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A.I.D. Farming Systems Research & Extension (FSR/E) Projects

Case Study No. 13

Vignettes of Core, Operational, and Generic Constraints in A.I.D-Funded Farming Systems Research and Extension Projects[1]

by

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[1]This **CDIE Working Paper** is one of 13 case studies prepared for a cross-cutting analysis of A.I.D. FSR/E projects, A Review of A.I.D. Experience with Farming Systems Research and Extension Projects (**A.I.D. Evaluation Special Study**, forthcoming). Each of the first 12 case studies in this series of **CDIE Working Papers** focused on one of the following FSR/E projects:

Botswana Agricultural Technology Improvement (633-0221)
Gambia Mixed Farming and Resource Management (635-0203)
Lesotho Farming Systems Research (632-0065)
Malawi Agricultural Research (612-0202)
Senegal Agricultural Research and Planning (685-0223)
Tanzania Farming Systems Research (621-0156)
Zambia Agricultural Development Research & Extension (611-0201)
Nepal Agricultural Research and Production (367-0149)
Philippines Farming Systems Development-Eastern Visayas (492-0356)
Guatemala Food Productivity and Nutritional Improvement (520-0232)
Honduras Agricultural Research (522-0139)
ROCAP Small Farm Production Systems (596-0083)

Information on how to order the case studies on any of these projects is provided on the last page of this report.

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TABLE OF CONTENTS

		Page
PREFACE		i
1.	INTRODUCTION	1
	1.1 Objective	1
	1.2 Methodology	1
	1.3 Overview of FSR/E's Core Characteristics	1
	1.4 Constraints to FSR/E Project Impact	4
2.	IMPACT OF FSR/E PROJECTS	6
	Technology Development and Transfer	6
	Institutionalization of FSR/E	8
3.	CORE CONSTRAINTS IN FSR/E PROJECTRS	12
	3.1 Farmer Orientation	12
	3.2 Farmer Participation	14
	3.3 Locational Specificity of Technical and Human Factors	16
	3.4 Problem-Solving Approach	17
	3.5 Systems Orientation	18
	3.6 Interdisciplinary Approach	19
	3.7 Complementarity with Commodity and Discipline Research	23
	3.8 Technology Testing in On-Farm Trials	24
	3.9 Feedback to Shape Agricultural Research Priorities and Agricultural Policies	25
4.	OPERATIONAL CONSTRAINTS IN FSR/E PROJECTS	26
	4.1 Stakeholder Understanding of FSR/E	26
	4.2 Agricultural Research Policy or Strategy Defining Role of FSR/E	28
	4.3 Long-Term Commitment of Resources	29
	4.4 Existing Research Capability and Shelf Technology	30
	4.5 Consensus on FSR/E Methodology	30
	4.6 Capability to Process Farming Systems Data	31
	4.7 Consensus on Criteria for Evaluating FSR/E	33
	4.8 Links with Extension	34
	4.9 Links with Agri-Support Services	35
	4.10 Links with Farmer Organizations	36

5. GENERIC CONSTRAINTS IN FSR/E PROJECTS 37

5.1 Project Management Structure 39
5.2 Government Funding to Meet Recurrent Costs 39
5.3 Staffing with Trained Manpower 40
5.4 Management of Training 40
5.5 Management of Technical Assistance 41
5.6 Factors Beyond a Project's Control 44

6. EFFECTIVELY COPING WITH CONSTRAINTS IN FSR/E PROJECTS 46

6.1 Core Constraints 46
6.2 Operational Constraints 48
6.3 Generic Constraints 50

Annex A. Summary of Core, Operational, and Generic Constraints in A.I.D.-Funded FSR/E Projects. 53

General References 54

Project-Specific References 55

Boxes

Box 1. Core Characteristics of FSR/E. 3

Tables

Table 1. Frequency of Core Constraints in 12 A.I.D.-Funded FSR/E Projects. 13

Table 2. Frequency of Operational Constraints in 12 A.I.D.-Funded FSR/E Projects. 27

Table 3. Frequency of Generic Constraints in 12 A.I.D.-Funded FSR/E Projects. 38

PREFACE

This report is based on case studies of 12 United States Agency for International Development (A.I.D.) farming systems research and extension (FSR/E) projects funded by the Agency from the mid-1970s to mid-1980s, as follows:

Botswana Agricultural Technology Improvement (633-0221)
Gambia Mixed Farming and Resource Management (635-0203)
Lesotho Farming Systems Research (632-0065)
Malawi Agricultural Research (612-0202)
Senegal Agricultural Research and Planning (685-0223)
Tanzania Farming Systems Research (621-0156)
Zambia Agricultural Development Research & Extension (611-0201)
Nepal Agricultural Research and Production (367-0149)
Philippines Farming Systems Development-Eastern Visayas (492-0356)
Guatemala Food Productivity and Nutritional Improvement (520-0232)
Honduras Agricultural Research (522-0139)
ROCAP Small Farm Production Systems (596-0083)

A cross-cutting analysis, A Review of A.I.D. Experience with Farming Systems Research and Extension Projects (**A.I.D. Evaluation Special Study**, forthcoming), assesses the impact of these projects on agricultural technology development and transfer, and institutionalization of FSR/E in research and extension systems. Further, the review identifies a series of core, operational, and generic constraints to FSR/E project impact that were present in these projects.

Given space limitations, it was not possible in the main report (i.e, A Review of A.I.D. Experience...), to include the vignettes, from the case studies, that underlay the findings and conclusions presented in that report. This **CDIE Working Paper**, however, provides the interested reader with a sample of the vignettes derived from the case studies. These vignettes are illustrative of how the identified core, operational, and generic constraints in these projects operated as breaks on technology development and transfer, and institutionalization of FSR/E in national agricultural research and extension systems. Greater attention to these constraints by designers, implementors, and evaluators of agricultural research and extension projects having an FSR/E component could enhance the contribution of FSR/E to technology development and transfer.

The intended audience for this **CDIE Working Paper** is the person having a special need for an in-depth understanding of FSR/E in relation to agricultural research and extension. This audience includes, but is not limited to:

* FSR/E practitioners who are implementing agricultural research and extension projects, programs, and systems;

* Technical specialists who are designing or evaluating agricultural research and extension projects involving an FSR/E component;

* A.I.D. personnel who manage or provide policy guidance for the design, implementation, or evaluation of agricultural research and extension projects that involve an FSR/E component;

* Management and field staff of public sector agencies, private voluntary organizations (PVOs), and private sector firms that carry out agricultural extension and technology transfer activities and projects; and

* Professionals in agricultural universities, regional and international agricultural research centers, and bilateral and multilateral donor agencies that are concerned with strengthening agricultural research and extension capacity in the developing countries.

Information on how to order any of the **CDIE Working Papers** in this series is provided on the last page of this report.

1. INTRODUCTION

1.1 Objective

This **CDIE Working Paper** provides the interested reader with a sample of the vignettes, drawn from case studies of 12 A.I.D.-funded farming systems research and extension (FSR/E) projectse, illustrative of the core, operational, and generic constraints to project impact, where impact is measured in terms of development and transfer of technology to farmers, and institutionalization of FSR/E in national agricultural research and extension systems. These vignettes provide evidence of the range of constraints that have influenced the performance of FSR/E projects. This information, in turn, can be used to dentify ways in which the design, implementation, and evaluation of FSR/E projects (or projects including elements of FSR/E) could be improved. A cross-cutting analysis of the 12 case studies is presented in A Review of A.I.D. Experience with Farming Systems Research and Extension Projects (**A.I.D. Evaluation Special Study**, forthcoming).

1.2 Methodology

The vignettes reported herein were derived from case studies of 12 A.I.D.-funded FSR/E. The case study on each project was based on a review of the A.I.D.-sponsored evaluation documents for that project; the 12 case studies are available as individual **CDIE Working Papers** (see cover page).

1.3 Overview of FSR/E's Core Characteristics

FSR/E is a process having nine core characteristics, with each characteristic being a necessary but not a sufficient condition for doing technically-sound FSR/E. These characteristics are (adapted from Merrill-Sands, 1985, 1986; Wiese, 1985; Hildebrand, 1985; and Farrington and Martin, 1987):

FSR/E is farmer-oriented. FSR/E practitioners target small-farm families as the client group for agricultural research, with the fundamental objective of generating technology relevant to the management conditions of this client group. This is done by identifying these conditions before proposing technological solutions, and by adapting technologies to local circumstances and needs.

FSR/E involves the client group as participants in the research and extension process. FSR/E practitioners involve and work with client group members (i.e., small farmers) in designing, implementing, and evaluating research and extension activities.

FSR/E recognizes the locational specificity of technical and human factors. FSR/E practitioners identify "recommendation domains," or groupings of farmers that are relatively homogeneous in terms of agro-climatic, socioeconomic, and other factors. The criteria used to classify farmers into a domain will depend on the practitioner's objectives. A practitioner working at an International Agricultural Research Center may develop categories of farms grouped largely according to agro-climatic criteria, while a practitioner in a national agricultural research system, working in a specific region, may categorize farms according to a set of much more specific criteria such as product mix, presence of draft power, and household socioeconomic status.

FSR/E is a problem-solving approach. Once relatively homogeneous groups of farmers have been identified, a FSR/E practitioner identifies the limiting technical, biological, and socioeconomic constraints to improved farm productivity and farm family income. Data on these constraints provide a basis for identifying technologies that may be effective in removing or relaxing the constraints and feasible for the client group of farming households to adopt. Thus, the primary concern of FSR/E is helping farmers to solve problems.

FSR/E is systems-oriented. Viewing the total farm as a system of natural and human components, the FSR/E practitioner focuses on specific subsystems to evaluate interactions between those subsystems, other farm subsystems, the farm as a total system, and the environment beyond the farm. FSR/E seeks to identify the potential for and impact on the farm of introducing a change in the technology of a specific target subsystem.

FSR/E is interdisciplinary. Collaboration among agricultural and social scientists facilitates identification of the conditions under which small farmers operate; diagnosis of constraints; and design, conduct, and evaluation of research and extension activities aimed at developing and introducing improved technologies suitable to the client group of farmers.

FSR/E complements, not replaces, conventional commodity and discipline research. FSR/E draws upon technologies and management strategies generated by conventional discipline and commodity research and adapts this knowledge to the agro-climatic environment and socioeconomic circumstances of a relatively homogeneous target group of farmers.

FSR/E tests technologies in on-farm trials. On-farm collaboration between farmers and FSR/E practitioners provides each with a deeper understanding of the farming system and the farmer's decisionmaking criteria, and allows for potentially improved technology to be evaluated under the environmental and management conditions in which it will be used.

FSR/E provides feedback for shaping research priorities and agricultural policies. FSR/E provides information on farmer goals, needs, priorities, and criteria for evaluating technologies, and how new technologies perform under farm-level conditions. Results of one season's trials generate hypotheses for testing in the next. Further, trial results provide an input to the setting of on-station research priorities as well as to the formulation of regional- and national-level policy.

Each of the nine characteristics must be present in a technology development and transfer (TD&T) methodology in order for the methodology to provide a technically sound approach to doing FSR/E. If one or more of the characteristics is missing or weak in a TD&T methodology, the methodology really does not constitute a technically sound FSR/E and the methodology's practitioners are not really doing FSR/E. For example, a TD&T methodology that emphasizes "technology testing in on-farm trials" can easily fail to give adequate attention to the other core characteristics of FSR/E. Thus, the FSR/E practitioner needs to be careful that he or she does not neglect any of the core characteristics or overemphasize one characteristic to the detriment of the others. Box 1 provides a summary listing of these key concepts.

Box 1. Core Characteristics of FSR/E

* Farmer orientation
* Farmer participation
* Locational specificity of technical and human factors
* Problem-solving approach
* Systems orientation
* Interdisciplinary approach
* Complementarity with commodity and discipline research
* Technology testing in on-farm trials
* Feedback to shape agricultural research priorities and agricultural policies

1.4 Constraints to FSR/E Project Impact

The 12 case studies indicated that FSR/E projects were not living up to the early expectations held for them. This prompted several questions: Why were the projects not more successful? Was this a failure of the FSR/E concept *per se* or one of design and/or implementation? What *constraints* impeded FSR/E projects from having a greater impact on technology development and transfer and institutionalization of FSR/E? Analysis of the case studies indicated that implementation and impact were impeded by a series of factors that could be classified in terms of three categories of constraints: *core*, *operational*, and *generic*.

