

Agricultural Research and Planning in Senegal:
An Interim Report (1981 - 1987)

Contract Completion Report
for the

Senegal Agricultural Research and Planning Project

Contract No. 685-0223-C-00-I064-00

between the

U.S. Agency for International Development

and

Michigan State University

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August 1988

EXECUTIVE SUMMARY

The Agricultural Research and Planning Project

The Senegal Agricultural Research and Planning Project (SARPP) was conceived as the first phase of a long-term (10-15 year) institution-building effort to reorient agricultural research carried out by the Senegal Institute for Agricultural Research (ISRA) of the Government of Senegal. It was among the first projects in sub-Saharan Africa to build a national capacity for addressing agricultural policy questions on the basis of solid research programs at the household and market level.

Michigan State University was chosen in August 1980 under the Title XII Collaborative Assistance Mode Selection Procedures to design and implement the project associated with the World Bank funded program to reorganize ISRA.

The SARPP was authorized in mid-1981 as a five-year \$4.95 million project, including \$4.75 million in PL 480, Title III funds for all in-country research program costs. The Technical Assistance contract for \$4.87 million was signed with MSU in December 1981 and extended without additional funds until December 1987.

Contract Objectives

The objectives of the contract were to:

(1) develop Senegalese agricultural research capacity through training and through advice on the design and execution of production systems and macro-economic research programs;

(2) assist in organizing and carrying out production systems research in major ecological zones that would identify social, economic, technical and institutional constraints on farming systems and lead to the development of improved technical packages which were biologically stable, privately profitable and socially acceptable; and

(3) carry out policy-relevant macro-economic research on food, nutrition and agricultural policies with an

emphasis on the foodgrain subsector and food security issues.

Contract Accomplishments

Training, Workshops, Computers and Documentation

Under its contract, MSU successfully managed 21 MSc. degree programs covering 7 academic fields at 11 participating universities throughout the United States. Most of the training was in applied economics (agricultural, fisheries and forestry) and in rural sociology. By the end of the contract, more than 80% of the MSc. graduates had remained in ISRA.

MSU also: managed two 9-month special certificate programs in economics for two research assistants; helped to organize four in-country workshops (Production Systems Research; On-Farm Agronomic Research; Livestock Research; MSTAT); and, provided in-country English language training as well as several in-service training sessions in computer use.

The contract financed the development of an applied social science library and documentation center in the headquarters offices of the Production Systems Research Department, supported subscriptions to almost 25 English-language professional journals, and provided a core social science collection of 100 titles to the headquarters documentation center and to three regional research centers where the Department's production systems teams are located.

MSU helped to build a capacity for in-country data analysis and the timely preparation and publication of scientific reports. To accomplish this task, MSU purchased and advised in equipping the PSR Department headquarters and the three teams with IBM personal computers, related equipment and several applications programs for data management, statistical analysis and word processing. In addition to the special training sessions run by consultants, several of the MSU faculty assigned to ISRA provided continuing advice and support to encourage the use of microcomputers in ISRA's research programs.

Production Systems Research

MSU long-term faculty in Senegal and on short-term consultancies helped to establish the ISRA Productions Systems Research Department and two of ISRA's Production Systems Teams (Djibelor and St. Louis). These faculty helped: to define an approach to production systems research; to supervise junior Senegalese researchers in the development, implementation and analysis of their research; and, to administer ISRA's overall production systems research program.

As a result of this assistance, production systems (farming systems) research is an accepted and integral part of ISRA's national research program. Findings from the farm-level research supported under the project are used to identify and to justify crops research planning priorities. In at least one case, financial and material resources at a regional research center have been redirected in order to respond to farm-level constraints reported by the Production Systems researchers.

The results of the production systems research have influenced and led to modifications in the extension program of at least one regional development agency. Collaboration with extension agents occurs more frequently, many trials and surveys are undertaken in response to requests from government planning offices, and senior PSR Department personnel consult frequently with the planning and programming offices in the Ministry of Rural Development.

Macro-Economic Research

The MSU contract was the principal source of technical assistance to establish ISRA's new Bureau of Macro-Economic Analysis (BAME). MSU faculty helped to prepare the BAME research program, and, in collaboration with junior Senegalese agricultural economists trained under the contract and with MSU Research Associates, launched the BAME research programs in cereals marketing and the economics of agricultural production, as well as studies of the food situation.

Regional agricultural planning in the Casamance has been adjusted to accommodate research results showing that the region is not a grain export region and that there are limited prospects for maize production. In the Peanut Basin, the results of BAME cereals marketing research has led policy-makers to remove some of the uncertainty in the application of cereals market regulations and to consider credit programs which would encourage traders to hold cereals stocks for distribution during periods of drought and/or short supply. Moreover, the Food Security Commission, in consultation with BAME researchers, has adopted an improved national system to report cereals prices.

The principal conclusions of the BAME's major study of fertilizer distribution led the government to revise the "withholding program" for fertilizer and seed and they are the basis for the government's continuing review of its fertilizer distribution policy. The implications for achieving the government's food security objectives which emerge from the national model of Senegalese agriculture (constructed from 181 crop budgets and 11 farm models as part of the BAME food situation studies) are a source of continuing discussion among government policy-makers and donors.

Lessons and Recommendations

Project Design. Continuity in staffing between the design team and key project positions helped to establish a base of mutual understanding between ISRA, MSU and USAID/Dakar that contributed throughout the project to the constructive resolution of many project issues.

Long-Term Training. In-country selection and screening of proposed MSc. candidates contributed to the 100% success rate in degree completion and to the high rate of return and retention in ISRA.

MSU contract management of all the training programs helped to achieve a measure of continuity between the MSc.

programs and future ISRA employment. In-country thesis research was encouraged, when feasible, to assure the relevancy of the training program.

