 months; and c) short-term assistance amounting to approximately 30 months to support CARDI in various technical and administrative areas."

VIII. In Annex 1, Section C, paragraph 4(b)i, the words "The research management specialist will not reside in the Caribbean, but will be required to spend extensive short-term periods in Trinidad and other states participating in the Project." are deleted and the following words substituted in lieu thereof: "The research management specialist may reside in the Caribbean and will be required to spend extensive short-term periods in Trinidad and other states participating in the Project."

IX. In Annex 1, Section E, the Project Financial Plan is deleted in its entirety and substituted in lieu thereof is the following:

E. PROJECT FINANCIAL PLAN

1. AID Contribution

a. Personnel Costs ($2,804,000)

AID Grant funds will be used to fund the following personnel costs of the Project: (1) Country team members who are not funded by individual countries,

195X

(2) Management support staff at the regional offices in St. Lucia and Antigua, (3) Accounts clerk for the country teams, (4) Director, Finance and Administration at CARDI headquarters in Trinidad for a period of twelve months, and (5) Technical specialists during the first four years of the Project.

b. Equipment and Supplies ($848,000)

AID will fund the following equipment and supplies: office equipment for regional offices in St. Lucia and Antigua, and country team offices; micro-computer systems for the Project territories and CARDI headquarters in Trinidad; laboratory equipment, field equipment and experimental materials and supplies for the life of the Project; ten vehicles; field station renovation, and equipment for three of CARDI's research stations.

c. Operating Expenses ($963,000)

AID will fund administrative expenses, (office rental, utilities and office supplies) for the two regional offices and for each country team office during the life of the Project. AID will fund all on-farm research and on-island travel costs (gasoline, oil, and maintenance for Project vehicles) for the life of the Project.

d. Regional Travel ($339,000)

The AID contribution will fund regional travel for Project staff associated with technical and administrative activities.

e. Technical Assistance ($1,964,000)

$1.579 million is budgeted for the following technical assistance: 23 person months of a Research Management Specialist; 31 person months for a long-term Farming Systems Research Specialist; and 30 person months of short-term assistance.

$103,000 is budgeted for short-term assistance for the design and implementation of a CARDI organization and management system.

$282,000 is budgeted for specialty technical assistance needs such as: yearly project audits; conducting workshops; the development of micro-computer systems; travel, per diem and honorariums for the Research Advisory Board; and other short-term needs that may arise during the Project.

f. Training ($432,000)

Funds are provided for essential staff development of a short-term nature. Short-term training will focus on workshops, conferences, short courses and other training necessary to increase the capabilities of CARDI, participating country staff and the private sector.

g. Evaluation ($200,000)

Funds are provided for two external evaluations during the life of the Project.

2. CARDI Contribution

a. Personnel Costs ($1,063,000)

CARDI will fund the salary and benefits of all CARDI staff needed to backstop Project activities. CARDI will fund the personnel costs of the Director, Finance and Administration at CARDI headquarters in Trinidad after AID has made its contribution to such costs for a twelve month period. CARDI will also fund the personnel costs of Technical Specialists during the fifth year of the Project.

b. Operating Expenses ($870,000)

CARDI will fund the operational costs of the field stations and other in-country activities that serve as backstopping to the Project.

c. Regional Travel ($99,000)

CARDI will fund regional travel associated with Project activities for its core staff.

3. Host Governments' Contribution

a. Personnel Costs ($348,000)

It is anticipated that host Governments will contribute to the salary and benefits of at least one member of each country team.

b. Operating Expenses ($169,000)

The Governments of Antigua, Grenada, St. Kitts/Nevis and Montserrat also contribute to the office space used by country teams in their states. CARDI will attempt to have other Governments contribute to the operating expenses of the Project.

197

X. The Illustrative Budget is deleted in its entirely and substituted in lieu thereof is the Illustrated Budget set forth as Attachment 1, hereto.

XI. All other terms of the Project Grant Agreement remain unchanged.

IN WITNESS WHEREOF, Grantee and the United States of America, each acting through its respective duly authorized representative have caused this Amendment to be signed in their names and delivered as of the date first above written.

Caribbean Agricultural Research & Development Institute

By: _____
Samsundar Parasram
Title: Executive Director

United States of America

By: James S. Holtaway
James S. Holtaway
Title: Director

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
3	May 13, 1985		

6. ISSUED BY — CODE

Regional Development Office/Caribbeen
P.O. Box 302
Bridgetown, Barbados

7. ADMINISTERED BY (If other than Item 6) — CODE

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)

South-East Consortium for International Development
400 Eastovne Drive
Suite 207
Chapel Hill, N.C. 27514

(X)	9A. AMENDMENT OF SOLICITATION NO.
	9B. DATED (SEE ITEM 11)
X	538-0099-C-00-4104
	10A. MODIFICATION OF CONTRACT/ORDER NO. 7-16-84
	10B. DATED (SEE ITEM 13)

CODE | FACILITY CODE

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(X)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
X	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAA of 1961, as amended, and E.O. 11223
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

The purpose of this amendment is (i) to reduce the level of effort under the contract, (ii) to decrease the contract amount by $802,614, from $2,847,124 to $2,044,510, and (iii) to make other necessary changes. Accordingly, the contract is hereby modified as follows:

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)
Edward Vickery, Executive Director	S. D. HEISHMAN Regional Contracting Officer

15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
Edward Vickery (Signature of person authorized to sign)	July 2, 1985	BY S D Heishman (Signature of Contracting Officer)	7/15/85

A. On the Cover Page in the Total Estimated Contract Cost Block, delete "$2,847,124" and in lieu thereof insert "$2,044,510".

