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Farming Systems Research Defined

This issue of *Culture and Agriculture* focuses on farming systems research and extension (FSR/E). FSR/E is an approach to agricultural research and extension that attempts to deal more effectively with the problems of low-resource agriculturalists. The approach was developed in the 1970s in response to the observation that groups of small-scale farm families were not benefiting from mainstream agricultural research. Although a number of terms and concepts have been used over the last 15 years to describe the approach, there is now general consensus on the basic assumptions, methodologies, and objectives. FSR/E is used here because it explicitly addresses the linkages among researchers, extension workers, and farming systems.

A good definition of farming systems research and extension has been provided by Shaner et al.:

"... an approach to agricultural research and development that views the whole farm as a system and focuses on: 1) the interdependencies between the components under control of members of the household, and 2) how these components interact with the physical, biological, and socioeconomic setting and with the farm families' goals and other attributes, access to resources, choice of production activities and management practices."

(Shaner, W.W., P.F. Philipp, and W.R. Schmehl, 1982. Farming systems research and development: guidelines for developing countries. Boulder: Westview Press.)

In This Issue

The Culture and Agriculture Group is an organization of academics and practitioners interested in agriculture, development, and agrarian transformation. C&A welcomes members concerned with the social, biological, and environmental aspects of agriculture who are interested in dialogue, debate, and collaboration.

Accountability: A Dilemma in Farming Systems Research

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Initiating farming systems research in the late 1960s and early 1970s meant working on a frontier. There was excitement in working with a process that was, and is, conceptually sound. It was a process that in its very simplicity and internal consistency convinced the pioneers of that time that it would be readily accepted by other researchers, by donor agencies, and by national governments. Unfortunately, the farming systems approach was accepted by many donor agencies before the fruits of the process had been given time to mature. Twenty-five years later we are living with that legacy—a measured withdrawal on the part of many donor agencies just when many national programs are justifiably accepting its value. The overenthusiastic initial acceptance blinded supporters of the farming systems approach ... that has now become an important issue in the late 19... dilemma of accountability in farming systems research.

In this article I consider three areas in which this dilemma of accountability now manifests itself. These areas, which are not mutually exclusive but are separated to simplify discussion, are the following:

- Multiple clients for results of farming systems research.
- Limited availability of resources for research.
- Incorporating societal goals into farming systems research.

I will emphasize accountability aspects as I discuss these topics. Close links exist between credibility and accountability. Where there is credibility, there is accountability. However, the three areas specified above complicate the task of achieving credibility and thus make the issue of accountability more significant.

Multiple Clients

The development, dissemination, and adoption of relevant improved technologies and the development of relevant policy/support programs are obviously two equally important complementary approaches to improving the productivity (and therefore hopefully the welfare) of farmers.

There are four groups of actors who are critically important in contributing to the process of agricultural development (Table 1). Productive, interactive linkages between planners, researchers (on-station and on-farm), extension and development staff, and farmers are very important. Nevertheless in many developing countries, until recently, the one-way, top-down pattern was most common. The situation in many countries is that the link *to* the farmer (top-down) is still stronger than that *from* the farmer (bottom-up).

Table 1. *Roles and Functions of the Actors in Agricultural Development*

Role	Functions	Actors
Implementers		Farmers
Supporters	Transmitters Input Provision	Extension Staff Development Agencies
Provide Potential Means	Technology Policy/Support Systems	Research Planning

There is a number of reasons why some of these linkages are fragile.[2] It is apparent that farming systems work can act as a broker in helping to forge linkages among the groups of actors. In other words, it facilitates a process and does not produce a product. Therein lies the problem of accountability as some of the clients (e.g., donor agencies) demand a more tangible outcome.

Two practical problems in terms of accountability follow:

1. Farming systems work, by its nature, encourages the development of linkages between the various actors in the development process. Some of these linkages are horizontal, in contrast to the vertically-organized institutions in most countries. For example, research and extension are usually in different departments within the Ministry of Agriculture. The need for these horizontal linkages is often recognized, but they are harder to establish. It is particularly important for credibility that farming systems workers, in further development of horizontal linkages, do not alienate or ignore the vertical nature of control and accountability exerted by the different institutions.[3] They are located in one of those institutions. The accountability or legitimacy of such efforts is enhanced if development of such horizontal linkages is formalized rather than being based on personal relationships. Support for such linkages by top personnel within the existing institution also helps. This issue of linkages needs to be addressed in many national settings to improve the impact of farming systems work.