Core Constraints -- A *core* constraint is present when a project's concept of and approach to FSR/E lacks or is weak in one or more of FSR/E's nine core characteristics, as follows:

- Farmer orientation
- Farmer participation
- Locational specificity of technical and human factors
- Problem-solving approach
- Systems orientation
- Interdisciplinary approach
- Complementarity with commodity and discipline research
- Technology testing in on-farm trials
- Feedback to shape agricultural research priorities and agricultural policies

Operational Constraints -- An *operational* constraint is present when a practitioner's efforts to implement the FSR/E concept are impeded by problems in any of the following areas:

- Stakeholder understanding of FSR/E
- Agricultural research policy/strategy defining role of FSR/E
- Long-term commitment of resources
- Existing research capability and shelf technology
- Consensus on FSR/E methodology
- Capability to process farming systems data
- Consensus on criteria for evaluating FSR/E
- Links with extension
- Links with agri-support services
- Links with farmer organizations

Generic Constraints -- A *generic* constraint is present when implementation of a FSR/E project is impeded by problems that can arise in any A.I.D.-funded project, regardless of the project's technical focus. Potential problem areas include:

- o Project management structure
- o Government funding to meet recurrent costs
- o Staffing with trained manpower
- o Management of training
- o Management of technical assistance
- o Factors beyond a project's control

In Chapter 2, vignettes from case studies of 12 A.I.D.-funded FSR/E projects are presented to illustrate the impact of FSR/E Projects on technology development and transfer, and institutionalization of FSR/E. The following three chapters provide vignettes on the core (Chapter 3), operational (Chapter 4), and generic (Chapter 5) constraints identified as being present in the projects reviewed. Finally, Chapter 6 provides a number of vignettes illustrating instances where FSR/E projects were effectively coping with core, operational, and/or generic constraints. A summary listing of the core, operational, and generic constraints is presented in Annex A.

2. IMPACT OF FSR/E PROJECTS

The following vignettes drawn from evaluations of A.I.D.-funded FSR/E projects indicate that at least half of the projects reviewed encountered major difficulties in technology development and transfer and/or institutionalization of FSR/E in agricultural research and extension systems.

2.1 Technology Development and Transfer

Botswana/ATIP -- The second ATIP evaluation found that, by the project's fourth year, several technologies from station-based research had been tested in "maximum yield" plots. But there was "no consistency to performance nor general application of technology" (A.I.D., 1986:22). The evaluation concluded that: "Few interventions had been sufficiently tested and proven...to move forward to the dissemination stage" (A.I.D., 1986:5).

Lesotho/FSRP -- By FSRP's second evaluation, TA had been provided for nearly two years (Martin, et al., 1981). However, there was no evidence that farmers were adopting the improved agricultural practices developed by the project. The evaluation concluded that the research underway would

> need to be carried on for a number of years before a proven technology exists which can be disseminated on a broad basis to the farming community. Accordingly, it is uncertain whether or not the Project will reach the stated objective of reaching five percent of the households in the project area with enterprise mixes (Martin, et al., 1981:25).

In the evaluation's view, "the normal start up period of settling in and getting organized to do agricultural research work" had impeded achievement of project outputs. Thus, it was too early to determine how farmers would accept new practices of relevant technology (Martin, et al., 1981:21). During the two years following the second evaluation, FSRP made progress with on-farm trials. But the third evaluation cautioned that "significant adoption probably cannot be expected to occur before the 1984-85 or the 1985-86 cropping seasons. ...verification and demonstration must occur before adoption can be expected (Dunn, 1983:36).

Senegal/ARPP -- The mid-term ARPP evaluation highlighted the difficulty of evaluating a project that is a part of a longer-term effort to strengthen the research capacity of a national agricultural research institute. When ARPP was initiated, there was a recognition that some of the project's components might be difficult to evaluate during the project's early years. Given

> the long...time (10 to 15 years) necessary to improve agricultural research systems in Senegal (as in most developing countries), the implementors recognized that progress toward this objective might not be clearly measurable in the first phase of the project (St. Louis, et al., 1985:2).

Overall, the evaluation noted the dissatisfaction expressed over the "lack of results" of Production Systems Research (PSR). But the evaluation also noted a dilemma centering

> around trying to improve farmer production systems as soon as possible while being fairly certain that...recommendations are solid. ...PSR tries to account for the complexity of a...system and how changes can be expected to influence it. This...puts PSR into an extensive time frame, but... increases...certainty that recommendations can and will be adopted by farmers with a high probability of success. ... Compared to the potential costs in both financial terms and in farmer morale due to rapid dissemination of "inappropriate technology," the longer term pay off of the current data collection and analysis methods...could very well justify the delay (St. Louis, et al., 1985:61).

Tanzania/FSRP -- FSRP provides an example of the negative impact on technology development that results when A.I.D. support for a FSR/E project is provided for only a short length of time and project support is then cut off. This project sought to introduce FSR in the Tanzanian Agricultural Research Organization. Despite the project's early success with "Kito" maize, implementation was curtailed when application of the Brooke amendment required USAID/Tanzania to reduce funding to the Mission's projects. Comparing actual to planned accomplishments, the Project Completion Report found that FSRP had fallen short of its targets (Faught, 1986:15). FSR had been introduced "on too limited a scale and conducted for too short a time to have had any significant impact" (Faught, 1986:15).

Philippines/FSDP -- The first FSDP evaluation found that FSDP had, during its first two years, "brought about the beginning of an understanding of the dynamics of farming systems and the practices and concepts of farming systems research (Mazo, et al., 1983:Foreword). While FSDP made progress during the next two years in introducing new technologies in the form of improved crop varieties and management practices, the second evaluation was "unable to identify technologies completely ready for broad extension" (Sajise, et al., 1985:27).

ROCAP/SFPS -- While, the first SFPS evaluation found the project's staff troubled by the requirement to develop "tech-packs" (technology packages) for mixed farming systems, the evaluation noted that the success of SPFS "depends primarily upon successfully achieving other outputs -- development of methodologies, institutionalization of the methodologies, and training of country personnel -- rather than on development of technology alone" (Mann, et al., 1981:8). Of course, training nationals in FSR/E, developing FSR/E methodologies, and institutionalizing FSR/E required a longer time frame than that provided by SFPS.

2.2 Institutionalization of FSR/E

Botswana/ATIP -- The second ATIP evaluation found that the project's Logical Framework had been revised when it became

> apparent that the original Logframe was overly optimistic and unrealistic. While...ATIP...is already identifying technical changes which will work under specific conditions, it is not likely that these will increase grain production by 10% or increase per capita income by 10% (as stated in the original Logframe) (A.I.D., 1986:6).

Changes of this magnitude, the evaluation noted, could only come about through favorable weather and a longer-term FSR/E effort.

Accordingly, USAID/Botswana's revised Logical Framework for ATIP identified institutionalization of FSR as a key project output. Indeed, one project output read: "Institutionalization of FSR, with corresponding organizational structures and systems will be in place and operating effectively" (A.I.D., 1986:8). However, by the second evaluation, institutionalization was no longer expected to take place

> before the end of the present [TA] contract. Rather, ...the project will have provided sufficient experience and empirical evidence by the PACD to demonstrate whether...the FSR approach should be institutionalized (A.I.D., 1986:6).

When the PACD was extended, the rationale was to provide an additional year in which to test the FSR approach. The evaluation concluded that Botswana's severe agro-climatic conditions had not given ATIP "an opportunity to fully test the effectiveness of an FSR approach or develop technologies appropriate to varying rainfall conditions" (A.I.D., 1986:5). Extending the PACD would provide the added time and level of effort needed to draw conclusions about the appropriateness of FSR in Botswana, and would provide the Ministry of Agriculture "time to solidify [its] views on the appropriateness of institutionalizing the FSR approach on a national scale" (A.I.D., 1986:6).

Lesotho/FSRP -- While one FSRP objective was to develop a FSR Unit, the second FSRP evaluation concluded that the project's designers had been unrealistic in thinking that a FSR Unit could be established as a separate unit within a newly created Research Division (RD). Further, the evaluation found "a divergence [of] thought on the...extent to which a Farming Systems Research Unit is being or should be established within the Research Division" (Martin, et al., 1981:8). Many RD professionals felt that the TA team should support the building of the entire RD. The evaluation recommended that FSRP reduce "its visibility as a Farming Systems Project," that the FSR Unit not be established, and that the project identify more closely with the RD, focusing its resources on institutionalizing an effective research and extension capacity in the Ministry of Agriculture by orienting the project "to the development of the Research Division as a National Institution" (Martin, et al., 1981:23).

While the output of a FSR Unit had not been officially changed by the third evaluation, all parties (GOL, TA team, and USAID/Lesotho) agreed that the project should strengthen the overall RD program rather than establish a FSR Unit. With the TA team's departure, the final evaluation concluded that the RD had not yet developed an adaptive research capability (Frolik and Thompson, 1986:28). The evaluation felt that the RD lacked the institutional capacity

> to carry out an effective adaptive research program without continuing technical assistance. The critical mass of personnel is lacking in all sections and collectively. Some disciplines received little, if any, support from the FSR project. Capacity to plan, lead, and implement an effective, well-balanced, adaptive research program is a critical need (Frolik and Thompson, 1986:iii).

Tanzania/FSRP -- FSRP was carried out within the fairly new Tanzania Agricultural Research Organization (TARO) (Jackson and Osburn, 1986). But the project's design had divorced TARO from the research organization it represented. A former TA team member recalled: "Institutionalization [of FSR/E] should have begun within the research center at Ilonga, NOT in this hypothetical organization that was ostensibly created to unify all the research in the country" (A. Cunard, personal communication). The FSRP Project Completion Report concluded that FSR/E "failed to establish a firm organizational niche within the Government structure" (Faught, 1986:4).

Nepal/ARPP -- The mid-term ARPP evaluation found that the lack of permanent personnel in the Farming Systems Research and Development Division (FSRDD) and the Socioeconomic Research and Extension Division contributed to ARPP's difficulty in meeting its targets to place participants in degree programs.

> Only three of ten degree candidates had been sent for higher education mostly as a result of the shortage of permanent staff positions within the offices scheduled to receive training assistance. In some situations [this] has led to the local hire of technical assistants by [the TA contractor] as an emergency measure to implement Project programs and/or to provide counterpart staff to the expatriate advisors (Rood, et al., 1988:64-65).

Thus, ARP's attempt to base FSR activities in the FSRDD "had not been as effective or efficient as hoped in promoting an understanding of FSR" (Rood, et al., 1988: 15).

Honduras/ARP -- ARP sought to institutionalize improved agricultural research methods. ARP's third evaluation noted that this entailed institutionalizing a Central Unit for Technical Support (UNAT), "making that specialized technical support and training unit part of the regular...bureaucracy so that it continued as part of [the Ministry of Natural Resources (MRN)] after Project assistance ended. Honduran technical leadership and GOH funding commitments are essential for institutionalization to succeed (Hansen, et al., 1984:17). However, the GOH did not make a commitment to UNAT in terms of budgeting staff positions for FSR/E. As the evaluation noted:

> None of the HARP professionals occupy regular DIA [Department of Agricultural Research] line positions. There are no institutionalized positions so no one is really counterparting anyone. Counterparting refers to the situation where one person has a regular position and is advised by someone. In HARP no one has a regular position; all are paid, directly or indirectly, by USAID, and none have established DIA jobs.
>
> UNAT does not really exist except on paper, so there is no obvious bureaucratic home for HARP. ...HARP works and is housed in region 3...[but] it does not answer to the...MRN Regional Director. Although HARP is apparently an MRN group it works semi-autonomously, publishes reports that do not credit MRN or DIA as a sponsor, [and] deals with non-MRN institutions such as [the Centro Universitario Regional de Litoral Atlantico] (Hansen, et al., 1984:17).

ROCAP/SFPS -- The third SFPS evaluation noted that the Tropical Agricultural Research and Training Center (CATIE) is funded along project lines. As a result, CATIE may lose, from one project to the next, personnel who gained experience on an earlier project. The evaluation's "prognosis for continued FSR/E work at CATIE" was "pessimistic" (Zimet, et al., 1986:5-6). On this latter point, the evaluation stated:

even though some personnel that worked under the FSR project are presently working on other CATIE projects, such as Integrated Pest Management (IPM), they are not applying the FSR methodology. This is particularly distressing in several cases where the [evaluation] team believes that the [farming systems] approach would enhance the other projects. . . . Given this situation..., it is not possible for the team to state that the project has enhanced the ability of CATIE to carry out FSR on a continuing basis. It has been able to do so only partially under the specific case of the SFPS project (Zimet, et al., 1986:12-13).

3. Core Constraints in FSR/E Projects

FSR/E involves nine core characteristics (Chapter 1). On the one hand, if the FSR/E concept being implemented in a FSR/E project lacks or is weak in one or more of these characteristics, the project's chances of impacting on technology development and transfer, and institutionalization of FSR/E, are likely reduced. On the other hand, if any one or more of the nine core characteristics is weak or missing in a project's approach to FSR/E, the chances are likely increased that the project is not really doing FSR/E. Thus, if one asks why the FSR/E projects reviewed did not have a greater impact on technology development and transfer or institutionalization of FSR/E, one explanation may be that the concept of and approach to FSR/E in many of these projects lacked or was weak in one or more of the core characteristics. Whatever was done under the name of "farming systems," it was not FSR/E or in some way fell short of being FSR/E.