Pre-financing many of the MSc. programs, prior to final contract negotiations with MSU, enabled many trainees to complete their MSc. programs and return to Senegal to work with senior MSU, French and ISRA scientists during the life of the project.

Technical Assistance. French fluency, previous Francophone Africa experience, a 3-4 year preferred commitment and a "low profile" assignment within ISRA were critical elements in the establishment of close and successful working relationships between MSU faculty and ISRA researchers.

The use of advanced MSU Ph.D. candidates as Research Associates proved to be an extremely successful and cost-effective approach to carrying out field research.

The on-campus support staff played a critical role in the success of the contract through administrative and logistic backstopping, but also through a range of professional support activities, including library searches, bibliographic reviews, and documentation and equipment purchases.

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CHAPTER I.
INTRODUCTION

Historical Overview

Public agricultural research in Senegal started in 1921 with the establishment of the colonial peanut research station at Bambey, located in the heart of the country's Peanut Basin. During the 1920's and 1930's, research scientists concentrated on varietal testing, but also studied the use of animal traction and food crop rotations with peanuts. In 1938, Bambey became the Federal West Africa Research Center and was given administrative responsibility for agronomic research throughout the French Soudan (Secteur Soudanien) of French West Africa (AOF).

Upon political independence in 1960, Bambey was renamed the Senegal National Agronomic Research Center (CNRA) and had its responsibilities reduced to cover agricultural research only within Senegal. By bilateral agreement, the new Government of Senegal placed financial management and administration of the country's agricultural research with the French Research Institute for Tropical Agronomy, (IRAT). Fourteen years after political independence, the government nationalized agricultural research and in 1974 created ISRA, the Senegal Agricultural Research Institute.¹

ISRA inherited the Livestock and Veterinary Research Laboratory (LNERV) in Dakar (with research stations at Dahra and Kolda) from the French Institute for the Study of Tropical Veterinary Medicine (IEMVT), several research facilities which had been managed by the French Oil Products Research Institute (IRHO) and Tropical Forestry Research Center (CTFT), and several research stations and sites previously administered by the Ministry of Agriculture, including the Camberene Horticultural

Project Background

At the request of the Government in early 1978, the International Agricultural Development Service (IADS), with World Bank support, helped ISRA prepare a five-year (1979-1984) Master Plan (Plan Indicative) to improve and reorganize national agricultural research. This plan called for the regionalization of ISRA's research programs, including the coordination of multidisciplinary commodity programs on a national basis and the establishment of a process for setting research program priorities. On the basis of this plan and the IADS report, the World Bank appraised its Agricultural Research Project in late 1979. While 80 percent of this \$15 million project was devoted to the construction and improvement of ISRA stations, it provided the framework for the reorganization of ISRA into six research departments. This included the creation of the new Production Systems Research (PSR) Department designed to promote more on-farm, multidisciplinary research and the establishment of a Bureau of Macro-Economic Analysis (BAME) to carry out policy studies of the agricultural sector.²

During the same period, USAID/Dakar prepared a Project Identification Document (PID) for an agricultural research project that would be part of a more comprehensive World Bank

Research Center.

ISRA was originally part of the Office for Science and Technology Research, the DGRST, within the Ministry of Higher Education. The DGRST, upgraded in 1979 to a State Secretariat (SERST) within the Ministry for Higher Education, became the Ministry for Scientific and Technical Research (MERST) in 1982. In 1985 the government was reorganized; the MERST was disbanded and ISRA was placed within the Ministry of Rural Development.

²The complete titles in French: Departement de Recherches sur les Systemes de Production et le Transfert de Technologies Milieu Rural; and the Bureau d'Analyses Macro-Economiques. In 1987, these two research units were combined into the Direction de Recherches sur les Systemes Agraires et l'Economie Agricole. en

program.³ In August 1980, USAID/Dakar and ISRA selected Michigan State University, under the USAID Title XII Collaborative Mode process, to design (and implement) a project which would be the first phase of a long-term (10-15) year institution-building effort with ISRA.

The project purposes were:

(1) to develop Senegalese agricultural research capacity through in-country, third country and long-term overseas training and through participation in the design and execution of production systems research and macro-economic research programs;

(2) 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;

(3) to carry out macro-economic 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 foodgrain sub-sector and food security.

The Project Paper for the Senegal Agricultural Research and Planning Project (AR&P) was prepared during two missions by Michigan State University (MSU) faculty and associates in December 1980 and April 1981, including a short visit by the USAID/Dakar Project Design Officer to MSU in January 1981.⁴

MSU and USAID/Dakar signed a five-year (1981-1986) \$4.7 million contract on December 8, 1981. After an initial amend-

³The World Bank project included the following donors, in addition to IDA and the Senegal Government: the UN Interim Fund for Science and Technology Development (UNIFSTD); France; USAID; FAO/CILSS; ICRISAT; and WARDA.

⁴The MSU project design team(s) included: Carl K. Eicher, R. James Bingen, Lester V. Manderscheid, Josue Dione, and David Norman. John Balis, USAID/Dakar/Agricultural Development Office, and Ben Stoner, USAID/Dakar/Project Development Office, worked closely and traveled extensively with this team.

ment in 1982 which "fully funded" the contract, USAID/Dakar, ISRA and MSU negotiated four additional amendments to accommodate changes in the required level-of-effort, the training program, and authorized expenditures, including an addition of \$170,000 to cover a new long-term position, and in 1986, a no-cost, one-year extension of the contract to December 22, 1987.⁵

Project Services and Activities

The principal services and activities provided under the MSU contract were:

Technical Assistance.

-246 person/months of long-term assistance for the following positions:

- one Rural Social Scientist/Field Project Director
- two Production Systems Economists (Djibelor; St. Louis)
- one Marketing Economist
- one (Macro) Production Economist
- one Agronomist
- three Research Associates (cereals marketing; production economics (input distribution); food security analysis).

-231 person/months of on-campus support.

-32 person/months of consultant support of which MSU faculty represented 20 person/months.