2. Another manifestation of the multiple client issue consists of the types of trials conducted in farming systems research. Three levels of trials can be broadly delineated. These are differentiated on the basis of who manages and who implements the trial, i.e., researcher (technician) or farmer. Thus three types of trials are possible:

- ☐ Researcher-managed and researcher-implemented (RMRI)
- ☐ Researcher-managed and farmer-implemented (RMFI)
- ☐ Farmer-managed and farmer-implemented (FMFI)

RMRI trials are the same as those on experiment stations. The level of testing achieved in these trials meets the standards demanded by experiment station-based researchers. FMFI trials, however, are the most satisfactory for the farmer and provide the most practical test of the technology. Due to management and resource constraints, yields or returns will diminish from the RMRI to the FMFI level. Table 2 gives a breakdown of what can reasonably be expected from these different types of trials.[4] Different types of trials help to satisfy the needs of the different clients of farming systems work (e.g., experiment station scientists, extension workers, and farmers).

Table 2. *Expectations of Different Types of Trials*[a]

Item	RMRI[b]	RMFI[c]	FMFI[d]
Experimental Stage	Design[e]	1st stage testing	2nd stage testing
Design			
Complexity	Most	Less	Least
Type	Standard	Simple standard	With and without
Replication	Within and between sites	Usually only between sites, but can also be within	Between sites only
Who selects technology?	Researcher	Researcher/farmer	Farmer
Participation by			
Farmer	Least	More	Most
Researcher	Most	Less	Least
Numbers of farmers	None	Some	Most
Farmer groups	Least	More	Most
Potential			
"Yield"	Most	Less	Least
Measurement errors	Least	Greater	Most
Degree of precision	Highest	Less	Least
Data			
"Hard" (objective)	Most	Less	Least
"Soft" (subjective)	Least	More	Most
Determination of cause/effect relationships	Easiest	Less easy	Least likely
Incorporation into farming systems	Least	More	Most
Evaluation			
Who by?	Mainly researcher	Researcher/farmer	Mainly farmer
Nature of test	Assesses technical feasibility	Some of each plus economic evaluation	Validity for farmers—practicality acceptability
Appeal to			
Researchers	Most	Less	Least
Extension staff	Usually least	More	Most
Farmers	Least	More	Most
Ease of acceptance of trial results	Researcher	Researcher/farmer/extension	Farmer

[a] There is a degree of subjectivity in some of the entries in the table but in general they reflect the typical case. In a sense these expectations also reflect the reasons why the different types of trials are undertaken.
[b] Researcher Managed and Researcher Implemented.
[c] Researcher Managed and Farmer Implemented.
[d] Farmer Managed and Farmer Implemented.
[e] Standard multilocational trials are also RMRI.

In terms of multiple clients, farming systems work is faced with a challenging task in achieving accountability. Perhaps this is not altogether surprising because of the inherent nature of its approach, involving as it does, a systems perspective.[5]

Limited Research Resources

A growing problem in many developing countries is the lack of adequate resources necessary for conducting research. Consequently, there is a need to maximize return from the allocation of such resources. Discussion of this topic is based on the actors specified earlier: experiment station researchers, extension workers, and farmers.

1. *Experiment station researchers.* Farming systems research is a relatively new approach in many low-income countries. As a result, this approach faces the challenge of fitting into an already well-developed institutional structure. Farming systems work, or on-farm work with a farming systems perspective, is complementary to on-station research. However, because of the limited availability of research resources (funds and personnel), it is often considered competitive. This becomes an increasing problem as donor agencies withdraw their support. Consequently, national programs often have to absorb such programs, with very little increase in their resource base.[6] If credibility of on-station research is established (through field testing and adoption by farmers), then accountability is less of a problem. If credibility has not been established, then the feedback role of farming systems research to priority setting and programming of research conducted on experiment stations becomes more difficult.[7] A recent review of farming systems programs in nine countries shows that the feedback role has not been very successful in most of the programs (Merrill-Sand, Ewell, Biggs, and McAllister, 1989). Indeed, insistence on such a role could increase the potential for conflict between on-farm researchers and experiment station-based researchers. In such a situation credibility of on-farm research is likely to be adversely affected. To minimize the possibility of conflict, the study notes three issues that need to be addressed:

a. An understanding must be reached on the respective roles of on-farm research and experiment station-based research. Both have major contributions to make, and it is important to recognize how these fit together. The information in Table 2 shows major differences between RMRI work—mainly the preserve of experiment station research—and RMFI and FMFI which emphasize on-farm work. For example, the table indicates differences in research objectives, methods, experimental design, types of data collected, methods and analysis, and evaluation criteria. It is important to understand that cause-effect relationships and "hard" data are more easily obtained from RMRI work. However, farmer attitudes and inputs into the research process are more easily obtained from RMFI and FMFI work undertaken on farmers' farms. Once these different roles are acknowledged, it is easier to recognize the complementarity of such research, and the use of appropriate criteria for evaluating the research.

b. Effective communication must take place between on-farm and on-station researchers. Research groups organized around commodities and subject areas—and including all interested parties—can improve communication. This can help build potential credibility and accountability. Such groups can assist in planning and evaluating the results of the research. Field days on farmers' farms and visits to trials on the experiment station can further enhance communication. Some form of national coordination of farming systems work is also helpful.

c. The appropriate way to organize on-farm research will depend on the local situation, including availability of resources (funds and personnel). There is no one optimal model (Norman and Collinson, 1986). In small countries it can be argued that on-station researchers could also be responsible for on-farm research. However, in bigger countries, involving more personnel and/or greater distances, specialization in on-farm work and on-station research may be the only possible alternative. In both cases, however, it is possible to exploit the benefits of specialization in building up skills in farming systems work. A possible variation in the latter case is for farming systems teams to operate out of regional substations. What is apparent is that much farming systems work, now or recently financed by donor agencies, will need reorganization to fit in with resources available to national programs. Whatever model is adopted, collaborative work between on-station and on-farm researchers will be critically important in forging links and building credibility. Results and conclusions arrived at cooperatively rather than requiring transmission from one party to another will minimize feedback problems arising from unwelcome information. Where there are very limited research resources, this collaborative work becomes even more critically important. In such situations, collaboration can potentially improve the credibility and potential productivity of on-farm work.[8]

2. *Extension.* There has been an unfortunate tendency in many national programs to assume that the farmers are homogeneous in the natural (technical) environment that they face, and the socioeconomic characteristics or resources they have. As a result, the monolithic technological package concept has been widely advocated. It is not altogether surprising that where technological packages have been disseminated, many farmers have adopted components rather than the complete package. In such cases there is often little advice on what farmers should do. For example, should they put a top dressing of fertilizer on when they don't weed? The return from the limited research resources[9] can be improved by the following practices:

a. Stating conditional clauses that would indicate what to do under circumstances different from those originally envisioned in the recommendation. These deviations could be attributable to the farmer, weather conditions, lack of availability of some of the technological components, and other such circumstances. Included in the conditional clauses are possible variations such as the following: a recommended stepwise approach to the adoption of the different components of the package, suggesting a number of options for the farmer to pursue. These strategies result in widening intervention possibilities. It is particularly important to develop a range of options in more ... farming areas.

b. Including targeting information, showing under what technical and socioeconomic conditions the technology being recommended would be most applicable.

In recognizing the diversity of farmers, farming systems research can help in developing non-blanketed, targeted, and conditional clauses for proposed improved technologies. In doing so, it can potentially improve the multiplier effect of the limited research resources by providing a technology that is appropriate to more farmers.

Deciding when a technology is ready for recommendation is an important consideration when attempting to maximize the return from limited resources. Experiment station researchers are understandably conservative in making recommendations,[10] while extension staff are also justifiably anxious that recommendations are forthcoming on a regular basis. Farming systems workers interacting directly with farmers may find some technologies being accepted by farmers before they are officially approved as recommendations. This creates a dilemma. Obviously the best test of the relevance of a technology is adoption. However, since farming systems researchers work with relatively few farmers, it is important that the recommendations are formulated at the earliest possible opportunity to maximize their impact on the farming population. Because of limited research resources and various interest groups, devising interim best-bet recommendations, based on the best knowledge currently available to the research scientists, can be justified. A proviso should be included that these recommendations can be modified in the light of knowledge obtained later. (There is an inherent danger in doing this especially if an interim recommendation has any possibility of adversely affecting the environment or farmers' welfare. However, if the appropriate interested parties are brought together, it should be possible to avoid drawing up such inappropriate recommendations.)