B. ARTICLE III - LEVEL OF EFFORT

Delete in its entirety and substitute therefor the following:

"ARTICLE III - LEVEL OF EFFORT

The level of effort for the performance of this contract is 134.5 person-months of direct labor comprised approximately as follows:

A. Home Office	Person-Months
Campus Coordinator (U. of Maryland)	9.5
Secretary (U. of Maryland)	7.5
Project Manager (SECID)	1.0
Project Coordinator (SECID)	9.0
Financial Analyst (SECID)	8.0
Farming Systems Specialist (Winrock)	3.0
B. Field	
Farming Systems Specialist (Winrock)	28.0 1/
Administrative Assistant	15.5
Research Management Spec. (U. of MD.)	23.0 2/
Short-Term Specialists	30.0
Total	134.5

1/ This specialist will be assigned initially in the field for approximately 22 months, and subsequently for two or more short-term periods.

2/ These person-months will be provided by one or more specialists under short-term assignments."

C. ARTICLE VI - ESTIMATED CONTRACT COST AND LIMITATION OF FUNDS

Delete "$2,847,124", which is the total estimated cost of the contract, and in lieu thereof insert "$2,044,510".

D. ARTICLE VII BUDGET

Delete the budget and substitute therefor the following:

	"Year 1	Year 2	Year 3	Year 4	TOTAL EST. COST 4 Years
1. Salaries & Wages	$ 88,913	$ 83,130	$ 40,265	$ 49,632	$ 261,940
2. Consultant Fees	77,859	65,695	56,410	76,664	276,628
3. Fringe Benefits 1/	37,233	29,750	18,503	24,349	109,835
4. Overhead (Indirect) 2/	62,269	58,771	33,341	44,456	198,837
5. Travel & Trans.	34,280	29,781	21,112	19,545	104,718
6. Allowances	80,770	73,016	58,360	51,810	263,956
7. Other Direct Costs	19,099	8,596	7,493	9,553	44,741
8. Contract Procurement Costs	26,420	8,720	-0-	-0-	35,140
9. Equip. & Materials	466,000	-0-	-0-	-0-	466,000
10. G & A 3/	93,541	76,413	52,557	60,204	282,715
TOTAL EST. COST	$986,384	$433,872	$288,041	$336,213	$2,044,510

1/ University of Maryland, Winrock International, and consultant institutions, and SECID.

2/ University of Maryland, Winrock International, consultant institutions.

3/ SECID."

E. ARTICLE X - OVERHEAD

Effective July 16, 1984, substitute "26.0%" as the provisional rate for SECID.

F. APPENDIX A - STATEMENT OF WORK

1. Delete the last sentence in the first paragraph on page 1, and, in lieu thereof, insert the following:

"This contract provides for: 1) the services of a Farming Systems Specialist for 31 months; 2) the services of a Research Management Specialist or Specialists for 23 months; 3) short-term assistance of 30 person-months to support CARDI in various technical and administrative areas; 4) home office backstopping of 35 months in support of the field effort, and 5) procurement services for the purchase of commodities with an estimated cost of approximately $466,000."

2. Section A.1 - Change the first sentence to read as follows:

"1. Farming Systems Specialist: The Farming Systems Specialist will be the team leader while he is on long-term assignment in St. Lucia. Initially, he will be assigned in St. Lucia for approximately 22 months. Thereafter, he will be assigned either in the field or in the United States. While in the field he will work closely with the CARDI Project Manager."

3. Section A.2 - Change the first sentence to read as follows:

"The Research Management Specialist or Specialists will be assigned for short-term periods to work in the field or in the United States on the Project."

4. Section E - Procurement Services

a. In the first sentence of Subsection 1, delete "$1,100,000" and substitute therefor "$466,000".

b. Delete the paragraph at the end of Subsection 1 that was added by Amendment No. 1 of the Contract.

c. In Section 4(a) change "$183,000" to "$155,000".

d. In Section 4(b) change "$48.000" to "$57,000".

e. In Section 4(c) change "$275,000" to "$110,000".

f. In Section 4(d) change "$305,000" to "$35,000".

g. In Section 4(e) change "$200,000" to "$89,000".

h. In Section 4(f) change "$150,000" to "$20,000".

APPENDIX 8

TECHNICAL ANALYSIS

PART I - DETAILED DESCRIPTION OF CARDI'S FARMING SYSTEMS RESEARCH & DEVELOPMENT METHODOLOGY

A. CARDI's Approach To Farming Systems Research

The Caribbean Agricultural Research and Development Institute (CARDI) was established in 1975 to serve the agricultural research and development needs of the 12 member countries of the Caribbean Community. The objectives of the Institute are (1) to provide for the research and development needs of the agriculture of the region as identified in national plans and policies; (2) to provide an appropriate research and development service to the agricultural sector of member states; (3) to provide and extend the application of new technologies in production, processing, storage and distribution of agricultural products of member states; (4) to pursue for specified periods long-term research in pertinent areas; (5) to provide for the coordination and integration of the research and development efforts of member states where this is possible and desirable; (6) to undertake teaching functions normally at the post-graduate level, limited to the development of the relevant research by any member state; and (7) to seek to achieve the optimum decentralisation of facilities.

