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MID-TERM THRESHOLD EVALUATION

OF THE

SENEGAL AGRICULTURAL RESEARCH AND PLANNING PROJECT (685-0223)

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LIST OF ACRONYMS AND ABBREVIATIONS

AID	Agency for International Development
BAME	Bureau d'Analyse Macro-Economique
CDH	Horticultural Development Center
CIMMYT	International Center for Maize and Wheat Improvement
CIRAD	Centre International de Recherche en Agriculture et Développment (formerly GERDAT)
CNAPTI	National Center for Application and Improvement of Irrigation Techniques
CPD	Crop Production Department (in ISRA)
CPSP	Price Equalization and Stabilization Board
CREA	Centre de Recherches en Economic Appliquee (University of Dakar)
CRODT	Oceanographic Research Center for Dakar - Thiaroye
CS	Comite du Suivi (Interministerial Group within GOS)
CSA	Food Security Commissariat
CSAG	Central Systems Analysis Group
CTI	Camfister Center (in CROWT)
FAO	Food and Agricultural Organization in the United Nations
FARMAP	Farm Management Package
FSR	Farming Systems Research
FSSP	Farming Systems Support Project (AID)
GERDAT	Group for Studies and Research on the Development of Tropical Agriculture (see CIRAD)
GOS	Government of Senegal
IARC	International Agricultural Research Center
IBRD	International Bank for Reconstruction and Development (see the World Bank [WB])
ICC	Interministerial Consultative Committee
ICRISAT	International Crops Research for the Semi-Arid Tropics
IFPRI	International Food Policy Research Institute
IITA	International Institute for Tropical Agriculture
ISRA	Senegalese Institute for Agricultural Research
IRA	Institute for Research in Africa
ITA	Institute for Nutritional Technology
LD	Livestock Department (in ISRA)
MDR	Ministry of Rural Development
MEF	Ministry of Economy and Finance
MPC	Ministry of Planning and Cooperation
MSTR	Ministry for Scientific and Technical Research
MSTAT	Mathematics-Statistics Training Package

MSU	Michigan State University
NAP	New Agricultural Policy in Senegal
OMVS	Senegal River Bassin Commission
PIDAC	Project Interimaire de Developpment Agricole in Casamance
PSR	Production Systems Research
RDA	Regional Development Agency
SAED	Organization for the Development and Operation of the River Deltas of the Senegal and Falémé River Valleys
SAFGRAD	Semi-Arid Food Grains Research and Development
SARPP	Senegal Agricultural Research and Planning Project
SECID	Southeastern Consortium for International Development
SODEVA	Agricultural Extension and Development Organization
SOMIVAC	Agricultural Development Organization for Casamance
USAID	United States Agency for International Development (see AID)
WARDA	West African Rice Development Association
WB	The World Bank

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EXECUTIVE SUMMARY

A. Background

The Senegal Agricultural Research and Planning Project (SARPP) began in December 1981. This five-year project focused on the development of Senegalese macroeconomic research capacity in support of food and agricultural policy and the development of micro-level production systems research capacity. USAID's larger goal is to increase the capacity of the GOS to plan and evaluate agricultural development policies and projects. SARPP's purposes are:

- o To develop Senegalese macroeconomic agricultural research capacity;
- o To organize and carry out production systems research in major ecological zones; and
- o To carry out macroeconomic research on food, nutrition and agricultural policies to guide agricultural policy makers.

The ISRA/MSU/USAID Senegal project is part of a joint IBRD/French/USAID program to reorganize the ISRA and decentralize agricultural research.

The cost of the SARPP project was estimated at US$ 5 million. Its components were specifically designed in such a way as to define, and coordinate, AID support to ISRA. Other AID support to ISRA includes US$ 5.6 million in local currency under the PL 480 Title III Program (1981-1983), and approximately US$ 10 million from other bilateral and regional AID projects.

Two evaluations were planned during the first five-year phase of this long-term project. This evaluation, conducted at the end of the fourth year of project activities, is a threshold decision evaluation intended to assist the USAID mission in its design of follow-on support to agricultural research in Senegal.

B. Evaluation Purpose, Procedures and Scope

1. Purpose

The purpose of this mid-term, threshold decision evaluation is to provide guidance for future support by USAID/Senegal to ISRA. Crucial aspects of the project which were assessed include:

- o Degree of achievement of SARPP's initial objectives and overall purpose;
- o The validity of the project's original purpose and degree to which that purpose has been modified;

- Progress and achievements accomplished within each major project component;
- Constraints faced and their impact on the major project accomplishments;
- Degree of integration and/or linkages of SARPP with targeted project output users through identification of quantity and quality of linkages established; and
- Specific project outputs (in quantity and quality).

2. Procedure

The evaluation was undertaken in Senegal in July 1985. The evaluation team interviewed dozens of individuals involved with the project as well as University staff, donor representatives and various Senegalese officials. (Annex 10 has a complete listing of persons met.) The primary emphasis of the evaluation was on (1) the degree of progress attained in achieving the major purposes of the project, (2) the impact of project outputs on improving the capacity of individuals and institutions to enhance the quality of macroeconomic policy and (3) production systems research. The evaluation also sought to identify any modifications required to enhance future performance of the project and on any needed change in objectives.

3. Scope

The evaluation deals only with the SARPP project. Although the project represents a major contribution to the expansion of ISRA's capacity for micro and macroeconomic research affecting agricultural policy, it is but a part of a multi-donor effort to strengthen ISRA and improve the performance of Senegal's agriculture sector and food security. Inevitably the evaluation relates to and seeks to judge the effectiveness of the important linkages of the PSR and BAME activities to other departments of ISRA and other Senegalese and international research entities. Its scope is limited, however, to those activities supported by SARPP and carried out within ISRA by BAME, PSR and CSAG. The detailed Terms of Reference for this evaluation can be found in Annex 1.

C. Findings and Conclusions

1. Project Implementation Objectives

The evaluation team found considerable progress in the implementation of the SARPP. Basically, there is no major gap between SARPP's original objectives and the operational objectives that currently guide its work four years into the project. A good foundation has been laid in this initial phase for the long-term (10 to 15 years) institutional-building effort within ISRA.

The SARPP support for the Macroeconomic Analysis Bureau (BAME) has played a key role in launching macroeconomic research as a significant contributor to agricultural policy formulations in Senegal. BAME has served the interests of agricultural policy makers as well as of farmers and consumers by focusing on key issues relevant to Senegal's agricultural goals The short- and long-term training of BAME staff to address complex macroeconomic issues is a major plus for Senegal's drive to improve its agricultural sector performance. However, some problems constrain BAME's optimal performance including limited staff capacity for certain macroeconomic analysis, disagreement over the highest priority research topics, weak linkages between BAME and some other institutions and poor management of limited research (including financial) resources.

The Production System Research (PSR) program is established in three regions with varying degrees of success. The Basse Casamance program has been the most successful in terms of quantity/quality of data collected, technical studies undertaken, on-farm and on-station trials and linkages with other research projects. The Fleuve and Sine Saloum programs have made less progress but are moving forward. Effective research procedures have been established to identify unique production systems in the three agro-socioeconomic zones and to define major on-farm production constraints. The documented information and analysis is of high quality and adequate for the particular research phase of each PSR team. Linkages with other research entities, both Senegalese and international, that facilitate the coordination of research, extension and training activities have been important to the progress of PSR. All the PSR teams have, however, been beset with problems related to the lack of sufficient human and financial resources to successfully implement their programs. Moreover, field level coordination of PSR activities on a day-to-day basis has not been equally efficient especially between PSR staff and parastatals and between PSR staff and international agencies.

The data collection/analysis component of SARPP has been critical to the long-term success of the program. It appears that the type of data collection and farm management analysis being carried out is most useful in screening and evaluating technologies. The data collected through a "bottom up" approach is generally timely, practical and objective. FARMAP has been used with considerable success and PSR teams have been able to develop the necessary skills to effectively use the microcomputers and available software programs. The success of this data collection/analysis effort is, however, jeopardized by several factors including the lack of Senegalese staff capable of utilizing FARMAP, debate on the importance of precision versus timeliness of research findings and the lack of complementarity in data collection/analysis between PSR regional programs.

The SARPP program has provided a major share of the training needed to strengthen the research capacity of ISRA at the macro and micro levels. Both the long- and short-term training programs have been well received by participants who were better able to carry out their research responsibilities after their training experiences. There is a need, however, to strengthen Senegalese research staff capability, to increase the number of opportunities for relevant training especially in computer analysis skills and to establish an overall staff development and training program in ISRA.

D. Lessons Learned

There are a number of lessons to be learned from this first phase of the SARPP. They include, but are not limited to, the following:

- Combining PSR with macroeconomic analysis (BAME) within the same project, (especially in a country where uniform primary data collection is not usually carried out), is a good idea since both components tend to reinforce each other in producing timely and objective results;

- Phasing in PSR teams gradually is important to avoid excessive strain on available financial and human resources and to make sure that those already established are solid enough to perform all their tasks (research, extension, data collection and analysis) while being available to help other teams;

- Providing more attention to the training components of the project both in terms of quantity of people trained and in terms of the qualification and/or background of individuals selected for training is essential to the program's success;

- Coming to terms with and seeking a compromise between various research methodologies (e.g., single or multi disciplinary research); is a sine qua non for the success of this and other such programs in Senegal and in French Africa generally;

- Encouraging the participation of farmers in all phases of PSR is crucial both for optimal results and for the 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.

E. Recommendations

The evaluation team has carefully examined the issue of the future of SARPP beyond the end of Phase I in light of the accomplishments achieved to date and in the context of the environment in which it operates. As a result, it is 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.

However, before a final decision is made to go ahead, action should be taken to secure adequate and timely funding for both the PSR and BAME teams. While headquarters funding has been tight, but sufficient, the lack of funds at the field level has delayed the progress of the PSR field programs. In order to resolve this problem for the future, the ISRA budgeting, planning and research management systems should be significantly improved. If the 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 greatest importance for each region.

Specific recommendations for each component of the SARPP can be found in Chapter V. The following points summarize these recommendations.

1. BAME

- Identify additional macroeconomic analysis skills required and hire best personnel available;
- Focus priority research on issues of Senegal's food security, for example, on forecasts of supply/demand equilibria;
- Strengthen linkages between research priorities in BAME and the changing emphasis of Senegal's NAP;
- Support the development of systems for improved management, budgeting and planning, including tighter fiscal controls;
- Strengthen the management of research resources (including the linkage between BAME and PSR) to assure that available personnel are directing attention to top priority goals;
- Strengthen personnel management with a view to providing incentives which will give maximum encouragement and rewards to research output; and

- Establish development and training programs for the short- to medium-term to strengthen the capacities of the scientific and professional research staff of BAME and other departments of ISRA.

2. PSR

- Assure adequate funds are available on a timely basis so all of the PSR groups can function normally and not be delayed by lack of funding;

- Fill personnel vacancies on the PSR teams as soon as possible, taking care that replacements have the necessary skills to carry out work started by their predecessors (The provision of additional qualified Senegalese staff will also make it possible to release some key staff members for additional training);

- Consider consolidating the PSR program, perhaps by cutting back on some research themes to ensure quality results with the resources available.

- Clarify the relationship of the PSR teams and the Central Systems Analysis Group (CSAG) before the next project phase and strengthen CSAG's research capacity to support PSR teams;

- Provide additional advanced training opportunities for Senegalese PSR researchers in order to prepare them to handle those aspects of the research work requiring heavy emphasis on conceptualization; and

- Encourage the GOS to take the initiative for improving coordination among the donors and the implementators of PSR programs; and

- Secure adequate financial support for the documentation center.

3. Data collection and analysis

- Strengthen data collection and computer-based analysis skills of Senegalese staff;

- Organize exchange visits for PSR microeconomists to share information and plan for consistent database across all programs;

- Consider merging the entire data set for PSR Casamance on to a mainframe computer at MSU to speed up the generation of results and analysis;

- o Carry out more socioeconomic analyses of past and present on-farm trials and reevaluate the "appropriateness" of technology;

- o Undertake a regular internal review of the data collection and analysis activities which must go on annually within PSR;

- o Continue to improve coordination with other ISRA programs and formalize plans to conduct staff development seminars in ISRA;

- o Explore ways to decentralize the actual production of research reports once the CSAG review is completed; and

- o Review the use and appropriateness of the MSTA program with an eye to either strengthening or replacing it, possibly by STATPAC.

4. Training

- o Formulate an overall staff development and training program for ISRA for the short- to medium-term and define the needs in terms of quantity and level of training needed to support future ISRA programs;

- o Examine problem of course repetition by graduate students in Master's degree programs and devise a plan to mitigate situation by reviewing selection and placement procedures;

- o Develop a catalog of ISRA personnel and their skills as the basis for future development of in-country training programs and assignments; and

- o Organize a workshop for training of personnel in the Fleuve and Sine Saloum PSR teams to share experiences and develop greater capacity in those teams.

I. INTRODUCTION

A. Background

The Senegal Agricultural Research and Planning Project (SARPP) began in December 1981. This five-year Senegalese Institute for Agricultural Research (ISRA)/Michigan State University (MSU)/USAID project focused on the development of Senegalese macroeconomic research capacity in the area of food and agricultural policy. It also included components for training and development of micro-level production systems research capacity.

The larger AID goal to which SARPP contributes is to increase the capacity of the Government of Senegal (GOS) to more effectively plan and evaluate agricultural development policies and projects. SARPP's purpose is to carry out a long-term (10 to 15-year) program of institutional development 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 macroeconomic research programs
- 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; and
- Carry out macroeconomic research on food, nutrition and agricultural policies in order 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.

This approach is developed in further detail in the logical framework of the original project design summary. (See Annex 4.) Current and revised budget estimates for SARPP indicate that approximately 75 percent of the total project costs are to be spent directly in support of human resources development and/or professional training. (See Annex 5.)

The ISRA/MSU/USAID Senegal project is part of an IBRD/French/USAID Project to reorganize the ISRA and decentralize agricultural research in various regions of Senegal. More precisely, SARPP was designed to be an important part of AID support to the multi-donor financed program to decentralize and strengthen the research activities of ISRA within a 10 to 15-year period.

The cost of the MSU project was initially estimated at US$ 5 million. Its components were specifically designed in such a way as to define, and coordinate, AID support to ISRA. Other AID components beside those of the MSU project included US$ 5.6 million in local currency under the PL 480 Title III Program (1981-1983), and approximately US$ 10 million in foreign exchange and local currency from other bilateral and regional AID projects. In 1980, the overall cost of ISRA's decentralization program over the years 1981 to 1986 had been estimated by the World Bank (WB) at US$ 129 million, 33 percent of which was to be provided by Senegal.

Two evaluations were planned during the first five-year phase of this long-term project. This evaluation, conducted at the end of the fourth year of project activities, is a threshold decision evaluation intended to assist the USAID mission in its design of follow-on support to agricultural research in Senegal. In addition to evaluating the macroeconomic and training components of the project and the Production Systems Research (PSR) effort, it was agreed that the evaluation team would also analyze the documentation and computer services maintained under the project. Finally, the evaluation team was expected to make recommendations on the continuation of the project.

When the project was initiated, those involved sensed that some of its components might be difficult to evaluate. For example, because of the long period of 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 Devres team monitoring the end of the first phase found this to be the case since the SARRP project components are not revenue-producing in nature. It is, therefore, inappropriate to analyze them from a strictly economic viewpoint.

B. Evaluation Purpose, Procedure and Scope

1. Purpose

The purpose of this mid-term, threshold decision evaluation, undertaken at the end of the fourth year of the project, is to provide guidance through the evaluative process for future support by USAID/Senegal to ISRA. The evaluation appraises the results attained under SARPP.

Crucial aspects of the project which were assessed are the following:

- Degree of achievement of SARPP's initial objectives and overall purpose;

- o The validity of the project's original purpose and degree to which that purpose has been modified;
- o Progress and achievements accomplished within each major project component;
- o Constraints faced and their impact on the major project accomplishments;
- o Degree of integration and/or linkages of SARPP with targeted project output users through identification of quantity and quality of linkages established; and
- o Specific project outputs (in quantity and quality).

2. Procedure

The evaluation was undertaken in Senegal in July, 1985. The procedures followed by the team in undertaking this task reflect a clear distinction between its evaluative purpose and the usual objectives of project monitoring. In the latter, adherence to schedule and delivery of intended inputs and outputs are of primary concern. In this evaluation, the primary emphasis was on the degree of progress in achieving the major purposes of the project, the impact of project outputs on improving the capacity of individuals and institutions to enhance the quality of macroeconomic policy and production systems research. The evaluation also sought to identify any modifications required to enhance future performance of the project and on any needed change in objectives. Annexes 1, 2 and 6 provide additional information on the procedures used in carrying out the evaluation.

In examining the performance of the project, facts, opinions and beliefs concerning SARPP from its inception in 1981 to the present (July 1985) were sought from the GOS and other interested Senegalese groups (e.g., parastatal and University staff, etc.) as well as from the donors and the implementation groups involved. The views of these participants in the project were also sought on changes needed in the objectives and mode of operation in order to enhance the future performance of the project.

SARPP is a project whose full effects will only become discernible after the project has run most of the course of its 10 to 15-year life. Therefore, at this threshold stage, the examination seeks to determine the degree of attainment of its objectives in three main dimensions, namely--time horizon, scale and scope--in the four years of the first five-year phase.

In defining the methodology for this study, a clear hierarchy of priorities was established in order to align the scope of the report with the Terms of Reference of USAID/Senegal. This hierarchy is as follows:

- o Review of the initial objectives of SARPP in order to determine whether they remain relevant and/or the ways in which they might have evolved over time;

- o Examination of progress made within the project input delivery system as well as in achieving the major project outputs as originally specified.

  A set of fixed questions was prepared by each team member to make sure that the same basic set of information on inputs and outputs would be gathered by each team member at their respective levels. Information drawn from reading materials, field trips and from interviews was screened on the basis of these sets of questions;

- o Examination of linkages between ISRA and other key institutions in Senegal and/or other supporting programs in general.

  The decision was made to look at both the inputs and the channels used for establishing linkages as well as results so far achieved. Both formal and informal linkages were to be taken into consideration; and

- o Formulation of some frank questions on emerging issues.

  The team's judgment on emerging issues, as derived from evaluative work on the first, second and third priority issues, was guided by facts, opinions and beliefs whenever monitored data seemed to reveal a significant departure from initial expectations as established when the project was begun in 1981.

In carrying out the evaluation, the agronomist worked closely with the PSR microeconomist in determining a) the suitability of the PSR approach thus far, b) the nature and effectiveness of linkages developed between ISRA and the Regional Development Agencies (SOMIVAC, SAED and SODEVA), c) the degree to which ISRA is collaborating with other research programs, d) the extent to which research results are being incorporated into extension recommendations, and the adequacy of ISRA's system of dissemination of research findings, e) the degree of coordination between ISRA research departments and the extent to which this can be further enhanced and finally, f) the timeliness and adequacy of resources provided in support of PSR programs. The approach used by the microeconomist in responding to the terms of reference was based on a reorganization of the terms of reference, following a comparison of program activities actually in place with what was envisioned for the PSR component of USAID-SARPP.

3. Scope

This evaluation deals only with the SARPP project. Although the project represents a major contribution to the expansion of ISRA's capacity for micro and macroeconomic research affecting agricultural policy, it is but a part of a multi-donor effort to strengthen ISRA and improve the performance of Senegal's agriculture sector and food security. Inevitably the evaluation relates to and seeks to judge effectiveness the important linkages of the PSR and BAME activities to other departments of ISRA and other Senegalese and international research entities. Its scope is limited, however, to those activities supported by SARPP and carried out within ISRA by BAME, PSR and CSAG. The detailed Terms of Reference for this evaluation can be found in Annex 1.

C. Overall Approach for Implementation of SARPP

1. Project implementation objectives

In the judgment of the Devres evaluation team, no major gap seems to have developed with regard to SARPP's operational objectives between its' active inception (1980) and to the threshold evaluation (July 1985). The most explicit definition of SARPP's current primary objectives and purposes are summarized below. They are to:

- Strengthen the organization and operation of ISRA in order to be responsive to needs of different marketing systems and ecological areas of Senegal;
- Replace disciplinary research with multidisciplinary teams for six major commodities (groundnuts, cowpeas, millet, sorghum, maize and rice);
- Introduce farming systems research in the four priority regions;
- Establish long-term manpower planning and training for professional and technical staff and improve personnel management policies and procedures;
- Strengthen the research on production economics, marketing and human resources;
- Strengthen the capability for evaluation and application of new technology and incorporate this new technology into extension work; and
- Strengthen linkages with external assistance organizations including the International Agricultural Research Centers (IARCs).

These points can be compared with the initial purposes of SARPP, as stated in the original Project Paper, as well as with the World Bank's (WB) most recent interpretation of the stated purpose on the larger program package, for which SARPP was considered to be the keystone. (See Annex 7.) In general, there is general agreement on SARPP's specific objectives within the overall program, although there are different views on some design issues for the program.

2. SARPP implementation strategy to achieve objectives

In order to effectively and fairly evaluate whether or not project objectives have been met, it is necessary to review the strategy developed and the resources provided by USAID to accomplish these objectives below.