The presence of any single core constraint in a FSR/E project could seriously impede project implementation and impact. While core constraints were found in all of the 12 FSR/E projects reviewed, certain constraints appeared more frequently across projects than others. Table E-1 provides the frequency of instances of core constraints in the FSR/E projects reviewed. The most frequently occurring constraints, appearing in at least 7 of the 12 projects reviewed, were "problem solving" orientation and interdisciplinary approach. A threshold of 7 is significant in the sense of being 1 more than half (6) of the 12 projects reviewed. The FSR/E projects in which one constraint appeared are <u>not</u> necessarily the same projects in which any other constraint appeared. Vignettes illustrating each of the core constraints are now presented.

3.1 Farmer Orientation

FSR/E is farmer-oriented. FSR/E practitioners target small-farm families as the client group for agricultural research, with the fundamental objective of generating technology relevant to the management conditions of this client group. This is done by identifying these conditions before proposing technological solutions, and by adapting technologies to local circumstances and needs. However, establishing a "farmer orientation" in a FSR/E project is not something that just comes along naturally. The case of Lesotho/FSRP is illustrative.

Table 1. Frequency of Core Constraints in 12 A.I.D.-Funded FSR/E Projects.

	Core Constraints[3]								
Project	C.1	C.2	C.3	C.4	C.5	C.6	C.7	C.8	C.9
Botswana/ATIP				x		x			x
Gambia/MFP				x		x		x	
Lesotho/FSRP	x		x	x			x		
Malawi/ARP			x	x		x			x
Senegal/ARPP			x	x					
Tanzania/FSRP				x					
Zambia/ZAMARE		x					x		
Nepal/ARPP		x	x		x	x			xx
Philippines/FSDP		x	x	x	x	x		x	x
Guatemala/FPNI				x	x	x		x	
Honduras/ARP						x			
ROCAP/SFPS			x		x			x	x
TOTAL	1	4	5	9	4	7	2	4	6

[3]Key to Core Constraints:

C.1 Farmer Orientation
C.2 Farmer Participation
C.3 Locational Specificity of Technical and Human Factors
C.4 Problem-Solving Approach
C.5 Systems Orientation
C.6 Interdisciplinarity
C.7 Complementarity with Commodity and Discipline Research
C.8 Technology Testing in On-Farm Trials
C.9 Feedback to Shape Agricultural Research Priorities and Agricultural Policies

Lesotho/FSRP -- The second FSRP evaluation found that the TA team's failure to develop a profile of farming systems in the project's target area was a constraint to reaching "a consensus on what type of farmers...and what production technologies should receive...attention" (Martin, et al., 1981:19). "Lack of consensus 20 months after initiation of the project as to who...the target population is and what types of innovations are most likely to improve his/her farm enterprise is a significant liability" (Martin, et al., 1981:28).

A constraint to consensus was the existing split in agricultural policy. While donor projects were aimed at the Lesotho smallholder, the GOL was "engaged in a substantial program of large-scale mechanized farming to make Lesotho self-sufficient in food grains by using modern technology and inputs in a...commercial operation" (Martin, et al., 1981: 31). This split carried over into FSRP; while some felt that FSRP should aim at improving the level of subsistence agriculture, others felt that FSRP should develop small-scale commercial agriculture. "The project itself is divided on this issue" (Martin, et al., 1981:31).

3.2 Farmer Participation

FSR/E involves the client group as participants in the research and extension process. FSR/E practitioners involve and work with client group members (i.e., small farmers) in designing, implementing, and evaluating research and extension activities. Deficiencies in establishing farmer participation were encountered in at least a third (4) of the FSR/E projects reviewed. Philippines/FSDP provides an example.

Philippines/FSDP -- The first FSDP evaluation found evidence that farmer participation did not go beyond farmers being asked about their problems and giving their consent for FSDP to conduct trials in their fields. Many farmer-cooperators appeared "to have had little control over the choice of the cropping pattern for the verification trials thereby suggesting that farmers have had little say about the proposed solutions" (Mazo, et al., 1983: 32). This point was supported by a number of instances cited by the evaluation (Mazo, et al., 1983:30, 32):

-- Growing crops on fields where farmers indicated another crop as the traditional crop.

-- Planting crops in spite of the farmers' warning that the timing was wrong and could bring about severe pest infestation, with the project telling the farmers that timing would not be an important factor because insecticides could be applied if needed.

-- Planting rice in a farmer's field even after the farmer had indicated a preference to eat corn and would now have to buy it.

-- Not considering farmers' preference for the eating qualities of the traditional rice variety and that this variety's price was almost twice that of the variety the project was trying to introduce.

-- Designing cropping trials without reference to seasonal variability in market demand and prices or the farmer's knowledge of these factors.

-- Ignoring the farmer's wife in the design of procedures to gain farmer cooperation in identifying production constraints, despite evidence that the farmer's wife plays a major role in making decisions about the investment of family resources.

Most farmer-cooperators did not "feel or act as partners of the site teams in the conduct of the experiments. A number... have been involved only in plowing the field and, in many cases, all other labor was...provided by [the Site Research Management Unit] or by hired hands" (Mazo, et al., 1983:33). Minimal farmer participation, combined with farmer perception that they were not members of the field site teams, led to a situation where the farmers had a minimal understanding of FSDP's activities. Most farmers believed that the trials demonstrated new technology that was already proven and that they were expected to adopt. "There was...no appreciation...that the trials represented experiments to test and to compare different approaches under farm conditions" (Mazo, et al., 1983:33). Some farmers did not know what crop varieties had been planted, while few farmers could provide the rationale for rotating leguminous crops with grain crops.

One problem was that the work of the Site Research Management Unit (SRMU) teams placed project staff in the position of being perceived by farmers not as researchers but as extension workers. When an evaluation team asked cooperators what was the project's purpose, farmers usually responded "to give advice to farmers" (Sajise, et al., 1985:46). Asked how the project had benefited them, the same cooperators cited the new crops and varieties, the provision of inputs (e.g., fertilizers) for cropping pattern trials, and livestock dispersals. The evaluation also noted that FSDP's extension role hid the project's main purpose (technology development) from farmers. "Very few farmers, cooperators and non-cooperators, had any notion that [farming systems] involves research to develop and screen new technologies" (Sajise, et al., 1985:47).

3.3 Locational Specificity of Technical and Human Factors

FSR/E recognizes the locational specificity of technical and human factors. FSR/E practitioners identify client groups in terms of homogeneous groups of farming systems in specific agro-climatic zones. Difficulties in taking "locational specificity" into account were evident in 5 of the 12 projects reviewed. The cases of Senegal/ARPP and Philippines/FSDP are illustrative.

Senegal/ARPP -- The mid-term ARPP evaluation noted that the project's Production Systems Research (PSR) teams had found that it took a longer to develop cropping pattern recommendations in on-farm trials than in on-station trials. Delays in developing recommendations in on-farm trials, due to erratic rainfall patterns, micro-variation in topography, and ethnic heterogeneity, led ARPP into a debate on the importance of precision versus timeliness of research findings. While the PSR team was considering the possibility of doing research on the management of livestock in each production zone to improve the precision of research findings, the team recognized that many other secondary criteria could be used to define production zones but would disperse the area into several smaller zones. This would increase field costs, pose logistical problems, and make it difficult for extension services to provide specific technology packages over a larger area.

Philippines/FSDP -- The second FSDP evaluation noted that the project's mandated focus on crops grown by upland farmers directed research resources to previously neglected crops but "eliminated problem identification as the first step in the farming system approach at the site level" (Sajise, et al., 1985:32). Most Site Research Management Units (SRMU) merely targeted their efforts on farmers with less than 3 hectares of land. Thus, there was little stratification of the target population due an implicit assumption

> that all farming households in upland areas are relatively homogeneous.... . . . The various sondeos, socioeconomic profiles, and baseline studies reflected an assumption of homogeneity with data presented largely in terms of modal distributions. Cooperator selection and technologies being developed and methods of working with site farmers have, as one result, assumed homogeneity. . . . Understanding diversity would allow for better targeted research and extension efforts, and would allow for a better understanding of cases of adoption and non-adoption (Sajise, et al., 1985:35, 57).

But FSDP had 72 research locations scattered over the Eastern Visayas, with 6 sites and 12 farms per site. Several factors impeded implementation, including staff inexperience in implementing FSR, lack of understanding of the existing farming systems, and the time involved in traveling between research sites. Further, the "generally large number of locations at each site where field tests [were] underway may have prevented the [Site Research Management Unit] staff from spending time to fully understand the existing systems and how these should affect the proposed interventions (Mazo, et al., 1983:56). This led the evaluation to conclude that FSDP had too many research locations and recommended that the number of locations be reduced.

3.4 Problem-Solving Approach

FSR/E is a problem-solving approach. Once a region's farming systems are grouped into homogeneous agro-climatic zones, a FSR/E practitioner identifies the limiting technical, biological, and socioeconomic constraints to improved farm productivity and farm family income. Data on these constraints provides one of the bases for identifying technologies that may be effective in removing or relaxing the constraints and feasible for the client group of farming households to adopt. Thus, the primary concern of FSR/E is helping farmers to solve problems. Establishing a problem-solving approach was found to be a constraint in at least 9 of the 12 projects reviewed. Botswana/ATIP and ROCAP/SFPS are illustrative.

Botswana/ATIP -- The second ATIP evaluation noted that extension workers may not have cooperated in ATIP because they did not understand FSR. However, the evaluation team found that senior level extension staff had a very good basic knowledge of FSR. To the contrary, the team expressed concern that ATIP staff were "not focusing enough attention on...important problems identified by farmers, but rather on what [ATIP staff]...had decided to do research on" (A.I.D., 1986:42).

ROCAP/SFPS -- The third SFPS evaluation noted the lack of a "problem-solving" approach in SFPS' technique of characterizing the farmers at project sites in each participating country. The technique of characterizing "was observed religiously at the outset of each country project" (Zimet, et al., 1986:59). However, it was not clear "precisely what were the objectives to be achieved and how they were to be reached" (Zimet, et al., 1986: 59). Some of the problems with the characterization were:

-- There was limited multidisciplinary involvement of host country and CATIE personnel during the survey process.

-- The survey instrument required too much time to complete (up to four hours per respondent in Panama) and precluded or limited the farmer from providing his or her perspective on farming problems.

-- Survey data were sent to Turrialba for analysis instead of being analyzed on site as a cooperative effort between host country and CATIE personnel.

3.5 Systems Orientation

FSR/E is systems-oriented. Viewing the total farm as a system of natural and human components, FSR/E focuses on specific subsystems to evaluate interactions between those subsystems, other farm subsystems, the farm as a total system, and the environment beyond the farm. FSR/E seeks to identify the potential for and impact on the farm of introducing a change in the technology of a specific target subsystem. Difficulties in establishing a systems orientation appeared in at least 4 of the 12 projects reviewed. An example is provided by Tanzania/FSRP.

Tanzania/FSRP -- One of the project's FSR teams identified February as the month when there was a food shortage in Kilosa district. In response, the FSR team designed and implemented on-farm trials to test an early maturing maize variety known as Kito: "Early on-farm trial results were whopping successes. Almost all farmers were pleased. Seed is in great demand and is reflected in scarce seed supplies" (Jackson and Osburn, 1986:9). Kito's story illustrates the role that a systems approach can play in identifying production problems and designing on-farm trials to test solutions. It also brings home the necessity of adequate research support; Kito was an on-shelf technology and ARPP discovered and assessed its adaptability to existing farming systems (Jackson and Osburn, 1986:10). The key was looking at the total system rather than at only a single component.

Kito had originally not proven popular with farmers. But the major emphasis of corn breeders had been developing high yielding varieties for production during the Masika (long rains) season. While the short season Kito reduced the risk of crop failure from drought when planted in the Masika season, Kito's yields in the Masika season were lower than full season varieties. However, when planted in the Vuli (short) season, Kito yielded as well as traditional long season varieties and provided a harvest several weeks earlier than the traditional varieties. Also, it was found that:

> subsequent Masika season crops of maize or cotton following Kito planted in the Vuli season yielded 20 to 30 percent more than they did if planted after traditional full season varieties. Over the two year period that the trials were run approximately 50 farmers per season grew Kito and in the 1985/86 season Kito seed were sold to an additional 500 farmers (Faught, 1986:4).

Thus, commodity researchers working with a narrower commodity focus, saw no value in the Kito variety. Their partial analysis was incorrect, and highlighted the consequences when a total system perspective is not adopted (Jackson and Osburn, 1986:10).