CARDI was structured like most traditional agricultural research institutes and was conducting research along disciplinary and commodity lines. In 1978 with AID assistance, CARDI initiated the Small Farm Multiple Cropping Systems Research Project. The primary purpose of the project was to improve small holders' farming systems through the development of management and production recommendations which farmers could and would use, extension agents could explain, and credit institutions would finance. The project was fundamentally an adaptive research project where proven technology was to be introduced into the farm systems to enhance farm productivity.

The first activity undertaken was a reconnaissance survey in eight territories to identify the location of small farmers according to size of holdings, number of parcels and major farming enterprises. One of the first problems encountered was that in some territories there were no recent or existing farmers' register from

which an appropriate sample could be selected. The concept of a small farmer varied from island to island. Further, the ministry of agriculture in one territory laid down certain criteria for the selection of farmers in the absence of a register which did not allow for a random sample to be drawn. In another territory, because of certain circumstances beyond CARDI's control, certain districts in the island were left out of the population from which a sample was drawn.

Further, although the project was to deal with multiple cropping systems, the reconnaissance surveys indicated that the livestock component in the small farm milieu could not be ignored. Thus, the project was directed to a holistic farming systems approach as illustrated in Figure 1. CARDI researchers conceived a farming system to be a complex interaction between the physical, socio-economic and political environments, the available production resources at the farm level, and the farm household. A farming system evolves to meet the self fullfilment of farmers aspirations within a specific community environment.

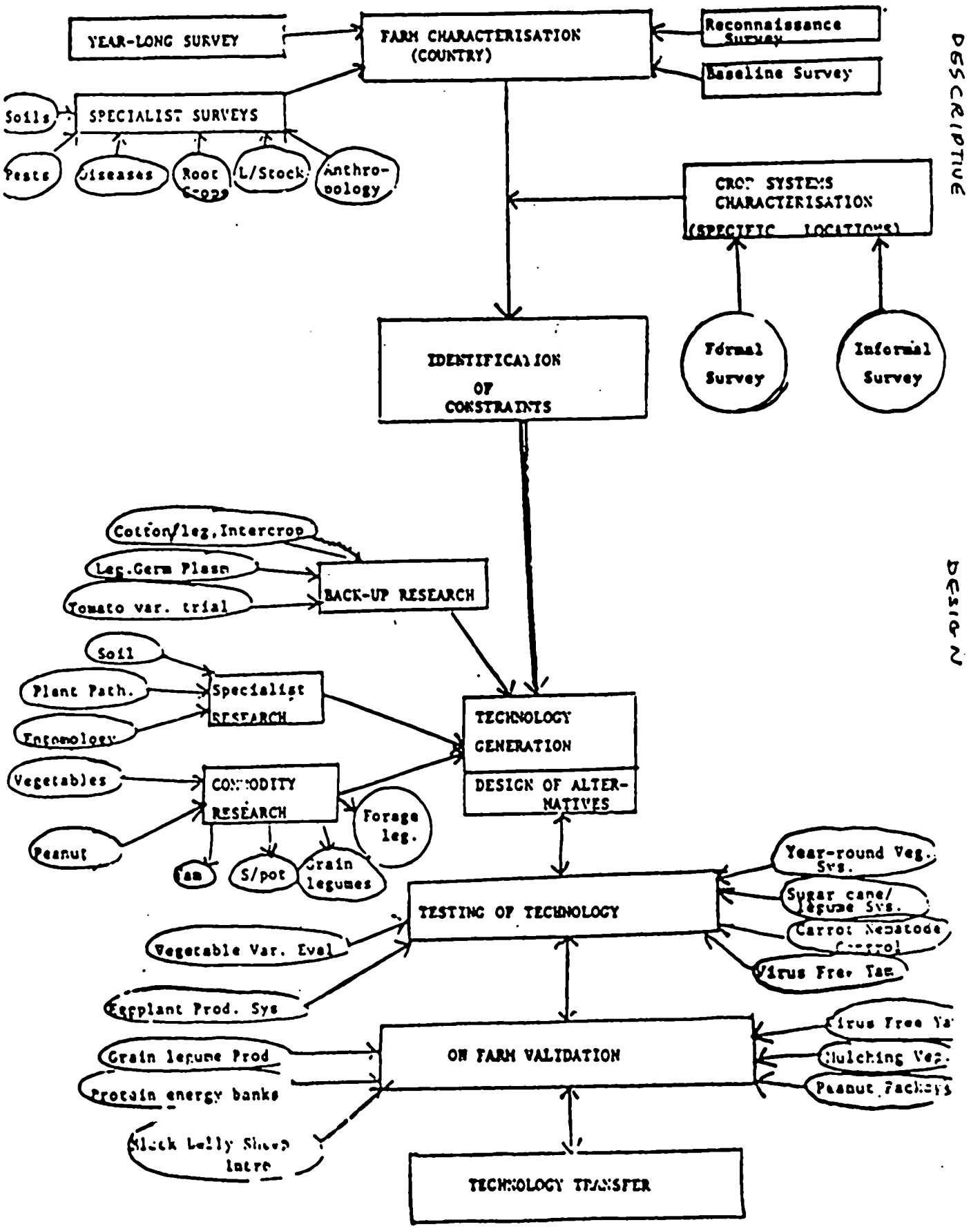
The unavailability of secondary agro-socio-economic data considered essential for a farming systems analysis necessitated the conduct of one-shot baseline surveys on an island basis. Initially, these surveys were conducted by the University of the West Indies and did not involve CARDI, who were to work on subsequent stages of the project. The project staff were not familiar with the circumstances of farmers at the outset and this delayed the learning process on the part of the researchers which is vital in farming systems work.