Training.

-21 MSc. degree programs; 3 of those trained have resigned from ISRA.

-two 9 month special certificate programs in economics for two research assistants.

-4 in-country workshops (Production Systems Research; On-Farm Agronomic Research; Livestock Research; MSTAT).

-In-service training in computer use and English.

⁵In December 1987, MSU and USAID signed a 2i year, \$1.9 million contract to continue a program of MSU technical support and training for ISRA while USAID identified a major, 'second phase' agricultural research project.

Documentation, Publications and Computer Support.

Subscriptions to approximately 20 professional journals for the PSR/BAME Documentation Center.

-A selection of 100 titles in the agricultural and social sciences for four ISRA documentation units (PSR/BAME; Djibelor; Kaolack; and St. Louis).

-The development of a joint MSU-ISRA International Development Paper Reprint Series.

-Computer program development.

-Provision of computer hardware, software, and supplies.

Project Expenditure~

(1981 - 1987)

Salaries

On-Campus Professional Staff	\$252,000
On-Campus Support Staff	251,000
Senegal Staff	803,000
MSU Consultants	93,000
(Fringe Benefits)	283,000
Outside Consultants	45,000

<u>Travel/Transportation/Per Diem</u>	414,000
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<u>Allowances</u> (Post Differential, Quarters, Education, etc.)	540,000
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<u>Documentation/Publications</u>	60,000
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<u>Computer Support</u>	87,000
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<u>Training</u>	639,000
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<u>Other Direct Costs</u>	278,000
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<u>Indirect Costs</u> (Overhead)	866,000
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<u>Tot al</u>	4,610,000
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*Figures-rounded to nearest thousand. See Appendix 6 for the Final Budget and Expenditure Report.

The Issue of Assessing Project Impact

The types of impact or contribution of a project should be assessed in relation to the project's specific objectives and to

the longer-run challenges which confront the viability of its accomplishments.

It is relatively easy to show clear progress, for example, in training ISRA scientists and support staff. Maintaining the "critical mass" of trained and experienced personnel, however, may depend upon decisions which are beyond the scope of an individual project. Human capital investment must be seen in broader terms. Similarly, it seems clear that project activities have influenced Senegal's development policy makers, despite the continuing, difficult and complex nature of the decisions confronting the government. In addition, the contribution of the AR&P must also be viewed within the context of the multidonor program of which it was a part.

Overall, this report confirms the finding that

"the Agricultural Research and Planning project .. has resulted in organizational development, human capital formation, and social capital in the form of economically useful knowledge. The studies and the data collection efforts developed under the project are extremely valuable ... and ... the project has made progress in developing the Senegalese capacity to do research and increase the knowledge base about agricultur~ ..something that has been seriously overlooked in the past."

Organization of the Report

This report is organized into eight chapters. The first deals with the principles underlying the design of the project and some of the key features and issues of relevance to other Title XII projects. Chapters 2 through 5 deal respectively with the training, computer support and documentation components of the project. In addition to discussing the major components of these project activities, these chapters present outstanding issues of relevance in designing continued support programs for ISRA. Chapters 6 and 7 present the principal features of MSU contract support for the Production Systems Research Department

6William K. Jaeger (1987). "U.S. Aid to Senegal, Its Impact on Agricultural and Rural Development," Research Report #9, MADIA, Washington, D.C.: The World Bank.

and the Macro-Economic Analysis Bureau, and some of the contributions of the research undertaken by these ISRA units to agricultural policy-making in Senegal are discussed. Chapter 8 identifies lessons for the design and implementation of future projects intended to support a country's agricultural research capacity.

CHAPTER II.
PROJECT DESIGN

The MSU Strategy..

The MSU design strategy for the AR&P drew upon 20 years of faculty and administrative experience with applied research projects in Africa. Specifically, the design team applied the lessons learned from the MSU African Rural Economy research program in training African scientists, in documentation and research publications, and in overseas staff support and management.

Two working assumptions, arising from this experience, guided the MSU design process:

- 1) that strengthening a national agricultural research institute was a long-term process requiring a sustained 10- to 20-year funding commitment; and,
- 2) that the most challenging and crucial elements of this process involved developing the human capital base and establishing agricultural research programs which were cost-effective, relevant to the needs of rural households, and responsive to agricultural and economic development policy-makers.

Based on these assumptions, the principal elements of MSU's strategy for the long-term building of an agricultural research institution in Senegal included:

- training of Senegalese research scientists in order to speed up the nationalization of the country's agricultural research institute (ISRA);
- providing technical assistance from MSU faculty in agricultural economics, rural social sciences, computer science and data processing. These experienced faculty would help ISRA's new PSR

Department⁷ initiate a national production (farming) systems research program, and assist in the establishment of a macro-economic (agricultural policy) analysis unit at ISRA headquarters.

Training. MSU assumed management responsibility for long- and short-term training in order to replace ad hoc programs of courses in scattered U.S. universities with a more comprehensive, project-related approach, including seminars and workshops in Senegal, third-country training and special programs in the U.S.

Technical Assistance. (See Figure 1). The in-country MSU team members were first considered as researchers working for ISRA and only second as part of an 'MSU Team.' All were assigned as research scientists under the direct administrative and professional supervision of the Director of the Production Systems Department or Head of the Macro-Economic Analysis Unit.