Initially, to ensure that project purposes and outputs were met, USAID developed a program of activities and assistance to implement the strategy. MSU was selected as the implementor of these activities, contingent upon forthcoming USAID and ISRA management and financial support. In addition to headquarters staff in Dakar, SARPP provided a PSR economist in the Casamance and in a second area. Each of the PSR teams were to be composed of "a PSR agronomist, economist, rural sociologist, research extension liaison specialist and possibly a livestock specialist; other specialists would be added as necessary."[1]

With the establishment of the decentralized and independent PSR Directorate, USAID supported a Central Systems Analysis Group (CSAG) in the PSR Department in order to coordinate the work of the regional PSR teams and establish a "coherent national work plan". The CSAG was also expected to provide valuable 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. SARPP was to provide a rural scientist and operating support to the CSAG. It was not clear at the outset what Department and/or who was operationally and specifically responsible for supplying operational funds to support CSAG activities.

The USAID strategy also included the formation of a macroeconomic unit within ISRA (presently attached to the PSR department) in order to build upon research produced by PSR teams and to develop sectoral-level analysis and policy recommendations. The Bureau d'Analyse Macro-Economique (BAME) was designed to have a direct link to the PSR program. 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."

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[1] Senegal Agricultural Research and Planning Project, Project Paper, (Washington, DC: USAID, 1981.)

Since 1984, an Interministerial Consultative Committee (ICC), composed of representatives from five ministries (Rural Development, Plan, Economy and Finance, Commerce, Scientific and Technical Research), has been established to promote better coordination between the Ministries. The purpose of this consultative committee is to review BAME's research and to supply required informations and/or to make policy recommendations to appropriate government authorities.

Finally, sufficient external staff resources were to be made available to the project to assess its success.

The total level of expatriate effort that was to be brought into SARPP during the life of the project included a Rural Social Scientist Team Leader (five person years), a Production Systems Economist/Casamance (five years), a Macro-Economist in BAME (five years), a Macro-Economist in BAME (three years), Research Associates (nine years), Consultants (30 months) and Computer Program Development Specialist (18 months).[2]

For all of these activities (PSR, CSAG and BAME), USAID provided project support funds for technical assistance, operating expenses and short- and long-term training. The project is being partially supported by local currency funds from the PL 480 Title III Program. These funds are completely administered by ISRA, through the Ministry of Economy and Finance (MEF) and include expenditures for the operation of the PSR teams.

3. Comments on SARPP's implementation strategy

There are a number of critical issues affecting the success of the implementation strategy for SARPP. One of the most important was raised as early as 1980 had to do with the scheduling of implementation for PSR during the first phase of SARPP. In a paper on the SARPP, Carl Eicher noted that:

> "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:
>
> - A push to launch five PSR teams will rely too heavily on expatriate scientists...;
>
> - 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...;

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[2]Ibid., p. F-5.

- ISRA does not have the logistical, budgetary, and computer capacity to launch five PSR teams in year two; and

- 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..."[3]

The Devres evaluation team agrees with this analysis and believes these conditions still hinder progress on the project.

There are a number of implementation issues which need to be taken into account in evaluating the project's success in achieving desired outputs given its stated objectives related to a number of constraints which have impaired the SARPP's rates of output. These constraints included the following:

- Chronic lack of liquidity within ISRA;

- Very rapid rate of growth in the overall size of ISRA (research activities and non-research activities);

- Limited absorptive capacity of ISRA for new disciplinary research approaches;

- Limited managerial capacity at ISRA;

- Perennial imbalance of management's responsibilities between ISRA headquarters and regional research stations, even after publication of ISRA's revised statutes in August of 1982;

- Logistical delays encountered in setting up space and infrastructure support for the CSAG, for the BAME in ISRA (at project inception), and for one PSR team;

- 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

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[3]Carl K. Eicher. "Reflections in the Design and Implementation of the Senegal Agricultural Research Project", (MSU/ISRA, Dakar, October 14, 1982.

- 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).

In addition to the above issues, it is necessary to mention that MSU has not retained either complete financial or personnel management responsibility over the resources allocated to the implementation activities associated with the PSR teams. This situation manifests itself in four ways:

- MSU is not the sole source of technical assistance to any of the PSR regional teams now functioning (Basse Casamance, Fleuve Senegal and Sine Saloum); these teams are not homogeneous and are made up of different combinations of MSU, Senegalese and other donor researchers;

- The CSAG, within the Directorate of the PSR in Dakar, is likewise not completely staffed by MSU;

- Funds to meet expenditures for PSR field research, and possibly also for CSAG coordinating activities, are generally funded from PL 480 Title III receipts which are controlled by ISRA and the Ministry of Economy and Finance (MEF). In fact, in the case of the Casamance, PSR team expenditures, field research and analysis activities have been partially met by USAID's Basse Casamance sub-project; and

- Funds to meet expenditures for BAME's field research activities, over and above those activities performed for BAME by PSR teams, are also allocated from PL 480 Title III receipts which are controlled by ISRA and the MEF. In the case of the special research project on fertilizer distribution which was carried out by BAME, some additional funds were used to cover part of the expenditures.

In sum, while there has been seemingly adequate provision for funds, personnel and program activities to implement the SARPP strategy, there have been a number of systemic institutional problems and constraints that have mitigated the timely achievement of all of SARPP's objectives in the first four years of the project. Hence, the evaluation of the MSU contribution towards meeting SARPP's initially designated purposes and outputs must be viewed within the constraints which these developments have imposed on MSU-PSR and BAME's field research activities (i.e., on the nature and timeliness of funding, of publication activities and/or data analysis strategies).

These and other factors are given serious consideration in the following chapters of this evaluation in an effort to focus attention on the most appropriate operational monitoring mehcanisms targets. Attention is also given to evaluating the real development potentials of agricultural research and/or extension institutions in Senegal. Throughout, it is important to remember that the overall goals of SARPP are to be accomplished through a long-term (10 to 15 years) institution-building effort within ISRA. This evaluation is concerned with the first phase which will end in December 1986.[4] The evaluation team has designed its approach to evaluate SARPP within that perspective.

[4]See the SARPP Project Paper, p. 10, 1981.

II. EVALUATION OF MACROECONOMIC ANALYSIS BUREAU: BAME

A. Staffing

The Macroeconomic Analysis Bureau (BAME) was established within ISRA in 1982 because of the expected interdependence between farm level production decisions and transactions in local, regional, national and international markets. The importance of understanding the behavior of the farmers as well as that of the traders and of analyzing their interrelationship was given considerable emphasis. In 1982 and early 1983, three MSU consultants (Crawford: June 1982, Peterson: October 1982 and Newman: March 1983) identified preliminary research problems in Senegal. Their main task was to write a research program proposal for BAME.

In the early Fall of 1983, the initial group of researchers affiliated with BAME included Jacques Faye (Acting Director), Mark Newman (MSU Research Associate), Eric Crawford (MSU Research Associate), Ousseynou Ndoye (finishing a MS degree in agricultural economics), Curtis Jolly (South-East Consortium for International Development (SECID) in Djibélor), A. Seck (Horticultural Development Center (CDH), M. Kebe (Oceanographic Research Center for Dakar Thiaroye (CRDOT) and Fadel Diame (student at MSU). The first nucleus of BAME's human research capacity was established slightly behind schedule. Its task was to launch the BAME research program. Contacts with researchers and others in AID/Washington, the WB and the International Food Policy Research Institute (IFPRI) were made.

A proposed research program for 1984-1986 was set up--Research on the Macroeconomic Aspects of Senegalese Agriculture: Priority Questions and Proposed Plan of Work. This program, which in 1983 had not yet been approved by ISRA nor reviewed outside of ISRA, was built around the following priority issues: food security, the organization and performance of marketing systems, the economics of agricultural production in Senegal, the use of improved technology at the farm level and international trade linkages. These topics fit well with SARPP's initial purposes.

In 1984, Michael Morris (MSU-Research Associate), and Valerie Kelly (MSU-Research Associate) joined in BAME, along with Alassane Sow (MS Agricultural Economics, MSU), M. Ndione (MS Agricultural Economics at University of Minnesota) and Makhuma Mbaye (MS Agricultural Economics, MSU). A BAME Issues Paper was reviewed within ISRA, taking into account the New Agricultural Policy of Senegal (NAP) which was about to be made public. Staffing, training and research priorities had to be adjusted accordingly. Staffing for collecting primary data for BAME's studies being undertaken became a major concern for BAME and

for regional PSR teams. Mamadou O. Sidibe joined BAME's group as the PSR Department Programmer, and at the end of 1984, Frederic Martin (MSU Research Associate) joined BAME's group with the intended purpose of helping policy makers address the food security problem in Senegal. BAME's staff size had then reached its current size.

B. Research Priorities

1. Present

As previously stated, BAME's first transitory Issues Paper was written in January and February of 1984. It was reviewed within ISRA and by GOS officials and representatives from donors in Dakar. A dialogue between ISRA and other government agencies was started to discuss agricultural policy analysis. A proposal was made to create an interministerial committee to guide and oversee BAME, called the Interministerial Consultative Committee (ICC). Following these meetings, BAME prepared a second Issues Paper entitled--Orientation and Revised Plan of Work for Macroeconomic Research on Senegal's Food and Agricultural System, discussed and adopted by the ICC and ISRA. Its content was consistent with the New Agricultural Policy (NAP).

The national agricultural goals of NAP included increasing national food security and reducing Senegal's massive food import bill. A number of specific strategies were proposed in NAP to help achieve these and other goals including:

- Increasing local production, thereby improving self-sufficiency in cereals to substitute for imports of rice, sorghum and wheat from foreign grain markets and international food donors;
- Decreasing production variability associated with rainfed cropping systems by expanding the area under irrigation; and
- Reducing the cost of GOS agricultural policies and/or programs by more actively involving the private sector in agricultural production ("responsibilitisation du paysan"), in food processing and in food marketing activities.

There are actually four major research areas which are, or were, covered by noteworthy research efforts undertaken by BAME. These are:

- Grain marketing in the Groundnut Basin;
- Fertilizer distribution and the use of other inputs;
- The economics of agricultural production; and
- Food security.

These research themes are consistent with GOS research priorities as well as with SARPP's initial operational research targets. Thus, BAME's priorities seem to be carefully set up and to fit well with the GOS's agricultural policy planning priorities. This is one of BAME's major accomplishments to date.

2. Outlook

The economics of agriculture has suffered as a research topic in BAME as compared to other topics. This may be partly explained by staff shortages, such as the case when the annotated bibliography of farm household and village studies had to be suspended in September 198- with the departure of the program's research assistant. It may also be partly explained by the fact that CSAG is expected to some extent to cover this topic at the macroeconomic level, and that sound and coherent sets of secondary data on agricultural production and/or inputs used are not readily available in Senegal.

Whatever the reasons, there is some danger that agricultural production, as viewed from its macroeconomic perspective in BAME, might become a research subject without sufficient human resources available to do the work. Thus, specific attention must be paid to the appropriate staffing for research in the economics of agricultural production.

The economic and managerial aspects of cooperatives (marketing, transformation and management efficiency) as well as of parastatals might also be raised as a prospective research priority question for BAME since the present GOS privatization trend brings this theme to the fore. It may be more appropriate for SARPP to concentrate BAME's research work on existing research themes and to reinforce the less established ones, instead of trying to begin in new areas.

Since Senegal faces an increasingly serious food deficit which, if current trends continue, might mean importing about one million tons of cereals by the year 2000, it is of the utmost importance to improve Senegal's level of food security. This fact emphasizes the need for more research on all agricultural policy issues having to do with food security in Senegal, in both the short- and long-term.

If the price of imported rice is raised, such as occurred in 1984-1985, it is likely to cause shifts in both the demand and supply of domestic cereals. However, very little is really known about relevant supply and demand elasticities of various food items in Senegal. Therefore, it is impossible to make sound predictions of new demand and supply equilibria for the near future. This reinforces the need for a macroeconomist with some major interest in agricultural production and policy analysis in BAME.

Finally, BAME needs to remain in touch with the changing priorities of the GOS. The recent creation of the Comité du Suivi (CS), an interministerial committee within the GOS, in June 1985 indicates that short- and long-term priorities for policy analysis will be given increasing emphasis. ISRA and BAME should consider streamlining their research priorities and making sure that the priorities determined by the CS receive adequate attention.

C. Research Output

1. Present status

BAME's earliest listed publications were in the form of preliminary reports and preliminary analyses of primary data collected on specific research topics. The nature and quality of research tools indicate that each research group within BAME has tried hard to continue relating macro to micro problems while building almost exclusively on primary data collected according to specific survey designs. The reason for this is simple: Existing sets of data on agricultural production in Senegal are not sufficient to allow for specific hypothesis testing for agricultural production or marketing policy analysis especially for drawing conclusions intended to direct short-term policy decision-making. The most recent list of publications issued by the PSR Department and/or by BAME in ISRA appears in the Bibliography of this report (see Annex 3). Other internal research notes, requested briefs and comments have been written by the research staff in BAME and/or the PSR Department, especially within the last year. These, however, are not listed in the Bibliography.

In recent efforts, BAME has emphasized marketing studies based on data collected at the grass roots level. Since there had been little data available on both regulated and non-regulated markets for farm inputs and outputs, the gathering of data will be very important to the relevance of research undertaken. Both are of great interest to ISRA and the Interministerial Consultative Committee (ICC/GOS). Data collection and analysis has been uneven in the various zones. In Sine Saloum where work has been under way since 1982, results have been significant as an input to agricultural marketing policy formulation especially for grains. In the other zones, work was started later and has been constrained by inadequate staff and financial resources. The output for those zones has been limited and has had little relevance or impact on policy to date. In general, results to date have not had significant impact on policies concerning fertilizer distribution, seed and equipment acquisition even in respect of Sine Saloum.

The seed and farm equipment study in the Sine Saloum (Valerie Kelly, Matar Gaye and Makhina Mbaye), the grain marketing study in the Fleuve (Michael Morris), and the food security study (Eric Martin) are now in their data gathering stage. It is too early to report on any publications resulting from these specific studies.

In sum, the research work done to date by BAME tends to be more practical and coherent than some of the other work done in ISRA (see Annex 8). It is intended to lead to the formulation of sound policy by decision makers. The research has pointed out the major constraints of actual market structures and price regulation policies. The relevance of these documents seems to be gaining increasing recognition by the ICC/GOS, by some parastatals and by some University of Dakar research groups such as the Centre de Recherche en Economie Appliquée (CREA). This seems to have come about especially since the NAP has been made public in 1984 and perhaps even much more so since policy measures on market deregulation (such as the new seed and fertilizer distribution policies) were announced and implemented by the GOS in 1985.

2. Outlook

The more explicit the NAP becomes in terms of setting up new guidelines for its major agricultural commodity marketing systems, the easier it will be for the research staff in BAME to both refine and enlarge the scope of their policy analysis work, particularly in terms of practical signals concerning forthcoming national pricing policies. For example, the use of pricing as a market regulator in Senegal with some flexibility over time and space is an important issue for analysis. This, in turn, might contribute to eliminating some of the actual constraints which impede changes in the crop mix regions and between regions.

One of the possible priority issues to be explored further has to do with the uncertainty that marks the fertilizer situation in Senegal. According to a recent analysis, the GOS..."is faced with the stark reality that it is unable to finance fertilizer subsidies and that there is presently no system either governmental or private, with the proven ability to distribute fertilizer, even at full cost, to farmers in a timely fashion. The socially optimal level of fertilizer use is unclear, given new prices. Detailed crop budget calculations are required to determine where, on which crops, and in what quantities fertilizer might best be employed."[1]

It has been suggested that pending the results of those experiments with the private sector, marketing at full cost of fertilizer should be carried out in some of the regions visited in this study. It seems appropriate for BAME, as well as for PSR-CASG, to make a major contribution towards a general definition of a comprehensive national fertilizer policy. Some of the intended policy papers in BAME might be geared to provide policy analysis inputs which would be useful for this study. This view seems to be shared by ISRA to judge by the direction in which its research is moving.

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[1]Abt Associates, Inc., Senegal Agricultural Policy Analysis: Agricultural Policy Analysis Project (Cambridge, MA: Abt Associates, Inc., April 1985) p. x.

Finally, it has been suggested that BAME's research results be given more and better exposure through publications of two types, namely:

- o Working papers which are defined as reports of research in progress; and
- o Research reports which are defined as policy papers that address specific issues.[2]

However, given the actual financial constraints that BAME is facing within ISRA, it would seem appropriate for BAME to target research reports that can be built on previous research. At the same time, BAME and the centers in the respective zones need to have more adequate resources if their work is to be timely and effective.

D. Relevance of Research Results Obtained

A summary of the Data Base and of the main findings of the major studies conducted thus far by BAME can be found in Table 1. As noted in the table, three studies have been completed or are in progress. In two others, the data collection process has begun but the analysis to derive the findings is yet to be done.

A program for diffusion of departmental scientific publications has recently been set up by ISRA. This activity was made operational through the CSAG. Normally, CSAG requires and coordinates an internal review for new types of documents and reports. Activity and synthesis reports are then prepared by each research program coordinator to conform to ISRA's standard regulations for such administrative reports. Departmental papers are used to present the tentative results of research programs. They are intended for internal or restricted circulation. In practice, most of BAME's departmental papers have also been circulated through informal channels in order to diffuse them in the most expeditious manner. Two other administrative series, which are called Research Papers and Research Series ("Travaux et documents de recherche") are intended for wider distribution. These include final reports, bibliographic reviews and methodological notes.

This diffusion system has been flexible enough to allow the research staff in BAME, either through formal or informal channels, to achieve the following:

- o Receive useful feedback on data collection activities fairly rapidly;

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[2] James Shaffer, "Consulting Report", Senegal Agricultural Research and Planning Project (East Lansing, MI: MSU, Department of Agricultural Economics, February 23-March 8, 1984).

Table 1: BAME: Summary of Main Research Reports Published by Subject: Underlying Data Bases and Major Conclusions

Subject	Data Bases Accumulated	Main Findings
A. Grain Marketing in the Groundnut Basin	Census of periodic markets, descriptive survey of products and infrastructure in assembly markets, census of market wholesalers and retailers in 15 markets, survey of transactions in 34 markets.	o Private traders have been important in the distribution of imported rice and sometimes in the parallel assembly of grains. o Regulations and their enforcement have a noticeable impact on degrees of incentives for the marketing system to function in accordance with GOS policy objectives. o Past and actual administrative regulations introduce uncertainty for both private traders and producers. o It is difficult to say what "official prices" actually mean.
B. Grain Marketing Research in the Senegal River Basin	Survey of grain distributors in the Fleuve region (in progress).	Preliminary findings and conclusions on the parallel market include: o The parallel market for cereals has expanded during the 1984-1985 season; o There is a rapid increase in the number of small rice mills in the region, and o Legitimizing the parallel market may be a first step in reforming the marketing system.
C. Fertilizer Distribution Study	Survey of CEPA/perimeters, seccos, village sections, producers groups, individual farmers in Sine-Saloum, Casamance and Fleuve (1984-1985 season).	o Late deliveries of fertilizer were frequent; o Instances of fertilizer sold in Sine-Saloum were frequent; o Amounts delivered under the "retenue" system were small; o Except for the Fleuve, farmers use of fertilizer is very low; and o There is inadequate planning of the "retenue" system.
D. Fertilizer and Agricultural Equipment Acquisition	Survey of 45 farmers in Gossas (Sine-Saloum) (in progress).	Forthcoming.
E. Food Security and Comparative Advantage	Collection of secondary data (in progress).	Forthcoming.

Source: BAME's Publications (see Annex 3, Bibliography) and Interviews by Devres Staff, Dakar, July 1985.

- o Reconsider the scope and extent of data collection activities for methodological and strategic reasons of major interest to policy-makers; and

- o Maintain close contact with the ever changing policy priorities of the GOS prior to, and after, the NAP was made public.

Many people outside of ISRA believe BAME should be capable of rapidly publishing some relevant results on the latest agricultural policy issues in Senegal. BAME's objective approach, which has thus far rested heavily on primary data collection activities, has stirred up much interest in GOS circles and in parastatals because of the urgent decisions that have had to be reached in order to make some of NAP's strategies operational for the 1985-1986 crop year.

It is very important for BAME's research activities to try to obtain relevant results in the most expeditious manner. However, there are at least two dangers in overemphasizing this point. First, BAME could become a group devoting too large a proportion of its total effort to data collection activities, and therefore not enough to data analysis. Second, BAME could lose sight of the fact that some groups in Senegal will need to take a medium- and/or long-term research approach when addressing the short-term changes that are taking place. Presently, it is not altogether clear how farmers will react to these changes. The farmers may overreact at first and then adjust their agricultural production activities to the new situation. Marketing activities may not respond in the same manner. It is therefore essential to define more precisely how the production and marketing communities will react in the longer run.

In sum, it is very important for BAME to remain a research group doing relevant studies rather than a service group exclusively documenting specifically requested issues from GOS departments and/or from elsewhere. There seems to be agreement within ISRA on this matter.

E. Timeliness and Adequacy of Other Resources in Support of BAME

Besides staffing, two other types of resources in support of BAME--including supporting materials and equipment for BAME and PSR teams--were intended to be financed within SARPP. At first the only major commodity financed by the project was to be an IBM 5120 minicomputer system. The unit was planned to be used for developing a program for the IBM equipment that Senegal had already purchased. It was to be taken to the field mostly for use on processing data on farming production systems. Some assistance was to be provided by MSU in developing programs, such as linear programming, for use by BAME.