However, while the first evaluation indicated that the diagnosis stage of FSRP had been adequately designed, the evaluation also pointed out that project had not investigated "all...the resource allocation decisions that farmers must make" nor addressed "the functioning of the total system...in an explicit systematic fashion" (Jackson and Osburn, 1986:5). The evaluation recommended that FSRP conduct earlier-proposed market analysis and intra-household studies "to provide...the missing links regarding the total system" (Jackson and Osburn, 1986:5).

The evaluation also noted that most Tanzanian commodity researchers were also part-time farmers. One would expect that they would be "readily cognizant" of

> the constraints that farmers in the area have, and in turn, that hands-on experience would influence their commodity research activities. Apparently this is not the case in that the...researchers rarely, if at all, visited FSR/E... trials. In addition the constraints that commodity researchers had with their own farm operations were significantly different than other farmers. ...the commodity researchers <u>lacked the total system perspective</u> and were not fully aware that other farmer[s'] constraints were different (Jackson and Osburn, 1986:7; emphasis added).

3.6 Interdisciplinary Approach

Collaboration among agricultural and social scientists in FSR/E facilitates identification of the conditions under which small farmers operate; accurate diagnosis of constraints; and design, conduct, and evaluation of research and extension activities aimed at developing and introducing improved technologies suitable to the client group of farmers. Problems in achieving an interdisciplinary approach in FSR/E were found in at least 6 of the 12 FSR/E projects reviewed. Malawi/ARP is illustrative of how lack of an interdisciplinary approach can constrain implementation of FSR/E.

Malawi/ARP -- While the ARP Project Paper emphasized the importance of a multidisciplinary team approach, the second ARP evaluation found that the TA skill mix contained in the PP would lead one "to believe that most of the expatriate researchers were to advise on several crop programs" (Baker, et al., 1983:21). Further, the expatriates were to work as a team, "each making some contribution to improving the technical quality or relevance of the various research programs to the smallholder farmer" (Baker, et al., 1983:21). However, each TA team member tended to work independently and to specialize in particular crops, thereby deemphasizing the importance of a multidisciplinary approach.

A particularly difficult problem was that of defining the role of agricultural economics vis-a-vis the Farming Systems Analysis (FSA) section. Neither the Outputs section nor the Logical Framework of the Project Paper listed "anything specific for the economics section" (Baker, et al., 1983:30). Further, the duties for the economist listed in the Long Term TA Job Descriptions differed from the work plan of the economist provided by the TA contractor. While the work plan listed six objectives, there was little emphasis on supporting the FSA section. The evaluation found that the research program of the agricultural economics section leaned more toward

> addressing macroeconomic policy issues than...economic constraints faced by Malawi smallholder[s]. . . . Therefore, the evaluation team recommends that the section spend more time in (a) farm-level trial design and analysis of trial results, (b) determining whether or not improved treatments benefit the farmer more than they cost him, and (c) collaborating with the adaptive research effort via the FSA section. If this recommendation is followed, the...work plan of the...agricultural economist will begin to look more like the original job description for this position outlined in the Project Paper (Baker, et al., 1983:34-35).

Another TA position during ARP's initial two years was a farming systems analyst to establish and serve as acting head of the FSA section of the Department of Agricultural Research (DAR). An anthropologist was recruited to head the FSA section. Having identified local maize as the predominant variety in the majority of farm cropping systems, the FSA section proceeded to conduct a series of on-farm trials on fertilizer in local maize in the 1981-82 cropping season. One trial was designed for a cropping system including maize, cowpea, and sunflower. There were four treatments: (1) local maize without fertilizer, (2) local maize with fertilizer, (3) improved maize without fertilizer, and (4) improved maize with fertilizer.

Based on the harvest data for that season, the FSA section concluded that variety made little difference without fertilizer, and that both varieties responded to fertilizer. But including local maize as the key treatment in the on-farm fertilizer trials led to "a basic misunderstanding about the role of FSR" (Baker, et al., 1983:39). While the FSA section's approach to the diagnostic phase of FSR had been helpful in assessing farmers' needs,

> problems arose when the FSA section headed the subsequent trial design phase. Some DAR officials and [TA contractor] research staff believe the trial design phase should have been a joint exercise, where agronomy takes the lead with [the] FSA section assisting. ...the original job description for the Farming System Analyst position states...: "Assist the Research Coordinator and research officers in... selection and evaluation of smallholder research projects to ensure [in]corporation of local smallholder farming systems data into research planning." (PP, Annex A, p. 11) (Baker, et al., 1983:40).

Apparently, as the second evaluation found, the "agricultural scientists...did not like the idea of a social scientist designing, implementing, harvesting and analyzing agronomic on-farm trials" (Baker, et al., 1983:41). Also, the evaluation team concluded that there had been

> very little [TA] team interaction between the diagnostic survey stage and the farm trial design phase. . . . Instead of assisting the rest of the team in design of trials, the FSA section head had employed a more direct approach.... There were few alternatives, however, as the...DAR staff and...technical assistance [team] had no formal mandate to work in an interdisciplinary mode; thus the FSA section was forced to rely on recruiting voluntary assistance. . . . The FSA section head was forced into a choice between proceeding using whatever manpower and agronomic advice was available and willing to participate in 1981-82, or waiting another season to initiate on-farm trials. As the FSA technical assistance was only funded for the first two years of the five year project, delaying the trials would have meant that the objectives of the FSA workplan would have fallen short of achievement (Baker, et al., 1983:41).

The evaluation noted that identifying the importance of local maize was an important outcome of the diagnostic phase of the FSR methodology being implemented by the FSA section. However, as the evaluation also noted, basing the first round of on-farm trials on local maize varieties seemed to go counter to the government's policy of quickly increasing per hectare yields in smallholder fields. Further, from an agronomic point of view,

> it was assumed by the...DAR researchers, based on years of experience that the improved varieties...are genetically superior to the local varieties in their ability to yield well under high doses of nitrogen fertilizer and good management. What the...[FSA section's on-farm trials] measured, however, during only one growing season, was the response of an improved versus a local variety using DAR-recommended levels of fertilizer in the farmer's cropping system (which...included both sunflower and cowpea) under his (or her) own management. Thus, the improved variety was subjected to two conditions for which it was not specifically bred (Baker, et al., 1983:41).

The evaluation noted that very few agronomists/breeders would place as much emphasis on one year's data as did the FSA section that was headed by an anthropologist. However, as the evaluation also noted, the MOA/DAR and the TA team misinterpreted the implications of the on-farm trials (OFTs).

> What the results indicate is not that there are no differences between varieties, but that in the particular [Agricultural Development District (ADD)] farmer system and under the unique farmer management during the 1981-82 season, there were no statistically significant differences between varieties. Further, the importance of considering alternative sets of recommendations for different levels of farmer resources was pointed out. The...MOA/DAR-[TA] research team should have used this information as... positive feedback from the farm level to refine on-station research priorities to address the issues raised by the OFTs. They should not have reacted negatively to the results of the OFTs. ...the way in which the FSA section reported...results should have been positive - "we believe more on-station work could be done on improved varieties grown...with other crops..., rather than "there are no differences between local maize and the improved variety."
>
> Once the...actors began to go separate ways, subsequent contacts became less frequent and opinions about..."others" solidified and became self-reinforcing. The FSA section viewed the OFTs as ultra-high priority and dedicated much time to them; other [TA team] scientists had their own programs and priorities, and little inclination to visit trials into which they had little or no input; some MOA officials continued to lament...that the FSA section was taking the lead in...farm trials (Baker, et al., 1983:41-42).

Between the 1981-82 and 1982-83 seasons, the Chief Agriculture Research Officer (CARO) and the TA team chief of party decided to stop the FSA section's OFTs until such time as agronomy could be "officially" involved in the effort.

3.7 Complementarity with Commodity and Discipline Research

FSR/E complements, not replaces, conventional commodity and discipline research. FSR/E draws upon technologies and management strategies generated by discipline and commodity research and adapts this knowledge to the agro-climatic environment and socioeconomic circumstances of a relatively homogeneous target group of farmers. FSR/E cannot complement what does not exist. Where conventional agricultural research programs are weak, it is very difficult for FSR/E to play a complementary role in technology development and transfer. Two of the FSR/E projects reviewed provide cases in point: Lesotho/FSRP and Zambia/ZAMARE.

Lesotho/FSRP -- The second FSRP evaluation recommended that, while the TA team worked to strengthen the Research Division (RD) as a newly formed institution, the TA team needed to play "a stronger role in the management and planning areas...to provide a sharper focus on reaching the specific objectives of conducting relevant research and...transferring technology to small holders" (Martin, et al., 1981: 8). Acknoweldgement of the need for the TA team to strengthen the RD reflected the evaluation team's conclusion that the project's ability to complement commodity and disciplinary agricultural research was constrained by "the absence of an ongoing agricultural research program" (Martin, et al., 1981:8). Indeed, Lesotho did not have a published set of crop production recommendations.

Zambia/ZAMARE -- The second ZAMARE evaluation reported that the project had sought, during its early efforts to institutionalize FSR in the Research Branch, to avoid arousing animosity on the part of Commodity and Specialist Research Teams (CSRTs) personnel (Sutherland and Warren, 1985). Given the considerable TA and training support that were being given to the Adaptive Research Planning Team (ARPT) by outside agencies and the government, the evaluation felt that there was a danger that technical component research would be overlooked.

> This is due in part to the tendency to see farming systems research as a panacea. However, it has become very obvious to those with ARPT that it is not, and that whilst it does have several unique and important features it must be seen as an integral part of the Research Branch complementing the work of the CSRTs. For, when no technical component research has been undertaken....., then ARPT is not able to test any possible technological situations (Sutherland and Warren, 1985:56; emphasis added).

3.8 Technology Testing in On-Farm Trials

On-farm collaboration of FSR/E practitioners and farmers provides each with a deeper understanding of the farming system and the farmer's decisionmaking criteria, and allows for potentially improved technologies to be evaluated under the environmental and management conditions in which they will be used. While technology testing in on-farm trials is widely recognized as an essential im FSR/E, problems associated with this activity appeared in at least four of the FSR/E projects reviewed. A major question is that of the emphasis that FSR/E practitioners should place on testing technologies vs. validating technologies in on-farm trials. How the question is answered has implications for how FSR/E is carried out, in particular, for how farmers are involved in the research process. A case in point is ROCAP/SFPS.

ROCAP/SFPS -- The third SFPS evaluation noted the following pattern in on-farm trials conducted by the Tropical Agricultural Research and Training Center (CATIE). First, SFPS emphasized developing complete technological packages vs. improving single components of production systems. Second, the "trials were managed by researchers and the inputs were furnished." Third, "more field management was given by CATIE staff than should be done at the validation stage" (Zimet, et al., 1986:42). Also, there were instances where CATIE field teams performed validation when research was not really complete in order to conform with a contractual obligation to validate "tech-packs." In this regard, the evaluation team noted its belief

> that validation should test the acceptability (by the producer) of the technology.... This cannot be accomplished if the field team is involved in the management of the production-site or if inputs are supplied to the farmer. Thus, we believe that CATIE validated the technical efficiency of the technology...and did not attain the goal of validation (Zimet, et al., 1986:41)

While CATIE recognized the importance of the evaluation team's definition of validation (testing a technology's acceptability by a farmer), CATIE saw validation as a further stage of research than CATIE was trying to accomplish under SFPS (A.I.D., 1985). The evaluation responded by noting its belief that

> a good part of the [CATIE] effort was misspent because the validation was generally of the technology not of the acceptability of the technology. (The result of doing the former is a reduced frequency of adoption by producers). What the team (as well as most practitioners) believes to be the correct definition would have been applied had either CATIE or ROCAP been better versed in FSR/E techniques (Zimet, et al., 1986:126).

3.9 Feedback to Shape Agricultural Research Priorities and Agricultural Policies

FSR/E provides feedback for shaping research priorities and agricultural policies. FSR/E is a dynamic and iterative process that provides information on farmer goals, needs, priorities, and criteria for evaluating technologies, and how new technologies perform under farm-level conditions. Results of one season's trials generate hypotheses for testing in the next. Further, trial results provide an input to the setting of on-station research priorities as well as to the formulation of regional- and national-level policy. At least six of the FSR/E projects reviewed encountered problems in providing feedback to shape agricultural research priorities and/or agricultural policies. Philippines/FSDP and Botswana/ATIP are illustrative.

Agricultural Research Priorities

Philippines/FSDP -- Site Research Management Unit (SRMU) teams were to provide researchers at the Visayas State College of Agriculture (VISCA) with feedback on farm-level production constraints that might be investigated in the "back-up research program." But the proposed studies in this program were not linked in any way with the project's farm-level trials or even with specific problems at the project sites (Mazo, et al., 1983: 34). Further, Ministry of Agriculture and Food "site personnel informed the Evaluation Team that they [had] not made any suggestions to the VISCA Technical Team on the specific back-up research to be conducted" (Mazo, et al., 1983:34).