The long-term team members with MSU faculty appointments included a Rural Social Scientist/MSU Field Project Director and an Agronomist assigned to the headquarters-based Central Systems Analysis Group of the Production Systems Department; two Production Systems Economists who worked on two of the PSR Department's regional PSR Teams (Djibelor and St. Louis); and a Cereals Marketing Economist and a Macro (Production) Economist assigned to help establish the BAME.⁸

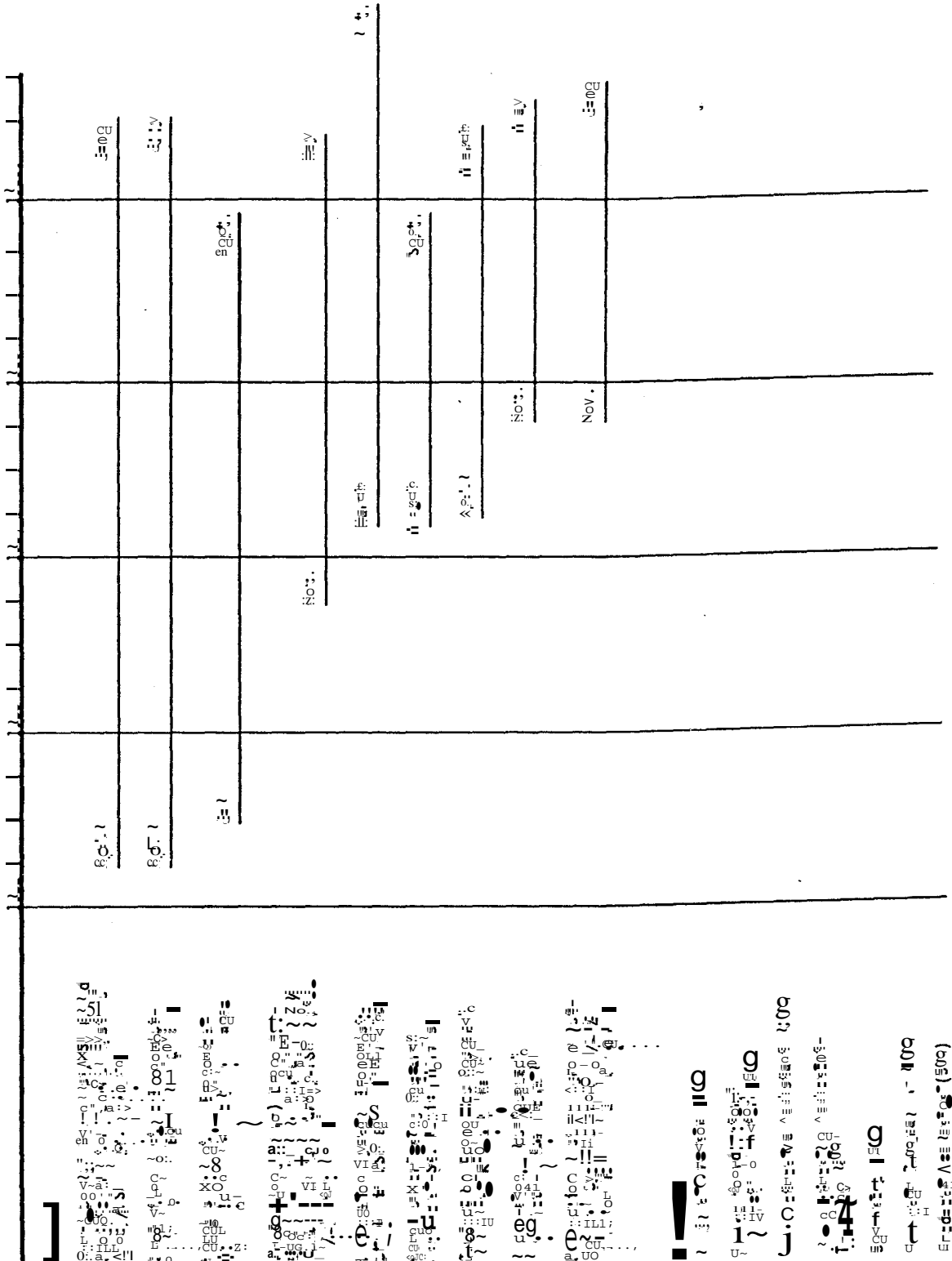
In addition to these long-term posts, the MSU team included three Research Associates. These were unique, long-term positions filled by MSU graduate students in Agricultural Economics who were fluent in French and had previous experience in French-speaking Africa. With the approval of the Director of

⁷This was previously ISRA's Department of Economics and Sociology.

⁸The Macro (Production) Economist had a one-half time appointment with the BAME and a one-half time appointment in the Central Systems Analysis Group of the PSR Department.

FIGURE 1.

AGRICULTURAL RESEARCH AND PLANNING PROJECT MSU STAFFING



the BAME, and under the supervision of either the MSU Marketing or Macro-Economist, each Associate undertook a specific study within the BAME's cereals marketing, input distribution, or food security programs as part of their PhD research requirements.

MSU consultants on short-term assignments (each approximately four weeks) worked under individual terms of reference that were developed collaboratively by ISRA and the MSU Field Project Director. Each consultant prepared a draft report which was discussed with ISRA and with USAID at the end of the consultant mission. All consultant reports were translated and distributed in both English and French (see Appendix 5).

Consistent with the primary obligation of MSU staff in Senegal to ISRA, they reported to the MSU Field Project Director only for specific contract-related questions or matters regarding their MSU employment. In keeping with this low-profile approach, MSU did not set up a contract office in Senegal; all contract activities were handled by the MSU Field Project Director out of the office of the Rural Social Scientist within the Production Systems Department.⁹

On-Campus Project Management. The MSU Field Project Director and faculty researchers in Senegal were part of, and relied heavily upon, an on-campus support group which included the project director, the campus coordinator, a part-time administrative assistant and a part-time secretary. The campus coordinator played the central management role in the long-term training program; and the secretary and administrative assistant provided key administrative and professional backstopping for

⁹A secretary and an administrative assistant were hired with project funds under a USAID/Dakar local-hire contract. The secretary was assigned to the Production Systems Department with the primary assignment to assist the MSU Field Project Director; the Administrative Assistant was assigned full-time to the Production Systems Department and was available when necessary for specific, contract-related duties.

the faculty on long-term assignments in Senegal, the consultant missions and the training program (see Figure 1).

