



CDIE WORKING PAPER NO. 112

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

Case Study No. 5

Senegal Agricultural Research and Planning Project (685-0223)¹

by

Kerry J. Byrnes²

Center for Development Information and Evaluation
Agency for International Development
Washington, DC 20523

¹This CDIE Working Paper is one of the 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). The 12 FSR/E projects reviewed in this series are:

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 any of the CDIE Working Papers this series is provided on the last page of this report.

²Senior Social Science Analyst, Program and Policy Evaluation Division, CDIE. This case study, prepared under a CDIE contract with Labat-Anderson Incorporated, is based on a review of project evaluation documentation. Interpretation of the data reported is that of the author and should not be attributed to A.I.D. or Labat-Anderson Incorporated.

Senegal Agricultural Research and Planning Project (685-0223)

The Senegal Agricultural Research and Planning Project (SARPP), conceived as the first phase of a long-term (10-15 year) institution building effort, is part of a joint donor program to reorganize and regionalize the agricultural research of the Senegalese Institute for Agricultural Research (ISRA) of the Government of Senegal (GOS).

USAID/Senegal prepared the Project Identification Document (PID) for SARPP in November/December 1979, and the PID was approved in February 1980. Michigan State University (MSU) was chosen in August 1980 as the technical assistance (TA) contractor under A.I.D. Collaborative Assistance Selection Procedures.

A design team prepared the Project Paper (PP) from December 1980 to April 1981. The design team was comprised of a prominent African farming systems practitioner (David Norman), about 5 agricultural economists, and a political scientist concerned with problems of agricultural development and research.

SARPP was authorized in mid-1981, as a five-year project, for \$4,950,000. However, the original TA contract with MSU eventually ran six years from December 1981 to December 1987. The TA contract totaled \$4.87 million. USAID/Senegal provided an additional \$500,000 (approximate) for short-term training in-country and in the U.S, international travel and seminars for Senegalese researchers, and support personnel. Another \$4.75 million in PL 480, Title III funds was managed by ISRA and used to finance all in-country research program costs. Additionally, other bilateral and regional A.I.D. projects were contributing approximately \$10,000,000 in foreign exchange and local currency.

The MSU-USAID/Senegal contract was signed in December 1981, with implementation being the responsibility of ISRA. The original TA team included a rural social scientist (Team Leader), a production systems economist, and a macroeconomist; a second production systems economist and a second macroeconomist subsequently joined the TA team. The project was amended in 1984 to expand the TA team to include an expatriate production systems research agronomist. The first MSU representative began working full-time with ISRA in April, 1982; the first macro-economist (Cereals Marketing) arrived in Senegal in July, 1982.

SARPP was evaluated once in July 1985, at the end of the third year of contract activities (St. Louis, et al., 1985). The evaluation was a "threshold decision evaluation" to assist USAID/Senegal in its design of follow-on support to agricultural research in Senegal. In addition to this evaluation, the present case study draws on recent information on SARPP provided by MSU.

Concept - What was the basic technical idea underlying the project?

According to the PP, SARPP's goal was: "To increase the capacity of the GOS to more effectively plan and evaluate agricultural development policies and projects." The project's purpose, as identified in the PP, contained three sub-purposes:

1. "To develop Senegalese agricultural research capacity through in-country, third country and long-term overseas training and through participation in the design and execution of production systems research and macroeconomic research programs."
2. "To carry out macroeconomic research on food, nutrition and agricultural policies...to provide guidance to policy makers on economic and institutional constraints on agricultural production and marketing with emphasis on the food grain subsector and food security."
3. "To assist in organizing and carrying out production systems research in major ecological zones in order to identify social, economic, technical and institutional constraints on present farming systems and develop improved technical packages which are biologically stable, privately profitable and socially acceptable."

It should be emphasized that this case study focuses only on the FSR/E component of the SARPP project. Also, the project did not use the term "farming systems research" (FSR) but rather "production systems research" (PSR). The term

'production systems research' is a direct translation from the French. After unsuccessfully trying to identify a good French translation for 'farming systems research,' the project design team decided to go the other way and translate the French term 'recherche sur les systemes de production' into English (Jim Bingen, personal communication).

PSR has been defined as "all data collection and analysis activities associated with the resources applied to crop and livestock activities as well as off-farm 'productive' activities (i.e., labor migration)" (St. Louis, et al., 1985:29).

PSR, like FSR, involves a series of research phases which the evaluation (St. Louis, et al., 1985:Annex 6.II) outlined as follows: (1) description of research area and zoning; (2) definition of production constraints and prioritization of research to relieve constraints; (3) field testing of technologies and/or management practices; (4) evaluation of technologies and/or management practices, and identification of appropriate technologies/practices to relieve production constraints; and (5) recom-

mentations and pre-extension. As the evaluation noted: "The research phases and their associated activities are the standard 'modus operandi' for PSR teams in Senegal and they follow the accepted practices of production systems research as they have thus far been developed" (St. Louis, et al., 1985:29).

Thus, the approach of PSR is to analyze farmer production systems and their environments, to identify constraints and prioritize them for research, to experiment with and evaluate with farmer participation solutions responding to identified constraints, and to participate in the extension of identified technologies through local development organizations (Sall, et al., 1982; cited in St. Louis, et al., 1985:31).