Agricultural Policy

Botswana/ATIP -- The second ATIP evaluation suggested that the project could be more effective in collecting information from farmers about the effects of national policy on their productivity and income, identifying possible modifications in policy which will enhance productivity and income, and working with colleagues in the Ministry of Agriculture to provide information to decision makers in the Department of Planning and Statistics (A.I.D., 1986).

4. Operational Constraints in FSR/E Projects

Implementation and impact of a FSR/E project may be constrained when the project implementor's concept of and approach to FSR/E lacks or is weak in one or more of the nine core characteristic of FSR/E. Even if steps are taken to ensure that all nine core characteristics are in place in a FSR/E project, implementation and impact may yet be jeopardized by operational constraints. An operational constraint is present when a farming systems practitioner's efforts to operationalize (implement) the FSR/E concept are impeded by problems in any of the following areas:

- o Stakeholder understanding and support of FSR/E
- o Agricultural research policy/strategy defining role of FSR/E
- o Long-term commitment of resources
- o Existing research capability and shelf technology
- o Consensus on FSR/E methodology
- o Capability to process farming systems data
- o Consensus on criteria for evaluating FSR/E
- o Links with extension
- o Links with agri-support services
- o Links with farmer organizations

As may be seen in Table 2 four operational constraints--stakeholder understanding of FSR/E, agricultural research policy or strategy defining the role of FSR/E, consensus on FSR/E methodology, and links with extension--appeared in at least 7 of the 12 FSR/E projects reviewed. An additional three constraints--long-term commitment of resources, existing research capability and shelf technology, and links with agri-support services--appeared in at least five projects.

While FSR/E practitioners emphasize the importance of taking a systems approach, implementors of FSR/E projects often paid relatively little attention to dealing systematically with operational constraints that could impede the practitioner's ability to do FSR/E. Project-specific vignettes now illustrate each operational constraint.

4.1 Stakeholder Understanding and Support of FSR/E

Successful FSR/E depends, in large part, on stakeholders understanding of the FSR/E approach. FSR/E project implementation and impact will be impeded where project personnel fail to ensure that key stakeholders understand, hold realistic expectations for, and fully support the FSR/E approach. This constraint appeared as a negative factor in at least seven FSR/E projects. Botswana/ATIP is illustrative.

Table 2. Frequency of Operational Constraints in 12 A.I.D.-Funded FSR/E Projects.

	Operational Constraints[4]									
Project	O.1	O.2	O.3	O.4	O.5	O.6	O.7	O.8	O.9	O.10
Botswana/ATIP	x	x		x	x	x		x		
Gambia/MFP			x			x	x		x	x
Lesotho/FSRP	x	x	x	x	x	x	x	x	x	x
Malawi/ARP	x	x	x		x		x	x		
Senegal/ARPP	x			x	x	x				
Tanzania/FSRP		x	x					x		
Zambia/ZAMARE	x							x		
Nepal/ARPP	x	x		x			x		x	
Philippines/FSDP				x	x			x	x	
Guatemala/FPNI	x				x			x		
Honduras/ARP		x	x		x			x		
ROCAP/SFPS		x			x			x	x	
TOTAL	7	7	5	5	8	4	4	9	5	2

[4]Key to Operational Constraints:

O.1 Stakeholder Understanding of FSR/E
O.2 Agricultural Research Policy/Strategy Defining FSR/E's Role
O.3 Long-Term Commitment of Resources
O.4 Existing Research Capability and Shelf Technology
O.5 Consensus on FSR/E Methodology
O.6 Capability to Process Farming Systems Data
O.7 Consensus on Criteria for Evaluating FSR/E
O.8 Links with Extension
O.9 Links with Agri-Support Services
O.10 Links with Farmer Organizations

Botswana/ATIP -- The second ATIP evaluation noted "little indication that...FSR...had been understood and adopted" or "that this approach is likely to be widely adopted by the [Ministry of Agriculture] in the near future" (A.I.D., 1986: 18). Some Crop Production Officers (CPOs) believed that Department of Agricultural Field Services administrators had little or no interest in FSR because no administrator had ever attended an ATIP-sponsored FSR workshop. CPOs felt that "until...real interest in and support for the Farming Systems Approach are demonstrated by administration, ...it will be a waste of time for field staff to study and develop the technique further" (cited in A.I.D., 1986:36).

The evaluation also noted that FSR is a difficult concept "to articulate and to incorporate into an established research and extension system, since impact may not be as easily measured as that of a new maize hybrid or an irrigation scheme" (A.I.D., 1986:1). Indeed, the first evaluation pointed out that a "major conceptual difficulty in institutionalizing" FSR/E is "starting with a 'bottom-up' approach in an organization which has an essentially 'top-down' operating mode and decision-making structure" (Francis, et al., 1984:10). As the second evaluation emphasized, decision makers at the national level as well as regional and district agricultural officers need to understand "how the farming systems approach can enhance the effectiveness of the research and extension system" (A.I.D., 1986:1).

4.2 Agricultural Research Policy or Strategy Defining Role of FSR/E in Research and Extension

A second operational constraint to doing FSR/E (and implementing FSR/E projects) occurs when a country's agricultural research policy or strategy does not define a role for FSR/E in the existing research and extension system. An even more basic constraint may be the simple lack of an agricultural research policy and strategy. This constraint appeared in at least nine FSR/E projects. Contrasting examples may be seen in Lesotho/FSRP (negative) and Zambia/ZAMARE (positive).

Lesotho/FSRP -- The second FSRP evaluation found that the Research Division lacked an agricultural research policy and strategy and that this lack of policy and strategy had impeded implementation of FSRP (Martin, et al., 1981).

Zambia/ZAMARE -- Adaptive Research Planning Teams (ARPTs) in ZAMARE were operational by the project's end in six of Zambia's nine provinces. Although each ARPT was supported by a separate donor, all operated under a National Coordinator reporting to the Chief Agricultural Research Officer. Thus, the funding provided by USAID/Zambia to the first ARPT was part of an overall program of donor support for FSR/E in Zambia.

4.3 Long-Term Commitment of Resources

Agricultural research cannot be successful in developing improved technologies without a long-term commitment of resources. FSR/E as a component of the overall agricultural research and extension process is dependent on resources being available to cover expenses associated with intensive field work (e.g., fuel expenses incurred with reconnaissance surveys and on-farm trials). These expenses need to be covered not only during but also beyond the life of the project. Resources also will be needed beyond the LOP for training and possibly technical assistance. This constraint appared in at least six projects, with negative examples in five cases, and a positive example in one. Tanzania/FSRP and Guatemala/FPNI are illustrative.

Tanzania/FSRP -- The FSRP Project Completion Report (PCR) indicated that FSRP had been less than successful in improving management capability within the Tanzania Agricultural Research Organization (TARO). In this respect, the PCR noted that "the experience of going through planning, budgeting, and monitoring and other exercises involved in a research program jointly with trained and experienced researchers...must have improved the skills and capability of the TARO staff to carry out these activities in the future" (Faught, 1986:5). However, any "improvement in TARO management that did occur may have been wiped out with the dismissal of the TARO Director and other top staff shortly before USAID/[TA contractor] participation terminated" (Faught, 1986:5). The PCR concluded that:

> The major lesson that should have been learned, or perhaps more appropriately re-learned, is that development of a research capability and the institutionalization of such capability is a very long term activity. Resources that are used for short-term support of such activities are generally, if not always, wasted (Faught, 1986:16).

Guatemala/FPNI -- An impact evaluation of FPNI concluded that much of FPNI's progress could be attributed to the important role that the Rockefeller Foundation and A.I.D. had played, over a long period, in developing the research capacity of the Agricultural Science and Technology Institute (ICTA). In the five years preceding ICTA's creation, USAID/Guatemala worked with the GOG in planning and implementing the reorganization of the public agricultural sector. Early and sustained Mission support to ICTA helped to ensure timely and appropriate assistance.

4.4 Existing Research Capability and Shelf Technology

FSR/E's ability to complement conventional agricultural research depends on the ability of commodity and disciplinary research to support FSR/E. But in many developing countries commodity and disciplinary research are limited because of shortages of trained research personnel and other weaknesses in the existing research system. An important indicator of existing research capability is the existence of "shelf technology" that can be adapted and tested in on-farm trials. Often appropriate technologies have yet to be developed; thus, they are not ready "on the shelf" for FSR/E practitioners to take to the field. Problems of this nature appeared in at least five of the projects reviewed. Botswana/ATIP and Nepal/ARPP provide two illustrative cases.

Botswana/ATIP -- While several technologies derived from station-based research had been tested in "maximum yield" plots by ATIP's fourth year, there was "no consistency to performance nor general application of technology" (A.I.D., 1986:22). The evaluation concluded that: "Few interventions had been sufficiently tested and proven...to move forward to the dissemination stage" (A.I.D., 1986:5). Thus, the lack of technologies derived from station-based research impeded ATIP's ability to develop technologies ready for extension to disseminate to farmers.

Nepal/ARPP -- The mid-term ARPP evaluation found that the research base for technologies for hill agriculture was poor, with a lack of technically feasible, economically viable, and socially acceptable technologies (Rood, et al., 1988).

4.5 Consensus on FSR/E Methodology

While FSR/E's core characteristics define what FSR/E is, they do not define how to do FSR/E, that is, the methodology for doing FSR/E. In at least 8 of the 12 FSR/E projects reviewed, lack of consensus over the methodology for FSR/E appeared as a constraint. Two examples were Lesotho/FSRP and Philippines/FSDP.

Lesotho/FSRP -- Finding that Research Division (RD) staff and units did not agree on the project's FSR methodology, the third FSRP evaluation expressed concern over "the many concepts of FSR held by either [TA team] or Basotho staff in the RD" (Dunn, 1983:27-28). The need for clarification on the FSR/E approach to be followed was echoed by the fourth evaluation's recommendation that "the FSR interpretation (there are many) for Lesotho" be spelled out in writing, with copies...made available to all concerned Frolik and Thompson, 1986:iv).

Philippines/FSDP -- While FSDP's Project Paper stated that "the existing farming system is the starting point...from which any changes and improvements must be made," the first evaluation questioned "why...the main crop...grown by...farmers during the past years" had been changed in on-farm trials. This "may be viewed as tantamount to a total change" of the existing farming system (Mazo, et al., 1983:24). Concern was also expressed that FSDP was trying to introduce "more than one or two major modifications at the same time" in a farm, this also being "tantamount to...total change in the farming system" (Mazo, et al., 1983:2).

As a result, the evaluation expressed concern that FSDP staff "may be thinking incorrectly that the goal of farming systems research is to introduce an entirely new farming system and the role of...verification trials is to demonstrate the superiority of [the] new system (Mazo, et al., 1983:25). An example of this questionable approach was a project-sponsored study of ducks that was neither linked with farmer crop production activities nor conducted at sites where farmer-cooperators had previously raised ducks. This indicated

> a seemingly widespread misconception that the purpose of FSDP...is to introduce a new livestock system to replace, rather than modify, the existing systems of the farmer-cooperators. The suggestion of one of the researchers to have separate cooperators for livestock further displays a serious misunderstanding of what is meant by integration of crops and livestock under a farming systems approach to research (Mazo, et al., 1983:25-26).

Given the proposed operational procedures for FSR/E outlined in the second evaluation (Sajise, et al., 1985: 33-34), there is a question of whether FSDP had established, even three years into the project, consensus on a methodology for implementing FSR/E.

4.6 Capability to Process Farming Systems Data

FSR/E involves considerable data collection and analysis. Lack of adequate capability to process farming system research data will constrain doing FSR/E (or implementing a FSR/E project). This problem may exist because of the amount of data needing to be analyzed, lack of data analysis equipment (e.g., computers), or lack of personnel trained in data analysis. This constraint appeared as a negative factor in six projects and a positive factor in two projects. Examples from Gambia/MFP and Senegal/ARPP are illustrative.

Gambia/MFP -- The first MFP evaluation noted that while the Socio-Economic Unit (SEU) was generally on schedule in initiating its surveys and studies, the same could not be said for output delivery (Osburn, et al., 1983). There were numerous delays in developing, pre-testing, and coding survey questionnaires. The SEU lacked microcomputers and delays were encountered in data processing in the TA contractor's home office. By the first evaluation (April 1983), the results of the baseline survey, for which the preparation for data collection had started in September 1981, were still unavailable, largely because the SEU lacked experience in data collection, processing, and analysis. While the TA team's two social scientists (an agricultural economist and a rural sociologist) provided leadership for the development of the project's socio-economic studies, they lacked experience in designing and conducting large-scale data collection programs, and in analyzing data with computerized data processing. As the evaluation noted: "Learning on-the-job... has caused unfortunate delays (Osburn, et al., 1983:70-71).