Key Design Features and Issues

The design team was composed of MSU faculty and associates of the African Rural Economy Program. Most team members were professionally attracted (because of the provisions of the Title XII Collaborative Mode process) by the opportunity for longer-term affiliation with ISRA either through a long-term assignment or in a shorter-term collaborative and advisory relationship with ISRA's researchers. This contributed to continuity in project implementation.

Led by Dr. Carl K. Eicher, the design team prepared a first draft of the project paper during a three-week period in November-December 1980. Following an extensive review of this draft by ISRA and USAID, Drs. Eicher and Bingen completed the final draft during a mission to Senegal in March 1981.

Two aspects of the design process contributed significantly to project implementation. First, frequent and lengthy discussions were held between the design team, ISRA management and USAID project officers in order to review the different components of the project and alternative ways to organize project activities. In addition to improving the quality and soundness of the project paper, these discussions helped to establish open lines of communication between ISRA, MSU and USAID/Dakar, which subsequently proved important in day-to-day project management.

Second, continuity in the MSU staffing and direction, from design through contract implementation (made possible by the Title XII process) helped to establish a measure of shared trust and confidence among the key MSU, ISRA and USAID actors. This also facilitated the resolution of many implementation problems.

The project design could have been more effective in at least three areas.

First, USAID decided to use PL 480 local currency to cover all the in-country costs of the research programs related to the

achievement of project objectives.^{IO} This took MSU out of the 'business' of buying and shipping equipment and supplies to Senegal and kept MSU from being perceived as a 'competitor' with ISRA for project funds. It assumed that ISRA had the financial and administrative capability to manage the local currency account. This matter was never adequately examined, and major questions concerning the administrative competency and authority of ISRA's regional research centers vis-a-vis the scientific research departments and the headquarters went unresolved for almost six years. This situation created a high degree of budgetary uncertainty for research staff and jeopardized the effectiveness of several research programs throughout the life of the project.^{II}

Second, despite the plan to assign a full-time manager to the project, USAID/Dakar was unable to staff this position with a regular and experienced officer. Ad hoc coverage substituted for a USAID Mission collaborative management plan and strategy. This led to an untimely delay in the mid-term evaluation and to infrequent and/or superficial project review meetings. In addition, two separate USAID/Dakar offices were responsible for two different (but complementary) components of the project: training and the PL 480 (Title III) funds. Neither USAID office consulted regularly with the USAID Agricultural Development Office; and in some cases, each office negotiated independently with ISRA without prior inter-office discussions within USAID. Consequently, the MSU Field Project Director allocated considerable time to assure clear lines of communication between

^{IO}This permitted USAID to keep the total life-of-project cost below the limit of \$5.0 million and thereby retain the USAID Mission Director's authority to approve the project.

^{II}As a stopgap measure in late 1985, USAID made \$55,000 in project funds available to the MSU Field Project Director, in collaboration with the Director of the PSR Department/SAME, to finance part of the PSR programs at Djibelor, Kaolack and St. Louis, and several SAME research activities.

USAID, ISRA and MSU, often at the expense of time for research management and support in ISRA.

Third, prior to the preparation of the USAID project paper, ISRA scientists raised many fundamental policy and administrative questions related to the proposed reorganization of the Institute under the World Bank project. The project design team was unaware of this internal ISRA debate,¹² and moreover, did not know that the World Bank had not resolved several fundamental, statutory questions associated with ISRA's officially recognized organizational structure. Consequently, many questions surrounding the administrative legitimacy, as well as the political and bureaucratic issues raised by the creation of the Production Systems Department, were confronted only after the project was approved. Such encounters frequently sacrificed the research time of both national and expatriate scientists for administrative and organizational matters. This conflict remains unresolved, and the legitimacy of continuing a separate, production systems department is still an open question in ISRA.¹³

¹²Nor was there any reason to expect that ISRA's senior management would believe, a priori, that the MSU design team would need to know or try to address these questions. That is, officially, or "on paper," no problem existed since the MSU project was being designed within the already agreed-upon framework of the World Bank project.

¹³For a more detailed discussion of the background issues and a specific discussion of the on-going debate, see Jacques Faye and R. James Bingen, (1988). Organisation et Gestion de la Recherche sur les Systemes de Production au Senegal. The Hague: ISNAR.

CHAPTER III.
TRAINING

Long-Term Training . (Figures 2 and 3)

The Need and the Response. In 1980, about 25% of the ISRA scientific staff were Senegalese; most of the expatriate scientists were from the French tropical research institutes and assigned to Senegal under the annual Senegal-French Bilateral Agreements. Moreover, approximately 40 new research scientists were needed to meet the staffing requirements of the World Bank project. Given these conditions, training was unquestionably the most effective way to help ISRA improve its scientific capacity. In short, training was a cornerstone of the Agricultural Research and Planning Project.

The AR&P Project emphasized MSc.-level, instead of Ph.D., training in rural sociology and agricultural economics as the most direct and useful way to build the social science research staff for ISRA's new PSR Department and BAME.

In 1981, USAID/Dakar tapped the Sahel Manpower Development Program (SMDP) to begin the long-term training, including English Language and the first year of MSc. studies, prior to the commencement of the AR&P Project. This contributed to the effective integration of the training and long-term staffing components of the project. Based on an evaluation of their academic background and personal interviews with MSU faculty in Senegal, 11 of ISRA's proposed candidates started MSc. training in late 1981 and were able to return to Senegal mid-way during the project life. Another 10 researchers were selected shortly after the project started; and upon their return to Senegal, most of these were also able to work closely with MSU staff. The training programs were broadly distributed in the agricultural

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FIGURE 3.