The "ultimate criteria" for deciding upon the adequacy of PSR is the farmer's acceptance of PSR-generated recommendations that are "environmentally sound, extendable by development authorities, culturally acceptable, and most important, relevant to the goals and resources of the target group, farmers" (Bernsten, 1985; cited in St. Louis, et al., 1985:31). In the view of the PSR practitioner, PSR "has completed its mandate when it has either a) been successful through demonstration of new technologies and management practices to improve farmers livelihoods and such technologies have been adopted by farmers or b) developed and evaluated technologies or management practices are recommended to extension services" (St. Louis, et al., 1983:31).

SARPP was to play a major role in PSR in support the World Bank program to regionalize agricultural research in Senegal. However, SARPP's project director expressed reservations about the Bank's schedule for this decentralization process.

The World Bank's implementation schedule unwisely assumes that ISRA has the capacity to launch Production Systems Research in year one in five regions. The Bank's strategy can be described as a "crash" approach. The Bank's proposed implementation schedule should be modified for the following reasons:

- o A push to launch five PSR teams will rely too heavily on expatriate scientists...;
- o There is no standard methodology for PSR which can be adapted for crop and for livestock systems research. Livestock systems research is in its infancy...;
- o ISRA does not have the logistical, budgetary, and computer capacity to launch five PSR teams in year two; and

- o A revolutionary approach overplays the role of the PSR Department as the lead department. The dialogue between the PSR Department, the Crop Production Department (CPD), and the Livestock Department (LD) must be pursued in an evolutionary fashion and a year spent in establishing this dialogue will not be a year wasted... (Eicher, 1982; cited in St. Louis, et al., 1985:7-8).

By contrast, SARPP's design aimed at developing the foundation for a PSR program in Senegal.

Design - How was this basic technical idea translated into a project?

SARPP was designed to be a part of multi-donor financed program to decentralize and strengthen the research activities of ISRA within a 10- to 15-year period. SARPP's operational objectives were:

1. To strengthen the organization and operation of ISRA in order to be responsive to the needs of different marketing systems and ecological areas of Senegal;
2. To introduce farming systems research in the four priority regions;
3. To establish long-term manpower planning and training for professional and technical staff and improve personnel management policies and procedures;
4. To strengthen the research on production economics, marketing, and human resources;
5. To strengthen the capability for evaluation and application of new technology and incorporate this new technology into extension work; and
6. To strengthen linkages with external assistance organizations including the International Agricultural Research Centers (IARCs).

SARPP's design provided for a TA team PSR economist in the Casamance and in a second area. Each PSR team, the composition of which had been identified in the World Bank project appraisal report (Jim Bingen, personal communication), was to include a PSR agronomist, economist, rural sociologist, research/extension liaison specialist and possibly a livestock specialist. Other specialists would be added as necessary.

Further, SARPP was to provide support for a Central Systems Analysis Group (CSAG) in a decentralized and independent PSR Directorate in Dakar. CSAG was to coordinate the work of and provide conceptual support to the regional PSR teams, to serve as a clearinghouse for information on PSR in Senegal, and to help address research/extension links.

The SARPP design also provided for the formation of a Bureau d'Analyse Macro-Economique (BAME) within ISRA. At the time of the evaluation, BAME reported to the Director General of ISRA; however, BAME's Director was also the Director of the Production Systems Department. BAME was to build upon research produced by the regional PSR teams and to develop sectoral-level analysis and policy recommendations.

The PSR component and BAME were intended to be closely dependent on each other for a two-way feedback mechanism. According to the Project Paper, the BAME "would analyze policy and institutional constraints on the agricultural sub-sectors and develop recommendations for agricultural policy changes." (St. Louis, et al., 1985:6).

Expatriate TA specialists were to include a rural social scientist/Team Leader (5 person years), production systems economist/Casamance (5 years), macroeconomist in BAME (5 years), macroeconomist in BAME (3 years), research associates (9 years), consultants (30 months), and a computer program development specialist (18 months). SARPP was amended in April 1984, to add a PSR agronomist (21 months) to the TA team.

In 1984 ISRA requested that USAID fund the services of a PSR agronomist to be assigned to the PSR department in Dakar as a national advisor/coordinator to PSR programs. When the project was designed it was envisioned that Senegal would provide someone for this position, however, during project implementation it became apparent that ISRA did not have a senior level researcher experienced in PSR who could assume these duties (A.I.D., 1984).

USAID/Senegal provided project funds for TA, operating expenses, and short- and long-term training. PL 480 Title III Program funds for the project were completely administered by ISRA, through the Ministry of Economy and Finance (MEF). These funds were used to cover field operating costs and contractor logistical support (i.e., housing, furnishings). But during project implementation, several factors made timely provision of adequate levels of Title III funds impossible. Specifically, sales of rice were proceeding slowly and sufficient funds were not being generated to support all Title III activities at required levels. Consequently, the April 1984 project amendment authorized the TA contractor to pick up all housing and furnishing costs for its TA personnel from contract funds.

Implementation - How was the project managed by the host-country implementing agency, the TA team, and USAID?