However, the results derived from the baseline surveys provided criteria for the selection of a sub-set of 25 farmers per territory who participated in a long term monitoring exercise. The criteria were: (a) farmers between 25 and 65 years of age; (b) farmers with 1 to 3 parcels of land; (c) reasonable access to farm holdings and; (d) cooperativeness of farmers.

The sub-sets of farms in each territory were visited at weekly intervals and monitoring continued for about one year. These surveys were 'whole farm' in that data were collected on all aspects of the farming systems as well as certain non-farm activities. Several problems arose during this exercise. There were misinterpretations on definitions leading to variations in the data collected by different interviewers. Due to the complex nature of the enterprises identified and the minute nature of some, it was very difficult to separate the inputs and the outputs of several components in an enterprise.

FIGURE 1

SCHEMATIC DIAGRAM OF MAJOR COMPONENTS OF SMALL FARM MULTIPLE CROPPING SYSTEMS RESEARCH PROJECT #538-0015



The sheer volume of data collected led to delays at the country level in the preparation of the data for computerisation at headquarters. Time lags occurred in the return of data central processing unit to the country teams which did not allow for the proper identification of constraints before interventions were designed. Many of the difficulties encountered in the data collection exercise were rectified by the introduction of a new system which involved pre-coding of data, rapid checking and processing with the establishment of a data management sub-unit within the project.

The results of these activities described led to the identification of constraints and opportunities on crop and livestock systems on an island or regional basis. The nature of the research undertaken varied from country to country depending on the problems identified and the 'body of knowledge' existing to alleviate the problems. Thus in some cases, on-farm testing of shelf technology was conducted, e.g. virus-free yam in St. Lucia, and commodity research activities led to the testing of a package of practices in peanut production in St. Vincent. In other cases, because of the absence of existing knowledge, the generation of new technologies had to be carried out by back-up research activities at the country level, e.g. cotton/legume intercropping evaluations in Nevis. In addition, on-farm validation of known, proven and tested technologies were conducted, e.g. protein/energy banks for livestock in Montserrat and mulching of vegetables in Antigua.

The conduct of the research was confined to the farmers who originally participated in the detailed year long monitoring and it was thus difficult to obtain adequate replication of some experiments. The experiments were not confined to clearly defined agro-ecological zones. In order to develop more relevant technologies and to effect faster transfer of technologies to a wider group of farmers, each country was divided into tentative recommendation domains on the basis of natural conditions -- rainfall, number of dry months, topography and soils. These domains were further refined by taking socio-economic farmer circumstances into consideration. Both formal and informal surveys were conducted in specific locations on a particular cropping system.

The greater amount of project time, devoted to data collected, limited the time spent on actual conduct of on-farm tests. This in turn resulted in a low level of technology generation and adaptation and so precluded the last link in the Farming Systems Research chain, i.e. transfer of technology. The experience gained from this approach to farming systems are being used to refine and modify the approach to this project. More emphasis will be placed on analysis of data collected, design of

on-farm tests, conduct of on-farm tests, and the question of technology transfer will be tackled vigorously. This involves the consideration of establishing formal linkages with extension and support services and their involvement in the Farming Systems Research Approach to be adopted in this project.

B. The Systems Approach

Taking a systems approach to agricultural research and development means conceptualizing agricultural phenomenon as systems. The identification of components that interact to form systems that use inputs to produce outputs is not an arbitrary process. In this complex agricultural scene of the Eastern Caribbean, it is often quite difficult to identify, describe and analyse the agricultural systems that must be understood if alternative technologies are to be recommended.

CARDI's Farming Systems Methodology requires an understanding of the following agricultural systems:

1. The Island Agricultural System: This system is composed of; a) the farms that process natural resource inputs and agricultural chemicals, seeds, fertilizer, labour, credit etc., and produce agricultural commodities; b) commodity processing components, such as mills and packaging plants; and c) services such as private sector suppliers of inputs, public sector institutions such as credit, agricultural research, extension and marketing boards.

2. The Farm System: A farm system is a key sub-system of an island agricultural system. It is composed of a household and a set of agricultural production systems that are controlled by the household. The inputs include the family labor and assets owned by the family plus those items purchased and those provided by nature. A farm system produces and sells agricultural commodities. In addition, part of the output is consumed by the household. Using the cash obtained from selling these outputs, or credit a farm system buys the inputs required for its agricultural production system and the household. Aspects that have not been included as farm system components in the above definition, but which are important factors that affect farm operation, are off-farm work by members of the family and non-agricultural activities (such as running a small store) that may occur within the physical limits of the farm.

3. The Agricultural Production System: This system is a sub-system of a farm system. It is composed of physical components (soil, nutrients, etc.) that interact in space and time. Inputs can include precipitation, solar radiation, agricultural chemicals, seed, labour, mechanical energy, animal energy, management, etc. Outputs include desirable commodities such as grain, roots and tubers, fruits, meat, milk, and undesirable products such as soil erosion or pesticide runoff. A crop production system is an agricultural production system that includes one or more crop populations that interact in space and/or time; a crop/livestock production system is an agricultural production system that includes one or more crops and one or more livestock populations that interact in space and time. All crops and livestock on a farm interact in that they compete for labour, land and capital resources, but sets of crops and/or livestock are grouped together to form a system when they compete biologically (e.g. for sun or soil nutrients, or for the same feed resource) and when farmers manage them as a unit, (e.g. when small plots of different vegetables are planted in one field to which a farmer allocates labour without regard to vegetable species).