AGRICULTURAL RESEARCH AND PLANNING PROJECT
MICHIGAN STATE UNIVERSITY

MSc. Program Profiles

<u>English language Training Institution</u> {% attending}		
Economics Institute {Boulder}:		63%
ALIGU (George Washington University):		21%
EI and ALIGU:		16%
Other:		1%
 <u>Length of Training (Average)</u>		
Economics Institute:	8.6 months	
Academic Training:	18.1 months	
TOTAL	34.8 months	
ALIGU:	5.0 months	
Academic Training:	~ months	
TOTAL	35.0 months	
<u>Degree Area</u>	<u>.lfth</u>	<u>.S.</u>
Agricultural Economics:	5	24
Animal Science (includes Nutrition and Range Management):	4	19
Agricultural Engineering:	1	5
Biometrics (and Computer Science):	2	10
Crops and Soils (Entomology; Soil Science):	2	10
Fishery and Forestry Economics:	2	10
Sociology (includes Agricultural Extension):	5	24
<u>~ree</u> <u>Institution</u>		
<u>Michigan State University</u> (38%)		
Agricultural Economics:	3	
Animal Science:	2	
Sociology:	2	
Computer Science:	1	
<u>New Mexico State University</u> (10%)		
Range Management:	1	
Animal Nutrition:	1	
<u>University of Missouri - Columbia</u> (14%)		
Agricultural Extension:	1	
Sociology:	2	
<u>Others</u> (38%)		
Rhode Island		
Iowa State		
Sam Houston State		
SUNY-Syracuse		
University of Arizona		
Kansas State		
North Carolina State		
Texas A&M		

and social sciences. A majority of the training programs was equally divided between agricultural economics and rural sociology, but almost 30% of the students received MSc. degrees in animal science or agronomy.

The MSU Management Approach. MSU management responsibility for all long-term training ensured that individual MSc. programs were closely tied to each student's research interests and to the broader program support provided under the contract.¹⁴ A part-time, MSU-based administrative assistant and the MSU Campus Coordinator matched graduate schools, programs and faculty to the individual ISRA participant's academic training, interests and research plans. With a majority of the students enrolled at 10 universities across the country, 'on-site' visits to each student and their major professor at least twice during their US training period helped to orient the training program to the student's future research assignment in ISRA.

Most of the students maintained frequent telephone contact with MSU to deal with administrative and personal questions. An informal and occasional newsletter was also circulated to help keep the students in touch with each other, advised about participant trainee regulations and matters, and informed about ISRA programs and events, including MSU project activities in Senegal.

Program Innovations. In addition to the personal screening interviews administered by MSU faculty in Senegal, the long-term training component included four innovations in participant training. First, all candidates were advised, when possible and necessary, to gain field experience and identify a tentative research topic prior to beginning their training.

¹⁴Financial and administrative management for the first 11 students was transferred from the USDA/OleO to the MSU contract upon completion of the first year of training funded under the Sahel Manpower Development Project.

MSU Summer Institutes

All students were encouraged to attend at least one of the MSU Summer Institutes in field research methods, data collection and data processing and analysis. The Institutes were held on the MSU campus from July 7 to August 6, 1982¹⁵ and from August 5 through 12, 1983. The Director General of ISRA visited with the ISRA students during the first Institute and the Director of the Production Systems Research Department and Bureau of Macro-Economic Analysis participated in the second one in order to review the students' academic programs and to discuss the Department's research policy and programs.¹⁶

The Institutes offered students a valuable opportunity to improve their understanding of the relationship between their program of study, ISRA's research activities and plans, and the role of the MSU project in ISRA's research programs. The students had an extended opportunity to meet and associate with each other and to gain a common understanding of some of the concepts and methods of FSR. Each student's training program was also reviewed, with the participation of many of the students' major professors, in order to identify and resolve problems which might have arisen.

Field Research Opportunities

Five students spent 3 to 4 months in Senegal to complete the field research requirements for the MSc. degree.¹⁷ The

¹⁵See Appendix 1 for the program calendar of this Institute.

¹⁶Based on an evaluation of the first Institute, the second one was designed for a shorter period in order to accommodate the students' academic calendars and to concentrate the Institute program on data collection and computer skills.

¹⁷Since the project paper indicated that all long-term participants would return to Senegal for their thesis research, those trainees who did not return and their major professors were asked to show convincing evidence to ISRA and to MSU that a Senegal field research experience was either unnecessary, inappropriate, or would not make the best use of the trainee's time.

Production Systems Department's PL 480 (Title III), local currency budget financed the international travel and local costs associated with the thesis research. The fieldwork was a useful training experience and it did lead to theses that were immediately and directly relevant to the students' and to ISRA's programs. The success of the field experience required considerable administrative time to arrange international travel, review the research proposals and organize the required financial and material support for the students.

Special Programs

Students were encouraged to attend between-term short-courses or seminars and to consult faculty and the library facilities at other universities. In addition, two students attended special post-degree programs at the International Rice Research Center (IRRI).¹⁸

Short-Term Training

Short-term training complemented and supplemented the long-term training component of the project. USAID managed the funds for short-term activities which included: special in-country workshops and seminars, in-service training by visiting consultants, and participation in international seminars and conferences designed specifically to improve and encourage communication and exchange among agricultural scientists within the West African subregion.

In-Country Workshops. Three in-country workshops on production systems research, on-farm agronomic trials, and field methods in livestock research were organized under the

¹⁸Approximately 30% attended USDA-sponsored short-courses; another 20% participated in other types of between-term programs.

auspices of the PSR Department during 1984 and 1985.¹⁹ Researchers from ISRA's Crops, Livestock, Forestry and Production Systems departments and representatives from government agencies and from international research institutes attended. The workshops offered some skills training; but more important, they helped to improve scientific exchange and communication among ISRA scientists in different research departments and to establish an improved understanding of the contribution and legitimacy of on-farm research activities in conjunction with on-station research programs.