By the evaluation, SARPP had helped to establish, with varying degrees of success, a Production Systems Research (PSR) program in three agro-socioeconomic regions. Variation could be observed in the sequence of implementing the phases of PSR. This variation was due, in part, to the existence of previous agricultural research efforts and their quality, the different characteristics of each region's environment, and access to resources to carry out a PSR program. In retrospect, it may also be argued that the

sequential establishment of the three PSR programs was related more to personnel matters than to any of [these] factors.... The teams were launched as research scientists returned from training or were recruited by ISRA (Jim Bingen, personal communication).

At the time of the evaluation, the Basse Casamance program was the most successful in terms of quantity and quality of data collected, technical studies undertaken, on-farm and on-station trials, and links with other research projects. The Fleuve and Sine Saloum programs had made less progress but were moving forward.

In Basse Casamance, the PSR team was originally comprised of two agricultural economists and an agronomist. The TA contractor provided this team with a senior agricultural economist and short-term TA for computer programming and software improvement. The team's senior agronomist was provided by the USAID/Basse Casamance Development Project being implemented by SECID. The GOS provided the second agricultural economist. By the time of the evaluation, the Basse Casamance PSR team consisted of the original team plus a third economist, a second agronomist, an animal scientist, a farm machinery expert, and a sociologist.

Based on the PSR team's early data collection and analysis work in Basse Casamance, five agro-socioeconomic zones were established. The guiding principle was to "identify major production systems in which a description and analysis of their operations would permit a definition and experimentation of technological packages which would be economically viable and socially acceptable" (Sall, et al., 1982; cited in St. Louis, et al., 1985:34). Three criteria were used to establish zones: type of labor organization (division of labor by crop and by activity), importance of animal traction, and importance of upland crops versus aquatic rice.

The PSR team was considering further precision based on the management and type of livestock present in each zone. However, 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 PSR field costs, pose logistical problems, and make it difficult for extension services to provide specific technology packages over a larger area.

Based on zoning and associated data collection and analysis, the PSR team chose four primary research themes. Two themes were diversification of the cropping system by introducing a late seeded crop (e.g., cowpea) that would not compete for labor required by the existing cropping pattern; and planting of a relay crop (sweet potato) to take advantage of residual moisture. The evaluation found these themes to be relevant to the major constraints facing farmers: labor shortages, continuing loss of rice lands (caused by a falling water table in higher rice land or by salt intrusion into mangrove swamps in the case of low lying rice land), and overall decreased agricultural production. The evaluation noted that a potentially important future theme could be the control of soil erosion if the current trends of population growth, increases in livestock, and adverse climatic conditions (drought) were to continue.

It is interesting to note that sample sizes in Basse Casamance, decreased over time, resulting in a reduction in the amount of data collected. This was not an arbitrary decision. Initially,

a larger number of sample households was justified...to gauge the variability among compounds in each zone. At the end of the first year, the PSR team carried out a statistical analysis of...major economic variables across households and decided that enough similarities existed to allow a decreased volume of data collection effort in the second year (St. Louis, et al., 1985:37).

The trend to smaller sample size and a tightening of the research focus continued into the 1985-86 program, with data collection focusing on information required to monitor major constraints. The evaluation found the PSR team's approach to data collection to be sound on two counts.

First, it forces the team to focus in on major questions of importance and to attempt to define solutions which can be immediately tested.... Second, the decrease in data collection means that less data needs to be stored, processed, and analyzed, thereby saving both time and money. Given limited resources, there is too great a risk that too much data will be collected and, even if representative, will never get analyzed (St. Louis, et al., 1985:37).

Nevertheless, the required analysis task was formidable. This

led the evaluation to recommend 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. However, such an approach would have been totally contrary to the project's institution-building objectives and was never adopted. Further, the evaluation recommended more socioeconomic analysis of past and ongoing on-farm trials (e.g., considering the impact of changes in estimated costs and returns for a particular farm model); this recommendation was adopted.

In two regions, Basse-Casamance and Fleuve, the PSR teams had implemented on-farm and on-station farm trials to test technology and resource management packages. Some promising new technologies had been identified, some of which had already been adopted by farmers. Also, some new production techniques that were tested had been rejected as inappropriate to farmer circumstances. The evaluation noted that the progress of the PSR teams in developing cropping pattern recommendations based on field trials for each of the five zones had taken a longer time than on the basis of on-station trials due to erratic rainfall, micro-variation in topography, and ethnic heterogeneity.

The evaluation observed that farmer participation had been significant only in the Fleuve region.

Farmers were contacted in advance of the on-farm trials to discuss their problems in a series of triparty meetings (farmers, extension agents, PSR). 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 for participating and were compensated where yields were below normal (St. Louis, et al., 1985:46).

Close linkage of the PSR program with the BAME and the CSAG had been established in two regions. Linkages between the PSR programs and other development and extension programs in Senegal varied. The evaluation recommended that more frequent meetings of PSR teams with extension would serve to introduce new findings that could be used to update extension technical materials. The evaluation also recommended that future PSR on-farm verification trials be jointly implemented by PSR and PIDAC (Interministerial Project for Agricultural Development in the Casamance).

The project was instrumental in assisting ISRA researchers to acquire and develop skills in using computer facilities. Two of the three PSR teams had access to appropriate microcomputer software. Further, the teams had developed the necessary skills in using data recording instruments, surveys techniques, and other tools for data management and analysis; as a result, the

project had gained experience in effectively 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 some...constraints to the production systems (St. Louis, et al., 1985:73).