Secondly, MSU was to supply reading material to improve the social science collection and the documentation centers at Djibélor and Bambey.[3]

It was not possible for the evaluation team to clearly separate the resources which were intended to support BAME from those that were intended to support PSR teams because they were designed to be a closely linked computer supporting system. What seems fairly clear is that the assessment of needs which was done in 1982 (see report by Wolf, Tapsoba and Crawford), took into account the fact that ISRA was in the process of establishing a computer center (CTI) at the Center for Oceanographic Research (CRODT). It appears that BAME in Dakar now has access to adequate hardware and software in support of its research activities. However, BAME's research staff in the Fleuve and in the Sine Saloum do not yet have access to operational computer facilities anywhere near their offices. Up to now, they have worked their way around this problem mostly by making use of other facilities.

The documentation center in Dakar appears to have gotten off to an excellent start. But, due to financial constraints which may have prevented the staffing of librarian services, the center has not been keeping its reference materials up to date. It is possible that it might become increasingly neglected in the near future, which would substantially reduce its utility.

F. Effectiveness of ISRA in Utilizing MSU Personnel in BAME

1. Past and present

ISRA has been quite efficient in utilizing MSU personnel in BAME. The policy of distributing personnel throughout the various regions of Senegal rather than concentrating forces in one or two points does not seem to have had any major negative effect on the efficiency of using BAME/MSU personnel within SARPP. However, the obligation for Senegalese research personnel returning from advanced degree training to prepare their training reports (memoires) seems to cause some difficulties as a result of this policy. Many of these young researchers who lack experience are prevented from being fully integrated into larger projects. Moreover, because of this situation, these new trainees are not fully productive as BAME team members before their second year on the job.

This issue of utilizing research personnel must be viewed within the more general issue of the promotion of research activities and of research staff within ISRA. At SARPP's inception (1981) it was clearly stated by the person charged with implementation that the newly passed statute for researchers "may compromise the chances for the long-term success of the decentralized research program. This statute links

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[3]"Senegal Agricultural Research and Planning Project", Project Paper (Washington, DC: USAID, 1981), p. 59.

career advancement to diplomas rather than research experience and excellence. If this statute is not revised, ISRA might risk losing many experienced researchers."[4] It was also clearly stated that the GOS ought to provide assurances to AID that "the question of the degree equivalency will be addressed and resolved to USAID satisfaction...(and that)...ISRA procedures will be modified to place more emphasis on promotion by experience and performance and less on diploma earned."[5]

It appears that no major significant changes have been made in ISRA to adjust hiring and promotion procedures in such a way as to meet these conditions. It would therefore seem very important that these questions be given serious consideration before Phase II of SARPP is undertaken.

2. Outlook

The Senegalisation trend for BAME and ISRA staff is well under way. A list of Senegalese participant trainees within SARPP can be found in Annex 9. The size and the quality of research teams in BAME and PSR have made substantial progress throughout the first years of Phase I.

Despite these improvements, there is an important need to establish medium- and long-term development and training programs for ISRA, BAME and PSR scientists. This planning strategy, which might be linked to a specific plan for better utilization of MSU personnel in BAME, definitely needs to include some clear cut incentives to reward scientific work according to productivity rather than according to years of service of individual scientists.

G. Linkages Between BAME, ISRA and Other Institutions and Parastatals in Senegal and Elsewhere

As previously stated, BAME Issues Papers have been reviewed within ISRA ever since the end of 1983. They have also been reviewed in meetings with GOS officials and representatives from foreign assistance agencies in Dakar. This has lead to the establishment of more formal linkages through the Interministerial Consultative Committee of the GOS (ICC/GOS). The first meeting of ICC was convened by the Minister for Scientific and Technical Research (MSTR) on January 4, 1985.

Following this meeting the ISRA Scientific and Technical Committee recommended "that the BAME's contribution to policy-making in Senegal could be enhanced by:

- o Assuring the scientific autonomy of BAME vis-a-vis other GOS agencies;

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[4]Project Paper, p. 34.

[5]Project Paper, p. 60, 1981.

- o Creating a BAME consultative committee to review BAME's research and to make policy recommendations to appropriate GOS authorities;

- o Promoting collaboration between BAME and other research institutions such as the CREA, the Institute for Research in Africa (FA) and the University of Dakar (Economics Faculty): and

- o Diversifying the sources of BAME's financial support in order to achieve some measure of continuity and long-term financial backing (Title III is now the principal source of BAME financing)."[6]

Materials and statistics collected and compiled by BAME were solicited by FAO, the WB and various GOS departments, especially since the beginning of 1985. Thus, it appears that exposure of BAME's results may be much greater than that for which it is usually given credit. Concerning the linkages between BAME and USAID/Senegal, it appears that the latter is well aware of the research studies done in BAME, particularly since the fertilizer distribution study was requested by AID.

Finally, it should be noted that a specific strategy for the publication of findings from the grain marketing research study in the Senegal River Basin is being set up. Its objective is to break down the materials issued for extension purposes into four different bulletins or working papers. This would facilitate the distribution of these publications to various audiences according to their specific interests in the findings (parastatals, the parallel trading sector, GOS departments, other research staff in ISRA and others).

Overall, there is strong evidence that research results obtained so far have been very helpful to some GOS departments. There is, however, general agreement among donors as well as among GOS authorities that some of the informal linkages which have been used to connect BAME's research with policy decision makers ought to be made more formal. This is a point SARPP could address during its second phase.

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[6]Senegal Agricultural Research Planning Project, Progress Report, July - December 1984 and Plan of Work, January - June 1985 (C-685-0223) (East Lansing, MI: MSU, Mrach 1985).

H. Effectiveness of BAME/PSR Linkages

Management linkages

The Bureau d'Analyse Macroeconomic (BAME) has two basic types of linkages with the PSR teams: management and program linkages. The Directorate is in Dakar, but at each of the three field research stations where PSR is active there is an agricultural economist whose main responsibility includes macroeconomic related issues. Two economists from Michigan State University (located in St. Louis and Kaolack) and a Senegalese recently returned from US training (Casamance) fill the three positions. The agricultural economist in St. Louis will leave late this summer and the one in Kaolack is due to go back at the end of the year. Although these BAME representatives are not formally integrated into the PSR teams, they are usually abreast of what is taking place in farming research and sometimes share or coordinate data collection efforts.

In terms of personnel, the Dakar level PSR Department and the BAME share the same researchers. Management linkages at this level are important for identifying issues for research to address at the farm and institutional levels and how these efforts can be coordinated in order to make efficient use of research resources.

The PSR/BAME linkages at the management level have been effective in avoiding duplication of research, but the cost has been that human resources have been spread too thin. Part of the problem is that personnel working with both divisions usually end up having to do detailed administrative tasks in addition to their own research and the assistance they are required to give to field personnel. The result has been that the time devoted to reviewing current research reports and defining research priorities is less than what would be desireable.

There are two possible solutions. First, an improvement in ISRA's management and financial capabilities would greatly increase the amount of time expatriate and Senegalese researchers could spend actually doing research and analysis. The second approach would be to expand personnel at the Dakar level in order to diminish the work load of the current staff. For example, the one senior agricultural economist in Dakar who covers both BAME and PSR activities would be joined by a second economist who would take over one of the two assignments. The drawbacks to this approach are that it is more costly and does run the risk of diminishing the coordination of the two research programs at the field level. If this were done very good communication between the two units would be essential.

2. Program linkages

Since the inception of the PSR and BAME programs, there have been consistent linkages between the two departments, mostly in the food marketing and more recently in the areas of input delivery, credit, and the study of farmer organizations. Regional PSR/BAME project research agendas are discussed below.

a. Basse Casamance

The Basse Casamance PSR program has long been in contact with the BAME but there has not been a very high degree of linkage between the two programs. Instead, the BAME economist stationed at Djibélor (Jolly) has emphasized food marketing and the PSR economist (Malumba) has concentrated on farm management studies. With the arrival of an MSU-trained agricultural economist to do macro work out of Djibélor (Fadel N'Diene), the linkage with the micro research effort may be more effective. The major problem, however, is that the MSU agricultural economist must spend a great deal of time doing research for his thesis. The new BAME economist is not expected to continue the marketing work of his predecessor but to concentrate on the subjects of on-farm credit and farm inputs. The latter is to help evaluate the impact of the NAP.

Bernsten made several timely recommendations for more effective micro/macro linkages in the Casamance program.[7] A major element of these recommendations was that the PSR team should exploit the FARMAP databases to generate information for policy issues selected for research. Also, the PSR data could be used to assist in the definition of macro-policies required to facilitate the adoption of technologies which have been successfully tested in the field. Specific ideas for the two-way micro/macro linkages are contained in Bernsten's report.

The BAME/PSR coordination and linkage of research will be quite extensive for the 1985-1986 crop production year as illustrated by the following:

- o PSR and BAME will cooperate in launching a study on supra-village organizations, their roles in resource use and their organizations. These include the "communautés rurales (rural communities), sections villageoises (village sections), groupements de jeunes" (youth groups), and traditional associations. The PSR sociologist, economist and the BAME macroeconomist are expected to participate with Bingen from the Groupe Centrale;

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[7] Richard Bersten, Consultancy Report-Summary Overview Observations, Senegal Agricultural Research and Planning Project (East Lansing, MI: Michigan State University, Agricultural Economics Department, February 1985).

- o Village level and extended studies on the use of agricultural material and equipment and agricultural credit uses: these studies will involve a basic census of equipment and services as well as principal constraints. The studies will be carried out in a sample of PSR villages; and

- o PSR, in collaboration with the BAME, will institute a survey on technology adoption (seeds, fertilizers, agricultural materials). The PSR macroeconomist has already started working with PIDAC on this issue.

One of the main concerns for BAME/PSR linkage in the Casamance is that the new macroeconomist will be spending the next year on his thesis. Although this will be directly integrated into the overall PSR/BAME research program, it is not expected that the macroeconomist will be able to master the full range of PSR field work until Spring 1986. This is just about the time the present phase of the MSU project will end.

b. Fleuve/PSR/BAME linkages

The Fleuve/PSR microeconomists did not arrive at their stations until Spring 1984. The macroeconomist (Morris) assigned to the Fleuve research station worked uniquely on the rice marketing and processing sector without any direct collaboration from the microeconomist. While the macroeconomist would have liked to have included a farm level/village marketing component in his study, the PSR did not collect such data because 1) PSR started doing field work too late to fit Morris' program and 2) the PSR decided only to work in Delta villages while the marketing work covered the whole Fleuve region.

Once the PSR economist (Lambrecht) arrived, he was immediately assigned to work with BAME on the national fertilizer study. This, the economist did up to September 1984. Despite this preoccupation with the BAME study, the PSR economist still assisted with programming and organizing PSR activities for the 1984-1985 year. The work with the BAME fertilizer study helped the PSR economist define specific criteria on which to base the definition of different production zones in the Delta area. For example, because all inputs for rice producers are channelled through some form of village or farmer cooperative structure (Groupement villageois, Section villageois, Groupements de jeunes), this was considered an important variable to take into account when selecting villages. With the divestiture of SAED in its input supply activities, the question of how different farmer groups will respond to obtaining their own inputs is crucial.

Understanding how these groups operated led to the selection of the type of farmer groups as a criteria variable for zoning the Delta and is subject to further inquiry for the 1985-1986 season. Specifically, it has been determined that the question of farmer organization will be of critical importance when SAED turns over its

function of input procurement and distribution to farmer groups. This research effort must therefore develop recommendations to farmers and SAED on the best possible farmer strategy for the management of inputs. This will be a crucial question in terms of maintaining and increasing current production levels and affects more than one of the geographical zones laid out for the Delta.

The nature of linkages until 1986 between BAME and PSR in the Fleuve will center around the question of farmer organizations and a follow-up on the adoption of new technologies being extended by the government development program. After the end of the first phase of the MSU project in December 1986, the micro/macro link may become more tenuous because no Senegalese macroeconomist is being trained to examine this issue at the station level.

One of the crucial linkages between micro and macro components at the field level in the Fleuve region will be a monitoring effort to guage the effects of changing price policies/subsidies and the reorganization of SAED. The character of these changes will have a direct influence over decision makers in agricultural policy at the national level. The linkage between the micro and macro sectors could be made by comparing the goals of the farmers and the goals and policies of the GOS.

One other study carried out in the Fleuve with PSR/BAME cooperation was a preliminary study on meat marketing and evaluation of the main market in the Fleuve: St. Louis. No assistance from BAME was forthcoming. The PSR team in St. Louis has proposed a joint PSR/BAME research effort on the marketing of tomatoes and cereal grains other than rice. It is unclear whether these needs can be met.

Because the Fleuve program is just getting under way, it is important that the research staff at the field level not get over-extended. It is suggested, as it is planned under the new OMVS II project, that the current macroeconomist (Morris) be replaced as soon as possible after his departure, and that his replacement directly coordinate his research priorities with those of the PSR team.

c. Other reflections on departmental organization and on BAME/PSR linkages

The present situation where the head of BAME and PSR has been the same has had certain advantages and perhaps also some disadvantages. One of the main advantages is the existence of a fair level of coordination between the two groups. The head has appeared to delegate some control of the selection of subject matters to individuals and groups of researchers but he has very good ideas on how BAME should be extended in the field. Observations in the Fleuve and in the Sine Saloum (not in the Casamance) indicate an added advantage in the BAME/PSR relationship. By attempting to integrate PSR teams into ongoing BAME projects in a bottom up approach, the PSR staff has been able to somewhat downgrade its dependence on uncertain flows

of funding from Title III programs and BAME has had a direct input into PSR studies. One of the drawbacks, however, of joint leadership of BAME and PSR is the tendency to spread researchers too thin, though this problem also has something to do with the small size of BAME in general.

It seems likely that without linkages to the PSR program, BAME might become just another research bureau which would then come under control of the Direction Generale. It seems that BAME is better off where it is organizationally so that macro and microeconomic researchers are at least in the same physical location.

To generalize about the "ideal" arrangement for BAME/PSR in terms of administrative and/or effective research linkages is difficult because the results observed and the opinions gathered are mixed. However, the informal working relationship between BAME and PSR should become more formalized. More coordination is needed in the sense that both groups' research priorities ought to be met within the scope of a combined budget to achieve a well coordinated research agenda. Informal agreements may not, necessarily guarantee that information required by either groups will actually get collected, especially if more special projects are requested by higher levels of the GOS.

Finally, the importance for BAME's research work of microlinkages work appears to be more openly recognized by the MSU economists than by the other team members who are primarily technicians. While the fact that the issues linking the two sectors are mostly economic in substance, these linkages are important to the approach adopted by SARPP. Thus, the importance of such linkages should be clearly explained to all PSR teams on all BAME's members.

I. BAME/CSAG

The Central Systems Analysis Group (CSAG) has devoted most of its time and activities to program planning and support for the PSR Department. At the outset, CSAG was mostly concerned with donor agreement, documentation reports, and control over the PSR regional teams. Gradually, it has increased its contribution to the following activities:

- Scientific support for young researchers in preparing theses;
- In-service training by offering a series of workshops to introduce researchers from other ISRA departments and development organizations to concepts of PSR;
- Attending a variety of short-term training programs and conferences sponsored by the World Bank, ILCA/IITA, FSU/SAFGRAD, the Sahel Institute, FSSP, USAID, UNSO and CIRAD; and

- o Coordinating internal review of activity and synthesis reports, working papers, research papers and research series and non-departmental scientific paper before publication (PSR Progress Report, March 1985).

The PSR Department continues to face problems in its lack of direction of this core group. 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.

The quality of past scientific reports has been deficient. During the period of 1982-1984, there was poor coordination with other departments. In order to obtain CSAG high quality reports, CSAG has instituted more rigorous standards on the preparation and distribution of research results. This position is aimed at training and improving the editing ability of young staff members.

The mandate, organization, financial and human resources of ISRA have been well presented in Volume III of the Assessment of Agricultural Research Resources in the Sahel, prepared by Devres, Inc. in August 1984.[8] Successful coordination among ISRA departments requires that the administrative staff understands the viewpoints of the technical staff and that the department is motivated to perform its role. A "jealous" attitude of other departments towards leading the department creates segmentation of the sectoral activities. The PSR Department is one of the leading departments of ISRA. Hence, coordination among ISRA departments must be a prime responsibility of ISRA management and not be left to the initiative of the department heads. This is a general issue within ISRA and not one that concerns only CSAG. Improving linkages between CSAG and BAME/PSR will be easier to achieve as part of an overall effort to enhance formal coordination between all departments within ISRA.

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[8]Devres, Inc. and l'Institut du Sahel, gen. ed., Assessment of Agricultural Research Resources in the Sahel, 9 vols. (Wasnington, DC: Devres, Inc., August 1984), vol. III: National Report: Senegal, by Moctar Touré, pp. 91-117.

III. EVALUATION OF PRODUCTION SYSTEMS RESEARCH (PSR)

A. Introduction

The approach used for the evaluation of the PSR of the SARPP is illustrated in the schema provided in Annex 6.II. Each phase of the production systems research model is associated with activities and criteria against which the success of implementation of each phase and related activities are compared. These criteria correspond to the overall Terms of Reference for evaluating the PSR program.

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. Within the Senegal PSR programs, some variability in the order of implementation of each phase does occur due to a) the existence of previous agricultural research efforts and their quality, b) the different characteristics of each environment, and c) access to resources to carry out a PSR program.

The PSR phases do not have to be followed in a strict sequence. Since the overall objective is to get improved technology or management practices adopted by farmers, the stage at which to begin research depends on the level of knowledge and experience of researchers and farmers, the complexity of farming systems, and character of the major constraints selected for research. Each of these determining variables differs in one degree or another in the three PSR programs discussed below.

The relationship between the PSR phases and their associated activities are not hierarchical, but interactive. PSR takes place in a dynamic on-farm level. There is constant feedback between all phases of the research effort and among applied and basic researchers, farmers, and extension-development authorities. New problems are identified, proposed solutions are reexamined and evaluation criteria may change. The extent of redefinition of constraints to production and testing new solutions depends upon the thoroughness of the research effort and changing economic and physical variables (cost/price relationships, availability of inputs, soil fertility, the vigour of seed varieties, etc.).

It is important to note that production systems do not correspond to agrarian systems. Production systems research 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). Agrarian systems would entail data collection efforts much broader in scope and depth including all consumption and expenditure flows and stocks and flows of resources both on- and off-farm. The monitoring team agrees with Bernsten's observation about the scope of the socioeconomic research which is necessary in PSR projects:

> "Socioeconomic research should be highly complementary to the biological component... To insure that only the data required to perform the intended analysis is collected, the analytical model must be specified as trials are planned and before surveys are designed. While a lot of socioeconomic information may be interesting, only a subset of that information impacts on technology adoption. Consequently, the research team must avoid too broad an inquiry and set boundaries that are defined by anticipated interactions between the technology being tested and specific socioeconomic phenomena expected to limit adoption."[1]

A basic argument among FSR practitioners is the number and type of socioeconomic issues which affect technology adoption and consequently the range of issues for which data must be collected and analyzed.

The depth of the information required on the technical level is a decision based on the level of knowledge of available physical resources and their current use. Because of the many interactions between climate, soils, plants, and human management the technical research component is usually a more complicated process. This situation has had implications for the character and amount of data collected at each phase of the FSR program.

A basic issue of FSR concerns the decision over who's goals are to be met through the implementation of FSR. The goals of the predominant groups mostly involved in FSR (researchers, farmers, and government development and extension personnel) are not always compatible and are frequently at odds within a given time frame. FSR needs to account for more than just the production potential, it needs to identify/develop appropriate technology. "To be appropriate, the technology must be technically adequate (i.e., is better than the producer's existing technology) and within the capacity of producers to adopt." Because a complicated set of criteria need to be met before technologies can be recommended, the FSR time frame becomes longer than expected and can slow down the transfer of recommendations to development-extension services.

Another issue in FSR is the choice representivity versus varietability in guiding data collection and analysis. The issue is raised at two levels for each phase of the FSR program--socioeconomic and technical data collection. The importance of the initial choice is apparent when it is necessary to recommend technology over a

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[1]Richard Bernsten, Mission Report-Summary, Overview, Observations, Senegal Agricultural Research and Planning Project. (East Lansing, Michigan: Michigan State University, Agriculture Economics Department, February 1985).

homogeneous area and to be sure that recommendations are based on reliable and representative data.

The global objectives of the PSR team are to:

- o Analyze farmer production systems and their environments;
- o Identify constraints and prioritize them for research,
- o To experiment with and evaluate with farmer participation solutions responding to identified constraints; and
- o To participate in the extension of identified technologies through local development organizations.[2]

The ultimate criteria for deciding upon the overall adequacy of PSR is farmer acceptance of recommendations which are "environmentally sound, extendable by development authorities, culturally acceptable, and most important, relevant to the goals and resources of the target group, farmers'."[3] However, in a dynamic environment where changes may occur in national decisions and goals, and the character of extension services may vary in ways which significantly affect the goals of farmers, PSR may be hard pressed to consistently meet all of these criteria over a long time frame.

Technically speaking 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.