The Use of Computers. Several activities were designed to improve the computer skills of ISRA scientists and support staff. Selected researchers attended specialized workshops at MSU and at FAO Headquarters in Rome. In January 1985, a special two-week introductory seminar on MSTAT20 was held in Dakar. Short-term consultants provided on-the-job training in computer skills and use of different applications programs for both scientists and support staff throughout the life of the project (see Chapter IV for a more detailed discussion of the computer support activity under the contract).

English Language Training. English language courses were organized to enable ISRA scientists to participate more

¹⁹The results of these workshops are reported in: R. James Bingen, (1985) "Orientation de la Recherche sur les Systèmes de Productions au S-n-gal," Dakar: ISRA, Département Systèmes de Production. ISRA, (1985) "La Recherche Agronomique pour le Milieu Paysan," Actes de l'Atelier. Dakar: ISRA; ISRA-IEMVT, (1987), "Methodes pour la Recherche sur les Systèmes d'Elevage en Afrique Inter-tropicale," Actes de l'Atelier. Paris: IEMVT.

The first workshop received financial and technical support from the Farming Systems Support Project (FSSP). Exclusive of FSSP support for the first workshop, the total estimated cost for all three workshops was \$40,000.

²⁰MSTAT is a specialized computer program for statistical analysis, primarily in agronomic research.

productively in international meetings. A special three-week, in-country intensive English-language program was organized with a Dakar-based training agency for approximately 15 ISRA scientists from the PSR Department and the BAME. The course improved the participants' English language skills, but continued and frequent opportunities to speak English were necessary in order to maintain their skills.²¹

Conference Participation. The Director of the PSR Department and BAME encouraged researchers to take at least two years to establish a research record before applying for project funds to participate in international and regional professional conferences.²² Conferences attended included: a World Bank Seminar on Agricultural Extension and Research in the Cote d'Ivoire; an IFPRI-ICRISAT Symposium on Cereals Production and Marketing in Ouagadougou; a CIRAD Rural Economy Seminar on the State, Development and Peasants at Montpellier; the Kansas State University Fifth Symposium on Farming Systems Research at Manhattan, Kansas; the first West African Farming Systems Research Network (WAFSRN) Workshop in Dakar; and a West African Animal Traction Workshop held in Togo.²³

Study Tours. One study tour to East and Southern Africa (Kenya, Botswana and Zimbabwe) was organized in early 1984 for the Directors of the Crops, Animal Production and PSR Departments, accompanied by the MSU Field Project Director. The

²¹Some of these researchers were able to continue language training through a class organized by a U.S. Peace Corps Volunteer.

²²MSU faculty were specifically discouraged from participating in seminars and conferences outside the West Africa sub-region.

²³The estimated life-of-project cost for travel and related costs to attend conferences, etc. was \$20,000.

purpose of the trip was to review how other national research systems organize and manage on-station and on-farm research. Specific attention was given to: scientific and administrative relationships, program administration and financial management, multidisciplinary team management, research career incentives, and research publication policies and procedures.

Outstanding Issues

Two major training issues remain outstanding for ISRA: the conditions for researcher growth and development and the limitations on researchers' careers.

The Development of Research Skills. During the course of the project, it became apparent that regular and close research guidance and support by senior scientists was significant in making the best use of the advanced degree training. Junior agricultural scientists, as a rule of thumb, require a 4- to 5-year apprenticeship with a senior researcher. The overlap between the senior MSU researchers and the new MSc-level Senegalese scientists helped to start this relationship. However, ISRA personnel regulations, specifically the memoire requirement, hindered its effective development.

Within one year of completing long-term degree training, all ISRA researchers are expected to prepare and defend an analytical research report (memoire) which confirmed their ISRA appointment (titularisation). The reports may be reasonable tests of a researcher's analytical and methodological skills; they may also serve as useful background documents for the research programs, even though the research for the report is usually separate from on-going research activities. Once the report is successfully completed and approved, the researcher receives tenure, thereby lessening the professional leverage which a senior scientist could use to encourage the development of research skills during an apprenticeship period.

Professional Advancement. Contrary to an assumption in the project paper, the MSc. was accepted as a degree equivalent to the French Advanced Studies Diploma (DEA). On the other hand, ISRA's statutory regulations do not offer an opportunity for advancement on the basis of scientific merit. Additional degree training beyond the MSc. or the French 3eme Cycle does not provide a promotion beyond the standard step advancement process common in most government personnel systems. Consequently, there is very little incentive for PhD-level scientists to chart a long-term professional career with ISRA.²⁴

²⁴The question of degree equivalency was a covenant of the project and led in 1985 to the "Proposal for the Classification of American Degrees" presented by Mouhamadou A. Dia, President of the National Commission of Degree Equivalency. MimeD. (Dakar: USAID/Senegal).

CHAPTER IV.
COMPUTER SUPPORT

Program Guidelines

Based on its prior experience with agricultural research and development projects in Africa, MSU used three guidelines to define the computer support component of the project: an insistence on in-country data analysis, the provision of adequate and appropriate equipment and programs and professional guidance to analyze data in a timely manner, and a reliance on equipment (hardware) that could be serviced and supported in Senegal.

In 1981, ISRA purchased a mainframe IBM 4331 and five IBM 5120 microcomputers with a grant from the Federal Republic of Germany. The mainframe and one 5120 were installed at ISRA's Computer Center in the Oceanographic Research Center (CRODT) near Dakar, and the other 5120's were assigned to regional research centers. The 5120's were not state-of-the-art microcomputers and their applications programs were designed for business purposes, not for agricultural research. The presence of an IBM office in Dakar, however, outweighed arguments to invest in computers that could not be serviced in Senegal.