Senegal/ARPP -- While ARPP cut back over time in the amount of data collected, the first evaluation cautioned that "there is too great a risk that too much data will be collected and...will never get analyzed (St. Louis, et al., 1985:37). The evaluation observed that ARPP was facing a formidable analysis task, and recommended that serious consideration be given to merging the entire data set on the TA contractor's mainframe computer in the U.S., in order to speed up analysis and generation of results.

Yet two of ARPP's three Production Systems Research (PSR) teams had access to appropriate microcomputer software, and had developed the necessary skills for data management and analysis. As a result, ARPP had gained some experience in using microcomputers for data analysis of production and marketing issues.

> In the Casamance, ...the team has made effective use of the FARMAP and MSTAT programs because its staff has had both the capacity to collect needed data and to formulate sound research and analytical approaches. They have been able to gain an understanding of and quantify...constraints to the production systems (St. Louis, et al., 1985:73).

However, progress in Fleuve, because of a later start, had not been as great, while Sine Saloum had been seriously hampered, in part, because the PSR team at this site lacked any computer capacity because of inadequate facilities to house a computer.

4.7 Consensus on Criteria for Evaluating FSR/E

A key factor in implementing any goal-oriented activity is obtaining feedback on the activity's progress toward its goal, and using this feedback to determine if any needed mid-course corrections. While clearly defined criteria are essential for evaluating an activity, this has been a problem in evaluating FSR/E projects. As one evaluation team pleaded: "Agreement should be reached on some practical suggestions for conducting FSR project evaluations which will be more satisfactory to USAID Missions, AID/W, and project contractors" (Francis, et al., 1984:12). While some attention has been directed to this issue (Farming Systems Support Project, 1986; Lichte, 1987), this attention came too late to be of any help to the FSR/E projects reviewed in the present study. Indeed, at least a third (four) of these projects encountered difficulty in establishing a consensus on criteria to evaluate a FSR/E project. Lesotho/FSRP, Malawi/ARP, and Nepal/ARPP provide examples of some of the problems faced in evaluating FSR/E projects.

Lesotho/FSRP -- The third FSRP evaluation used objectively verifiable indicators (OVIs) from the Project Paper to assess the project's progress (Dunn, 1983). But these OVIs focused on the status of project activities (e.g., FSR Unit, farming systems program), not on impact in terms of farmer adoption of technology or increases in crop yield and farm income. Yet the OVIs were useful in identifying whether FSRP was meeting its objectives or targets. In some cases, however, the OVIs were no longer meaningful or relevant. This suggested that it may not be possible to define meaningful objectives for an FSR/E project. Two of the OVIs for one FSRP component (FSR Unit) are illustrative.

One OVI for this component stated: Research priorities are determined through the use of social and economic benefit/cost techniques by 12/79 (OVI1). However, the third FSRP evaluation found, nearly four years after the target date, that there was no evidence that either technique was ever applied to selection of research priorities (Dunn, 1983). In this case, the objective implied by the OVI simply may not have been met because FSRP did not implement the required activity; it could also mean that it was difficult, if not impossible, to define realistic social and economic criteria and/or to measure benefits and costs.

Another OVI stated: The FSR Unit is pursuing or considering a program for replicating FSR/E after the project ends (OVI4). While including the TA team in the Research Division provided a foundation for institutionalizing FSR/E in the Division, the second evaluation earlier recommended that FSRP abandon the concept of a separate FSR Unit (Martin, et al., 1981). In this case, the objective implied by this OVI was no longer relevant by the time of the fourth evaluation.

Malawi/ARP -- The second ARP evaluation dealt with the problem of establishing evaluation criteria by identifying three "critical aspects" to assess the extent to which ARP's purpose was being achieved (Baker, et al., 1983). These aspects were: (1) Are the research programs technically sound, relevant to smallholders' needs, and conducted in a coordinated manner? (2) Is a research management system in place which efficiently allocates financial and human resources in accordance with project priorities? (3) Is there an adequate information dissemination system which provides research results to the appropriate clients of the research organization? However, the evaluation recommended that benchmarks needed to be more closely and carefully emphasized during project design, a task that may be difficult since the farm-level problems and constraints that need to be addressed by a FSR/E project likley are not yet known at the time a project is being designed.

Nepal/ARPP -- The Project Paper for ARPP outlined a "Project Monitoring Plan" divided into two categories (routine project implementation monitoring and impact monitoring). The latter category was concerned with ARPP's components (e.g., agricultural research). While the PP listed the elements to be monitored, the design did not include a plan of how the monitoring would be done, by when, or by whom. Subsequently, 30 months after ARPP started, the mid-term evaluation found that, while all parties had complied with routine reporting requirements, the evaluation team "could find no evidence of any specific reporting on impact achievement..., nor any indication that the Project Paper Plan was ever adjusted or used" (Rood, et al., 1988:87).

4.8 Links with Extension

A constraint that appeared repeatedly was the problem of FSR establishing adequate links with extension. All of the FSR/E projects reviewed were based in a research unit of one type or another, not in a governmental extension organization. Given that agricultural research in many countries traditionally has not had strong links with extension, the basing of FSR in a research unit automatically created a problem of how to link research and extension. This constraint appeared in 9 of the 12 FSR/E projects reviewed. The Philippines/FSDP and Guatemala/FPNI provide examples of this constraint.

Philippines/FSDP -- The first FSDP evaluation found that little attention had been given to integrating project functions and activities into existing Ministry of Agriculture and Forests (MAF) programs. FSDP had not addressed the potential for linking the project with the MAF's extension delivery system, despite the presence of an MAF extension unit at all FSDP sites. The evaluation reported that FSDP's "Special Project" status

> had isolated the project from the rest of the [MAF]. Middle and lower level MAF staff who are not part of the project indicated a pervasive feeling that the project is not part of [the MAF]. ...there has been little thought given to the relationship of the project to the [Regional Integrated Agricultural Research Stations] (Mazo, et al., 1983:46).

Guatemala/FPNI -- While the second FPNI evaluation found that the project had made progress in developing its FSR methodology, ICTA yet needed to improve its links with the extension service (DIGESA). The evaluation noted: "There seems to be a clear recognition of the fact that ICTA simply cannot diffuse the technology alone. It needs DIGESA and others" (McDermott, 1977a: 8). But even as ICTA was expanding its program of on-farm trials (pruebas), "vital linkages" with the DIGESA had not been developed (McDermott, 1977a:19), nor was it clear how ICTA's recognition of the need for such links was "going to be translated into effective action" (McDermott, 1977a: 8). While ICTA discussed "the need to involve DIGESA...in the pruebas" (McDermott, 1977a: 8), the third evaluation concluded that an imbalance had developed in ICTA's ability to link information generation with information transfer, suggesting a need for ICTA to improve "forward and backward linkages between the information generation and information transfer processes" (Mann and Dougherty, 1978:1).

4.9 Links with Agri-Support Services

The incentive for a farmer to adopt an improved technology depends on the farmer's ability to access the services required to support adoption and continued use of the technology. Such services include but are not limited to agricultural credit, production inputs, and markets. The lack of adequate links of FSR/E with agri-support services appeared as a constraint in at least five FSR/E projects. ROCAP/SFPS is illustrative.

ROCAP/SFPS -- The first SFPS evaluation observed that some of the farm operations developed by the project seemed

> to depend heavily upon considerably more than application of the technology introduced. They required intensive assistance by CATIE and/or national institution personnel in obtaining credit (or directly providing resources), locating and installing inputs, generating markets, etc. This emphasizes the fact that improved technology is a necessary, but far from sufficient, ingredient to transform the income and condition of the small farmer (Mann, et al. 1981:2-3).

Improvements in the small farm system likely will not take place unless complementary activities provide small farmers access to markets, credit, and continuing technical assistance.

The need to leverage change in key agri-support systems had still not been addressed by the time of the third SFPS evaluation (Zimet, et al., 1986). In the case of annual crops, "there was no parallel planning of commercial stocks of seeds of new crops and/or varieties. This led to...delays in the early acceptance of technologies tested that depended on this input" (Zimet, et al., 1986:42). Overall, the evaluation concluded that dissemination of a new technology, an extension exercise, needs to have strong links with agri-support institutions (e.g., credit).

4.10 Links with Farmer Organizations

FSR/E projects usually were implemented on a one-to-one basis, that is, with the FSR/E practitioner working with the individual farmer, despite the potential for working with and through farmer organizations to increase the impact of assistance efforts. Exceptions were Lesotho/FSRP and Philippines/FSDP.

Lesotho/FSRP -- The design of the FSRP provided for the development and testing of alternative strategies for farmer communication and education. This entailed Village Agricultural Committees (VACs) and a group approach on communal vegetable fields and grazing schemes. Other extension techniques (e.g., producing and distributing "Cropping Guidelines" and other technical publications) were also developed. But FSRP had taken no steps to monitor and evaluate the effectiveness of these alternative strategies for reaching farmers (Martin, et al., 1981). This problem was still found to exist at the time of the third evaluation (Dunn, 1983), leading the evaluation to make two recommendations--one that the project assess the impact of the VACs and the group approach on adoption rates of recommended technologies, the other that the project consider testing a facilitator approach to communicating with farmers.

Philippines/FSDP -- The first FSDP evaluation concluded that the project had not made any effort to involve farmer organizations or any other community organizations. "Group involvement came only in the group meetings organized for the purpose of briefing the farmers of the project, but all dealings between the project and the farmers are on [an] individual farmer basis" (Mazo, et al., 1983:42). However, the second evaluation found that FSDP had begun to involve farmer organizations in the development of work plans of the Site Research Management Units (SRMUs), the evaluation of research results, and the extension of technologies (Sajise, et al., 1983).

5. Generic Constraints in FSR/E Projects

The preceding chapters have illustrated several points about the A.I.D.-funded FSR/E projects reviewed: (a) that these projects had limited impact on technology development and transfer, and institutionalization of FSR/E (Chapter 2); (b) that the concept of and approach to FSR/E in each project lacked or was weak in one or more of the core characteristics of FSR/E (Chapter 3's discussion of core constraints); and (c) that these projects encountered difficulty in doing FSR/E because of the presence of one or more operational constraints (Chapter 4).

But implementation of FSR/E projects also has been impeded by a third type of constraint, namely, generic constraints. A generic constraint may be defined as a factor that can impede any type of A.I.D.-funded project, regardless of the project's technical content. Thus, a generic constraint (e.g., mismanagement of a project's TA component) can impede implementation of a project, regardless of whether the project's focus is FSR/E, self-financing primary health care, or whatever.

Six types of generic constraints were found in the FSR/E projects reviewed (Table 3), as follows:

- o Project management structure
- o Government funding to meet recurrent costs
- o Staffing with trained manpower
- o Management of training
- o Management of technical assistance
- o Factors beyond a project's control

Two of the constraints--staffing with trained manpower and government funding to meet recurrent costs--were encountered in at least 7 of the 12 projects reviewed. Of the remaining generic constraints, three appeared in at least five projects--project management structure, management of training, and management of technical assistance. Each of the constraints is now reviewed and illustrated with project-specific examples.

Table 3. Frequency of Generic Constraints in 12 A.I.D.-Funded FSR/E Projects.

	Generic Constraints[5]					
Project	G.1	G.2	G.3	G.4	G.5	G.6
Botswana/ATIP		x	x	x	x	x
Gambia/MFP	x	x	x		x	x
Lesotho/FSRP		x	x	x	x	
Malawi/ARP	x	x	x	x	x	
Senegal/ARPP	x	x	x		x	x
Tanzania/FSRP			x			x
Zambia/ZAMARE[6]						
Nepal/ARPP	x	x	x	x		
Philippines/FSDP	x	x		x	x	
Guatemala/FPNI			x			
Honduras/ARP	x	x	x		x	
ROCAP/SFPS		x	x			
TOTAL	6	9	10	5	7	4

[5]Key to Generic Constraints:

G.1 Project Management Structure
G.2 Government Funding to Meet Recurrent Costs
G.3 Staffing with Trained Manpower
G.4 Management of Training
G.5 Management of Technical Assistance
G.6 Factors Beyond a Project's Control

[6]While generic constraints were not identified in the case of Zambia/ZAMARE, there was evidence that the project had devised methods to deal with certain generic constraints (see the Project Description Sheet for Zambia/ZAMARE in Annex I and the supporting case study material in Annex H).

5.1 Project Management Structure

Project management structure appeared as a constraint in at least 6 of the 12 projects reviewed. Sometimes a project's management structure was not adequate to handle an "unwielding and over-ambitious" project design (e.g., Gambia/MFP). At other times, as in the case of Nepal/ARPP, the problem was simply an ineffective project management structure (e.g., having responsibility for but not authority over the resources needed to carry out a task). In other cases, the problem involved insufficient planning and coordination among the TA team, the counterpart organization, and the USAID Mission (e.g., Honduras/ARP). Consider the following example from Nepal/ARPP.