The evolution of each regional PSR program in Senegal has been well documented since their respective start-up dates (see Annex 3). Some of the issues to be addressed regarding progress made in implementing PSR include the following:

- o Suitability of the PSR approach thus far, including:
  - -- Adequacy of data collection and analysis in addressing the agronomics and economics of agricultural production techniques/systems;
  - -- Utility of FARMAP and MSTAT in support of PSR programs; and
  - -- Quality of PSR data analysis and reports;

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[2] S. Sall, M. Kamanga, J. Posner, "Recherche sur les Systèmes de Production en Casamance," (Note Methodologique, Centre de Recherches Agricoles de Djibélor, ISRA, Djibélor, septembre 1982).

[3] Bernsten, Mission Report.

- o Timeliness and adequacy of resources in support of PSR programs (training, technical assistance, documentation, data analysis, ISRA personnel and operating budget);
- o Effectiveness of linkages between BAME and PSR programs;
- o Degree of coordination provided by the Central Systems Analysis Group and PSR Department;
- o Nature and effectiveness of linkages developed between ISRA (PSR) and Regional Development Agencies;
- o Degree to which ISRA (PSR) is collaborating with other research programs; and
- o Extent to which PSR research results are being incorporated into extension recommendations and adequacy of dissemination of research findings.

For this evaluation emphasis is placed on the PSR program in the Basse Casamance because of its longer duration and the completion of several of its activities.

B. The Basse Casamance PSR Program

1. Introduction

The Basse Casamance PSR Program started in February, 1982. The original PSR team was comprised of two agricultural economists and an agronomist and research activities were to be limited to the administrative area of the Basse Casamance. Under the SARPP project, Michigan State University provided the Basse Casamance PSR team with a senior agricultural economist and short-term technical assistance for computer programming and improvement of software. The senior agronomist was assigned to the PSR team from the USAID/Basse Casamance Development Project implemented by SECID. The second agricultural economist was a GOS counterpart. Today, the Basse Casamance PSR team consists of the original team plus a second agronomist, a sociologist, an animal scientist, a farm machinery expert, and a third economist. The farm machinery expert and third agricultural economist were trained in the US to the MS level under the SARPP project. A gradual increase in the scope and depth of the PSR effort has been reflected in the increased number of staff on the PSR team.

2. The suitability of the PSR approach

a. Adequacy of data collection and analysis

The Basse Casamance PSR team, with support from the PSR department in Dakar, has prepared an impressive collection of documentation which describes, step-by-step, the research procedures

and themes, and data collection and analysis activities carried out since the team's inception. These reports include: Working Documents, Seminar Reports, Annual Reports, Minutes from Meetings with the Central Systems Analysis Group (CSAG), and Activity Reports. For the most part, this documentation is well summarized in a Mission Report authored by Richard Bernsten which is an invaluable document for a detailed description of all PSR socioeconomic and technical data collection and analysis activities up to February 1985.[4] The Mission Report also has served as the basic document for planning the Basse Casamance 1985-1986 research program.

(1) Phase I and II of PSR

In the first four months of PSR activities (February-May 1981), the first two phases of PSR research were completed including an extensive literature review. A rapid reconnaissance (exploratory) survey was carried out and analyzed and research themes were selected.

The literature review, along with discussions with local development extension and other research personnel, confirmed that the Basse Casamance had been the subject of very little relevant applied agronomic or socioeconomic research.[5] Information was exchanged with other researchers active in the Basse Casamance, as well as the Agricultural Development Organization for the Casamance (SOMIVAC) and the Interministerial Project for Agricultural Development in the Casamance (PIDAC) agents, to better orient a prospective on-farm research effort. In the case of PIDAC, specific attention was given to the technology packages being extended by that agency at the time (sole cropped field corn and direct seeding of tidal and upland rice).

The above activities led to the establishment of a census and implementation of informal surveys in 30 villages (about 10 percent of all villages in the Base Casamance) throughout the Basse Casamance. These villages were purposely selected with the collaboration of PIDAC agents and with the intention of obtaining an adequate representation of the different ecosystems in the Basse Casamance. This crucial first step in the identification of unique ecosystems served as the basis for a later, more refined definition of different production systems for each of those ecosystems.

(2) Exploratory (rapid reconnaissance) informal survey

The purpose of the census and exploratory survey was to measure resource stocks and identify the primary production constraints faced by farmers. The focus on constraints permitted the definition of precise surveys to be used during the exploratory

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[4] Ibid.

[5] Sall, Kamuanga, Posner, "Recherche sur les Systèmes de Production".

survey. The results of the exploratory survey also permitted the definition of the broad research themes to be studied more in-depth for Phase III research (discussed below).

The exploratory survey was a multidisciplinary effort and was executed with the assistance of personnel from ISRA's Crops Department over a two-month period. Data collection was not implemented on the basis of preestablished questionnaire forms, but organized around a list of informal discussion topics which included: village history, evaluation of rainfall, availability and organization of the decision-making process, cropping patterns, agricultural calendar, consumption patterns, use of farm equipment, importance of non-cropping activities, farm credit, storage, marketing, farmers opinions for improving production systems, and the objectives to be met from production. These topics were discussed with mixed groups of men and women and with individuals of each sex. The major problem with this approach was the misidentification of researchers for extension agents which resulted in the emphasis of major technical problems to the exclusion of secondary ones which could assume greater importance in the future.[6] After each visit, the PSR team discussed the information gathered to confirm that each discipline had an agreed upon interpretation of the results arrived at.

b. Zoning

The results of the census and informal survey were used to define five unique production zones and focus further research efforts during the first crop year. The zoning activity was based on three criteria: type of labor organization (division of labor by crop and by activity), the importance of animal traction, and the importance of upland crops versus rice. The guiding principle and the zoning activity 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".[7] The geographical location of the five zones is presented in many of the documents produced by the PSR team.

Since the zones were established was accomplished it has been reviewed by members of the Djibélor PSR team and the PSR Department in Dakar.[8] The review has centered around both the criteria used to zone the Basse Casamance and the geographic demonstration of the zones. This has direct implications for the type of socioeconomic and technical research carried out, what major constraints are identified which will guide secondary data collection and technology testing, and

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[6] Ibid.

[7] Ibid.

[8] Ministere de la Recherche Scientifique et Technique, Institut Sénégalais de Recherches Agricoles (ISRA), "Compte-Rendu de la Mission CGAS à l'Equipe Systèmes, Djibélor, 27-28 mars, 1985."

finally the selection of technologies or improved management practices which can be extended to a homogeneous area or type of farms.

The original zones were delimited using an adequate amount of collected data and an adequate system of data analysis. Based on field observations and analysis of socioeconomic and agronomic data collected in subsequent years, the original zones have withstood the test of time. Minor changes in the boundaries and the addition of one criteria (the importance of fishing in the production system) have taken place. The PSR team holds regular sessions to reevaluate its zoning criteria and the boundaries of the original zones. These sessions are based on the accumulated knowledge of the researchers and the analysis of production data. Presently, the team is considering further precision based on the management and type of livestock present in each of the zones. The PSR team also realizes that many other secondary criteria could be used to define production zones (degree of salinity, duration of the presence of extension services, other agricultural activities) but which would a) disperse the area into several smaller zones therefore increasing the costs for all PSR activities, b) pose logistical problems, and c) make it difficult for extension services to provide specific technology packages over a large area.

3. Identification of research themes, selection of sample households and formal surveys

a. Identification of research themes

Following the definition of the five major production zones and again based on the findings of the exploratory survey, four primary research themes were chosen around which a research strategy was based.[9] These themes were composed of:

- o Intensification of production on good land by increasing rice yields in low lying inland valleys through introduction of fertilizer and improved varieties;
- o Diversification of the cropping system by introducing a late seeded crop (sweet potatoes, cowpea, sorghum/millet) that would not compete for labor required by the existing cropping pattern;
- o Rehabilitation of higher rice land that had been abandoned due to a falling water table or low lying rice land abandoned due to salt intrusion into mangrove swamps; and
- o Planting of a relay crop (sweet potatoes) to take advantage of residual moisture

[9]Bernsten, Mission Report.

The overall purpose of identifying these research themes was to find ways to help farmers adapt to continuing drought conditions. The themes have laid the ground work for planning data collection efforts for the PSR team. As such, they need to be evaluated for their adequacy in addressing major production constraints in the Basse Casamance. The research themes are comprehensive and are relevant to the major constraints facing farmers; labor shortages, continuing loss of rice lands, and overall decreased agricultural production. The themes are considered adequate because they also are designed to retain some flexibility within current production systems. The major observation regarding the selection of the research themes is their scope. A future theme could be the control of soil erosion if the current trends in population growth, increases in livestock, and adverse climatic conditions continue. Another possible study theme could center around the use of management of energy. A more global approach, and an important theme, for the Casamance is food security. These themes could very well imply a change in survey sites and data collection strategies. Such an approach would require the PSR to have information from the farm level. It would also link the PSR work with more important macro issues such as marketing, price policy, input supply, and environmental protection.

b. Sample household selection and surveys

Before implementing a formal round of verification surveys in the five production zones, the PSR team selected two villages within each zone in which to focus in-depth studies. A random sample of households was selected in each village. This gave a total sample of 125 households, 235 independent farms, and some 1,300 plots.

The villages were purposely selected to respond to the need to capture as much variability within the zone and to select villages as far apart as possible. One of the two villages is a "village-laboratoire" where new technologies would be tested in agronomic trials. These are set up to be operated with the management and inputs of the farmer. Also, in the first village a program of agro-socioeconomic surveys are included (FARMAP). Here, an agronomic field questionnaire was designed to collect detail plot level information on each farm.

The second selected village is the focus of only agro-socioeconomic surveys which would permit the verification of information gathered in the informal exploratory survey, i.e., major constraints and reevaluation of criteria used to define zones. The major focus of the agro-economic studies in these villages, was to obtain a) descriptive information (demography, ethnic composition, infrastructure, available manpower), and b) detailed information or production practices and constraints, by operation and by crop. During the first year (1982-1983), the socioeconomic and agronomic data collection was combined and in all subsequent years collected separately.

The character and numbers of surveys have changed since the PSR program began. In the agronomic survey, the number of plots on which information, e.g., crop management practices, inputs used, outputs produced and plot characteristics, was gathered decreased from 1,300 to 1,100. For basic demographic and stock resource data (agro-socioeconomic), the sample of 235 farms was decreased to 150 farms (between 1983-1984 and 1984-1985) and detailed resource flow data reduced to a sub-sample of 30 farms (to three farms per village for 1984-1985).

The details of the evolution of both socioeconomic and agronomic survey work up to the present time is well summarized in the Mission Report by Rick Bernsten (see Annex 3). The overall objective here is to provide comments on the overall adequacy of data collection and analysis in the first two phases of PSR research as it relates to agricultural production techniques/systems.

The first issue is related to sample size. For the socioeconomic and agronomic survey data the sample sizes are adequate. It was observed that there existed very little variability in key parameters within villages compared to the variability between villages and zones. Therefore, reducing the sample and carrying out a more comprehensive study on a reduced number of farms has resulted in a reduced volume of data collected and lower costs. It also makes the data more manageable at the time of analysis.

The decrease in the sample size was not an arbitrary decision. At the end of the first year, a larger number of sample households was justified in order 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 some major economic variables across households and decided that enough similarities existed to allow a decreased volume of data collection effort in the second year. At the same time, special focus studies carried out from 1983 have tried to gather more detail on crucial issues (land tenure, animal traction, off-farm work, migration).

The trends towards decrease in sample size and a tightening of research focus has been carried into the 1985-1986 program. With a baseline experience of nearly three years, the research effort has been narrowed to information required to monitor major constraints. This evolution in the PSR team's data collection activities is sound from two perspectives. First, it forces the team to focus in on major questions of importance and to attempt to define solutions which can be immediately tested or verified. 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. To have kept the original sample size and extensive data collection effort would have demanded a larger staff for both data processing and analysis.

Aside from sample size in relation to the data collection effort, there is an issue as to the size of the data set generated and what is to be done with it. The Basse Casamance Project has generated a rich data set which can be more intensively analyzed than it has been in the past. We agree with Bernsten's suggestions that five major tasks should be undertaken as follows:

- o Description of an integrated system;
- o Conduct of more socioeconomic analysis (cost of production, sensitivity analysis, inclusion of implicit costs, use of yield/ha/day) of on-farm and on-station trials;
- o Linear programming analysis;
- o Analysis of micro/macro linkages; and
- o Regression analysis.

The integrated systems report was not given precedence but it has almost been completed in draft by the team.

In terms of a direct output for the PSR team or other researchers to utilize, regression analysis will be the most useful in identifying the variable which most explains identified constraints. This will require a merging of the socioeconomic and agronomic data sets over plot levels, farms, households and villages. The PSR team is planning to merge a small subset of the two data sets to see how much time it will take.

Serious consideration should be given to merging the entire data set on mainframe computer at MSU and running the regression analysis there to speed up generation of results and analysis. Results could be forwarded to the PSR team of Djibélor and subsequently screened before asking that more biological research be done.

Priority attention should also be given to carrying out more socioeconomic analysis of past and present on-farm trials. The "appropriateness" of technology could be re-evaluated by using changing estimation of costs and returns for a particular type of farm model.

C. Progress Assessment of the Basse Casamance PSR Program

1. Data collection

a. Socioeconomic

(1) Farm records

Data was collected in two phases. In Phase I, data collected from an informal reconnaissance at 35 villages in early 1982 was used to identify four research themes; in Phase II, three principal

data sets were obtained from agronomic surveys, farm surveys and on-farm tests. Agronomic data was collected on 1,300 plots (235 farms) in 1982-1983 and on 1,100 plots (150 farms) in each of two subsequent years (1983-1984 and 1984-1985). An economic survey was conducted in conjunction with the agronomic survey in the first year on the same plots. Both data sets were analyzed using BRADS.

Economic data was collected separately on 200 plots (150 farms) in each of the following two years. Data was analyzed using BRADS/FARMAP.

(2) In-depth subject matter study

Analysis of agronomic data collected over three years has provided a rich database on the importance of each crop, yields, crop rotation, parcel size and frequencies, seeding-to-weeding interval, land tenure, and management practices (see Bernsten 1985).

Analysis of economic data has also provided sufficient information on description of demographic characteristics, labor requirements by activity/crop, equipment use, cereals availability/farm, crop calendar, labor use by type/operation, revenue by crop and farm, costs of production, and gross margin. Preparation of a monograph based on these data sets is underway.

A new multidisciplinary study approach considering the village as the subject matter not a passage plan starts focuses on:

- Organization of the village and its institutions;
- Exploitation of aerial photos to assess land use;
- Retrospective survey of livestock;
- Agro socioeconomic study on the effect of anti-salt dams (Oulampane, Katoure, Bandjikak, Boulom); and
- Study on non-agricultural activities contributing to farm income: fishery at Seleky, and fruit crop at Boukitingo and Bandjikaki.

b. Technical

The research strategy was formulated around four themes identified in section 3a. The PSR team finished a set of three-year field experiments. Standard agronomic statistical techniques were used followed by an economic analysis of each treatment.

(1) On-farm trials

The number of on-farm trials increased from 34 in the first season (1982-1983) to 86 in the second and 112 in the third season. Eight crops were tested namely rice (upland, flooded, aquatic), cowpea, maize, sorghum, sweet potato, cassava, millet, and peanut. Three main types of treatments were varieties, fertilizer and weed control.

(a) Replication

Most trials were replicated across villages in up to five replications. Some on-farm trials in the intensification theme on maize and peanut were not statistically significant due to the lack of replications. On-farm trials were conducted on small plots (15 m^2) and on large-scale farms (up to 4,000 m^2) as demonstrations and as seed multiplication plots.

(b) Verification

The agronomic follow-up and field experiment were noted in more detail in various technical reports. They are summarized in the paragraphs below.

The follow-up in the plateau showed that peanut in mono-cropping accounted for 30 percent, in association with sorghum (42 percent), and in association with rice or niebe or millet (9 percent). Yields never attained more than 100 kg/ha. Among three varieties, Bourkousse was appreciated by farmers for its tolerance to weed.

Maize was evaluated in Zone III, IV and V. Variety ZM-10 accounted for 65 percent of the follow-up area. Variety BDS supplied by PIDAC was found in Boulom. Observations showed that maize is suitable in "Champ de case", not in poor and hydrophormic soil.

Upland rice "strict" was suitable in newly cleared Zones I, III, and Va. The improved variety 114B/g accounted for 13 percent and needed a longer period of fallow.

Millet variety Sanio was identified in Zone IV and Vb. It was found to be attacked by Pentatomidae Coreidae.

Sorghum was mostly in association with peanut in Zone IV and Vb. Results of the varietal improvement trial in diversification theme showed that short cycle varieties of 100 days (V_2, V_3, V_6, 51-69) were superior to local varieties.

Niebe was identified in five zones. Three improved varieties (Ndiambour, Mougne, and NGG-16) were compared with two local varieties. The experiment did not show a positive result.

Cassava appeared to be less important due to the Cochenille Phenacoccus manihote and mosaic.

Sweet potato showed a satisfactory potential yield and fit the cropping calendar. Variety NDargu, without fertilizer, yielded 3,700 kg/ha.

Aquatic rice accounted for 11.11 percent (1982), 82 percent (1983) (of follow-up area) of which 7 percent received manure, 67 percent received 35 kg urea/ha. Direct broadcast method was used on 82 percent of the area while in line was used on 18 percent.

Flooded rice accounted for 8.7 percent (1983), 13.6 (1982) of follow-up area.

With ethnic heterogeneity and micro-variation in topography, the cultural techniques changed from one system to another. Direct seeding of maize, sorghum, and millet with the distance 80 cm x 60 cm provided 18,000 plants/ha in 33 of total 48 panels observed. Hence, the thinning theme should be studied to reach an optimum density of 42,000 plants/ha.

The findings of productivity with regard to labor allocation were compared in on-station trials and on-farm trials in four villages. Three varieties used in the experiment were peanut 69-101, maize CM-10, upland rice strict 144B/g. Yields obtained in on-station trials were 877 kg/ha for peanut. Maize was less labor-intensive than rice in a ratio of rice 1-1.95, peanut 1-1.35. The cost benefit ratio for maize was 0.51-2.7.

A series of trials on weed control indicated positive results. Trials at Djibelor showed that weeding on upland at two, four, and six weeks after the seeding date would be recommended. Weed control by lining herbicide (Ronstar 250 CE) on flooded rice was conducted. Its cost benefit ratio was 2.45. Fertilization trials on maize showed that the rate of 75 kg of 8-18-27 was recommended with a cost benefit ratio of 3.54, while the agronomic follow-up found that maize received only 44 kg urea/ha at the first weeding.

Three-year experiments have provided a large agronomic data set on biological research. Assessment of variety treatments of eight crops tested in collaboration with other departments showed that rice varieties could be recommended to farmers with confidence. Types of rice varieties adapted according to topographic sequence were proposed to PIDAC: five upland rice types (IRAT 10, IRAT 112, DJ 11-509, IRAT 113, and DJ 12-519), seven aquatic and flooded varieties (IR 1529-680-3, BR 51-46-5, BR 51-118-2, IR 22, IR 442, and Rock-5) including variety resistant to a certain level of acidity (DJ 684D).

It is noted that further varietal improvement tests on maize, millet, sorghum, cassava, sweet potato, etc., should be conducted by the Crop Production Department to conserve PSR team resources for concentration on the most important crops and selected technologies.

An assessment of fertilization treatments (especially fertilizer rates) was carried out in experiments on maize, peanut and aquatic rice in the intensification theme and showed that further complementary research work by the soil fertility unit at the Djibélor should focus on crop response to each element N, P and K. The existing fertilizer application rates recommended to farmers by PIDAC can be reviewed when such complement to PSR results is completed.

Assessment of weed control treatments showed that technologies tested did not provide a solid result. More research work on this issue needs to be done. The trade-off between ridge and flat cultivation is still inconclusive in the present technology. Some positive results were obtained such as direct seeding method of rice, cropping pattern of theme 4: rice-sweet potato in using residual moisture by planing a relay crop.

In recent years, introduction of power tillers from China (1969), North Korea (1981), Japan (1984-1985) has not given any positive prospect due to multiple problems of maintenance and high energy cost. PIDAC has started finding ways to promote animal traction. The PSR animal specialist and the agricultural machinery specialist should seek to identify new alternative techniques in animal traction acceptable to farmers.

(2) On-station trials

On-station trials were a complement to on-farm trials. The number of on-station trials was limited to three in the first season and to seven in each of two subsequent seasons. Experimental design with sufficient repetition was used in collaboration with researchers from other departments.

It is observed that it has taken a longer time for the PSR teams to develop cropping pattern recommendations based on field trials for each of the five zones in Lower Casamance than on the basis of on-station trials due to the erratic rainfall patterns, the micro-variation in topography and the ethnic heterogeneity.

2. Farmer participation

On-farm trials were conducted by PSR enumerators (enquêteurs) who could not establish further dialogue with farmers like the role of extension agents. The contribution of farmers in defining field experiments was not taken into consideration following the agro-economic surveys and the building of research protocols. This approach is quite different from the dialogue tests conducted by PSR teams in the Fleuve Region. Hence, farmers who participated in those

experiments might adopt new technologies tested in their fields. The PSR approach and concept were very well presented in the Ziguinchor Workshop 1984. It appeared that the step from prediagnostic to diagnostic could be shorter when farmers entered the field dialogue before formulating protocols of treatment.