System analysis is a process of applying different analytical techniques in order to understand the relationship between a system's structure and its behaviour. Analytical techniques can include simple systems diagrams or graphical techniques, and financial budgeting, or more sophisticated mathematical modelling such as linear programming or simulation analyses. The objective is to explain how inputs are turned into outputs and how the relationships among components affect this process. For example, an analysis of a crop production system may explain how solar radiation, nutrients and water are turned into crop biomass and how the spacing between crops affects yield.

Much of the success of CARDI's Farming Systems programme is dependent on the development of system analysis techniques to analyse agricultural production systems, farm systems and island agricultural systems. This does not mean that all the data used to conduct these analyses must be generated by CARDI scientists. It does mean, however, that the methodology must contain activities to capture the information needed and to analyse this information so that alternatives to farmers' present production systems can be identified and evaluated.

C. Farming Systems Research Methodology

As mentioned above, CARDI has continually refined its

methodology as it has gained experience in farming systems research. The philosophical guidelines that were used to design the original methodology are still important. Some of the key characteristics are:

1. Farmer Participation: The farmer is conceptualised as a member of the FSR/D team. His or her intuitive knowledge of how farming systems and production systems function and the constraints that affect their function are key pieces of information.

2. The Objective is Alternative Production Systems: The technological options that are generated as a result of applying the methodology are alternative management, inputs, components and/or arrangement of components of existing production systems. The output of the research process is not just a production system component, such as a new crop variety or a new veterinary product, but rather alternative set of technological options that encompass the production system as a whole. In some cases the basic change proposed may be only a change in variety; but in most cases changes in other components will be necessary, such as management and other inputs.

3. Evaluation of alternative production systems is based on farm system performance criteria. While the new technology is generated at the production system level, its evaluation is based on how the farm performs. The question is not how does new technology function in isolation, such as on a field station, but rather how does it fit into an existing farm system (is labour available, etc?) and does the farm function better (using the farmer's criteria to define "better") with the alternative or without it?

4. Linkage with other agricultural institutions is essential. To function, the FSR/D methodology requires linkage to commodity and discipline oriented research to receive new technology and to give information as to the type of component research that should be done; linkage to agricultural policy institutions to receive information on credit, marketing, etc. and to give recommendations on possible policy changes; and linkages with extension institutions to receive information on farm level constraints and to give assistance in farmer evaluation of alternative technology and technology transfer.

The detailed FSR/D methodology contains 11 sets of activities. A key activity is that of "design of alternatives". The first 7 activities come together to allow the design of alternatives. The last 3 activities involve the testing and

transfer of the technological improvements that are produced during the design activities. Each of the 11 activity sets are discussed below. Figure 2 presents the methodology in Flow Chart form.

1. Area And Target Farmer Selections

The Country Team in each territory, together with Ministry of Agriculture decision makers, will select target areas and target groups of farmers. The team will then divide the target areas into sub-areas which may be based on communities to establish the outlines of the area to conduct the research. The team will divide the target area or target group of farmers into sub-sets according to common physical, biological and socio-economic characteristics. Such a classification leads to the establishment of a certain amount of homogeneity. This classification of farmers into 'Recommendation Domains' makes the cost-effectiveness of research more likely since results of on-farm tests conducted are likely to be applicable to farmers with similar circumstances. Recommendation domains are determined by the variations in farmer circumstances. They may be determined by variations in natural circumstances such as rainfall, soils, topography. Thus distinct agro-ecological zones in an island may be a recommendation domain. However, these agro-ecological zones may be further modified by socio-economic circumstances that will produce different recommendation domains. The country team by working within homogeneous units will be able to develop improved technologies for farmers operating under similar circumstances.

The number and locations of research areas in the various domains established will be dependent on the hetereogeneity of the area, size of the areas to be covered, the number of farmers per area and the available physical, human and financial resources.

2. Initial Reconnaissance

When the target area has been identified and the type of farmers that the project hopes to impact has been selected, the next step is to do a rapid reconnaisance. Different institutions have used different techniques to do this reconnaisance. Some do relatively structured short surveys, others send out a multidisciplinary team with the objective of qualitatively describing the agricultural systems in the area, and others send out multi-disciplinary teams to ask questions related to their own discipline. Techniques to be used by CARDI will depend on availability of human resources, the complexity and homogeneity of the farming systems, and the amount of time available.