Progress in Fleuve, due to a later start, had not been as great, while Sine Saloum had been seriously hampered because of a less adequate team structure (no one from the contractor's TA team had been permanently assigned to the PSR team in Sine Saloum). Also, the Sine Saloum team did not have any computer capacity due to the lack of facilities to house a computer.

Looking across the three PSR sites, several factors were jeopardizing continued successful implementation of data collection and analysis. First, in collecting data on the microeconomics of production systems, the PSR teams had used Farm Management Package (FARMAP) forms and open-ended questionnaires. However, FARMAP's "complexity... demands a high level of training and experience which precludes its use by other than [the contractor's TA] team members" (St. Louis, et al., 1985:72). Second, there was a debate on the importance of precision versus timeliness of research findings. While research can obtain greater precision by allowing more time for analysis, extension may not receive research results as quickly as would be desirable. Third, because the Sine Saloum region was not using FARMAP, there was a lack of complementarity in data collection and analysis between PSR regional programs making it difficult to compare results.

Several constraints particularly hindered the project's implementation. These included:

- Chronic lack of liquidity within ISRA to meet operational expenses and salaries for the research and secretarial staff; indeed, in the face of this constraint, the Basse-Casamance sub-project had to seek alternative funding;
- Limited absorptive capacity of ISRA for new disciplinary research approaches; indeed, the evaluation identified that SARPP needed Senegalese researchers with training beyond the Master's degree level who can eventually take on the conceptualization role being carried out by the expatriate TA team;
- Limited managerial capacity at ISRA;
- Logistical delays encountered in setting up space and

infra-structure support;

- Logistical delays and difficulties encountered in establishing field survey teams for primary data collection;
- Weaknesses in the process of selecting candidates and/or establishing credentials for training; and
- Rapidly changing parameters of Senegalese agriculture (e.g., drought, rising input prices and food import bill and/or changes in institutional roles and operating mechanisms).

The majority of these constraints reflected basic administrative and financial difficulties within ISRA.

The project's design did not provide for the TA contractor to retain financial or personnel management responsibility over the resources allocated to the implementation activities associated with the PSR teams. For example, the TA contractor was not the sole source of TA to any of the regional PSR teams (Basse Casamance, Fleuve Senegal, and Sine Saloum) functioning at the time of the evaluation, the teams being made up of different combinations of TA contractor, Senegalese, and other donor researchers. Also, the CSAG, within the PSR Directorate in Dakar, was likewise not completely staffed by the TA contractor. Similarly, the funds to meet expenditures for PSR field research were generally provided from PL 480 Title III receipts which were controlled by ISRA and the MEF.

To a certain extent, these conditions were in line with the project's institution-building objectives. Further, it may be correct to say that these conditions reflected "international cooperation" and flexibility in mobilizing funding from various sources. However, one may raise the question of whether these conditions may have aggravated rather than alleviated the various constraints that were encountered in the course of implementing the project.

However, the evaluation found that the progress of the PSR program had been favorably influenced by links with Senegalese and international research entities. These links had served to facilitate the coordination of a variety of research, extension, and training activities. However, all of the PSR teams had encountered problems related to the lack of sufficient human and financial resource to implement their programs. Thus, the evaluation noted that "the lack of funds at the field level has delayed the progress of the PSR field programs" (St. Louis, et al., 1985:xv). Further, the evaluation found that day-to-day coordination of field-level PSR activities had not been carried out efficiently, especially between PSR staff and parastatals and between PSR staff and international agencies.

The CSAG was supposed to coordinate the work of the regional PSR teams and establish a "coherent national work plan." Also, the CSAG was to "provide...conceptual support to the regional PSR teams, serve as an important clearinghouse of information on PSR work in Senegal and help address research/extension links" (St. Louis, et al., 1985:50). While the evaluation noted that there was a legitimate role for the CSAG, it also noted that:

There have been differences of opinion between CSAG members and PSR team members on both operating and research procedures. These differences of opinion are probably healthy in the long run as long as the individuals in both groups are convinced that a systems approach is necessary. Among some researchers in both groups (not [the contractor's TA team] persons), there is the impression that not all persons are completely convinced of the systems approach. Consequently, the PSR teams get "mixed signals" from the major CSAG support group which is supposed to help them understand what systems research is. All too often, the non-[TA team] people only concentrate their time and efforts on their disciplinary counterparts on the PSR teams.

This problem raises a fundamental question. How can the CSAG be responsible for assisting in the conceptualization of PSR programs if CSAG members cannot agree among themselves what PSR is or have differing opinions as to its validity (St. Louis, et al., 1985:51)?

Evaluation - How was the project's performance measured or assessed?

The evaluation noted the difficulty of trying to evaluate SARPP when the project is part of a long-term effort to decentralize and strengthen ISRA's capacity to carry out agricultural research. When SARPP was initiated, there was a sense

that some of its components might be difficult to evaluate. For example, because of 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. Also, an interim benefit/cost analysis, evaluating impacts in terms of net social benefits and net social costs, might not be the most appropriate technique to use. The members of the [evaluation] team monitoring the end of the first phase found this to be the case since the...project components are not revenue-producing in nature. It is, therefore, inappropriate to analyze them from a strictly economic viewpoint (St. Louis, et al., 1985:2).