Maximizing the return to limited resource funding also implies improving linkages between research and extension to avoid duplication of efforts. Such linkages become particularly important in the field away from headquarters. They can involve activities such as discussions on work programs; joint field days; and collaborative work including trials, joint training programs, and joint programs at agricultural shows.

3. *Farmer participation.* In the late 1960s, increasing numbers of researchers accepted that farmers could contribute substantially to the identification, development, and evaluation of relevant improved technologies. This increased revitalization provided a major impetus for advocating the farming systems approach which involves responding to the felt needs of farmers.

Simmons (no date) has defined three relationships between researchers and farmers: investigator-subject, collaboratŏr-participant, and teacher-learner. Many of us have been guilty of treating the farmer as a research subject or of acting only in a teacher mode. The ideal relationship is to act in a collaborative mode with farmers who participate directly in the research process. Participation goes far beyond simply contributing labor and land. Farmers must also provide verbal feedback on the wisdom or foolishness of suggested on-farm trials—including trial design.

Although most of us would agree that farmer participation in the research process is important, we are not very good at making sure that this takes place. Recently, this issue has come under increased scrutiny. In part, this was stimulated by criticisms that farming systems workers were increasingly failing to incorporate farmers into the research process (Chambers and Jiggins, 1985). As a result, a burgeoning literature has developed on this subject.[11] The search for cost-effective ways of incorporating farmers into the research process continues. *Sondeos* (rapid rural appraisals), farmer-implemented and farmer-designed trials, farmer field days, and workshops have become part of farming systems programs. In Botswana, we have recently made extensive use of farmer groups designed to increase the role of farmers in technology design and assessment.[12]

Although the move to greater participation of farmers in the research process is fully justified, it is important to recognize four issues that can arise from increased emphasis in this area:

a. Increased farmer participation implies the need for greater skills in verbal communication. This is an area in which technical and social scientists—apart from sociologists and anthropologists—have received little or no training.

b. There is likely to be increasing emphasis on "soft" data (qualitative and possibly subjective) rather than "hard" data (quantitative and usually objective). This makes results less acceptable to experiment station based-scientists.

c. Complete submission in responding to the felt needs of farmers could be deleterious to society, for example, by increasing inequalities in the society, accelerating ecological degradation, etc. It could also unnecessarily limit the opportunities available to farmers, since they may only articulate those needs they think researchers can address.

d. Increased farmer participation implies a constructive interactive relationship between farmers and researchers. This raises the possibility of biases in the selection of farmers involved in the research process. Are technologies evaluated by such farmers equally valid for those farmers with similar characteristics who did not participate in the research process?

Incorporating Societal Goals

The primary objective of farming systems research is to improve the well-being of individual farming families by increasing the overall productivity of the farming system. This is done in the context of both private and societal goals, given the constraints and potentials imposed by the determinants of the existing farming system. There has been much less success in incorporating societal goals. Three reasons for this follow.

a. As discussed earlier, the primary effort of farming systems work has been to respond to the "felt" needs articulated by farmers. The closer farmers are to the survival level, the more likely such needs will be those that must be fulfilled in the short-run (e.g., producing enough food to survive until next year). As a result, they will be less concerned about environmental degradation in the long-run, and other such issues.

b. Generally there is a short-run focus to much farming systems work. This is in contrast to a long-run orientation in which societal impacts become more crucial. This, combined with the methodological complexity of incorporating societal evaluation criteria, and the time required in deriving such societal impact evaluations, has limited the role of farming systems work in this area. Emphasis in this area has largely been confined to subjective *ex ante* evaluations. Such evaluations influence choices in problems to work with and the solutions to be advocated.

c. Most farming systems work, due to its institutional affiliation, tends to concentrate on the development of relevant improved technology. It is possible to develop technologies that do not have a negative impact on the environment—particularly the agroecological environment and, to a much lesser extent, the socioeconomic environment—in the equitable distribution of benefits. However, it is the implementation of relevant policy/support systems that plays an even more important role in making sure societal goals are fulfilled.

It is important to bear in mind that what is done now by the current generation of farmers has a bearing on what is potentially possible in the future. A primary example of this is the issue of environmental stability, recognizing the negative impact of environmental degradation on the livelihood of future farming families and possibly on the whole society.