3. Coordination with extension and development and other research projects

a. PSR staff

The PSR team in Ziguinchor has a present staff of eight (six Senegalese and two expatriates). The same expatriates have worked in the team since 1982. The expatriate agronomist worked at both levels recently in Ziguinchor and in Dakar. The Senegalese team members increased in number from one in 1982, three in 1983 and six in 1984-1985. Two out of four participant trainees in the US finishing their confirmation memoires have joined the team. All Senegalese team members are young and need a back-up from CSAG, especially the animal technician. It is observed that the coordination efficiency within the team declines as soon as new team members are introduced.

Coordination between PSR and ISRA departments

The Ziguinchor Workshop 1984, on the PSR approach, elaborated a constructive scenario where PSR scientists and basic research scientists work together. ISRA administration is making efforts to motivate the collaboration of other departments under the leadership of the PSR Department. At the regional PSR team level, it appeared that a strong PSR field team coordinator with three or four PSR researchers should be maintained to avoid staff expansion and the duplication of research work. PSR teams should call in support from concerned departments for specific issues.

Currently, rice selection is the main research work at the Djibélor Center directed by an acting director who reserves 20 percent of his time for rice research. Varietal improvement work on a collection of 3,000 varieties focuses on upland and fresh water types, not much on varieties resistant to salty water and acid soil. Some F2 lines of mangrove type from Rokupr Sierra Leone are under study at the Center. Rice researchers have worked closely with PSR teams. Research work on maize, sorghum, millet and other food crops is planned by the Crop Production Department. Some trials were jointly designed and implemented. A US-trained researcher in soil science stationed at the Center will support PSR in future fertilizer experiments. Documentation and distribution of technical reports have still been slow.

c. Coordination between PSR and SOMIVAC/PIDAC

The collaboration between SOMIVAC/PIDAC and PSR has been coordinated through the Development Research Liaison Group (cellule de Développement - Recherche). The first meeting was held in June 1984. Since then, seven technical committees have been created namely PSR and technological transfer; irrigation; seed production factors; agricultural policy; rice; animal production; and agricultural machinery. An eighth committee of agricultural statistics and computer analysis is proposed. It is noted that specialists of both organizations have defined working agenda and specified technical issues of mutual interest. PIDAC showed signs of impatience to get recommended technical packages. It is suggested that technical committee meetings be held more often to facilitate coordination.

For the time being, the most active PIDAC programs are in rice and maize production covering 13 areas in Kabrousse, Oussouye, Nyassia, Niaguis, Tenghory, Diouloulou, Oulampane, Ounck, Badiana, Sindian, Djibidona, Kartiack and Tendouck. Yields in the 1984-1985 season were low, 1.45 t/ha for rice and 725 kg/ha for maize. Through more frequent meetings, PSR could introduce new findings to update extension technical materials. It is also suggested that future PSR on-farm verification trials be jointly implemented by PIDAC/PSR.

D. The Fleuve PSR Program

1. Data collection

a. Socioeconomic data

(1) Farm records

In August 1984, an exploratory survey was conducted in 18 villages and 500 households in three of the seven priority zones (two zones were resolved for case studies and two zones have no interest). A field "village" level questionnaire was devised and used to collect detailed information on history, demography, social organization, infrastructure, irrigated, upland and flood recession crops, agricultural machinery, livestock, other agricultural activities (fishery, hunting, etc.) and nonagricultural activities. An aerial inventory of livestock, gardens and immigration camps, a synthesis of diagnostics conducted since 1978 and an agronomic follow-up at Ndombo-Thiago and Boudoum-Nord by the PSR agronomist complemented the field survey.

(2) In-depth subject matter studies

Past PSR studies focused on irrigated crops in the following areas: supply of services, machinery and farm equipment, crop diversification, water management, farmer group assistance, credit and farm budgeting. The Organization for the Development and Operation

of the River Deltas of the Senegal and Falème River Valleys (SAED) also proposed a plan for a study on forage production.

The objective and approach of PSR are very well defined in the "Note on Farm Trials Conducted in Collaboration with SAED, July 1984". The following activities were carried out in 1984-1985:

- o Exploratory survey, sampling and zoning: seven geographic zones of the Fleuve Delta were identified;
- o Aerial inventory of livestock, bibliographical summary on livestock and forage cropping possibilities: new data indicate that there are only 20,000 oxen instead of the old figure of 150,000;
- o Survey of agricultural by-products used for livestock feed. Analysis is underway of the data. The main by-products were rice straw, bran, broken rice, tomato, molasses and peanut cake from the South;
- o Survey of meat marketing: each zone contains an important meat market. In addition to local output there is a massive import of sheep from Mauritania for Tabaski (a major Moslem holiday). An in-depth study is proposed;
- o Fertilizer distribution study in association with BAME; and
- o Sampling, which has been conducted in five zones: Lampsar, Boundou, Ndombo, Thiago Podor and Matam.

b. Technical data

(1) On-farm trials

In association with SAED, on-farm trials were conducted on a large scale: dialogue trials from 0.3 to 2 ha for rice, from 0.1 to 0.5 ha for tomato. Small plot (25 m^2) on-farm trials were also designed by the PSR team as a complement to the dialogue trials.

Three variables were studied on the rice trials: varieties, fertilizer, and land preparation. Four subjects were examined in the tomato trials: varieties, transplanting dates, ridge cultivation techniques, and plant protection.

(a) Replications

Dialogue trials were conducted across three zones of Boundoum, Lampsar and Ndombo-Thiago with up to seven farmers in each trial. Where only one for farmer took part, two trials were carried out.

On-farm trials with small plots involved seven or eight farmers per zone. For these tests, each farmer carried out two trials.

(b) Verification

Part of three experiments with rice have given significant results. Urea application rates of 50 to 80 N appeared to be sufficient. The results of P fertilization, plant varieties, and soil preparation are inconclusive. These trials will be continued in the next season. The results of trials on tomato are not yet available since the harvest had not yet taken place.

Failure of on-station trials at N'Diol has made statistical interpretation of results obtained from on-farm trials less reliable. In the future it is important to plant a larger plot in order to prevent loss from irrigation and livestock and thereby assure more significant results.

(2) On-station trials

No on-station trials were conducted at N'Diol station due to water management problems and a lack of operating funds. Results from Fanaye Station were not relevant for Fleuve Delta.

2. Farmer participation

Farmers were contacted in advance of the on-farm trials to discuss their problems in a series of triparty meetings (farmers, extension agent, 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.

3. Coordination with extension and other research projects

a. Organization for the Development and Operation of the River Deltas of the Senegal and Faleme River Valleys (SAED)

Although the agreement between SAED and ISRA is not binding, SAED still owes money to ISRA because the former is not satisfied with the results of past research. At present, however, collaboration between the PSR team and SAED (Division of Research and Development) is much improved. Further dialogue is still needed between the higher administrative levels to clarify the approach of the two organizations. The PSR team has undertaken to train SAED extension agents (80 conseillers agricoles), to assist in conducting seminars and field visits, to review technical documents and analyze results of on-farm tests. Certain research and development experiments of

mutual interest were executed, such as no-land-preparation techniques on rice, forage crops, and the utilization of agricultural by-products for livestock. At present, the National Center for Application and Improvement of Irrigation Techniques (CNAPTI) at SAED only obtains old or general technical information dispersed through various dissertations and reports. The Center, however, is working in association with the PSR team on updating the bibliography of all technical publications to help in the training of extension agents. The extension agents engage in dialogue with farmers in order to help the farmers in solving their problems. Research results are being disseminated through these trained extension agents.

b. West African Rice Development Association (WARDA)

In 1983 WARDA was asked by Senegalese authorities to conduct the PSR in the Middle Valley to avoid duplication of the work of the ISRA/PSR team in the Fleuve Delta. The two PSR approaches are quite different. The WARDA approach is based on the farm model in the Technology Evaluation and Transfer Program. This is a rice-based system. The WARDA team has a staff of three (two Senegalese and one expatriate). The data processing is centralized in Monrovia. Basic questionnaires are based on FAO patterns.

The team has conducted various verification trials at Fanaye station and adaptive tests in collaboration with SAED at the farm level. By way of background, WARDA started rice research in the Fleuve Region in 1976. Its approach has been changed from basic research (1976-1980) to production system studies (1980-onwards). Based at St. Louis, the team covers the research work up to Bakel. The potential contribution of WARDA research on rice in supporting the development project in the region is evident, but it appears carried out in an un-coordinated manner separate from the PSR.

No recommendations on rice cropping systems have been obtained thus far. Research work is underway. The operating budget appears to be adequate. Contact between the PSR team and the WARDA team is on purely personal basis. The two teams should be more formally coordinated or integrated and a clear determination made on the usefulness of the WARDA approach to rice research.

c. Institut de Recherche Agricole Tropicale (IRAT)

At the beginning of 1985 an expatriate from IRAT (France) arrived at ISRA St. Louis to re-institute the maize selection efforts which FAO staff left. This individual works closely with the maize breeder based at Bambey station and Senegalese at Kaolak.

d. International Center for Corn, Wheat and Triticale (CIMMYT)

No CIMMYT coordinated research work has been done thus far and only a few varieties of maize have been requested. The same can be said of the relationship with the International Institute for Tropical Agriculture (IITA).

In Matam, observations showed that maize yields are affected mainly by the date of planting. It appears that the diversification strategy should focus particularly on the maize cropping pattern. The CIMMYT contribution through the ISRA Crop Production Department would be especially useful in the Fleuve.

e. N'Diol and Fanaye Research Stations

A fruit crop nursery financed by British funds is established at N'Diol Research Station with one expatriate. The onion multiplication project financed from Belgian funds is underway at Fanaye Station.

4. Progress in the Fleuve

At the time of the evaluation visit the PSR team had only been organized as a team and at work through one full rainy season and on the site for a little more than one year. Inevitably therefore, its progress was limited because more time is needed to tackle the tasks which must be undertaken in sequence. Some individuals members of the team had been in the zone for a longer period doing basically discipline-oriented work. It was only after several SARPP-trained personnel arrived that the PSR team was organized early in 1984.

The PSR work has focused solely on the Delta Department within the Fleuve Zone. The methodology adopted reflects the standard generic approach but has been shaped to deal with the particular conditions in the Delta. While work was delayed somewhat at the outset due to the division of the MSU-provided agricultural economist's time to work on the BAME fertilizer study, the team has achieved some notable progress. The sub-zones have been defined and baseline data collected and the preliminary information has been circulated. In the off-season and to some degress in the rainy season training and public relations work has been carried out to familiarize extension personnel, farmers and the local public generally with the plans and objectives of the PSR.

There are some significant constraints to progress in the Fleuve. Funding has been inadequate to meet the objectives of the team as has generally been the case in all three zones where PSR work is in progress. Some members of the team were in the field doing discipline-oriented research and were not trained at MSU. They need to be oriented to the systems-based approach of the PSR. Nevertheless there is an active intellectual ferment and good interaction among team

members which is resolving the differences between those emphasizing the practical and the theoretical. The team is weak in capacity for program conceptualization. The team's data capacity is very good but rests too heavily on the MSU staff. A Senegalese counterpart for the MSU economist is not yet available so it is of the greatest importance that the position be filled soon. The methodology for PSR adopted in the Fleuve is very broad in scope and expensive in terms of financial costs and human resource requirements. Collaboration between the PSR team in the Fleuve and the CSAG is improving, mainly through one-on-one contact but remains weak due to excessive work demands on the CSAG. The recently returned anthropologist who was trained at the University of Missouri has not yet had much time to contribute pending completion of her paper due soon after her assumption of field duties. She is experiencing some difficulties in being accepted and becoming integrated into the PSR team's work.

As resource constraints are likely to continue to confront the Fleuve team the broad scope and consequent expensive nature of their present study methodology presents a problem. It will be essential to set priorities for the work through tighter budgeting, planning and research management so that the greatest impact possible will be achieved within available funding.

E. The Sine Saloum PSR Program

1. Brief description

The PSR program in the Sine Saloum has nominally been in being longer than in the other zones where similar research is in progress. For a variety of reasons, however, the team has not achieved results as rapidly as elsewhere. The chief factors inhibiting progress have been the lack of infrastructure, extremely inadequate logistic and financial support and a consequent slump in morale. There is no computer capacity in Kaolack because there is no suitable facility in which to house a computer. Salaries have been paid late--sometimes very late. The team is deficient in capacity for program conceptualization even though a full PSR team is present at Kaolack. There is, however, no one from the MSU technical assistance group permanently assigned to the team.

2. Progress of PSR in Sine Saloum

Due to the constraints cited above progress to date in the zone is extremely limited. The research approach has been defined and preliminary data collected. Sub-zones based on agro-socioeconomic characteristics have also been delineated. The only publications so far prepared have described these activities. No annual reports have been issued. Some additional information on the activities in the Sine Saloum region may be found in Chapters 2 and 4.

F. Relationship of CSAG and PSR Departments with the PSR Field Teams

With the establishment of the decentralized and independent PSR Directorate, USAID decided to support a Central Systems Analysis Group (CSAG) in the PSR in order to coordinate the work of the regional PSR teams and establish a "coherent national work plan". The CSAG would also "provide valuable 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." The project would provide a Rural Social Scientist and operating support to the CSAG.

The assessment of the effectiveness of coordination of CSAG by MSU must take into consideration the fact that MSU does not retain either complete financial or manpower responsibility for resources allocated to the CSAG. This situation manifests itself in two ways:

- o The CSAG within the PSR Directorate in Dakar is not completely staffed by MSU or USAID funding; and
- o Funds to meet expenditures for CSAG coordinating activities are allocated from PL 480 Title III receipts which are controlled by ISRA and the Ministry of Finance.

The basic role which the CSAG has cut out for itself includes coordination, conceptualization and documentation review.

1. Coordination

Coordination of the work of the regional PSR teams really means that for certain types of information needed at the national level, the CSAG tries to encourage each team to collect and analyze certain specified kinds of data. This does not mean that the information has to be collected and analyzed by the same methods in each region. The CSAG recognizes that each region must develop its own ways of collecting data and also determine what important issues must be researched in depth. However, the CSAG does provide guidance in determining research issues.

2. Conceptualization

The CSAG will help PSR teams to conceptualize agricultural research activities. Technically speaking, the task would require that each phase of the PSR strategy is assisted by the CSAG once the PSR team has come up with a plan of action to carry out research (i.e., determine sampling frame or area to work in, carry out initial census and exploratory surveys, assist with zoning, and consult on a research strategy). The input of the CSAG has been carried out through two mechanisms; one-on-one cooperation between individual members of the CSAG and individual members of the PSR teams (not including memoire work) and, second, group working sessions between the PSR regional and CSAG teams. From discussions with members of both groups, it appears that the most frequent type of interaction is on a one-on-one basis.

The most frequent areas of interaction between the PSR teams and CSAG in order of importance has been the Casamance, Fleuve, and Kaolak. The Kaolak team feels it has been ignored by the CSAG but this may simply be because the Kaolak team has made hardly any progress in its field research program. The Fleuve team feels that they have not received much help because the CSAG trusts the field researchers at the post. The Casamance team, on the other hand, believes that perhaps there has been too much interference by the CSAG. It is important to resolve these various views on the degree of direction and support from the CSAG which is needed and appropriate so that the objective of more effective analysis is served.

The MSU staff serving on the CSAG also serve on the BAME. In addition, these same people get tied down in doing detailed administrative tasks which eat away at their time to do more constructive activities; go on field trips to PSR teams, comment on papers written by PSR staff, etc.

There is a legitimate need to have the CSAG; and at least in the case of the Casamance and Fleuve, it has provided important insights into the definition of the research program. 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 MSU 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-MSU 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? This is what is meant by the statement that the PSR departments continue to face problems in their lack of direction or self-definition.

One of the ways the CSAG has tried to cope with internal differences is to offer a series of workshops to introduce or reinforce the concepts of PSR amongst PSR team members, the CSAG, other ISRA departments and development organizations. One such workshop has been held under the sponsorship of the CSAG. 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.

One solution to this dilemma may be concentration on a one-on-one basis with field researchers in the form of technical backstopping and let each team develop its own unique systems approach. While

attractive, this option will be difficult to pursue in the near future because field PSR staff, with the exception of some MSU personnel, have only been trained to the Masters Level and will require some guidance in developing an overall long-term research program. A second option is to make sure that all members of the CSAG are committed to the systems approach; or at least its major features. Identifying features to look for include: a) is it farmer oriented and does it include farmer participation (including definition of research themes)? b) is the research interdisciplinary, and c) is the research applied and designed for a rapid turn-around of results. If there are members of the CSAG who are not willing to support these PSR aims, then they should be replaced. The evaluation team believes that as long as these three aspects of PSR are agreed upon, there is always room to determine how PSR can be done.

3. Documentation review

Another coordinating activity by the CSAG is to review PSR team documentation: annual reports, scientific papers, working papers, etc. We agree that because PSR is such a new research concept in Senegal and that research results are being disseminated to a wide audience, it is necessary to insure 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.

Again, the degree of control over documentation is a function of the level of training of the field staff. Many Senegalese researchers have never written "analytical" papers and need a lot of guidance. On the other hand, experienced writers always should have a third person help them edit their work. Which ever is the case, there will always be a need for the CSAG to review the documents.

One problem that has surfaced has been the management of the process of producing documents. Again, because CSAG staff are over-extended and CSAG has logistical problems (paper, ink, and xeroxing facilities) which have a tendency to turn into major bottlenecks and the timeliness of getting documents out has suffered long delays. The context of submitting PSR reports has not changed, but editing and clarification ultimately has to be done. With scarce time and insufficient material resources when they are needed, there have been numerous delays in getting papers out.

We found the role of CSAG for document editing and dissemination to be extremely useful. A further problem is that CSAG personnel are over-extended. This has slowed down the process of editing and finalizing papers. One possible solution would be to at least provide the Djibélor station with its own resources for documentation where reports could be turned out faster for the use of development and extension agencies. CSAG could still maintain an editing role but the responsibility for printing and disseminating research results would be shared with the research stations.

Despite the logistical problems mentioned above, the CSAG has managed to help edit and disseminate an impressive number of documents, mostly describing PSR research methods and findings. The CSAG has played a key role in guaranteeing high quality publications from all teams and serving as a clearinghouse to disseminate reports. This role could be further enhanced by unburdening the CSAG members with petty administrative details.

4. Other issues

CSAG has been affected, along with all other departments of ISRA, by the fiscal problems confronting the agency. In part this not only relates to an actual scarcity of funds but also reflects problems in general management, fiscal control and research management. Title III funds intended to support macro and microeconomic research priorities have been used to meet general overhead costs of ISRA. CSAG staff suffer from these problems enough that some are discouraged and are 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.

5. The future role of CSAG

The future role of CSAG in relation to the PSR program should be to:

- Backstop specific information or experimental needs of the field teams;
- Sponsor some short-term training in:
  - Experiences in other countries of PSR research;
  - Use of microcomputer software and care of microcomputers;
  - Data management and documentation of data files;
  - Technical report-writing;
  - Review of analytical needs/methods of various disciplines; and
- Coordinate work with other ISRA departments.

At this time, expanded growth of the CSAG would probably only make a difficult situation worse given the financial and managerial problems of ISRA in general. However, field programs, and hence, the work of the CSAG, need to be consolidated and made to respond to major research

issues. In the current fiscal environment, consolidation of activities would assist in making CSAG activities more efficient.

CSAG should consider giving one particular member (or two at the most) primary responsibility for working with the inspection station teams. If members of the PSR teams need specific guidance on a technical question, then the proper expertise would be found at CSAG level. For this to be effective, however, it would be absolutely essential to have the CSAG person with responsibility for the team to be absolutely committed to the PSR approach.

EVALUATION OF THE TRAINING AND THE DATA COLLECTION/ANALYSIS (COMPUTER SOFTWARE) COMPONENTS

A. Long-Term Training

As of December 1984, nine ISRA researchers financed under SARPP were pursuing Master's degrees in the US. Eleven researchers in various fields of agricultural and food sciences had successfully completed their Master's studies and had returned to ISRA. One additional researcher was planning at that time to undertake Master's studies in Agricultural Economics in the fall of 1985. 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.

Despite these successes, however, more attention should be paid to the management of the long-term training component of SARPP. Many participants are required to repeat courses. A review should be made of qualifications for entry into training program and the process by which candidates are selected to participate in Master's Degree programs. Specific issues should be viewed within the larger context of setting up a consistent, long-term manpower planning and training program for professional and technical staff in ISRA, including improved personnel management policies and procedures.

Specific issues for careful consideration within the overall plan are the following:

- Amount of repetition in training courses. (Since there does not seem to be unanimous agreement on this point, it should be addressed early in the second phase of SARPP);
- Selection of training candidates (fields and credentials);
- Justification of the number of PhDs needed in various fields in relation to the number of Masters per field and proper assignment in terms of location and team needs;
- Assignment procedures for research staff in relation to the need for balance among the departments of ISRA with special concern for PSR;
- Promotion standards for personnel in ISRA, with emphasis on quantity and quality of research work done, and on rapid integration into research teams;
- Research priorities of ISRA, BAME and PSR teams;
- Degree of involvement of the implementor in providing expatriate research staff;

- o Composition of the joint ISRA/implementor committee for the selection of trainees;

- o Importance given to field work experience and performance before undertaking post-Masters degrees;

- o Importance given to research work to be conducted in Senegal;

- o Capacity of ISRA's staff to act on research and on thesis committees by field and by methodological approaches;

- o Integration of US-trained researchers into ISRA. This has been slowed down due to administrative and logistical problems in implementing thesis research; and

- o Criteria of candidates' selection for US training before their departure to the US. ISRA feels that some are lacking a solid general education background.