The evaluation noted that SARPP established research procedures to identify agro-socioeconomic zones and to define major on-farm production constraints. The PSR teams completed exploratory surveys, zoned production systems, selected sample villages and households, and defined on-farm research themes to a greater or lesser degree in each region. The collection and analysis of data were found to be of high quality and adequate for the particular research phase of each PSR team. Here the evaluation stated:

The type of data collection and farm management analysis being carried out by PSR teams are very useful for screening and evaluating technologies for making recommendations to farmers and/or extension agencies. Research conducted from original data collected through a "bottom up" approach is generally timely, practical and objective (St. Louis, et al., 1985:72).

However, the evaluation cautioned that the project should recognize "that doing repetitive surveys is not an end in itself in PSR but only a tool which is and must be complemented with the finding of practical technological solutions to eliminate relevant constraints at the farm level" (St. Louis, et al., 1985:72).

At the time of the evaluation, systematic data were not available on the extent of farmer adoption of project-generated technologies. But the evaluation noted that the PSR team in Basse Casamance and BAME would collaborate during the 1985-86 crop production year to institute a survey on technology adoption (seeds, fertilizers, agricultural materials). As the evaluation noted, there was already some evidence that farmers in both the Basse-Casamance and the Fleuve had spontaneously adopted some technologies and management practices tested on their fields" (St. Louis, et al., 1985:61). Yet the evaluation noted that:

Development/extension practitioners have already expressed some dissatisfaction over the "lack of results", both in the Basse-Casamance and in the Fleuve regions. The dilemma centers around trying to improve farmer production systems as soon as possible while being fairly certain that forthcoming recommendations are solid. By its very nature PSR tries to account for the complexity of a given system and how changes can be expected to influence it. This...puts PSR into an extensive time frame, but...increases the degree of certainty that recommendations can and will be adopted by farmers with a high probability of success. ...

In the specific case of the Basse-Casamance it would appear that only one more year of research work is necessary before formal recommendations are passed on to extension for test dissemination. 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 used in the Basse-Casamance could very well justify the delay (St. Louis, et al., 1985:61).

As a result, a larger number of research reports and working papers were generated, indicating that "a significant amount of research was conducted" (Eric Crawford, personal communication).

While the extent of the project's impact on farmer adoption of improved technology developed by SARPP was not known at the time of the evaluation, it is clear that the project had made significant contributions in terms of strengthening ISRA's capability to conduct PSR. For example, as a former TA team member noted:

one of the benefits of our support to use of microcomputers was that both the analysis of research results and the preparation of reports was considerably speeded up compared to the previous norm at ISRA (Eric Crawford, personal communication).

The mid-term evaluation, written at the end of the third year of project activities, signaled the end of the 'first phase' of the project (Jim Bingen, personal communication). During SARPP's first phase, several "lessons learned" were identified, as follows (St. Louis, et al., 1985:xiv):

- Combining PSR with macroeconomic analysis, carried out by BAME, within the same project, proved to be a good idea since both activities tended to reinforce each other and produce timely and objective results.
- Phasing in the PSR teams gradually had been an effective means to avoid placing excessive strain on available financial and human resources.
- Providing greater attention to the project's training component, both in terms of the quantity of individuals trained and the qualifications and/or background of the individuals selected for training, had been essential to the program's success.
- Being able to compromise between various research methodologies (e.g., single or multidisciplinary research) would be a sine qua non for successful PSR.
- Encouraging farmer participation in all phases of PSR

is crucial for more rapid adoption of new technology packages; and

- Securing intensive, adequate financial and human resources to understand complex production systems and develop prototype technologies to relieve constraints is important in the early years of PSR activities.

Additional information recently became available on the impact of SARPP's PSR component on farmer participation in agricultural research and the contribution of PSR to agricultural development in Senegal. The following summary draws on notes prepared by TA team members (Jim Bingen and Eric Crawford). As a team member stated: "These notes are preliminary, represent our views, and were sent to the Mission at their request to assist them in preparing for presentations at AID/Washington" (Eric Crawford, personal communication).

- In the Lower Casamance, the Agrarian Systems Team works with a farmers' association (CADEF) to develop a collaborative research program which addresses farm-level constraints identified by the association.
- Collaborative trials (essais dialogue's are implemented in response to farmers' requests in the Senegal River Valley.
- A regional development agency's extension program was modified to include:
 - Selected, improved rice varieties tested by an Agrarian Systems Team under farm-level conditions;
 - The promotion of a rice-sweet potato package to improve food production through the maximum use of residual soil moisture; and
 - The adoption of the Systems Team's definition of agricultural zones as one means to adapt and make the "extension messages" more responsive to different farm-level conditions.
- Regular collaboration with "extension agents" occurs to identify research problems and trials, to setup and manage trials and to evaluate and interpret the results.
- Many Agrarian Systems Teams' trials and surveys are designed in response to requests for information concerning the government's proposed agricultural policies and plans.

- Agrarian Systems Department personnel regularly consult with the planning and programming offices in the Ministry of Rural Development concerning the findings and implications of the Department's research for agricultural policy-making and programming.