FIGURE 2

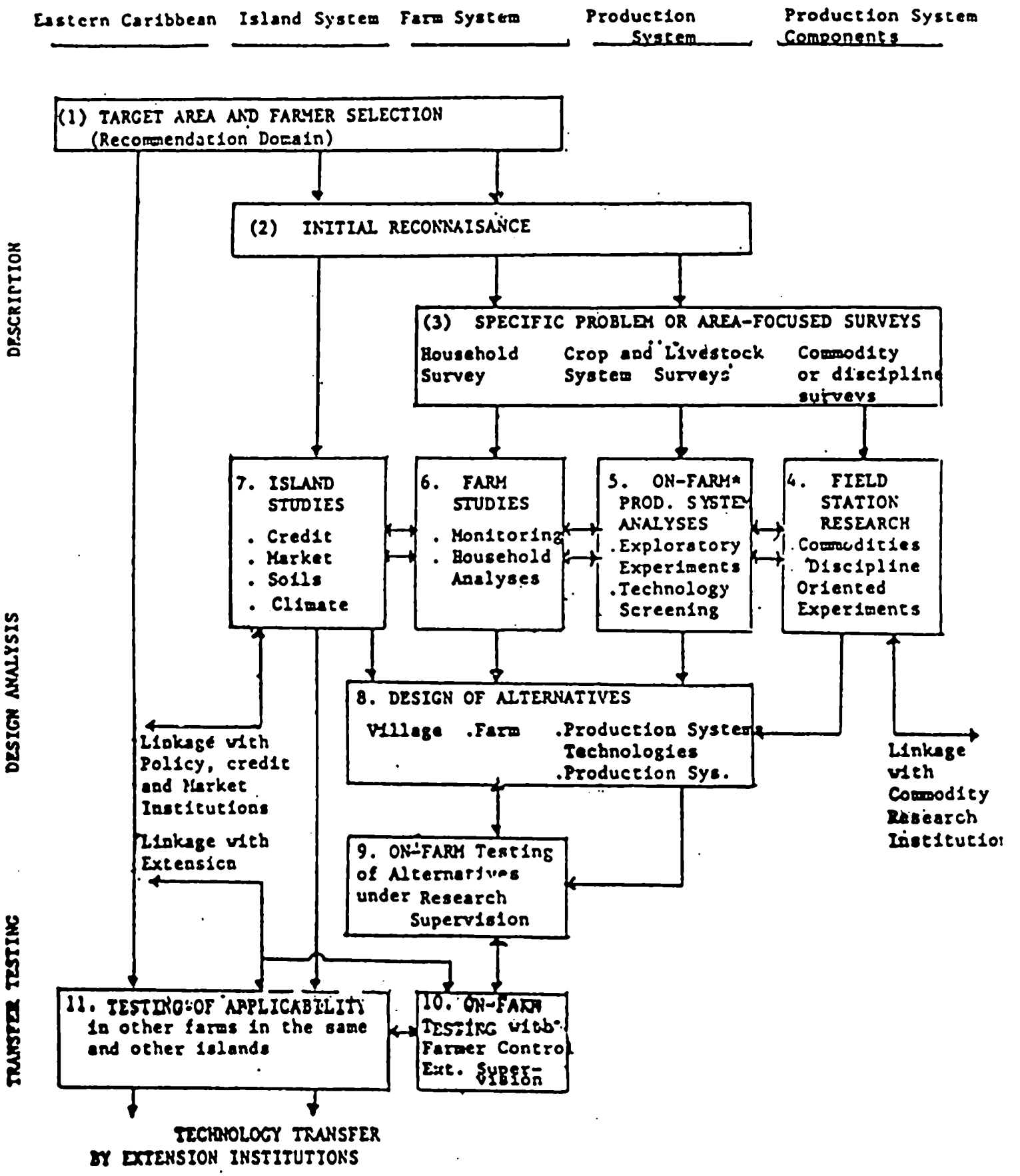


Figure 3.2. CARDI's GENERAL FARMING SYSTEM RESEARCH AND DEVELOPMENT METHODOLOG

*Note overlap in nature on On-Farm Tests in relation to Analyses, Testing and Transfer processes

211

Regardless of the technique used, the objectives of this activity are to gain a general understanding of the resources available at the farm level and how the farming systems work, and to identify the important questions that need to be addressed in the survey stage.

3. Specific Problem - Focused Surveys

During the evaluation of farming systems methodology, most projects have made the mistake of not devoting enough resources to the initial reconnaisance and, instead, began with a large un-focused survey. Most projects found that it took too long to analyse the results and a lot of the information gathered was never used. In the early stages in the development of CARDI's methodology, some of these same problems occurred. Overtime, CARDI has begun to put more emphasis on short, problem-focused surveys.

An important difference between the survey stage and the reconnaisance stage is that the information collected during the reconnaisance cannot be used to generalise from a sample to the population with statistical confidence. In the survey stage, enough is known about the population that a sampling procedure can be developed that will allow inferences about characteristics of the population. These surveys are designed to test specific hypotheses. Examples include: (a) sex of farmer affects choice of production system, (b) labour availability during land preparation is the key production constraint, or (c) off-farm work affects farmers choice of farming systems.

4. Field Station Research

The conduct of research under field station conditions is a complementary part of on-farm research. The objectives of this research is to increase the 'body of knowledge' from which researchers can draw technologies for on-farm testing and to attempt to solve specific problems encountered at the farm level. It has been found that such 'back-up' research, when conducted at the country level, can often provide technologies that are rapidly available for farm testing. The research can be conducted along the traditional commodity and disciplinary lines, but in a farming systems programme researchers at that level should make every effort to work as interdisciplinary teams. The key issue, however, for the inclusion of this type of research activity in a farming systems programme is the opportunity it provides for interaction between

specialist and country teams so that the specialists can direct their research closer to the needs of small farms.

The conduct of research at this level allows for the tapping of knowledge from international and regional research centres. It also provides a focal point for the introduction and testing of new materials from these centres. Most important, however, is that such stations provide a centre for multiplication of planting materials which could serve as inputs for on-farm testing and validation.