Because of low production and a high demand for agricultural products, tremendous pressure is now placed on the agricultural sectors of many African countries. However, current adoption of technologies and implementation of support programs can have either negative or positive influences on environmental stability. Technologies developed by researchers are being screened *ex ante* for their possible environmental impacts. There is explicit concern for conserving the productivity of the soil. However, both technologies and policy support systems must be designed to have a positive impact on environmental stability in the future. These policy/support systems should foster the idea that if something is taken out of the land to encourage production something else must be put in to sustain future land productivity. For example, in Botswana two development programs provide incentives for destumping to improve the efficiency of the plowing operation. This could have a negative impact by encouraging erosion, thus lowering the potential of the land in the future. A constructive policy would encourage destumping along with a program to encourage planting of windbreaks, living hedges, and other such things. It is essential to bring about convergence between private short-run interests of farmers concerned with attaining an adequate standard of living and the long-run societal interests of maintaining the environment for future generations.

As suggested above, the closer farmers are to the subsistence level the more concerned they are with survival, and the less concerned they are with maintaining environmental stability for future generations. Therefore, conservation measures by themselves are unlikely to be very attractive to most limited resource farmers. Rather, implementation will require a high degree of subsidization, or the use of the "carrot and stick" approach which requires farmers to participate in a specific conservation practice if they are to benefit from programs designed to stimulate production. Production need not be undertaken at the expense of conservation, as long as people responsible for developing technologies and policy support programs take conservation into consideration.

Donor funding is increasingly being devoted to the issue of land sustainability and researchers—including farming systems researchers—are increasingly being asked to address the area. Can farming systems research also incorporate such considerations, given the limited research resources available and all the other demands being placed on it? This is still an open question. The answer will depend, in part, upon institutional support of the issue.

Conclusions

Obviously, farming systems research has undergone evolutionary change since it developed in low-income countries. Changes are still taking place and will continue into the future. Table 3 delineates changes that have occurred, are now occurring, and are likely to occur in the future. Not all of these changes are desirable. However, they reflect the results of the interaction and pressures placed on farming systems work by different interested parties. Most of these changes have been alluded to in this paper. They, in turn, point up some of the dilemmas faced in farming systems work and hence the difficulty of obtaining credibility. The pressure for accountability in farming systems work has increased.

Accountability has been hindered because it is virtually impossible to quantify conclusively the contributions of farming systems research to small farmer development. The following reasons have been cited (Baker and Norman, 1989):

a. The complementary nature of station-based research and farming systems research.

b. The fact that adoption of technologies depends on a wide range of circumstances, e.g., the performance of support systems.

c. The fact that the farming systems approach encompasses both technology change and institutional change results of which can take 10-25 years to materialize.

Table 3. *Evolution of the Farming Systems Approach*

Characteristic	1970s to Early 1980s	Adjustment by Mid 1980s	Further Adjustment
Increasing Trends to Continue Support system perspective Extension linkage Area development mandate Work through channels	LESS	MORE	MORE
Increasing Trends Subject to Reversal Feed-up research priorities Emphasis on farmer first Sub-RDs within ecological zones Baseline diagnosis	LESS	MORE	LESS
Decreasing Trends to Continue Implemented by isolated teams Rely on donor funding Emphasis on quick turnaround time Dominated by expatriates Focus on private profitability	MORE	LESS	LESS
Decreasing Trends Subject to Reversal Focus on equable areas Predetermined commodity focus Feed-down from technical research Researcher managed trials	MORE	LESS	MORE
Trends Yet to Begin Focus on adoption rates Focus on social profitability (sustainability) Inclusion of macro-analysis	LITTLE	LITTLE	MORE

Source: Altieri and Hecht, 1989.

Even in the absence of such quantitative benefit-cost ratios, farming systems work is becoming a regular component of research programs in many different countries, as two recent global surveys have shown (Merrill-Sands, Ewell, Biggs, and McAllister, 1989; Frankenberger et al., 1989). Farming systems research is here to stay, although its viability will depend on the credibility it achieves and the related issue of accountability.

Notes

1. The opinions expressed in this article are personal and do not necessarily reflect those of the Department of Agricultural Research, Botswana.

2. Some of these factors, which are discussed elsewhere, include educational elitism, the desire to maintain the *status quo* on the part of existing personnel, institutional rigidity, evolving methodology of farming systems work, and a lack of expertise in farming systems work (Poey, 1986; Fresco and Poats, 1986).