The TA team also reports impacts of the project on agricultural policy research by BAME:

- With respect to cereals marketing policy for the Casamance:
 - Regional agricultural planning has been adjusted to accommodate research results showing that the region is not a grain export region and that farmers prefer not to sell, but to hold cereals to meet family consumption needs.
 - The limited prospects for maize production have created considerable discussion concerning the appropriate and most effective research and development strategy for the region.
- With respect to cereals marketing policy for the peanut basin:
 - Some of the uncertainty in the application of cereals market regulations, identified by BAME researchers, has been alleviated in order to improve and encourage private sector investment in cereal trading.
 - The use of credit programs which would encourage traders to hold cereals stocks that could be available for purchase and interregional trade during periods of drought and/or short supply are under consideration.
 - The Food Security Commission, in consultation with BAME researchers, adopted an improved system to report producer and market cereals prices.
- With respect to agricultural services and institutions:
 - The government revised the "withholding program" for fertilizer and seed; changes in fertilizer distribution policy to accommodate the use and availability of capital at the farm-level and in response to high risk conditions are under consideration.

- Local cooperatives can contribute to fertilizer and seed distribution, but BAME researchers have recommended a review of the notion of "group solidarity" as a criterion for the distribution and reimbursement of credit through cooperatives or other village level organizations.
- The national study of fertilizer demand and marketing commissioned by the Interministerial Council will benefit from BAME research on fertilizer distribution, farm-level demand, and the economic analysis of agronomic research on fertilizer in Senegal.

Institutionalization - How did the project provide for the implementing agency to develop a sustainable capability to continue to perform the types of activities supported by the project?

One of the ways that the CSAG had tried to cope with the internal differences about PSR as a "system approach" was to conduct a series of workshops. The CSAG attempted in these workshops to introduce or reinforce the concepts of PSR among PSR team members, the CSAG, other ISRA departments, and other development organizations. However, it is not clear

whether or not such seminars increase understanding among different research techniques or whether it has served to polarize basic beliefs on the role of research and how research should be carried out (St. Louis, et al., 1985:51).

A former TA team member recalled that

there were different views of what FSR should be in Senegal. What's the alternative to having seminars to discuss these views and work out a consensus--not talking to those who disagree with you? (Eric Crawford, personal communication)

The CSAG's role in reviewing PSR documentation was cited by the evaluation as being very important to the institutionalization of PSR in Senegal. The evaluation stated

that because PSR is such a new research concept in Senegal and...research results are being disseminated to a wide audience, it is necessary to [ensure] high quality reports and documents which will get read and used. This is perhaps the most effective way to guarantee that the PSR approach will be endorsed and supported after long-term donor assistance is terminated (St. Louis, et al., 1985:52).

However, the evaluation found that the management of the process

of producing documents had been a major constraint. Here the evaluation noted that

because CSAG staffed are over-extended and CSAG has logistical problems (paper, ink, and xeroxing facilities) which have a tendency to turn into major bottlenecks[,] ...the timeliness of getting documents out has suffered long delays. . . . With scarce time and insufficient material resources when they are needed, there have been numerous delays in getting papers out (St. Louis, et al., 1985:52).

Yet SARPP was able to overcome these constraints, with the result that the PSR program produced a large number of reports.

Another indicator of the extent to which staff had become "over-extended" was seen in the range of responsibilities being covered by TA team members. Here the evaluation noted:

The expatriate economist who already has too much work with the BAME is also trying to handle the role of PSR economist. The Senegalese agronomist spends 90 percent of his time on administrative and financial matters. The expatriate agronomist shares his time between CSAG and PSR Lower Casamance. As a result, CSAG cannot concentrate all its time on technical follow-up or in supporting the conceptualization of research priorities in the regions (St. Louis, et al., 1985:27).

Further, commenting on the project's overall scarcity of funds, the evaluation noted that CSAG staff had been discouraged to the point of being tempted to leave the PSR program. At the same time, "staff management and personnel policy problems inhibit productivity because the system of incentives is not designed to reward successful research output" (St. Louis, et al., 1985:53).

At the time of the evaluation, budget estimates for SARPP indicated that approximately 75% of the project's total cost was to be spent directly in support of human resources development and/or professional training. By the end of 1984, 11 ISRA researchers had completed Master's degrees in the U.S. and nine more were pursuing a Master's degree. "The long-term training sub-component of SARPP has 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 project also made important contributions in terms of in-country seminars and workshops and short-term courses at MSU).

In terms of in-country short-term training, project participants had highly rated the training that had been given in the Mathematics-Statistics Training Package (MSTAT), field trial methods, and the PSR approach. However, at the organizational level, ISRA had not yet formulated a long-term manpower planning and training program for its professional and technical staff.

Further, the evaluation team emphasized that ISRA needed to develop personnel management policies and procedures providing incentives that reward research output as the primary determinant of promotion and salary adjustments. Among several issues that needed to be considered, the evaluation noted that any overall plan should provide for procedures that would, in a balanced way and with special concern for PSR, assign research staff among the departments of ISRA (St. Louis, et al., 1985:55).

The evaluation recommended "that the second phase of SARPP be undertaken, without interruption, in direct sequence with the completion of its first phase at the end of 1986" (St. Louis, et al., 1985:xv). However, because the progress of the PSR program had been delayed by a lack of funds at the field level, the evaluation recommended that ISRA's

budgeting, planning and research management systems...be... improved. If...available resources are less than adequate, then it is important that PSR programs be maintained in all zones but that they focus on a narrower range of issues adjusting their priorities to address topics of...importance for each region (St. Louis, et al., 1985:xv).