Nepal/ARPP -- The mid-term evaluation found that ARP's "dispersed and vaguely defined" management structure had impeded implementation. For example, the evaluation found that the Project Coordinator's role and authority were never defined, and that he had not been given adequate staff to support "much real coordinating, planning, [or] monitoring. ...even the Project Director has not been very much involved in Project management, especially after [the National Agricultural Research Service Center] was established as a new ministerial body, separate from the [Department of Agriculture]" (Rood, et al., 1988:67).

5.2 Government Funding to Meet Recurrent Costs

This constraint appeared in at least nine of the FSR/E projects reviewed. Basically, when this constraint was present, implementation was impeded by a lack of timely availability of salaries for personnel, fuel for vehicles, fertilizer for trials, etc. Senegal/ARPP provides a typical example.

Senegal/ARPP -- The mid-term ARPP evaluation reported that implementation was constrained by the inability of the Senegalese Institute of Agricultural Research (ISRA) to meet the salaries and operational expenses of research and secretarial staff. The Production Systems Research (PSR) teams encountered problems in implementing their programs because of the lack of human and financial resources. Thus, "lack of funds at the field level... delayed the progress of the PSR field programs" (St. Louis, et al., 1985:xv).

5.3 Staffing with Trained Manpower

A key component in implementing a FSR/E project is ensuring that the counterpart organization assigns trained personnel to the project. Where trained manpower cannot be provided, be it for lack of funded positions or lack of trained people to fill those positions, project implementation will suffer. This constraint appeared in at least 10 of the 12 projects. Consider the example of Lesotho/FSRP.

Lesotho/FSRP -- The second FSRP evaluation found that implementation was impeded when the Ministry of Agriculture could only assign a limited number of trained professionals to the Research Division (RD) (Martin, et al., 1981). There were not enough trained Basotho agriculturalists available who could be allowed to leave for training, while others were assigned to work as TA team counterparts. Also, there were delays in assigning counterparts and assistants to FSRP; some counterparts were not assigned until six months to a year after the TA team's arrival.

5.4 Management of Training

Training has been one of the key inputs in the design of A.I.D.-funded FSR/E projects. However, problems in implementing training occurred in at least 5 of the 12 projects. Problems included difficulties in obtaining candidates for training, delays in obtaining clearances to send participants to training, and the departure of TA personnel before training participant returned to their countries. Malawi/ARP is illustrative.

Malawi/ARP -- The second ARP evaluation found that delays in clearance to create the first position in the Farming Systems Analysis (FSA) section and in hiring the first Malawian for that position resulted in a year's delay before the first participant could leave for training, while the second participant had still not been identified (Baker, et al., 1983). Further, neither participant was scheduled to return before the departure of the TA team member who was serving as the acting FSA section head. In considering the interaction between the TA team and Malawian project staff, the evaluation also found that TA team members "almost unanimously...regret...that they are not providing more on-the-job training and supervision for junior research staff" (Baker, et al., 1983:20).

The Project Paper stated that "all of the training decisions were based on the specific needs of research.... The training program represents the summation of specific project needs for better trained professional researchers." However, the second evaluation found that the eight Ph.D. candidates proposed in the PP had been increased to 12 trainees (Baker, et al., 1983). The evaluation noted that the increase in the number of Ph.D. candidates and the greater length of a doctoral program would result in a larger number of trainees returning after the PACD, thereby making it difficult for them to benefit from the TA provided by the project. This would jeopardize the output of

> an established and sustained program of research relevant to the smallholder.... . . . It will particularly affect the ability of the newly-returned researchers to benefit from the guidance of the technical assistance team and the continuity the latter have provided while participants were absent (Baker, et al., 1983:12, 15, 17).

The Regional Inspector General's audit in November 1982 noted the need for the project's TA component "to be synchronized with... long-term training...to insure a reasonable overlap between returning trainees and AID-funded expatriate researchers."

5.5 Management of Technical Assistance

All of the FSR/E projects reviewed included an expatriate technical assistance (TA) component. Most of these 12 projects encountered problems in managing the project's TA component. In some cases, TA personnel lacked FSR/E experience. Indeed, many donor-sponsored FSR/E projects were "staffed with individuals having little or no training or experience in on-farm research methods or team research approaches" (Baker and Norman, 1988:29). Also, a project's TA personnel often lacked experience in the country in which the project was being implemented. Finally, tours of duty often lasted nor more than two years and sometimes were less. Malawi/ARP provides an example of many of these problems.

Malawi/ARP -- ARP was designed using A.I.D.'s "collaborative assistance" mode which permits a Title XII university to be selected competitively to participate in the final design of the project and promptly commence implementation when A.I.D. approves funding for the project. However, delays in executing the TA contract resulted in the TA contractor losing several intended TA team members. This, in the view of the evaluation, had a

> negative impact on project implementation. It appears that the project designers wrote the project job descriptions with fairly specific individuals in mind but could only field part of that team by the time the contract for technical assistance was finally signed. As a result, the particular skills mix of the team actually fielded has not been as comprehensive as what seems to have been intended at the time the project was designed. For example, the PP called for a crops agronomist who was expected to work on a variety of food and forage crops. The individual fielded was primarily a forage crops agronomist and as a result, food crop agronomic research was somewhat neglected during the early years of the project (Baker, et al., 1983:20).

The evaluation concluded that the project had failed "to provide qualified individuals for the positions designated in the Project Paper" (p. 8 of PES for Baker, et al., 1983). The TA personnel would have benefited by "more experience in agricultural research in developing countries, particularly in Africa" (Baker, et al., 1983:21). Further, most short-term consultants

> were in-country for a duration of two weeks or less and that few...consultants...made repeated trips to Malawi. The team would have preferred to see fewer...con-sultants, longer durations of the consultancies and key... technical expertise returning periodically to assist the ...the [Department of Agricultural Research] (Baker, et al., 1983:21).

A second problem in managing a project's TA component is ensuring a smooth start up on the part of the TA team. Several difficulties in this area arose in Lesotho/FSRP.

Lesotho/FSRP -- The second evaluation found that FSRP's start up had been impeded by a slow start on the part of the TA team (Martin, et al., 1981). This was caused by a number of factors including selection of team members without the involvement of the TA team leader, lack of orientation to the project before leaving the U.S., delays in team member arrival, team members not arriving in the sequence planned, lack of orientation assistance by USAID/Lesotho when team members arrived, inadequate introduction of team members and the project itself to government agencies and other entities with which they were expected to work, and delays in housing and office construction.

A third problem in managing the TA component of FSR/E projects has been that project administration requirements often distracted TA personnel from their primary task, namely, doing FSR/E. This problem appeared in at least six projects including Botswana/ATIP and Honduras/ARP.

Botswana/ATIP -- The second ATIP evaluation found that the TA team's chief of party (COP) was a recognized leader in FSR. However, the COP's administrative duties limited him to spending only 20% of his time in the field, "with much of this allocated to routine administration" (A.I.D., 1986:56). In the evaluation team's view, the COP needed additional administrative support. This need was critical since ATIP team members had "limited experience" implementing FSR/E (A.I.D., 1986:26).

Honduras/ARP -- The TA team's chief of party (COP) estimated that 75% of his time had been spent on administration, while approximately 50% of the agricultural economist's time had been similarly occupied (Hansen, et al., 1984). The evaluation found that the TA economist had become "more involved in administrative matters and in [university] related work, substantially reducing the time allocated to field work" (Hansen, et al., 1984:30). The scope of this problem, and its existence in ARP as in other USAID/Mission projects, prompted the question of why USAID contracts fail to

> recognize the essential importance of administration and automatically provide for administrative assistance.... This Contract, like many others, only requests technical people for technical work as if COP responsibilities were inconsequential. In many instances this results in a COP assuming that the technical work is what counts and trying to minimize administrative tasks. In other instances this results in a technically qualified COP who does not really have the necessary administrative skills or experience (Hansen, et al., 1984:24).

It may be noted, in passing, that the various problems associated with the management of the TA component of FSR/E projects do not appear to stem from any inadequacy on the part of the TA personnel (usually from U.S. universities) who provided TA in these projects. Indeed, a recent evaluation of the IFAD-funded SAFGRAD FSR/E program in Africa found that inadequacies in the management of the TA component of FSR/E projects also arose when FSR/E projects relied on Africans to provide technical assistance in FSR/E.

> The 'Africanisation' of the technical assistance was a worthy experiment to have included in this project since previous experiences with non-African technical assistance have demonstrated that there are typically many difficulties of implementation and effectiveness with such assistance. The present project seems to suggest that much of the same sort of difficulties are experienced with the African "variety", suggesting...that such difficulties...are not ethnically related but are inherent in external technical assistance (Anderson, et al., 1987:44).

5.6 Factors Beyond a Project's Control

The last generic constraint confronted by the FSR/E projects reviewed was that of factors beyond the ability of a project to control. Yet acts of nature (droughts) or man (coups, government policies) can disrupt and impede project implementation and impact. At least a third of the 12 projects encountered problems in this category, as the following examples illustrate.

Botswana/ATIP -- The second ATIP evaluation found it "difficult to document" that the project's farming systems (FS) methodologies had made an impact (A.I.D., 1986:28). With limited and erratic rainfall during ATIP's first four years, there was "no indication of consistent and demonstrated increases in production [or] income as a result of introduced technologies, except under favorable soil and rainfall conditions" (A.I.D., 1986:18). In effect, the long period of drought during the project's early years effectively precluded the from project from making the progress that project designers had anticipated.

Gambia/MFP -- Early implementation of the MFP was disrupted by an attempted coup d'etat (Osburn, et al., 1983). However, by the second evaluation, MFP had prepared and delivered a tested maize production technology package to farmers (Corty, et al., 1986). This success was demonstrated by

> the increase in maize area from about 2,600 hectares at the beginning of the project to 18,000 hectares by [the] end of 1985. The average national yield has increased from 1.6 t/ha to 2.5 t/ha and there is a significant increase in number of maize growing farmers (Corty, et al., 1986:13a).

But most harvested maize is used locally, with marketed maize often finding its way into Senegal where prices were as high as D900 per ton. In October 1985, The GOG increased the producer floor price of maize 54% (from D390 to D600). Marketing arrangements were also changed. Instead of the Grain Produce Marketing Board buying the crop, local cooperative societies were authorized to buy all cereals and sell to the Gambian Credit Union (GCU). However, farmers were able to sell in the local market at higher prices than those offered by the GCUs.

MFP's design provided for PL 480 Title III Program funds to cover field operating costs and contractor logistical support (i.e., housing, furnishings). These funds were completely administered by the Senegalese Institute for Agricultural Research (ISRA) through the Ministry of Economy and Finance (MEF). But several factors made timely provision of adequate funds impossible. For example, sales of rice were proceeding slowly and sufficient funds were not were not being generated to support all Title III activities at required levels.

Senegal/ARPP -- The ability of the ARPP to plan its research program was constrained by the rapidly changing parameters of Senegalese agriculture (e.g., drought, rising input prices and food import bill, and changes in institutional roles and operating mechanisms) (St. Louis, et al., 1985).

Tanzania/FSRP -- Several factors beyond the control of the FSRP impeded the project's ability to make an impact on farmer adoption of improved technology. These included

> a) the rigidly controlled Government market for cereals, which gave rise to a purchase and payment system that deprived the farmer of any incentive to produce more than absolutely necessary, b) the UJAMA "villagization" scheme that removed farmers from their fertile fields and gave them infertile ones, and c) the inability of the Government to make good on many of its promises to villagers in providing them with services (A. Cunard, personal communication).

While two evaluations of FSRP failed to identify these factors as constraints on project success, the evaluations did identify that project implementation had been severely curtailed by the Brooke Amendment, a development that could not have been foreseen.

6. Effectively Coping with Constraints in FSR/E Projects

Occasionally FSR/E project evaluations provided evidence that FSR/E project were effectively coping with potential core, operational, or generic constraints. Examples of such effective coping are identified in the Project Description Sheets in Annex I as positive (+) instances of the core, operational, and generic constraints. Some of these positive instances are now reviewed.

6.1 Core Constraints

Farmer Participation (C.2)

Senegal/ARPP -- The first ARPP evaluation noted the contribution that farmer participation made to implementation of Production Systems Research (PSR).

> Farmers were contacted in advance of the on-farm trials to discuss their problems in a series of triparty meetings (farmers, extension agents, PSR team). Through these discussions, themes to be tested were formulated with the assistance of the PSR team. Field trials were then implemented. For large-scale on-farm trials, farmers participated in defining the experiment design. Farmers covered part of the cost of the experiments. For small-scale on-farm trials, farmers received an allowance and were compensated where yields were below normal (St. Louis, et al., 1985:46).