5. On Farm Production Systems Analysis

The major focus of this project is on-farm testing. On-farm testing occurs at several stages in this farming systems process. On-farm tests to be conducted at this stage are aimed at the development or modification of technology that may be applicable for a particular group of homogeneous farmers. The objective of the exercise is to identify the best way to improve the existing production systems. The tests are designed in such a way that a better understanding of the effects of physical, biological, social and economic factors on the performance of production systems can be obtained. These tests can involve the screening of technologies such as varietal or breed evaluation, livestock feed combination trials, polycultural crop interactions, fertility evaluation, pest and disease management, livestock management etc.

This first type of research activity aims primarily at generating information on the performance of production systems under varying environments to be used as a basis for design of alternative production systems.

Such experimentation that is to be conducted will be done under the strict control of the researcher. The principles of experimentation as those conducted at a research station should be operative. In other words the farmer's field is being used as an 'experiment station' so that the experiment is being conducted in an environment that is more akin to farmers' conditions.

6. Farm Studies

An understanding of how the farming systems, used by target farmers, operate is obviously a key requirement for a farming systems project. The farming system is the immediate environment in which the alternative technology that is generated by the research will have to fit.

The reconnaisance and surveys will provide the basic information about the existing farm systems, but most of this information is static in nature. Farms are dynamic systems and almost all farming systems projects have introduced some type of farm monitoring into their methodology. First, the key inputs and outputs from the farm and from the various production systems are identified, then a questionnaire is developed and filled in periodically. Information is usually collected either weekly, bi-weekly, or monthly. Some information is relatively dynamic and must be collected as often as possible, and other information is quite static and can be collected infrequently.

An important type of farm study is the analyses of specific farm sub-systems. These studies can be directed at one production system or at the household. For example, a detailed labour use study of a predominant production system may be needed. A study of household decision-making is often needed in order to understand how a farming system operates.

7. Island Studies

To identify alternative production systems that can have an impact on an island's agricultural sector, island level credit, marketing, soils and climate information are needed. To obtain this information, CARDI will have to establish strong linkages with policy, marketing and credit institutions both in the public and in private sector.

The soil and climate analyses are needed in order to identify the inputs into production systems and to identify the physical limits where a technological alternative is applicable. The policy, credit and marketing situation must, obviously, be understood in the design of a technological alternative; but the linkage with these institutions is also important in that it allows CARDI to communicate how changes in the macro-economic environment could allow more rapid adoption of potential technological alternatives.

8. Design Of Alternatives

This is a key stage in farming systems research. The information gathered during the analysis stage in (steps 4-7) is synthesized and alternative technology to be tested is identified. Design can be divided into the following steps:

(i) Identification of constraints at the production system level (for example, low soil fertility); the farm level (for example, lack of labour during land preparation periods), and the island system level (for example, excess production of vegetables during one period of the year).

(ii) Prioritization of constraints with regard to the possibility of overcoming them and, therefore, offering an opportunity to identify alternatives.

(iii) Prioritization of opportunities by the availability of technology that could potentially have an impact on farming systems.

(iv) Prioritization of technology to be tested by its level of potential impact on the farming systems in the target area.

9. On-Farm Testing Of Alternatives

Alternative designs of production technologies and systems identified are put to the test at this stage. These tests must be carried out on representative farms of a particular recommendation domain. The number of farms involved will be dependent on the nature of the experiment, the number of treatments, etc. However, regardless of the nature of the experiment, the tests must include a check plot with the farmers systems against which the alternatives will be evaluated. Adequate replication of these tests are mandatory. Wherever possible at least two replicates of the designs under test should be established per farm.

In these tests it is necessary that the farmer be a participant so that his experience and knowledge can be incorporated in the refinement of technologies and an insight can be gained into his ways of assessing the tested technologies. The extension agent is involved as an observer in these tests. However, these tests must be under the strict control of the researcher.

10. On-Farm Validation

This phase allows the testing of the best alternatives under several farmers' conditions. In this case the test can be under the control of the farmer with supervision from the extension agents. The researcher becomes an observer at this stage. The aim of these tests is to assess the extent of acceptability by the farmer of the best alternative systems developed. An important aspect of these validations is the development of close interaction between the researchers, extension agents and farmers. This is the point at which the technology transfer process begins. Thus, although the farmer will control the tests, the researchers must provide guidance on the design and sequences to be followed in the tests. The extension agents must monitor these tests and provide the farmer with any technical or other information relevant to the test that he may desire.

These tests will be conducted on a larger number of farms than was the case of researcher controlled tests. In these cases a minimum requirement is two plots. Each test, however, must have the farmers' system as a control. Each farmer can be used as a replicate in this case.

11. Applicability Testing

On farm validations will give a fairly good guide as to the acceptability of new technologies and production systems. The transfer of these technologies to a wider group of farmers within a given region or recommendation domain or even to other domains within a country can be evaluated by the involvement of the extension agents in simple On-farm applicability testing under farmer conditions and control. In this way the 'elasticity' of the technology can be determined. There is the added dimension that the technology developed in one agro-ecological zone in an island may be more applicable to an agro-ecological zone in another island. Thus validations of technologies across islands can be achieved as a further aid to the technology transfer process. The very close interaction of researchers and extension agents in the same as well as in different islands will be necessary for effective and rapid technology transfer.

E. Production System - Specific Research Processes

The general FSR/D methodology described above is a general process that is applicable in a wide range of situations. To apply the methodology on a specific island in a specific recommendation domain, with the objective of improving a specific production system within a specific type of farming system requires a detailed research process.