The PACD for SARPP was eventually extended by one year to December 1987. The contractor's expatriate TA team has since returned home. USAID/Senegal support for SARPP has continued under a non-competitive contract (Agricultural Research II) with Michigan State University for a 2.5 year extension, effective January 1, 1988. This contract provides an "ambitious" training and advisory support program and, it includes three long-term positions: a cereals marketing economist, an advisor to the Director of the Crop Production Research Department, and a research programmer/ advisor to the ISRA Scientific Director.

A project briefing document in mid 1987 noted the following accomplishments of SARPP (document prepared by Jim Bingen; cited by Eric Crawford, personal communication):

- Twenty-one (21) researchers with MSc. degrees; 18 still working with ISRA.
- In-country training workshops (Production Systems Research; On-Farm Agronomic Research; Livestock Research; MSTAT).
- On-going Production Systems and Agricultural Policy

Research at three regional research stations and Dakar (Agricultural Policy only).

- Improved computer facilities and researchers trained in computer use at three regional research stations.
- Operational documentation service in support of research programs (at Headquarters Office and in three regional research centers).
- ISRA Working Paper Series for timely publication and diffusion of research program results; most working papers to be available as joint ISRA-MSU International Development Paper Reprints in both English and French.
- Establishment of Research - Policy-making dialogue with agricultural production agencies and ministry offices.
- Improved communication between on-station and off-station researchers.

More recent information on the institutionalization of the PSR component of SARPP came to light in the drafting of the project's final report. The following draws on notes prepared by TA team members Jim Bingen and Eric Crawford.

- Scientists throughout the Institute accept a "farming systems" or on-farm, client-oriented approach as a complementary research strategy for research planning.
- Some crops research programs systematically incorporate relevant farm-level information or the farming systems typologies proposed by the Agrarian Systems Teams into their research programming.
- Findings from farm-level research are used to identify and to justify crops research planning priorities.
- Financial and material resources have been redirected to on-station rainfed crop research (at Djibe'lor, a station previously oriented toward irrigated rice) in order to respond to farm-level constraints reported by the Agrarian Systems Team.
- Agrarian Systems researchers regularly consult with Crops and Animal Production programs, and with selected IARCs, in order to obtain new technologies to test under farmers' conditions.

- Improved scientific communication and exchange among Institute researchers has been established through the regular publication of research working papers, a quarterly information bulletin and a periodical table of contents bulletin from the Agrarian Systems Department Documentation Center.

Looking back on SARPP, the TA team identified the following "lessons learned" (J. Bingen and E. Crawford, personal communication):

With respect to the project design team:

- Continuity in the design team staff and the translation of key staff into project positions helped to establish a base of mutual trust and understanding between ISRA, MSU, and USAID/Senegal that contributed to the constructive resolution of issues during the early stages of project implementation.

With respect to long-term training:

- In-country selection and screening of proposed MSc. candidates through personal interviews with MSU faculty contributed to the 100% "success rate" of the trainees and to the high rate of return/retention in ISRA following training.
- Contract management helped to assure continuity from the MSc. program to the research program and position in ISRA through regular MSU faculty visits to trainees and their advisors, an occasional newsletter and regular communication with the trainees.
- In-country thesis research encouraged when appropriate and more feasible because of contract management of the training programs; coordinated closely with TA team and ISRA.
- Supplementary post-degree, specialized training planned and financed when appropriate.
- MSU Summer Institutes to provide a common "core" in research methods and data analysis skills to MSc trainees and to meet informally with senior ISRA managers.
- Pre-financing some long-term training ensured that many trainees were able to complete their MSc programs. return to Senegal, and work under the guidance of a senior MSU, French, or ISRA scientist during the life of the project.

- The issue of degree equivalency made a "condition to disbursement."
- No attention had been given during project design to the need for having senior researchers in place in ISRA to advise and work with the returning MSc.-level scientists over an extended period of time. Learned that this was a major oversight in project design; since advisory responsibilities can be very time consuming, the issue has implications for the timing and numbers of researchers expected to return from long-term training.

With respect to technical assistance:

- Requirements: French fluency; previous Francophone Africa experience strongly encouraged; 3-4 year commitment preferred.
- Low profile assignment or secondment to ISRA; MSU faculty assigned first to work in role as a scientist and advisor to ISRA research programs and only second were to be considered as "members of a "MSU team."
- Research Associates fully integrated into ongoing ISRA research programs; fluent French and previous Francophone Africa experience required without exception.
- Support for an on-campus staff to support the training programs and to provide standard logistic and administrative support, but also to be available for professional backstopping such as library searches, bibliographic reviews, and book and document purchases.

With respect to documentation and computer support:

- Development of an applied social science library and document collection for the ISRA Agrarian Systems Department.
- Financial and technical support to encourage and facilitate the use of personal computers at the regional research centers; training in use of several applications provided.

References

A.I.D.

1981 Project Paper for the Senegal Agricultural Research and Planning Project (685-0223). (PD-BAE-227)

1984 Project Amendment for the Senegal Agricultural Research and Planning Project (685-0223). (PD-BAV-474)

Bernsten, Richard

1982 "Mission Report-Summary, Overview, Observations. Senegal Agricultural Research and Planning Project," East Lansing, Michigan: Michigan State University, Agriculture Economics Department, February, 1985.