Guatemala/FPNI -- A project impact evaluation of FPNI concluded that, to ensure small farmer participation in technology development and transfer, special programs need to be developed to ensure on-farm testing of potentially improved technologies and participation of farmers in that testing. "When such systems are in place, the ICTA experience shows that small farmers will assess the merits of the technology and gradually adopt it" (McDermott and Bathrick, 1982:14).

Feedback to Shape Agricultural Research Priorities and Agricultural Policy (C.9)

Botswana/ATIP -- The second ATIP evaluation found that the project's staff collaborated with researchers in the Division of Agricultural research (DAR) in designing and implementing on-farm trials (A.I.D., 1986). Thus, these DAR researchers were familiar with the project's trials and in a position to influence station-based colleagues to place a greater emphasis in their research agenda on problems of low-resource farmers. Also, the regional ATIP team was able to draw on the expertise of DAR researchers in setting the team's priorities. However, the evaluation noted the need for ATIP field teams to collaborate more effectively (a) with station-based researchers in describing current cropping systems and constraints and in setting research priorities, (b) with district-level extension agents to facilitate feedback to station-based researchers, and (c) with the Department of Agricultural Field Services in studying the process of adoption and the effects of adoption on production (A.I.D., 1986).

Zambia/ZAMARE -- The second ZAMARE evaluation found that the Commodity and Specialist Research Teams (CSRTs) worked closely with regional Adaptive Research Planning Teams (ARPTs) in designing and implementing on-station verification and on-farm trials. This was encouraging because inadequate communication between ARPTs and CSRTs was recognized as a potential problem since the initiation of the ARPTs. Faced by the potential for inadequate communication between an ARPT and the CSRTs, the ARPT national coordinator established a series of mechanisms to facilitate a two-way flow of information between an ARPT and the CSRTs. These mechanisms included:

-- Involving CSRT scientists in the exploratory surveys. This served to guide the development of the verification survey questionnaire and to apprise an ARPT's members of relevant technological solutions that already exist.

-- Involving CSRT scientists in Pre-Research Committee Meetings in which ARPT members presented the problems identified during the surveys or trials, and poroposals for technical component research and on-farm trials. Following approval of proposed ARPT adaptive research by the Research Committee, the CSRT scientists would comment on the details of each trial.

-- Providing CSRT scientists with agronomic data sheets (uninterpreted but quantitative summaries of ARPT survey data on agronomic practices and problems in farmers' fields).

-- Formulating crop research strategies based on the quantified data collected on farmer systems and CSRT scientists' knowledge of what research is feasible.

-- Using standard formats for ARPT to present ARPT-identified problems to CSRT researchers, for commodity researchers to prepare crop profiles on new varieties for ARPTs, and for outlining adaptive research trials.

These mechanisms facilitate the ARPT in providing information on farmers' problems requiring component research, and feedback on research conducted under farmer conditions. The CSRTs, in turn, provided information on possible technologies available for on-farm experimentation (Sutherland and Warren, 1985:56-57).

Senegal/ARPP -- A "lesson learned" from the ARPP was that combining Production Systems Research (PSR) with macro-economic analysis in the same project, while carried out by a separate group than that implementing PSR, proved to be a good idea since both activities tended to reinforce each other and produce timely and objective results (St. Louis, et al., 1985:xiv).

6.2 Operational Constraints

Agricultural Research Policy/Strategy Defining FSR/E's Role (O.2)

Zambia/ZAMARE -- Adaptive Research Planning Teams (ARPTs) in ZAMARE were operational by the project's end in six of Zambia's nine provinces. Although each ARPT was supported by a separate donor, all operated under a National Coordinator who reported to the Chief Agricultural Research Officer. USAID/Zambia funding of the first ARPT was part of an overall program of donor support for FSR/E in Zambia, in which FSR/E was a systematic component of the government's agricultural research policy.

Long-Term Commitment of Resources (O.3)

Guatemala/FPNI -- The project impact evaluation concluded that much of FPNI's progress could be attributed to the important role that the Rockefeller Foundation and A.I.D. had played, over a long period, in strengthening the research capacity of the Agricultural Science and Technology Institute (ICTA). In the five years preceding ICTA's creation, USAID/Guatemala worked with the Government of Guatemala in planning and implementing the reorganization of the public agricultural sector. Early and sustained USAID/Guatemala support to ICTA helped to ensure timely and appropriate assistance.

Capability to Process Farming Systems Data (0.6)

Senegal/ARPP -- Two of ARPP's three Production Systems Research (PSR) teams had access to appropriate microcomputer software, and had developed the necessary skills for data management and analysis. As a result, ARPP had gained some experience in using microcomputers for data analysis of production and marketing issues.

> In the Casamance, ...the team has made effective use of the FARMAP and MSTAT programs because its staff has had both the capacity to collect needed data and to formulate sound research and analytical approaches. They have been able to gain an understanding of and quantify...constraints to the production systems (St. Louis, et al., 1985:73).

Consensus on Criteria for Evaluating FSR/E (0.7)

Guatemala/FPNI -- The Agricultural Science and Technology Institute (ICTA) calculated an Acceptance Index to measure farmer acceptance of each technology tested in farmer-managed trials. The index was the percent of farmer collaborators who continued to use a technology in the year following its testing in their own fields, multiplied by the percentage of the farmers' land on which they apply the technology. An Index of 50 was required before a new technology would be considered as satisfactory. The 1979 Indices for maize revealed that, in the highlands where subsistence farming predominated, two out of five Indices had reached 50 by 1979. In the coastal area where commercial small farms predominated, two out of four recommendations had surpassed 50 in both 1978 and 1979. This suggested "that increasing numbers of farmers who have collaborated in field testing of technologies recommended by ICTA are adopting these recommendations. Interviews with ICTA personnel and with individual farmers supported this impression" (McDermott and Bathrick, 1982:9).

Links with Agri-Support Services (0.9)

Zambia/ZAMARE -- The second ZAMARE evaluation found that the project was providing its research output (i.e., basic cereal and oil seed) to ZAMSEED, the only seed supplier in Zambia. ZAMSEED

[has] every incentive to work with the project, as their lifeline is new varieties...released by the [Ministry of Agriculture and Water Development] research branch. ZAMSEED makes direct and in-kind contributions to the project/program and cooperates in the production, certification, supervision and pricing of seed for national distribution (Yohe, et al., 1985: p. 3 of Africa Bureau Executive Summary).

Links with Farmer Organizations (O.10)

Philippines/FSDP -- The first FSDP evaluation concluded that the project had not made any effort to involve farmer organizations or any other community organizations. "Group involvement came only in the group meetings organized for the purpose of briefing the farmers of the project, but all dealings between the project and the farmers are on [an] individual farmer basis" (Mazo, et al., 1983:42). However, the second evaluation found that FSDP had begun to involve farmer organizations in the development of work plans of the Site Research Management Units (SRMUs), the evaluation of research results, and the extension of technologies (Sajise, et al., 1983).

6.3 Generic Constraints

Government Funding to Meet Recurrent Costs (G.2)

Guatemala/FPNI -- While the evaluation of ROCAP/SFPS found that SFPS had difficulties in getting the Agricultural Science and Technology Institute (ICTA) to support SFPS activities in Guatemala, the impact evaluation of FPNI found that ICTA had supported FPNI research activities. FPNI's experience in supporting ICTA demonstrated the need to ensure that a research institution has adequate authority and resources to carry out its mandate. ICTA's semi-autonomous status provided flexibility for the Institute to implement new programs, hire personnel, and make independent contractual arrangements.

Management of Training (G.4)

Senegal/ARPP -- The mid-term ARPP evaluation noted that implementation had initially been constrained by weaknesses in the process of selecting candidates and/or establishing credentials for training. The project's budget estimates indicated that 75% of total project cost was to support human resources development and/or professional training.

Eleven researchers of the Senegalese Institute of Agricultural Research (ISRA) had completed Masters' degrees and nine more were purusing a Masters' degree by the end of 1984. The evaluation concluded the the project's long-term training subcomponent "made a major contribution to the Senegalisation of the scientific staff of ISRA. This is one of its major achievements despite constraining circumstances" (St. Louis, et al., 1985:55). The evaluation attributed much of the project's success to having paid attention to training, in terms of the number of individuals trained and the qualifications and/or background of those selected for training (St. Louis, et al., 1985:viv).

Zambia/ZAMARE -- The second ZAMARE evaluation found that early action by USAID/ZAMBIA was instrumental in implementing participant training, with the result that trained Zambians were scheduled to return to their posts while the TA team was still in the field. "Most AID development assistance projects don't see equipment and supply purchases until the second to fourth year of a project and often trainees don't return until after a project has terminated" (Yohe, et al., 19852).

Guatemala/FPNI -- FPNI's impact evaluation concluded that FPNI had successfully attained the project purpose of developing and strengthening the capability of the Agricultural Science and Technology Institute (ICTA) to conduct adaptive research on and farm-level testing of improved technology for basic food crops. In addition to donor-provided TA and Government of Guatemala budgetary support, two factors contributed to this success: (1) ICTA arranged for selection and efficient phasing of the ICTA professionals who participated in advanced degree training programs; and (2) ICTA developed an in-service training program.

With respect to degree and short course training, "timing of the arrival and departure of [TA] was programmed in relationship to simultaneous massive training so that expatriate line officers were replaced by trained Guatemalans" (McDermott and Bathrick, 1982:Appendix E-3). This approach enabled research to proceed, while the Guatemalans were obtaining advanced degree or short course training under FPNI or Rockefeller Foundation funding. During this period, FPNI and the Rockefeller Foundation provided funding for TA specialists to serve in line, not advisory, positions in ICTA, implementing the research program. The third FPNI evaluation noted that the TA specialists played "a major role in program design and execution" (Mann and Dougherty, 1978:16). As Guatemalans completed their studies, they returned to ICTA to assume research and/or research management positions.

Management of Technical Assistance (G.5)

Senegal/ARPP -- The mid-term ARPP evaluation found that the phasing in of the Production Systems Research teams had been an effective means to avoid placing excessive strain on available financial and human resources (St. Louis, et al., 1985:xiv).

Zambia/ZAMARE -- USAID/Zambia's Project Support Unit (PSU) afforded the TA team excellent logistical support. The PSU provided backstopping services to the TA contractor, with the cost of these services being covered by funds retained by the Mission from the project's budget. The PSU, in collaboration with the TA contractor, was instrumental in ensuring that equipment and supplies were available to TA team members upon their arrival in country. Also, ZAMARE provided funding for two Zambian staff persons to assist the TA team leader in handling the administrative details involved in implementing the project. This enabled the team leader to focus a greater percentage of his time on providing leadershp for implementation (Yohe, et al., 1985).

Guatemala/FPNI -- The FPNI impact evaluation concluded that one of the factors contributing to the project's success was ICTA's use of expatriate TA personnel to fill operational line management and technical positions within ICTA, while ICTA professionals were pursuing advanced degree training programs.

Annex A. Summary of Core, Operational, and Generic Constraints in A.I.D.-Funded FSR/E Projects.

This Annex summarizes the core, operational, and generic constraints identified in this project, per the following codes: core (C), operational (O), and generic (G).[7]

Core Constraints (C)

C.1 Farmer Orientation
C.2 Farmer Participation
C.3 Locational Specificity of Technical and Human Factors
C.4 Problem-Solving Approach
C.5 Systems Orientation
C.6 Interdisciplinary Approach
C.7 Complementarity with Commodity and Discipline Research
C.8 Technology Testing in On-Farm Trials
C.9 Feedback to Shape:
  a. Agricultural Research Priorities
  b. Agricultural Policies

Operational Constraints (O)

O.1 Stakeholder Understanding of FSR/E
O.2 Agricultural Research Policy/Strategy Defining Role of FSR/E
O.3 Long-Term Commitment of Resources
O.4 Existing Research Capability and Shelf Technology
O.5 Consensus on FSR/E Methodology
O.6 Capability to Process Farming Systems Data
O.7 Consensus on Criteria for Evaluating FSR/E
O.8 Links with Extension
O.9 Links with Agri-Support Services
O.10 Links with Farmer Organizations

Generic Constraints (G)

G.1 Project Management Structure
G.2 Government Funding to Meet Recurrent Costs
G.3 Staffing with Trained Manpower
G.4 Management of Training
G.5 Management of Technical Assistance
G.6 Factors Beyond a Project's Control

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[7]An analysis of these constraints in 12 FSR/E projects appears in A Review of A.I.D. Experience with Farming Systems Research and Extension Projects, **A.I.D. Evaluation Special Study** (forthcoming), available from A.I.D.'s Document and Information Handling Facility (per instructions on last page of this report).

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Year	Volume	Document No.
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1985	2	PN-AAU-145
1986	3	PN-AAV-904
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