B. PSR Summer Institute at MSU and In-Country Short-Term Training

Short-term training under the project has included two PSR summer institutes at MSU, an MSTAT computer seminar, PSR seminars and English language training in Senegal, a study tour to southern and eastern Africa, computer training, USDA and/or international research center training for some MS students, and attendance at professional society meetings. One new area of training has been the seminar on agronomic field trial methods. (It is noted that the PSR program has a great role in training agronomists.) Evaluation of the suitability and utility of these training programs are discussed separately for the PSR summer institute and other short-term training programs.

1. PSR Summer Institute

The Senegalese who attended the first Institute (one month in duration) in the United States had mixed reactions to the usefulness of its content. The second PSR Institute at MSU (one week in duration) was basically set up for Senegalese researchers training in the US to coordinate their academic programs with research activities to which they would be assigned once they reached Senegal. By account of all concerned, the second Institute provided valuable guidance to both trainees and ISRA staff who attended the program. In the future training programs of this type should take place at least once a year.

The first PSR Institute took place from July 6 to August 6, 1982. Approximately equal emphasis was given to the teaching of quantitative methods and instruments for data collection/analysis and to the presentation and explanation of the PSR strategy. For the students involved the most beneficial aspect of the first Institute was the discussion surrounding PSR strategy and research procedures. Most students thought that the microcomputer and TI-59 training sessions attempted to cover too much material in too little time. In retrospect

the time spent on the TI-S9 course modules has served no real field purpose since microcomputers have been the main tools used. The other drawback was that the analytical techniques seemed to be heavily biased towards the economics side without a comparative amount of time and resources given to biological and sociological aspects. All MSU staff who participated in the Institute were rated highly by all students.

Suggestions for improving future Institutes, if conducted in the second Phase of the project, would include the following:

- o Drop the TI-S9 component and spend more time in the field trying to operationalize PSR concepts and interdisciplinary working relationships;

- o Extend the Summer Institute from four to six or seven weeks and involve more participation from biological and social scientists. These additional disciplines could be invited from other US or international institutions who have actually done systems research in agriculture;

- o Invite participants from ISRA or other GOS ministries to future Summer Institutes; and

- o Include discussions about the difficulties which may be encountered in dairy systems research and in working with an interdisciplinary team when back in country.

2. In-country short-term training

All in-country short-term training activities were rated very high in utility and suitability by the PSR program participants and by outside development/extension personnel who attended. The opportunities to train at international centers and to attend at professional meetings have helped Senegalese researchers maintain outside institutional ties which are so important in the research community.

Recommendations for future in-country training include the following:

- o Compilation of a catalog of ISRA personnel and their training background so individuals can be identified for specific training needs;

- o Organization of a PSR "Atelier" in the Fleuve & Sine Saloum regions similar to the one which was held in Ziquinchor with ISRA and development/extension personnel. Djibélor and SOMIVAC personnel should be invited in order to share experiences with the new groups.

- o Training of counterparts (including researchers) in microcomputer operations, software application, and documentation of data bases. Up until now this type of work has fallen on the shoulders of service research staff who are already overburdened. Mini-courses should be held in the dry season and run about a week for each type of program covered (Statpac, Dbase III, FARMAP, Lotus, etc.);

- o Conduct of annual data collection and analysis training seminars to assist research teams in determining the types of analysis they could and need to do. A training session would be offered at the same time that a review was underway of the past efforts and future directions of each team (similar to the Casamance trip in early 1985). This type of training seminar should be attended by a multi-disciplinary group of people so that there is more understanding of each discipline's data collection and analysis needs; and

- o Organization and formal planning of staff training and/or professional seminars/meetings. ISRA or PSR may want to seriously consider instituting staff training programs similar to those set up in many US universities.

Evaluation of FARMAP and MSTAT: Quality of Analysis and Use of FARMAP

1. General comments

The topics discussed below are considered in light of each of the three PSR regional programs' status of research completed. As previously discussed, the differences among each team's progress is due to the timeliness and adequacy of PSR resources provided in support of PSR programs (training, technical assistance, data analysis, ISRA personnel, and operating budget). Each of these resources has varied in quantity and quality among the three teams. Whereas the longest-running, best-supported, and relatively financially independent Basse-Casamance PSR program has nearly completed the initial cycle of PSR research, the Fleuve Program is now just ready to implement Phase III based on the selection of sample farms and compounds. The Sine Saloum program, although it has identified research experiments, still needs to determine how and where it will field test new technologies, and gather the relevant farm record information needed to evaluate the different research experiments.

All PSR teams have collected and analyzed micro-economic data related to the description of representative production systems located in specific zones. Only the Basse-Casamance team has accomplished micro-economic data collection and analysis of agricultural production techniques as tested for on-farm and on-station trials of new technologies or management practices.

The data collection instruments concerning the microeconomics of production systems have varied somewhat from region to region, but all except the Sine Saloum PSR program have been based on a combination of FARMAP forms and more open-ended questionnaires which were not established in any predetermined format. The open-ended questionnaires in each region can be more or less classified as informal surveys; data related to microeconomics (land use, village demographics, cropping patterns, labor activities, equipment use, labor organization) are not readily quantifiable.

The purpose of gathering such data via a census and exploratory survey was to account for major differences in the production systems within the research area and to delimit production systems into fairly homogeneous production zones. This particular phase of the PSR effort has been implemented in a methodologically sound manner based on a review of the existing documentation and interviews with the various PSR teams. Depending on the type of microeconomic data collected with FARMAP, each of a sequence of forms employed has undergone some revision. These revisions have been site specific to each regional program and reflect the different resource endowments of each research area. The new FARMAP program is therefore quite flexible in its use (new questions and codes can be programmed into each individual type of questionnaire) and allows for a more realistic data collection effort.[1]

The main drawback to FARMAP is its complicated coding system and that its flexibility may lead to collecting more data than necessary. The IBM-PC version of FARMAP also needs a careful review for programming "bugs", which could delay its usefulness. In the Casamance program a number of FARMAP instruments have been used while the Fleuve program has to this date made more limited use of them due to later start-up times by those PSR teams. (Fleuve: FARMAP Types 110 and 210).

The basic utility of FARMAP is in farm management analysis and in facilitating the preparation of tables which indicate patterns of resource use. FARMAP is a combined package of data collection instruments and analytical programs. The types of analysis it can perform include whole farm budgets, partial farm budgets, and analysis of returns to various factors of production. Only in the Basse-Casamance program, where many FARMAP instruments have been employed over the last two years, has this full range of options been

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[1] Off-Farm Work by Individual (FARMAP Type 130)
Socioeconomic Basic Demog. Characteristics (FARMAP Type 110)
Land Characteristics by Parcel (FARMAP Type 210)
Crop Characteristics by Parcel (FARMAP Type 230)
Livestock by Type (FARMAP Type 310)
Fixed Assets by Type (FARMAP Type 410)
Inputs Used and Outputs Produced (FARMAP Type 700A and 700B)

pursued. The results of these types of analysis, mostly whole farm budgets and returns to various inputs tested in on-farm trials, are presented in the Basse-Casamance PSR Annual Reports. Based on calculations of returns to labor for various types of technology, some technologies have been found to make more demands on labor while others have shown promise of smooth adoption, if integrated in the agricultural calendar at the right time.

2. Comments from the Basse-Casamance experience

There seems to be no doubt that the types of farm management analysis now being carried out, despite their simplicity in comparison to other analytical methods (linear programming, regression analysis), are a useful approach for screening and evaluating technologies for recommendation to farmers and/or extension agencies. The basic trade-off is between the time required to obtain results and the precision of analysis.

The Basse-Casamance PSR team is now aiming at more precision in the definition of production constraints, by combining agronomic and socioeconomic data from two years of research results and carrying out more replication trials on technologies which have been found to be extendable. Previous results have been considered "indicative" because of the lack of enough on-farm replications to come up with production co-efficients which can be statistically verified as realistic estimates for production parameters. With the implementation of these replications (now under way) a more detailed pinpointing of constraints will be possible with the use of linear programming. Once linear programming models are developed for different production systems two types of useful analysis can be implemented: first, "...ex-ante evaluation of the feasibility of relieving a given constraint with a proposed technology and identifying resource constraints that would have to be modified to permit adoption...;" and second, "...to evaluate the impact of government policies (price policy, introduction of credit, etc.) on technology adoption, production and employment." Regression analysis is also planned to "...better understand yield varietability by crop and zone...."[2]

Two basic problems have surfaced with the types and tools of analysis now being used. The first problem relates to the complexity of using FARMAP which demands a fairly high level of training and experience. To date, only MSU team members have the skills in applying FARMAP and Senegalese expertise must be developed as soon as possible to take over. Up to this point data analysis has been delayed (and will continue to be delayed) because it is only getting done by MSU technical assistants who have many other tasks. Two US-trained Senegalese agricultural economists have been slated to fill training

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[2]Richard Bernsten, Consultancy Report--Summary Overview Observations, Senegal Agricultural Research and Planning Project (East Lansing, MI: MSU, Agricultural Economics Department, February 1985).

slots on the PSR teams (Fleuve and Basse-Casamance) but their assignments have not been officially confirmed.

The second problem is that, while greater precision can be obtained by allowing more time to do analysis, extension authorities may not receive the research results in a timely manner. 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 basic point of departure puts PSR into an extensive time frame, but at the same time increases the degree of certainty that recommendations can and will be adopted by farmers with a high probability of success. There is already some evidence that farmers in both the Basse-Casamance and the Fleuve have spontaneously adopted some technologies and management practices being tested on their fields.

How does all this relate to the adequacy of data collection and analysis in relation to the economics of various agricultural production techniques/systems? In sum, the methods of data collection and analysis used by the PSR teams are not short-term instruments which can generate short-term solutions. They do serve the purpose of building up an adequate baseline of information, assisting in better focusing resources towards specific research objectives and creating a better understanding of the suitability of farmers adopting any given technology. 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.

The Fleuve and Sine Saloum programs are not nearly as far along as the Basse-Casamance. The Fleuve has completed its census and exploratory surveys as has Sine Saloum. Neither program has yet implemented the diagnostic surveys, technical or socioeconomic, at the compound or field level.

At this point in time it appears that the Fleuve and Sine Saloum teams will go separate ways in implementing the diagnostic phases of PSR. The Fleuve team is in the process of implementing FARMAP surveys (in addition to special purpose surveys) in three out of seven zones in the Delta area. Selection of villages and households for the survey work is complete for two of the three zones. The major problem with their implementation will be a lack of operating funds to pay for field work.

The Sine Saloum research program has chosen to work in five villages in one zone. However, further research work will be based around special themes, some of which are directly coordinated with the BAME. There is to be no use of FARMAP or heavy emphasis on field trials. The lack of any complementarity in data collection and analysis between PSR regions will make it difficult to compare returns to labor for specific crops across all regions.

A further problem with planned economic research in the Sine Saloum (non-farm income and expenditures, cereal marketing, evaluation of fertilizer techniques, marketing of animal feedstuffs) is that without FARMAP or an equivalent it will not be possible to tie in findings about on-farm resource use or the interaction between on-farm resource use and any of the above topics. The Sine Saloum team has had difficulties due to problems of getting research resources to the team when they are needed and due to the lack of computer expertise at the Kaolack station. Still, it is an open question whether or not the data collected and analyzed for the Sine Saloum will be adequate to lay down a base case on which technologies can be tested, effectively evaluated, and recommended over a large enough area.

Overall, the quality of analysis, including the utility of FARMAP and MSTAT, has been very relevant to understanding and quantifying some constraints to production systems. Although there were initial problems in the use of FARMAP, and some disadvantages still exist, it is a very flexible tool for farm budgeting and producing standardized tables to compare results from different farms, households, etc. The utility of FARMAP has already been thoroughly assessed by an internal review completed by Bernsten who recommended that FARMAP continue to be used as a tool of analysis, provided that:

- "A minimum data set is identified to meet analytical needs, and avoid too much data collection;
- Improved training materials for enumerators are available for training enumerators;
- The package is evaluated for programming bugs and aggregation assumptions; and
- The data can be transferred to a statistical package for further analysis."[3]

The MSU team has begun to address some of these issues.

The search to identify a statistical package to test the reliability of results is an indication that Stat II has not been as useful as perhaps another package. The main disadvantages of Stat II have been 1) the absence of a module to format data entry in the same

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[3]Ibid.

form as any given questionnaire, thereby slowing down processing and extending analysis time, and 2) the absence of some fairly common methods of comparing variables, i.e., crosstabs. Both agronomic and socioeconomic information collected in the Basse-Casamance are starting to undergo detailed statistical analysis with MSTAT at the same time that other statistical packages are being reviewed.

In order to verify the results of previous and future farm trials in the minimum amount of time possible, either MSTAT should be upgraded or it should be replaced by another program, which would mean giving priority to the review of a possible replacement for MSTAT. One alternative would be to employ the new version of STATPAC, which can run many different kinds of statistical analysis and is easily transposed into other programs such as Dbase III and LOTUS.

There are still a wide range of options open to the PSR Basse-Casamance team for analysis of previously collected data. So far three years of data have been partially analyzed, the results of which have appeared in regular annual reports. In the first year only simple statistical analysis was carried out consisting of: 1) frequencies of agricultural practices, production constraints faced by farmers, farmer opinions related to animal traction, varietal availability; 2) comparisons of farmer practices versus recommended practices; and 3) analysis of farmers resource base.

With regard to the breakdown of relevant data from other socioeconomic studies similar to the PSR effort, it has been shown that there is fairly high correlation between the use of improved inputs and the location of their use, i.e., household versus individual fields. Usually, most inputs will first be allocated to compound fields which in turn reflects who has control over resources at the farm level. This is similar to the argument over the unit of analysis--the independent household or compound (difference between individual and shared resources). The process by which inputs are distributed across different types of fields is crucial in terms of knowing where improved technologies are most likely to end up on the farm fields. For example, even though a specific fertilizer dosage may be developed for corn, it could be placed on a different crop because the head of household, who has incurred a debt from the extension service, believes he can make better use of it elsewhere.

FARMAP can do several levels of aggregation and is designed to make comparisons and generalize between various elements of different production systems. It is not possible, given the small sample size and major differences between farming systems across zones, to produce farm tables across zones for the total sample. The elements which have been compared by the PSR team include the resource base, crop output, use or non-use of animal traction, and demand for labor based on interzone differences. Comparative crop tables have also been generated which include crop output (amount, price, total value), breakdown of variable costs, labor inputs, and power inputs (animal and machine). The small sample size has only permitted an aggregation of

the three farms per village to represent an "average" farm for that village and also for that zone.[4] In the second and third years (1983-84 and 1984-85) more detailed data at the plot and compound level were gathered, thereby allowing more sophisticated analysis. Analytical methods for the two years of data were equivalent for both agronomic and socioeconomic surveys.

The agronomic analysis generated descriptive statistics with respect to management practices employed and yields by village and by zone. Many charts and tables in annual reports and working documents are valuable indicators of what variables appear to have the most pronounced influence on production. As explained previously, these variables are undergoing further research in the 1985-86 crop year.

Socioeconomic data analysis has been aimed at updating resource inventories for each farm and producing a set of four tables for each farm. These include data on resource base, production, economic analysis (gross margins, fixed costs by type, net family income, composition of expenditures, net balance and others) and labor use by source and by cropping activity. Labor has received the most attention due to the necessity to disaggregate it by month, sex, and age. Because of the detailed nature of socioeconomic data it is tempting to reaggregate and/or reduce data down to many comparative variables. The type of economic analysis carried out thus far by the PSR team, although unsophisticated, is relevant and adequate to the major requirements of the PSR programs to evaluate proposed changes within the production system.

It is recognized that there is no utility in averaging farm tables across all zones, but the PSR team should consider measuring whether there are statistically significant differences between key variables on the three farms within each village which represent an "average" farm. These variables would include household composition in person-years, land by tenure type, total land available (household vs. individual), production (area and output), use of inputs, and labor use. The results of these measurements could be used to support or adjust the final recommendations based on farm type.

In general this team agrees with Bernsten's recommendations for guiding future data collection and analysis and suggests:

- "...Tighter direction in the collection and analysis of data to support the adoption potential of technology being tested in on-farm trials; and

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[4] Ibid

- o Shifting resources away from intensive agronomic and socioeconomic surveys so that resources freed up can be used for verification trials aimed at producing a data base that can be used to develop extension recommendations, and so that previously collected data be more intensively analyzed."[5]

The accomplishment of these tasks is already underway and should be feasible before the completion of Phase I of the SARPP given the cut-back in data collection, the installation of improved computer facilities to speed analysis (on IBM-XT) and the use of improved statistical packages.

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[5]Ibid

V. CONCLUSIONS AND RECOMMENDATIONS

A. Introduction

The following paragraphs summarize the major findings which arise from this threshold evaluation of SARPP, its support of ISRA and the linkages between ISRA and other Senegalese and international organizations. This evaluation also covers the training, institution-building and computer systems components of the project and their contribution to research results as an input to agricultural policy in Senegal.

The team's working definition of "evaluation" has been guided by the points listed in the Terms of Reference for the evaluation as found in Annex 1. The conclusions and recommendations are presented as sometimes critical but basically positive assessments of the various elements of the SARPP project with a view to helping to ensure its continued progress and with the intention of providing both a foundation and an agenda for the end-of-Phase I evaluation of SARPP in 1986/87.

Chapters I to IV of this report examine indepth the multiple effects and linkages which SARPP has developed and produced from its inception in December 1981 until this evaluation in July 1985. The various constraints which limit the range of accomplishments and progress have also been assessed. The recommendations presented in this chapter are designed to reduce or eliminate some of the major constraints identified, to facilitate the completion in December 1986 of SARPP's first phase and to assist in the launching of the second phase.

The SARPP project has been funded by AID as part of a multi-donor program to strengthen ISRA's research capacity. It is hoped that at the macro level the project's output will continue to facilitate the formulation of more effective agricultural policies. Similarly, it is hoped that, at the micro level, SARPP will continue to help farmers by assisting in the provision of technological packages suitable to the various agro-socioeconomic zones, and thus over time increase agricultural output, raise farm household incomes, and improve Senegal's food security.

In addition to funding the technical assistance aspects of SARPP, AID has supported ISRA's research activities by making available funds generated under the PL 480 Title III program. This support has been vital to the success of SARPP, especially through making expatriate personnel and other support available for the PSR program in the Basse-Casamance administrative zone. Other donors have also assisted ISRA in ways which have contributed to the achievement of SARPP's purposes both directly and indirectly, notably the World Bank

and France through IRAT. Research activities which are closely related to those carried out under SARPP (especially PSR) are also being implemented or assisted by WARDA, ICRISAT and IITA, etc. The financial support provided by the government of Senegal has also been vital in influencing the progress of the work toward achievement of the project objectives. It should be noted that control of these funds is not within the management scope or control of the project implementor (MSU) or, to some degree, of the USAID mission. Hence, while the report calls attention to serious funding problems for both the BAME and PSR operations, the evaluation team realizes that the solution of these problems may lie beyond the scope of the SARPP project.

B. Macroeconomic Analysis Bureau: BAME

1. Findings and conclusions

The Macroeconomic Analysis Bureau (BAME) was successfully established and staffed with MSU and Senegalese personnel in 1982. A research program proposal was prepared in 1982-83 identifying research problems to be addressed with emphasis on developing an understanding of the interdependence of farm level production decisions and transactions in local, regional, national and international markets as well as the behavior of farmers and traders. When the NAP was being formulated in 1984, BAME reviewed its research priorities in light of the main thrust of NAP to:

- Increase local cereals production;
- Decrease the variability of food output in Senegal; and
- Reduce the cost to the GOS of existing agricultural policies.

In this sense BAME has, in general, focused its priorities for research on key questions relevant to Senegal's major national agricultural goals, as well as serving the interests of farmers and consumers. This is a significant achievement for BAME and is a major justification for having such an entity within ISRA.

The SARPP support for BAME has played a key role in launching macroeconomic research as a significant contributor to agricultural policy formulation in Senegal. The BAME program has fairly successfully integrated micro and macro level information for policy formulation and its publications are substantial. The research output tends to be more practical and relevant to the needs of policymakers than some of the narrowly focused single discipline research, and is distributed to an increasingly broad audience.

Without the support that the SARPP and Title III funding have provided, the GOS would not have been prepared to launch the drive toward improved food self-sufficiency and food security under the NAP by formulating programs and incentives appropriate to the mobilization of farmer production and private trader operatives. The technical

assistance team members, overseas training of Senegalese and in-country training of staff to address these high level macroeconomic issues is a major plus for Senegal's drive to improve agricultural sector performance. In addition, the linkages between BAME and PSR have improved the effectiveness of both programs to some degree.

There have been problems, however, in the operations of BAME and constraints continue to thwart optimal performance. Given the importance focused on macroeconomic issues related to the NAP, a constraint is emerging in terms of the staff capacity for macroeconomic analysis with special emphasis on the need to understand demand and supply elasticities and to make sound predictions on demand/supply equilibria. Similarly, the priority accorded to policy issues affecting Senegal's food security are probably still under-served. Fertilizer policy may need greater attention than it has so far received with a view to determining the effects of full-cost marketing. As staff is spread thin in some areas, additional staff may be one answer to increasing research outputs, but it will also be essential to focus available resources on the highest priority research topics which will have the greatest impact on both short- and long-term policies supportive of the NAP.