Bingen, R. James, and Jacques Faye

1987 Agricultural Research and Extension in Francophone West Africa: The Senegal Experience, Reprint No. 13, MSU International Development Papers, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan 48824-1039.

Eicher, Carl K.

1982 "Reflections in the Design and Implementation of the Senegal Agricultural Research Project," MSU/ISRA, Dakar, October 14, 1982.

Sall. S., M. Kamanga, and J. Posner

1982 "Recherche sur les Systems de Production en Casamance," Note Methodologique, Centre de Recherches Agricoles de Djibelor, ISRA, Djibelor.

St. Louis, Robert, C. Franklin Casey, and Kham T. Pham

1985 Mid-Term Threshold Evaluation of the Senegal Agricultural Research and Planning Project (685-0223).

Annex A. Project Description Sheet.

This Project Description Sheet lists the core, operational, and generic constraints identified in this project, per the following codes: core (C), operational (O), and generic (G). A positive (+) sign after a constraint indicates that the project was effectively coping with the identified constraint.³

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

³An 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).

Senegal/ARPP - Agricultural Research and Planning Project
(685-0223)

Initial Authorization: 1981 (for 5 years)

Goal: "To increase the capacity of the Government of Senegal (GOS) to more effectively plan and evaluate agricultural development policies and projects."

Purpose: The project's purpose contained three sub-purposes:

- "To develop Senegalese agricultural research capacity through in-country, third country and long-term overseas training and through participation in the design and execution of production systems research and macroeconomic research programs."
- "To carry out macroeconomic research on food, nutrition and agricultural policies...to provide guidance to policy makers on economic and institutional constraints on agricultural production and marketing with emphasis on the food grain subsector and food security."
- "To assist in organizing and carrying out production systems research in major ecological zones in order to identify social, economic, technical and institutional constraints on present farming systems and develop improved technical packages which are biologically stable, privately profitable and social acceptable."

Outputs:

1. Production systems studies, on-farm trials of improved technical packages for "recommendation domains;"
2. Macro-economic studies of the agricultural sector;
3. Upgraded technical and professional skills for researchers;
4. Expanded collection of socio-economic documents in the Senegalese Agricultural Research Institute's Documentation and Information Service, including the improvement of the documentation in two research stations; and
5. Improved computer capacity for the Production Systems Research (PSR) and macro-economic programs.

Implementing Agency: Senegalese Institute for Agricultural Research (ISRA), Government of Senegal.

TA Contractor: Michigan State University.

Evaluations: One -- in July 1985, at the end of the project's fourth year (St. Louis, et al., 1985).

Constraints: C.2 (+), C.3, C.4, C.9.b (+), O.1, O.4, O.5, O.6, O.6 (+), G.1, G.2, G.3, G.4 (+), G.5 (+), G.6.

HOW TO ORDER REPORTS IN THIS SERIES

This **CDIE Working Paper** is a case study that was 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). A total of 13 case studies were prepared. These may be ordered from the A.I.D. Document and Information Handling Facility, 7222 47th Street, Suite 100, Chevy Chase, MD 20815. Telephone: (301) 951-9647. Please request **CDIE Working Paper No. 112**, followed by the required **Case Study No.** and **PN number**.

Botswana Agricultural Technology Improvement Project (633-0221), CDIE Working Paper No. 112--Case Study No. 1. (PN-ABC-073)

Gambia Mixed Farming and Resource Management Project (635-0203), CDIE Working Paper No. 112--Case Study No. 2. (PN-ABC-074)

Lesotho Farming Systems Research Project (632-0065), CDIE Working Paper No. 112--Case Study No. 3. (PN-ABC-075)

Malawi Agricultural Research Project (612-0202), CDIE Working Paper No. 112--Case Study No. 4. (PN-ABC-076)

Senegal Agricultural Research and Planning Project (685-0223), CDIE Working Paper No. 112--Case Study No. 5. (PN-ABC-077)

Tanzania Farming Systems Research Project (621-0156), CDIE Working Paper No. 112--Case Study No. 6. (PN-ABC-078)

Zambia Agricultural Development Research & Extension Project (611-0201), CDIE Working Paper No. 112--Case Study No. 7. (PN-ABC-079)

Nepal Agricultural Research and Production Project (367-0149), CDIE Working Paper No. 112--Case Study No. 8. (PN-ABC-080).

Philippines Farming Systems Development Project-Eastern Visayas (492-0356), CDIE Working Paper No. 112--Case Study No. 9. (PN-ABC-081)

Guatemala Food Productivity and Nutritional Improvement Project (520-0232), CDIE Working Paper No. 112--Case Study No. 10. (PN-ABC-082)

Honduras Agricultural Research Project (522-0139), CDIE Working Paper No. 112--Case Study No. 11. (PN-ABC-083)

ROCAP Small Farm Production Systems Project (596-0083), CDIE Working Paper No. 112--Case Study No. 12. (PN-ABC-084)

Vignettes of Core, Operational, and Generic Constraints in 12 A.I.D.-Funded Farming Systems Research and Extension Projects, CDIE Working Paper No. 112--Case Study No. 13. (PN-ABC-127)