3. Understandably the strongest linkage for the farming systems team is with others in the institution in which the team is located. Apart from some francophone countries, such teams are usually located within research institutions—the assumption made in this paper. Thus, it is not surprising that the major thrust of farming systems research has been in the area of technology and not policy/support systems, as in some francophone countries where farming systems teams are sometimes associated with development projects (Fresco, 1984).

4. If station-based researchers don't understand the differences, this will convince them that the experimental procedures are poor, and hence give rise to their concern about high coefficients of variation which often result. This is because it is virtually impossible to ensure standardization in nonexperimental variables (*ceteris paribus* conditions).

5. Another client that, over time, is likely to be less significant, is the donor agency. Much farming systems work in low-income countries is financed by donor agencies. By its very nature, the donor agency needs quick results from its contributions. However, much of the credibility of farming systems work within national programs derives from a longer term perspective than that acceptable to a donor agency. There are obvious legitimate reasons why donor agencies need quick results. However, it does provide a potential conflict with making satisfactory and sustainable progress within national programs. In such programs, changes are more likely to be acceptable if introduced slowly on the basis of dialogue and agreement, rather than on the basis of quick decisions and sharp conflicts.

6. This implies that limited resources were mainly responsible for the difficulty of absorbing farming systems research. However, even if credibility is achieved, a recent study concluded that incorporation was often limited because those responsible were not very familiar with the special organizational and managerial requirements of farming systems research (Merrill-Sands, Ewell Biggs, and McAllister, 1989). Examples of issues that need consideration are the interdisciplinary nature of farming systems research, the high ratio of variable to fixed costs of farming systems research compared with experiment station-based research, an appreciation that the methodology for farming systems research is still evolving, and other such issues.

7. The significance of this relationship becomes critically important in thinking through, for example, whether RMRI trials should be carried out on the experiment station (e.g., if the pest or weed complex is very different from farmers' fields), considering setting some magnitudes of experimental variables at levels realistic for farmers to consider adopting, setting nonexperimental variables at levels farmers can reasonably expect to achieve, using evaluation criteria appropriate to farmers; these criteria may be different from the usual one of return per hectare, etc. (Baker and Norman, 1988).

8. Admittedly, although the relationship between on-station and on-farm research is, as a result, not a "mutually exclusive" or "uneasy" one, it is likely to be "leading-supporting" (Simmons, no date). Although some farming systems practitioners might find it difficult to accept such a relationship, I believe that Simmons is quite right in concluding that this type of relationship is likely to have the biggest pay-off in the long-run. However, it is important to ensure that in such a relationship, on-farm RMRI work is not emphasized at the expense of work at the RMFI and FMFI levels.

9. See also discussion by Byerlee (1986) on prescriptive and auxiliary information.

10. Optimum recommendations drawn up after many years of work on the experiment station will, in fact, given the heterogeneity within the farmers' environment, not be optimal for most farmers.

11. Particularly useful references on this subject are Chambers, Pacy, and Thrupp (1989); Farrington and Martin (1987); Ashby (1987); and Lightfoot (1986).

12. These groups have also proved to be efficient in reducing time and logistical costs, in providing a good forum for station-based researchers and extension personnel to interact with farmers, in ascertaining farmers' interest in interventions that do not necessarily address the most critical constraint or enterprise but can improve overall farming system productivity (non-leverage interventions), in decreasing the necessity to tightly specify recommendation domains since farmers choose the technologies they wish to test, in improving farmer-to-farmer dialogue on the merits of the technologies they are testing in a forum where researchers are present, etc. (Norman, Baker, Heinrich, and Worman, 1988).

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Identification of Results of Farming Systems Research and Extension Activities: A Synthesis

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Purpose of the Study

The purpose of this study was to review, analyze, and document the results of Farming Systems Research and Extension (FSR/E) projects/programs that have been implemented worldwide. Funded by the U.S. Agency for International Development, Bureau of Science and Technology, Office of Agriculture, the study focuses on the factors that affect sustainability of FSR/E within national agricultural research and extension systems. It seeks to determine the degree to which externally-funded FSR/E projects have assisted in institutionalizing the FSR/E approach into these systems, and the extent to which governments will support these activities. The study relied on field case studies in Indonesia, Guatemala, Botswana, and Costa Rica, and a secondary review of FSR/E programs. Key topics addressed