Funding and staffing problems have also limited the optimum output in a timely fashion by BAME. This requires improved general management within ISRA, a better planning and budgeting process and more careful management of ISRA/BAME research resources.

2. Recommendations

In light of the foregoing findings and conclusions, the following recommendations are made:

- Identify additional macroeconomic analysis skills suitable for BAME and hire the best personnel available to address priority issues related to the major goals of NAP;

- Focus greater macroeconomic research attention on issues related to determining supply and demand elasticities for major cereal crops in Senegal and enabling BAME to forecast supply/demand equilibria in the short run;

- Direct more attention to questions affecting food security in Senegal with particular reference to reducing the weather-related fluctuations in the levels of output of major cereal crops;

- Seek to strengthen the linkage between research priorities in BAME and the changing emphases of national agricultural policy in Senegal;

- o Support the development of systems for improved management, budgeting and planning to assure greater stability in financial support including tighter fiscal controls so that funds are focused on priority needs;

- o Strengthen the management of research resources (including the linkage between BAME and PSR) to assure that available personnel are directing attention to the top priority goals and building on previous research to the maximum degree possible;

- o Strengthen personnel management with a view to providing incentives which will give maximum encouragement and rewards to research output; and

- o Establish development and training programs for the short- to medium-term to strengthen the capacities of the scientific and professional research staff of BAME and other departments of ISRA.

C. Production Systems Research (PSR)

1. Findings and conclusions

There have been varying rates of progress made in implementing PSR in three regions of Senegal--Basse-Casamance, the Fleuve and Sine Saloum. The Basse-Casamance program has been the most successful; the Sine Saloum and the Fleuve less so. In general, the PSR program has helped to establish an effective research procedure to identify unique production systems in agro-socioeconomic zones and to define major on-farm production constraints. Moreover, interdisciplinary PSR teams have completed exploratory surveys, the zoning of production systems, the selection of sample villages and households and defined on-farm research themes to greater or lesser degrees in each region. Literature reviews for each PSR team are also complete.

In two regions--Basse-Casamance and the Fleuve--the PSR teams have implemented on-farm and on-station farm trials to test technology and resource management packages. Only in the Fleuve region however has farmer participation been significant. Critical variables to increase production have been selected for testing new technologies. In depth, interdisciplinary research efforts have identified some promising new technologies, some of which have already been adopted by farmers. Equally relevant, some tested new production techniques have been rejected as inappropriate to farmer circumstances.

Coordination with other research entities, both Senegalese and multinational, has been important to the progress of PSR in Senegal. For example, combining PSR with macroeconomic analysis (BAME) within the same project, especially in a country where uniform primary data collection is not usually carried out, has been good since both

components tend to reinforce each other in producing timely and objective results, close BAME and PSR linkages are established in two PSR programs. Coordination linkages between the PSR and Central Systems Analysis Group (CSAG) have also been established in two regions. While some CSAG personnel have not fully understood or appreciated the systems approach of PSR, the overall support CSAG has given to the PSR zones. For example, PSR workshops and documentation review has been useful but needs to continue and be strengthened. Linkages between PSR programs and other development and extension programs in Senegal vary. There is a serious effort to encourage close cooperation with other ISRA departments. Similarly there is some coordination with SOMIVAC/PIDAC and SAED. Collaboration with international research agencies such as WARDA and IRAT is becoming stronger and is developing adequate feedback mechanisms to coordinate research, extension, and training activities.

PSR in Senegal does however, face some problems. There has been a lack of liquidity to meet operational expenses and salaries for the research and secretarial staff. This has caused major problems in SARPP ever since PSR teams became operational. The Basse-Casamance sub-project had to seek alternative funding. There is also evidence that there have been delays in the Fleuve and Sine Saloum PSRs for this reason. There is also a need for additional Senegalese researchers with training beyond the Master's degree level who can eventually take over the conceptualization role now carried out by expatriates. Because PSR teams have been delayed by lack of human and financial resources, there is a need to assure that future teams are phased in gradually to make sure that those already established are solid enough to perform all their tasks (research, extension, data collection and analysis) while being available to help new teams.

It also appears that there is a need and scope for improved coordination between the donors and various project implementors working on PSR at the field level to avoid unnecessary duplication of efforts. The quantity and the quality of work of PSR teams could be enhanced by the strengthening of these links. Additionally, the role of CSAG needs to be further clarified and made more effective--something that could be achieved through careful attention by ISRA management in the next phase of SARPP. In sum, the first years of PSR activities have required, and will continue to demand, intensive financial and human resources to understand complex production systems and develop prototype technologies to relieve constraints.

2. Recommendations

In light of the foregoing findings the following recommendations are made:

- Assure adequate funds are available on a timely basis so all of the PSR groups can function normally and not be delayed by lack of funding;

- Fill personnel vacancies on the PSR teams as soon as possible, taking care that replacements have the necessary skills to carry out work started by their predecessors;

- Consider consolidating the PSR program, perhaps by cutting back on some research themes to ensure quality results with the resources available.

- Clarify the role and relationship of the PSR teams and the Central Systems Analysis Group (CSAG) before the next project phase and strengthen CSAG's research capacity to support the PSR teams. Assure that personnel assigned to CSAG and carefully selected for their commitment to production systems research and its multidisciplinary approach;

- Provide additional advanced training opportunities for Senegalese PSR researchers in order to prepare them to handle those aspects of the research work requiring heavy emphasis on conceptualization;

- Encourage the GOS to take the initiative for improving coordination among the donors and the implementors of PSR research in order to assure that the approaches are compatible; and

- Secure complete funding of the documentation center which is presently constrained due to lack of funds and no librarian.

D. Data Collection and Analysis (Computer Software) Components

1. Findings and conclusions

The types 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. At present, the document information and analysis of research methods, findings and recommendations is of high quality and is adequate for the particular research phase each PSR team has attained. There is a need to recognize, however, 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.

The data collection instruments concerning the microeconomics of production systems vary but generally a combination of FARMAP forms and open-ended questionnaires have been used with considerable success. Several basic problems have been encountered. First, the complexity of FARMAP demands a high level of training and experience which precludes its use by other than MSU team members. Second, while greater precision can be obtained by allowing more time for analysis, extension

authorities may not receive research results as quickly as they desire them because of the nature of the survey instruments. Third, because the Sine Saloum region is not using FARMAP there is a lack of complementarity in data collection and analyses between PSR regions making it difficult to compare results.

In terms of the computer analyses, the PSR teams have generally had access to appropriate computer software programs and have been able to develop the necessary skills in using data recording instruments, survey techniques and other tools for data management and analysis to effectively use the microcomputers for data analysis of production/ marketing issues. In the Casamance, in particular, 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 of the constraints to the production systems. It has also had available facilities to house the hardware and has therefore made good progress. Due to a later start, progress has not yet been so great in the Fleuve and has been seriously hampered in Sine Saloum both by less adequate team structure and total absence of hardware due to the lack of facilities to house a computer.

2. Recommendations

In light of the foregoing findings and conclusions, the following recommendation are made:

- Organize exchange visits for all microeconomists to the various PSR programs as soon as the 1985 survey period is over to see what types of basic information could be shared across zones, assist one another in overcoming research problems and promote planning for a consistent database;

- Consider merging the entire data set for PSR Casamance onto a mainframe computer at MSU and run the regression analysis there to speed up the generation of results and analysis;

- Carry out more socioeconomic analyses of past and present on-farm trials and reevaluate the "appropriateness" of technology by using changing estimation of costs and returns for a particular type of farm model;

- Undertake a regular internal review of the data collection and analysis activities which must go on annually within PSR and hold seminars to take maximum advantage of the resident experience to accelerate skills development;

- Continue to improve coordination with other ISRA programs and formalize plans to conduct staff development seminars in ISRA;

- o Explore ways to decentralize the actual production of research reports once the CSAG review is completed;

- o Provide opportunities for more Senegalese research staff to develop skills for microcomputer operations and computer-based analysis techniques; and

- o Review the use and appropiateness of the MSTAT program with an eye to either strengthening or replacing it, possibly by STATPAC.

E. Training

1. Findings and conclusions

The SARPP program has provided a major share of the training needed to strengthen the research capacity of ISRA both at the macroeconomic and production systems (micro) levels. By the end of 1984, 11 Senegalese researchers had completed Master's degrees in the United States and nine more were engaged in the pursuit of such degrees. Some trainees have had to repeat courses during their studies which has given rise to controversy as to the cause and to appropriate solutions to decrease the repetition rate. The success of this training however is attested to by the good start made on the development of macroeconomic policy-oriented research undertaken by BAME and the substantial progress achieved in field-based PSR activities especially in Basse-Casamance with somewhat less success in the Fleuve and Sine Saloum programs.

ISRA, however, has not yet formulated an overall staff development and training program for professional and technical personnel for the agency. ISRA needs to develop personnel management policies and procedures that emphasize incentives that reward research output as the primary determinant of promotion and salary adjustments.

The two PSR Summer Institutes and in-country short-term training programs in MSTAT, field trial methods and the PSR approach have been highly rated by the participants in terms of utility and suitability. It is clear that Senegalese/Research staff capability levels must continue to be strengthened to reduce dependence on expatriate staff especially in computer analysis techniques.

2. Recommendations

In light of the foregoing findings and conclusions, the following recommendations are made:

- Formulate an overall staff development and training program for ISRA for the short- to medium-term and define the needs in terms of quantity and level of training for future ISRA programs. Include the development of a comprehensive personnel policy emphasizing the provision of incentives to research productivity;

- Examine the causes of the problem of course repetition by graduate students in Master's programs and devise a plan (including a review of selection procedures) to decrease repetition;

- Develop a catalog of ISRA personnel and their skills as the basis for future development of in-country training programs and assignments; and

- Organize a workshop for the training of personnel in the Fleuve and Sine Saloum PSR teams to strengthen their capacity and allow them to share experiences.

ANNEX 1

Terms of Reference

ANNEX 1

Terms of Reference

The Terms of Reference for the midterm Threshold Decision Evaluation of the Senegal Agricultural Research and Planning Project were to assess the following:

- Comprehensiveness and nature of ISRA's long-range plan of work for the Macroeconomic Analysis Bureau (BAME);
- Relevance of research conducted thus far within Senegal's agricultural policy content and the quality of analysis conducted and reports produced;
- Adequacy of the system for making research findings available to policy makers;
- Effectiveness of ISRA in utilizing personnel with advance degree training to conduct policy analysis related research;
- Extent to which ISRA is coordinating its BAME research program with research carried out by other entities such as the University of Dakar, Regional Development Agencies (RDA's) and private research organizations;
- Nature and effectiveness of links between the BAME and other ISRA department research programs;
- Timeliness and adequacy of resources provided in support of BAME research activities, such as technical assistance, training, computer programming, Title III local currency funding and ISRA personnel;
- Progress made in implementing Production Systems Research (PSR) in three regions of Senegal, namely the Lower Casamance, the Senegal River Valley and Sine Saloum. Emphasis was to be placed on the work done in the Lower Casamance since it had been ongoing for three full seasons. The objectives of this part of the overall assessment were to determine (a) the suitability of the PSR approach used thus far, (b) the nature and effectiveness of linkages developed between ISRA and the Regional Development Agencies such as the Societe pour la Mise en Valeur Agricole de la Basse Casamance (SOMIVAC), the Société d'Amenagement et d'Exploitation des Terres du Delta (SAED) and the Société de Developpement et de Vulgarisation Agricole (SODEVA), (c) the degree to which ISRA is collaborating with the research programs in the three areas sponsored by regional and international organizations/centers such as the West African Rice Development Association (WARDA), the Institut de Technologie Alimentaire (ITA) and the International Crops

Research Institute for the Semi-Arid Tropics (ICRISAT), (d) the extent to which research results are being incorporated into extension recommendations and the adequacy of ISRA's system of dissemination of research findings;

- Degree of coordination between ISRA research departments and ways this can be further enhanced;

- Timeliness and adequacy of resources provided in support of PSR programs such as training, technical assistance, documentation, data analysis, ISRA personnel and operating budget;

- Adequacy of data collection and analysis in addressing questions related to the economics of various agricultural production techniques and/or systems;

- Utility of FARMAP and MSTAT computer programs in support of PSR activities;

- Quality of data analysis and reports prepared under PSR programs;

- Effectiveness of linkages between the BAME and PSR programs and the degree of coordination provided by the Central Systems Analysis Group (CSAG) and the PSR department; and

- Usefulness of the PSR Summer Institute at MSU and the PSR and MSTAT training seminars held in Senegal in supporting PSR programs.

In assessing these elements of the research project, the team was instructed by USAID/Senegal to pay serious attention in assembling relevant evaluative information in such a way as to provide guidance for future support to ISRA while addressing, in a general sense, the need for strengthening linkages between PSR and agricultural policy research programs with other departments. Measures to improve ISRA's research management (administrative, technical and financial) and to address related institutional development issues, to the extent that they were of very immediate concern for SARPP activities, were also deemed to be important.

ANNEX 2

Scopes of Work for Individual Members of the Evaluation Team

ANNEX 2

Scopes of Work for Individual Members of the Evaluation Team

A. Macroeconomist (Team Leader)

This individual will assess the following:

- The comprehensiveness and nature of ISRA's long-range plan of work for the Macroeconomic Analysis Bureau (BAME);
- The relevance of research conducted thus far within Senegal's agricultural policy context, the quality of analysis conducted and reports produced;
- Adequacy of the system for making research findings available to policy makers;
- The effectiveness of ISRA in utilizing personnel with advance degree training to conduct policy related research;
- The extent to which ISRA is coordinating its BAME research program with research carried out by other entities (i.e., University of Dakar, RDA's, and private research organizations);
- The nature and effectiveness of links between the BAME and other ISRA department research programs; and
- The timeliness and adequacy of resources provided in support of BAME research activities (i.e., technical assistance, training, computer programming, Title III local currency funding, ISRA personnel).

He/she will present recommendations on how the BAME program can be improved and to what extent it should be expanded.

B. Production Systems Research Agronomist

This individual will assess:

- The progress made in implementing PSR research in the three regions (Lower Casamance, Senegal River Valley, Sine Saloum). Emphasis will be placed on the work in the Lower Casamance since it has been ongoing for three seasons. The agronomist working closely with the PSR economist will determine a) the suitability of the SR approach used thus far, b) the nature and effectiveness of linkages developed between ISRA and the Regional Development Agencies (SOMIVAC, SAED and SODEVA), c) the degree to which ISRA is collaborating with other research programs in the three areas

sponsored by regional or international organizations/centers, (i.e., WARDA, IITA, ICRISAT), and d) the extent to which research results are being incorporated into extension recommendations and the adequacy of ISRA's system of dissemination of research findings;

- o The degree of coordination between ISRA research departments and ways this can be further enhanced; and

- o The timeliness and adequacy of resources provided in support of PSR programs (i.e., training, technical assistance, documentation, data analysis, ISRA personnel and operating budget).

He/she will provide recommendations on the need for modifications in the PSR program and resources required in support of PSR programs.

C. Production Systems Research Microeconomics

He/she will assess:

- o The adequacy of data collection and analysis in addressing questions related to the economics of various agricultural production techniques/systems;

- o The utility of FARMAP and MSTAT computer programs in support of PSR activities;

- o The quality of data analysis and reports prepared under PSR programs;

- o The effectiveness of linkages between the BAME and PSR programs and the degree of coordination provided by the Central Systems Analysis Group and PSR Department; and

- o The usefulness of the PSR Summer Institute at MSU and the PSR and MSTAT training seminars held in Senegal in supporting PSR programs.

He/she will provide recommendations on improving and/or expanding the PSR program.

One of the team members should have experience/knowledge of agricultural research administration and management.

ANNEX 3

Bibliography

ANNEX 3

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ANNEX 4

Logical Framework

ANNEX 4

Logical Framework

Life of Project:
From FY 1981 to FY 1985
Total US Funding: 4.95 million
Date Prepared: April 9, 1981

Project Title and Number: Senegal Agricultural Research and Planning Project (685-0223)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS Measures of Goal Achievement:	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS Assumptions for Achieving Goal Targets:
Program or Sector Goal: The broader objective to which this project contributes: Goal: To increase the capacity of the GOS to more effectively plan and evaluate agricultural development policies and projects.	1) An improved micro and macro data base of major constraints on agricultural production, storage, transportation, marketing, nutrition and pricing. 2) Improved policies and programs for food, agriculture and nutrition.	1) GOS records and annual reports of agricultural research and regional development agencies. 2) Agricultural production and nutrition statistics and national accounts data.	That the GOS will provide recurrent and capital budget allocations, and human resources in order that ISRA can implement a decentralized research program.
Purpose: A. 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.	1) Number of long-term overseas trainees, short-term training, etc.; number of Senegalese scientists on ISRA staff; number of ISRA research studies.	ISRA reports and publications. Research reports and publications. GOS policy decisions.	GOS will provide adequate policy direction, coordination, and support; the Scientific and Technical Committee will function effectively; and donors will provide planned inputs in a timely manner. France, the World Bank and other donors continue the proposed level of collaborative support to the ISRA decentralization program.
B. 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.	2) Production Systems Research (PSR) based on social and technical scientists working collaboratively to identify constraints on the expansion and diversification of agricultural production and future adoption of PSR recommendations.		

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Purpose: (cont'd)	Conditions that will indicate purpose has been achieved: End of project status:		
C. To carry out macroeconomic research on food, nutrition and agricultural policies in order 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.	1) Macroeconomic research on food, nutrition and agricultural policies produced and recommendations adopted by policy makers.		
Outputs:			
1) Production systems studies, on-farm trials of improved technology, and improved technical packages for "recommendation domains" in major ecological areas.	1) Studies of performance of improved technical packages.	1) Reports and publications by FSR team and other researchers.	1) a) ISRA with assistance from other donors, will supply adequate personnel, financial support and equipment, and coordinate the implementation of FSR teams. b) Farmers will be able to put into practice the improved agricultural production technologies. c) The output of FSR teams will provide relevant micro information for the macro-unit, commodity researchers, and extension personnel.
2) Macroeconomic studies of the agricultural sector and subsectors.	2) Macroeconomic policies and programs for the agricultural sector.	2) Reports and Publications by macroeconomic researchers and DIS documents.	2) ISRA will provide adequate support for the macroeconomic unit, including effective DIS support and coordination of agencies concerned with doing improved macroeconomic analyses.
3) Upgraded technical and professional skills for agricultural researchers.	3) a) Twenty-four researchers trained to PD and/or PhD levels. b) Twenty-five on Third Country Training.	3) Training records for IRI and Third Country participants.	3) DIS will identify and release qualified candidates.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs: (contd)			
4) Expanded collection of socioeconomic documents in ISRA's Documentation and Information Service, including the improvement of the documentation and information service in the research stations.	4) Number of books, documents and microfiche items in the socioeconomic collection of ISRA's library.	4) Reports of the ISRA Documentation and Information Service.	4) ISRA will provide recurrent costs to maintain an effective Documentation and Information Service.
5) Improved computer capacity for the PSR and microeconomic programs.	5) Computer hardware and software capacity.	5) Interviews with data processing staff and reviews of computer programs and hardware.	5) ISRA will provide recurrent costs and human resources to maintain computer capacity.
Inputs: USAID Technical Assistance		Records of TA Contractor.	
1) Technical Assistance 1 Team Leader/Rural Social Scientist, 5 person-years. 2 Microeconomists, 6 person-years 2 Production Systems Economists, 8 person-years 8 Research Associates, 9 person-years Consultants (31 pa) in econometrics, microeconomics, marketing, farming systems, computer programming, documentation and information services and rural sociology. 1 1/2 person-years of computer program development.	1) Inputs $1.85 million for long-term technical assistance. $258,000 for research associates. $300,000 for consultancies. $90,000 for computer program development.		1) Qualified technical assistants will be identified and will be able to join the contractor team.
2) Training: Long-term academic training in the agricultural and social sciences in the US (approximately 864 person-months at approximately 36 months/participant for 24 participants).	Implementation Target (Type and Quantity): $1.1 million for long-term training.		2) Adequate supplies, commodities and equipment can be purchased and delivered.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
2) Training: (contd)	Implementation Target (Type and Quantity): (contd)		
Short-term training in the US in-country and in third countries (25 pm).	$115,000 for short-term training.		
In-country training.	(Title III)		
3) Committees and Operating Support:	(Title III)		3) Local currency will be available for research support and to purchase additional and replacement vehicles and other equipment.

ANNEX 5

SAPPP - Initial (1981) and Revised (1983) Budgets by Major Components

ANNEX 5

SARPP - Initial (1981) and Revised (1983) Budgets by Major Components

		Current Budget	Change ($000)	Revised LOP Total
A.	Technical Assistance			
	MSU Contract	$2,724	$-315[a]	$3,039
	Contract Field Support	67	+ 13	80
B.	Training			
	Long-term	997	-190[b]	807
	Short-term	101	+ 49	150
C.	Computer Equipment/ materials	52	+ 30	82
D.	Evaluation	52	+ 48	100
E.	Architectural Study	32	0	32
F.	Overhead MSU Contract	925	+ 31	956
G.	Contingency	0	+104[c]	104
	TOTALS:	$4,950	$ 400	$5,350

[a]Based on MSU contract budget submitted in January 1985 and adjusted to reflect changes in level of effort.