When area and target farmer selection, initial reconnaissance, and specific problem-focussed surveys (steps 1-3) have been implemented, and island, farm and production system-level analyses have been initiated (steps 4-7), it will be possible to identify specific production systems as key research focci. Criteria to identify these key production systems will include both the availability of technology to overcome biological farm-level constraints (e.g. disease resistant varieties of a particular crop are available to overcome a plant pathology problem that is a constraint), and the availability of island-level macro-economic opportunities (e.g. - import substitution opportunities exist). These production systems may include only crops (e.g. cotton-legume rotation), both crops and livestock (e.g. intercropped bananas and aroids, and pigs fed primarily crop residues), or only livestock (e.g. - pasture-fed cattle). When a preliminary identification of key production systems has been made, then the next step is to develop a research process that is specific for that production system and the farm system, recommendation domain and island where it is found. The key elements in this research process are: (1) a continuously-updated Technological Improvement files (TIF's), and (2) work plans to design, test and validate potential technological improvements.

The steps outlined above are linked to each other in a process which yields identified, tested and documented technological improvements. The process begins with the implementation of area and target farmer selection, initial reconnaissance and specific problem focused surveys (step 1-3). When the island level, farm level and production sub systems analyses have been initiated (steps 4-3) it becomes possible to identify research focci. Criteria to identify these focci include both the availability of technology to overcome biological farm-level constraints (e.g. disease resistant varieties of a particular crop are available to overcome a plant pathology problem that is a constraint) and the availability of island-level macro-economic opportunities (e.g. - markets, inputs and credit are available). (These production systems may include only crops (e.g. cotton-legume rotation), both crops and livestock (e.g. intercropped bananas and aroids, and pigs fed primarily crop

residues), or only livestock (e.g. - pasture-fed cattle). When a preliminary identification of key production systems has been made, the next step is to develop a research plan that is specific for that production system, the farm system and recommendation domain. The key elements in this research plan are: (1) a continuously up-dated Technological Improvement Files (TIF), and (2) work plans to design, test and validate potential technological improvements.

i) Technological Improvement Files (TIF's)

The objective of FSR/D is to generate technology that is better than what farmers are presently using. These technological improvements evolve over the course of time. At any point in time, the progress made towards identifying improvements will be at a different stage for different production systems. In the case of one production systems, it may be possible to move quickly and begin on-farm testing under farmer control (step 10); in other cases more than five years will be required to reach that stage. This means that on an island basis, and for the project as a whole, research planning and data management will be very complex. Continuously updated production system-specific Technological Improvement Files (TIF's) will be used to organize both the information that is generated and the research activities that are undertaken.

The format of the TIF will evolve over time, but is expected to take the form of four sub-files:

- desoription of the present production system, the farm system and the physical environment in which it functions (i.e. chronology of farmer management activities, inputs and outputs from the system, etc.);

- description of available technology to improve the present system (e.g. new crop varieties, crop population and spacing, or new livestock breeds, feed management systems, etc.);

  technical justification for the technological improvements (e.g. experimental evidence, results of marketing or anthropological studies, etc.); and

- research activities that are presently being implemented or planned for the future.

The TIF for each production system will first be developed by hand and refined. Later, microcomputers will be introduced to ease the process of up-dating, communicating and storing the information. When confidence in the Technological Improvement is such that extension begins to play the lead role, the first three sub-files will be transfered for use in the development of extension activities and extension bulletins.

ii) Work Plans To Update TIF's

A Technological Improvement File will be started when a decision has been made that a specific production system in a specific farming system and recommendation domain on a given island is an area of future research emphasis. At first, the file will include only a description and analysis of the farmers present system. This is information that will have been gathered during steps 1-7. As part of the analysis to identify a priority system, potential technological improvements will have been discussed, and these can be stored in the sub-file on technological improvements, even though the sub-file on "justification" will be empty.

At the first planning session after a specific production system has been identified, work plans will be developed to implement either analysis activities (steps 4-7) if further analysis is needed, or begin to test potential technological improvements (step 9). In cases where a specific technology has obvious potential, it may be possible to move directly to on-farm validation trials (step 10).

The work plans that are developed by a country team with the assistance of project specialists can be filed in sub-file 4 of the TIF. At the next planning sessions the results from the research that was planned can be moved to the technical justification sub-file. Based on an analysis of the result, other potential

improvements can be identified and stored in sub-file 2. The work plans for the next year can then be developed and stored in sub-file 4. At the yearly planning session the decision will be made to continue research on a specific production system until viable ecological and socio-economic improvements have been identified; or to discontinue the research because of the low probability of generating improvements. Availability of resources may also enter into this decision.

iii) Technological Improvements As Project Outputs

If the research with a specific production system has been successful, and potential improvements have been evaluated in on-farm tests under researcher control (step 9) and validated in on-farm tests under farmer control with extension supervision (step 10), the TIF can be transfered from research (CARDI and Island-level Research institutions where they exist) to extension institutions. The file at this point will include the sub-files describing the farmers system and ecological and socio-economic environment where the technology was generated, the sub-file describing the technological improvements, and the sub-file describing the technical justification for recommending the improvements.

When the TIF is transferred from research to extension, the first step will be for extension management personnel and research personnel to jointly plan a testing of the applicability of improvements in geographic areas outside of the specific area where the technology was developed (step 11). This may be on one island or possibly more than one island. If this test is successful and farmers adopt the new technology, extension will plan a more extensive effort (such as mass media campaigns) to transfer the technology to more farmers.