[b]Reflects deleting three of remaining MS training positions and budgeting fourth position for 18 months under project with remainder (i.e., 12 mo.) funded from OMVS project.

[c]No contingency remains under original funds, therefore this amount is budgeted at this time.

ANNEX 6

Schema for Review of Research Activities:
Macroeconomics and PSR Components (Microeconomics
and Agronomy) of SARPP

II. SCHEMA FOR REVIEW OF PRODUCTION SYSTEMS RESEARCH OF SARPP

Production Systems Research Phase References	Specific Issues	Review Criteria
A. Description of Research Area Zoning.	Data collection (socioeconomic and technical).	Adequacy and relevance of data collection and data collection instruments (FARMAP and open ended questions).
	Preliminary data analysis (socioeconomic and agronomic).	Quantity of data collected (representiveness vs reliability).
	Selection of criteria and zoning.	Tools of analysis (utility of FARMAP, BRAINS/FARMAP, statistical packages).
		Appropriateness of zoning criteria.
B. Definition of Production Constraints and Prioritization of Further Research to Relieve Constraints.	Data collection priorities (socioeconomic and agronomic).	Adequacy and relevance of data to be collected. Utility of data collection instruments.
	Data analysis priorities (socioeconomic and technical).	Quantity of to be data collected (representivity vs. varietability).
	Dialogue with farmers.	Utility of tools of analysis to define production constraints and program research (hardware, software).
	Dialogue with extension and development services.	Appropriateness of definition of constraints and research themes.
	Coordination with other research projects.	
C. Field Testing of Technologies and/or Management Practices. Data on Resource Use for Production.	Socioeconomic data collection (farm records and in-depth subject matter studies).	Adequacy of quantity of data collected (data collection instruments and methods; varietability vs. representivity).
	Technical data collection (field trials: replications and verification; and on station trials).	Degree of farmer participation.
	Farmer participation.	Degree of coordination with extension, development and other research projects
	Coordination with extension and development and other research projects.	

II. SCHEMA FOR REVIEW OF PRODUCTION SYSTEMS RESEARCH OF SARPP (cont.)

Production Systems Research Phase References	Specific Issues	Review Criteria
D. Evaluation of Technologies and/or Management Practices and Identification of Appropriate Technologies/ Practices to Relieve Production Constraints (or Screening of Technologies and Management Practices Which are Unsuitable).	Establishment of evaluation criteria. Farmer input. Data analysis (socioeconomic, technical, combined socioeconomic and technical). Participation of development, extension, and research community.	Adequacy of evaluation criteria/method. Degree of farmer input. Adequacy of data analysis (methods and tools of data analysis: software and hardware; time frame for data analysis). Compatibility with farmer goals, resources, and cultural environment. Degree of participation of relevant groups and adequacy of extension to disseminate technologies.
E. Recommendations and Pre-Extension.	Liaison with extension and development departments (reporting: documentation and work sessions; demonstration; and pre-extension effort). Identification of researchable issues. Feedback from extension and development services.	Frequency of reporting effort - timeliness of recommendations. Quality of reports (descriptive and prescriptive). Amount of technology and management practices adapted for pre-extension. Adequacy of extension and development services to identify problems.

III. SCHEMA FOR REVIEW OF TECHNICAL ASPECTS OF PSR OF SARPP

Production Systems Research Phase Reference	Specific Issues	Review Criteria
A. Description of Research Area and Zoning.	How many households were surveyed in each village? Did any agronomic follow-up start in zones of anti-salt dams?	Adequacy and relevance of data collection. Suitability of research area and zoning.
B. Definition of Production Constraints	Did the PSR team obtain the summary of past research done by ILACO, MAC, FED/OMR/SAED? To what extent did the retrospective survey of livestock in Lower Casamance effect the adjustment of research theme definition? Can rice base system approach respond fully to the development in Middle Valley Fleuve Region?	Appropriateness of definition of research theme. Approach consistency.
C. Field Testing.	How many joint field trials between Crop Department/International Research Centers and PSR have been realized? What is the technical level of encadreurs and conseillers techniques? Have they been trained to conduct field experiments? Why was mixed NPK 8-18-27 used to determine crop response to fertilizer in the intensification theme? Were those treatments relevant?	Adequacy, relevance and reliability.
D. Evaluation of Technologies and Management. 1. Suitability of PSR Approach. 2. Collaboration with Development Organizations.	Why have field trials taken longer time to provide cropping pattern recommendations? What nature and extent of links were established between PSR and SOMIVAC/SAED/SODEVA? What constraints and key issues were identified in joint effort? What procedures of preparation and distribution of technical reports were involved?	Compatibility with farmer goals, resources and cultural environment. Efficiency of linkage. Effectiveness in overcoming constraints. Suitability of preparation and distribution of reports.

III. SCHEMA FOR REVIEW OF TECHNICAL ASPECTS OF PSR OF SARPP (cont.)

Production Systems Research Phase Reference	Specific Issues	Review Criteria
3. Timeliness and Adequacy of Resources Provided in Support PSR Activities.	What was the relationship between the budget proposed and that which was implemented? What percentage has been spent thus far? When and how was the team staffed? Was training sufficient?	Effectiveness of support. Adequacy of resources. Timeliness of execution/delivery.

ANNEX 7

World Bank's Statement of Program Objectives

ANNEX 7

World Bank's Statement of Program Objectives

"The project aimed at the definition of clear and adequate agricultural research priorities on a continuing basis. This was to be achieved by associating to the establishment of ISRA's programs--a Scientific and Technical Committee composed of experienced national and international scientists and by incorporating in the process the feedback received from the Ministry of Rural Development as well as the needs of the farmers as understood by the Subject Matter Specialists and the Extension Service..."

Source: World Bank Office Memorandum
June 21, 1985

Summary Project Description: Senegal Agricultural Research Project

The purpose of this project is to Strengthen Senegal's agricultural research capability through:

1. Establishment of five production research programs in:
   a. The Senegal River Valley;
   b. The South Groundnut Basin;
   c. The Lower Casamance Zone;
   d. The Sylvo-Pastoral Zone; and
   e. The Upper Casamance Zone.
2. Establishment of six national commodity research programs on: groundnuts, cowpeas, millet, sorghum, maize and rice;
3. Development and rehabilitation of six research stations and a 100 hectare experimental irrigation parameter;
4. Centralization of management and decentralization of research; and
5. Provision of technical assistance.

Source: World Bank Office Memorandum
June 11, 1985

ANNEX 8

ISRA's Programs and Projects

ANNEX 8

ISRA's Programs and Projects

Program Name and Number	Program Title
Research Support Services (ISR.24)	Statistical and data processing
Research Support Services (ISR)	Scientific and technical information. Documentation --Publications. Dissemination of research results
Fisheries Production --Oceanography	Inshore fishing
Agricultural Research (ORS.09)	Study of development of soil under the Eucalyptus
Agricultural Research (ORS.10)	Nitrogen fixation in flooded ricefields
Agricultural Research (ORS.11)	Biological cycles of iron and sulphur in flooded ricefields
Agricultural Research (ORS.12)	Symbiotic nitrogen fixation
Agricultural Research (ORS.13)	Ectomycorhization of certain woody (ligneous) species
Agricultural Research (ORS.14)	Aerobic and anaerobic fermentations
Forestry Research (ISR.11)	Study of natural forests and reafforestation in the Casamance
Forestry Research (ISR.12)	Study of natural forests and reafforestation in the groundnut basin
Forestry Research (ISR.13)	Study of resources and natural (tree) planting of the river valley and Sahel Basin
Forestry Research (ISR.14)	Accompanying independent research project--reaforestation of Peri-Urbai Bandia

Program Name and Number	Program Title
Forestry Research (ISR.15)	Supportive forestry research
Forestry Research (ISR.16)	Improvement of rapid growth genetic plants and certain local species
Forestry Research (ISR.17)	Research on species thought to be non-woody (non-ligneous--waxy Latex and Graines)
Animal Health and Production (ISR.01)	Study of pastoral environment: Cartography of the changing environment and improvement of natural pasture
Animal Health and Production (ISR.02)	Study and improvement of forage production
Animal Health and Production (ISR.04)	Improvement of beef production
Animal Health and Production (ISR.05)	Improvement of sheep and goat production
Animal Health and Production (ISR.06)	Intensive and semi-intensive milk production
Animal Health and Production (ISR.08)	Viral pathology of domestic animals
Animal Health and Production (ISR.01A)	Study of pastoral environment. Cartography of the changing environment and improvement of natural pasture
Animal Health and Production (ISR.05A)	Improvement of sheep and goat production
Animal Health and Production (ISR.08A)	Viral pathology of domestic animals
Animal Health and Production (ORS.02A)	Study and improvement of forage production
Animal Health and Production (ISR.03)	Economic development of natural resources for livestock feeding
Animal Health and Production (ISR.07)	Bacterial pathology of domestic animals

Program Name and Number	Program Title
Animal Health and Production (ISR.09)	Parasite pathology of domestic animals
Animal Health and Production (ISR.3A)	Economic development of natural resources for livestock feeding
Animal Health and Production (ISR.7A)	Bacterial pathology of domestic animals
Animal Health and Production (ISR.9A)	Parasite pathology of domestic animals
Animal Health and Production (ISR.9B)	Parasite pathology of domestic animals
Animal Health and Production (ISR.9C)	Parasite pathology of domestic animals
Agricultural Sciences (ISR.26)	Multidiscipline program on improvement of millet
Agricultural Sciences (ISR.27)	Multidiscipline research program on improvement of sorghum
Agricultural Sciences (ISR.28)	Multidiscipline research on rainfed and flood recession rice in the Casamance
Agricultural Sciences (ISR.29)	Multidiscipline research program on irrigated rice
Agricultural Sciences (ISR.30)	Multidiscipline research program on improvement of maize
Agricultural Sciences (ISR.31)	Multidiscipline research on cowpeas
Agricultural Sciences (ISR.32)	Multidiscipline research on groundnuts
Agricultural Sciences (ISR.33)	Multidiscipline research on cotton
Agricultural Sciences (ISR.34)	Multidiscipline research on soybeans
Agricultural Sciences (ISR.35)	Development of market gardening

Program Name and Number	Program Title
Agricultural Sciences (ISR.36)	Development of fruit production
Agricultural Sciences (ISR.37)	Stocking and residue of pesticides
Agricultural Sciences (ISR.28A)	Multidiscipline research on rainfed and flood recession rice in the Casamance
Agricultural Sciences (ISR.31A)	Multidiscipline research on cowpeas
Agricultural Sciences (ISR.32A)	Multidiscipline research on groundnuts
Agricultural Sciences (ISR.34A)	Multidiscipline research on soybeans
Production System Transfer (ISR.39)	Development of natural agricultural resources for vegetable production
Production System Transfer (ISR.39A)	Development of natural agricultural resources for vegetable production
Production System Transfer (ISR.39B)	Development of natural agricultural resources for vegetable production
Production System Transfer (ISR.23)	Sociology and economics of fisheries in Senegal
Production System Transfer (ISR.38)	Diagnostic constraints technically limiting vegetable and animal production--North Central area
Production System Transfer (ISR.40)	Post-harvest technology for the groundnut
Production System Transfer (ISR.41)	Agro-climatology: usefulness of water rationing in the principal cultivation systems of Senegal
Production System Transfer (ISR.42)	Supporting research: SAFGRAD/CTSR and Thies-Diourbel ISRA/SODEVA

Program Name and Number	Program Title
Production System Transfer (ISR.43)	Production system of Sine Saloum
Production System Transfer (ISR.44)	Production system of Lower Casamance
Production System Transfer (ISR.45)	Development of the basin slopes of the "bolongs" of the Casamance
Production System Transfer (ISR.46)	Production system of the Delta and of the Middle Senegal River Valley
Production System Transfer (ISR.47)	Hydraulic agriculture in the River region
Production System Transfer (ISR.48)	Supporting research: MATAM
Production System Transfer (ISR.49)	Preliminary study for setting up basic production system program in the Niaye zone
Production System Transfer (ISR.50)	Marketing of fruits and vegetables in the Niaye and Cape Verde regions
Production System Transfer (ISR.51)	Marketing of fruits, vegetables, and cereals in the Casamance
Production System Transfer (ISR.52)	Pre-extension and training in market-garden production
Production System Transfer (ISR.53)	Sociology and economy of fisheries in Senegal
Production System Transfer (ISR.54)	Project: Population--Health--Development
Production System Transfer (ISR.43A)	Soil fertility and development of land in Central Southern zone
Production System Transfer (ISR.44A)	Production systems of the Lower Casamance
Production System Transfer (ISR.45A)	Development of the basin slopes of the Casamance dams

Source: Touré, Mortar, "Assessment of Agricultural Research Results in the SAHEL: Volume III National Report: SEWEGA"

ANNEX 9

SARPP's Participant Trainees
(February 1984)

ANNEX 9

SARPP's Participant Trainees (February 1984)

Participant	University	Field	Degree	US Arrival Date	Transfer Date	Departure Date
Diaw, M. Chimere	Michigan St. Univ.	Sociology	MS	1/20/81	1/20/82	10/30/83
Diallo, Ms. Medina Ina	Univ. of Missouri	Sociology	MS	2/20/81	2/20/82	12/31/83
Sarr, Desire Yande	Michigan St. Univ.	Sociology	MS	2/20/81	2/20/82	6/14/83
Niane, Ms. Aminata	N. Carolina St. Univ.	Soil Science	MS	3/31/81	3/31, 82	8/30/83
N'Dione, Cheikh	Univ. of Arizona	Agri. Economics	MS	5/12/81	5/12/82	12/19/83
Youm, Ousmane	Texas A&M Univ.	Entomology	MS	5/12/81	5/12/82	-
Boye, Cheikh	New Mexico St. Univ.	Animal Science	MS	5/26/81	5/26/82	12/19/83
Dieng, Salla	Univ. of Missouri	Agronomy Ext.	MS	5/29/81	5/29/82	8/18/83
N'Doye, Ousseynou	Kansas St. Univ.	Agri. Economics	MS	5/29/81	5/29/82	12/26/83
Fall, Alioune	Sam Houston St. Univ.	Agri. Mech.	MS	6/15/81	6/15/82	1/02/84
Berthe, Jean-Louis	New Mexico St. Univ.	Range Mgnt.	MS	9/11/81	9/11/82	-
Diouf, Moustapha	Univ. of Missouri	Sociology	MS	4/13/82	6/01/83	-
Ly, Cheikh	Michigan St. Univ.	Agri. Economics	MS	5/11/82	6/01/83	-
Gueye, Samba	SUNY-Syracuse	Forestry Econ.	MS	6/04/82	6/04/83	-
Faye, Raymond	Michigan St. Univ.	Computer Science	MS	6/22/82	6/22/83	-
N'Diaye, Fadel	Michigan St. Univ.	Agri. Economics	MS	6/22/82	6/22/83	-
Fall, Abdou	Michigan St. Univ.	Animal Science	MS	3/20/83	-	-
Diop, Mamadou	Michigan St. Univ.	Animal Science	MS	3/20/83	-	-
Dene, Moustapha	Univ. of Rhode Island	Resource Economics	MS	4/03/83	-	-
Diedhiou, Mamadi	Iowa State Univ.	Bio Metrics	MS	1/05/84	-	-

ANNEX 10

Itinerary and List of People Met--June 30th to July 25, 1985

ANNEX 10

Itinerary and List of People Met--June 30th to July 25, 1985

Sunday, June 30	Individual team members arrive in Washington, DC
	Robert St. Louis, Team Leader/Macroeconomist Frank Casey, Microeconomist Khan T. Pham, Agronomist
Monday, July 1	Project Orientation in Washington, DC
	1. Meetings with:
	Jayne Millar Wood, President Vincent W. Brown, Senior Associate & Project Executive Officer
	2. AID/Washington staff:
	Cam Pippet, Program Development Officer Cal Martin, AFR/Tech
	Depart Washington, DC for Dakar, Senegal
Tuesday, July 2	Arrival in Dakar
	Meeting with USAID staff:
	John Balis, Agriculture Development Officer Richard Caldwell, Project Officer
Wednesday, July 3	Devres Team meeting--Establishment of work plan and schedule with Jacquilene Damon, Macroeconomist/USAID
Thursday, July 4	Meeting with James Bingen, Team Leader, Michigan State University (MSU)
Friday, July 5	Meetings with the following:
	BAME staff:
	Mark D. Newman Ousseynou N'Doye P. Alassane Eric Crawford

Friday, July 5 (cont.)	ISRA staff:
	Dr. Madicky Niang, Director General Jacques Faye, Head, Production Systems Department
Saturday, July 6	Devres Team meeting--Outline Proposal for Mission Report and Summaries of Readings and Interviews
Monday, July 8	Meetings with the following:
	Jacques Faye, Head, Production Systems Department ISRA
	MSU Project Staff (Research Associates):
	James Bingen Mark D. Newman Michael Morris Eric Crawford Valerie Auserehl Kelly Philippe Lambrecht Muhumba Kamuanga Joshua Posner
Tuesday, July 9	Meeting with Joshua Posner, Research Associate, MSU
Wednesday, July 10	F. Casey and K.T. Pham depart for St. Louis to meet with the following:
	M. Fall, Director Centre de Recherche (Research Center in St. Louis) Michael Morris, MSU Philippe Lambrecht, PSR
	Robert St. Louis meeting with Dr. Moctar Touré, Directeur Scientifique, ISRA in Dakar
Thursday, July 11	Field trip in St. Louis continues. F. Casey and K.T. Pham meeting with the following:
	J.Y. Jamin, Agronomist, PSR Team M. Diallo, Sociologist, PSR Team M. N'Diaye, Agronomist, PSR Team J.F. Tourrand, Veterinarian, PSR Team B. Clerget, Agronomist, Maize G. Francois, M. Diop, Research Development Division M. Diop, Research Development Division, SAED H.J.G. Van Brandt, WARDA, Special Project
	Robert St. Louis meets with Dr. Mustapha Kassé, Director, Center de Recherches en Economie Appliquée (CREA), Université de Dakar

Friday July 12 — Field trip in St. Louis continues. F. Casey and K.T. Pham meet with the following:

Michael Morris, MSU, BAME Economist
Philippe Lambrecht, Economist, PSR team
M. Fall, Director, St. Louis Research Center

R. St. Louis meets with Mark D. Newman in ISRA and James Bingen, MSU

Saturday July 13 — Devres Team meets in Dakar

Monday July 15 — R. St. Louis meet with the following:

Jim Shaffer, MSU
Michael Weber, MSU
Michael Morris, MSU

Field trip to ISRA Research Activity-Ziquinchor in the Basse Casamance. F. Casey and K.T. Pham meet with the following:

A. Faye, Acting Director, Djibelor Research Center
S. Sall, Economist-Coordinator of PSR team
M. Kamuanga, Economist, PSR team
M. Lo, Agronomist, PSR team
M. Diouf, Sociologist, PSR team
M. Sonko, Animal Scientist, PSR Team
Fidel N'Dieme, Macroeconomist
Alioune Fall, Machinery Expert

Tuesday July 16 — Field trip to Kaolack in Sine-Saloum. R. St. Louis with Eric Crawford, MSU) meet with the following:

Valerie Kelly, MSU/Research
Adama Faye, PSR/Coordinator, Animal Scientist
Lamine Niang
Desire Sarr
Matar Gaye
Modou Sene

Field trip in Ziquinehor continues. F. Casey and K. Pham meet with the following:

P. Tendeng, Director of PIDAC
A. Wane, Chief of Agro-Extension Division, PIDAC
F. Kane, Agronomist, Extension Division, PIDAC
B. Coly, Director General of SOMIVAC
A. Niane, Soil Scientist, Djibelor Station, SOMIVAC

Wednesday July 17	Field trip in Ziquinchor continues. F. Casey and K. Pham meet with the following: M. Diallo, Coordinator, ISRA/PIDAC Group and SOMIVAC Animal Scientist G. Demay, Rice Specialist, Djibelor Station Robert St. Louis meets with James Shaffer and Michael Weber of MSU in Dakar
Thursday July 18	Devres Team meets in Dakar with Michael Morris
Friday July 19	Meeting with the following: John Balis, Agriculture Development Officer, USAID/Dakar Jacques Faye, Head, Production Systems Department ISRA
Saturday July 20	Devres Team meeting in Dakar with the following: Dr. Moctar Toure, Directeur Scientifique, ISRA Jacques Faye, Head, Production Systems Department, ISRA Eric Crawford, MSU Mark D. Newman, MSU Richard Caldwell, USAID/Dakar
Sunday July 21	Robert St. Louis departs Dakar and arrives in Washington, DC
Monday July 22	Meets with the following Devres staff for debriefing: Jayne Millar Wood, President Vincent W. Brown, Senior Associate and Project Executive Officer Robert St. Louis departs from Washington, DC for Quebec City
Tuesday July 23	F. Casey and K. Pham meet with: Jacques Faye, Head, Production Systems Department, ISRA

Wednesday, July 24 F. Casey and K. Pham meet with BAME staff:

P. Alassane Sow
Ousseynou N'Doye
Lamine Niang

Thursday, July 25 F. Casey and K. Pham depart from Dakar for Washington, DC