Computer Program Development

In order to facilitate the use of the 5120s, MSU computer specialists spent a substantial amount of time during the first two years of the project developing and adapting 5120 programs which would be most useful to ISRA research scientists in the regional centers. Specifically this involved: altering 5120 programs (e.g., the STAT program) to be more effective for agricultural research, modifying the IBM BRADS-II program to emulate features of the FAO Farm Analysis Program (FARMAP) which

led to BRADS-FARMAP,²⁵ and designing programs to transfer data from the 5120 with its limited memory (64K) to the 4331 mainframe in Dakar for more in-depth data analysis.²⁶

The IBM-PC was available in Dakar by the end of 1983, but work continued on BRADS-FARMAP and other 5120 applications programs since the 5120 was still the most widely accessible computer for ISRA researchers. IBM PCs were installed in the headquarter offices of the Production Systems Department and BAME by mid-1983; and in mid-1985, IBM XTs replaced the 5120s in some of the research centers. During this "transition period", support activities turned away from modifying programs to solving hardware problems and adapting the fast-growing number of English language applications programs (word processing, statistical analysis, data base management) for Francophone users and sometimes on equipment designed with somewhat different (French) specifications.²⁷

In-Service Training

Once the computers were installed and applications programs available to research scientists and staff in the regional centers, a special one-month in-service training program was designed in early 1986 primarily for the PSR Department and BAME researchers and support staff posted to Djibelor, St. Louis and

²⁵In 1981, the FA--developed computer program, FARMAP, appeared to be the best and most comprehensive computer program for use in farming systems research. When the AR&P project was being prepared, FARMAP was still being tested, and it was available only for mainframe computers in FORTRAN computer language. The MSU contract stipulated that MSU would be responsible for translating and updating FARMAP for use on the IBM 5120.

²⁶The MSU computer support group also advised the ISRA Computer Center staff on a range of computer operation and program installation problems.

²⁷For example French or English language programs would often not work on "American" or "French" machines. Matching keyboards, programs, character sets and printers, for example, was especially time-consuming.

Kaolack. This training helped make more effective use of the computers by specifically covering the use and management of microcomputers and reviewing various applications programs, and special problems confronted by researchers.

In November 1987, an MSU consultant gave one-week training sessions at the Dakar, Djibelor, Kaolack, and St. Louis stations on the use of SPSS/Pct. This powerful statistical analysis program was acquired and installed partly in response to requests from ISRA researchers.

Hardware, Software and Supplies

MSU provided a substantial amount of computer hardware, software and supplies to ISRA.

Hardware. Two desktop computers (IBM PC and IBM PC-AT) equipped with high-resolution monitors and printers, including one letter quality printer, were installed in the PSR/BAME headquarters in Dakar. An external 8 inch disk drive was purchased to permit transfer of data from the 5120's to the more modern computers. Two Zenith laptop computers were also purchased, as well as two high-speed modems, the latter to experiment with telephone transmission of documents and data files between MSU and the Dakar project office.²⁸

Software. Software purchased in the U.S. and supplied to ISRA included programs for word processing (Multimate and Wordperfect), statistical analysis (MSTAT, ABTAB, ABSTAT, and SPSS/Pct), spreadsheet (Lotus 1-2-3), database management (dBASE

281n December, 1987, MSU consultant Alan Johnston successfully tested modem transmission of messages and data between ISRA centers, and between ISRA/Dakar and MSU. This showed that with a modest investment in modems, software, and dedicated telephone lines, ISRA scientists would be able to exchange computer files with their colleagues within Senegal, facilitating the timeliness and quality of scientific exchange. Access to international data bases, and communication with scientists in other countries, would also be possible.

II and 111+ and Notebook II), linear programming (LP88), communications (Laplink, ProComm), and utilities (Norton Utilities, QDOS-II, and Fastback Plus). In most cases, copies were provided for the Dakar office and the research stations at Djibelor, Kaolack, and St. Louis.

Supplies. Smaller hardware items and supplies purchased and sent to these offices included surge suppressors and backup power supplies, monochrome graphics cards, higher-capacity (30-megabyte) hard disk drives, tool kits, vacuum cleaners, and disk drive cleaners, as well as diskettes, printer ribbons, paper, and other miscellaneous supplies.

CHAPTER V.
DOCUMENTATION AND PUBLICATIONS

Support for Documentation Centers

Improved documentation facilities and the development of a publications program were integral elements of strengthening ISRA's capacity in production systems and agricultural policy research. Support under the MSU contract consisted of: the establishment of a documentation center in the headquarters offices of the PSR Department and BAME; an expansion of the collection through the transfer of documents, books and articles to four of ISRA's documentation centers; subscriptions to professional and scientific journals; and support for a scientific publications program for PSR and BAME researchers.

Over a 12-month period during 1983 and 1984, a local-hire documentalist classified, processed and shelved approximately 2,000 books, documents and fugitive materials that had accumulated in the offices of the former Economics and Sociology Department at Bambey. The classification scheme was coordinated with other documentation units within ISRA and with other documentation programs such as the Sahel Institute RESADOC, the OECD Macro-Thesaurus and the FAO AGROVOC.²⁹ An accessions register was started and a card catalog by author, title and subject was established.

In addition to a selection of 100 titles in agricultural and social sciences which were sent to the headquarter's documentation center and to the documentation units at Djibelor, Kaolack and St. Louis, the headquarter's documentation center

²⁹This also permitted the greatest flexibility for compatibility with the ISRA-wide system to be developed under the UNIFSTD project.

had three-year subscriptions to 25 English-language professional and scientific journals and received the complete series of MSU papers and working papers from the African Rural Economy program, the Rural Development and the International Development series, and the Sahel Bibliographic Bulletin (see Appendix 2).

Under the leadership of a highly qualified and experienced part-time documentalist who was hired by ISRA at the end of 1985, the following publications are circulated regularly to PSR Department and BAME researchers: a periodicals Table of Contents Bulletin ("Bulletin des Sommaires de P~riodiques"); a selected, annotated Acquisitions List ("Nouvelles Acquisitions - Notes et Analyses Bibliographiques"); and a catalog of periodicals in the center's collection ("Catalogue des Collections de P~riodiques"). In addition, the documentalist established a document exchange system with approximately ten international research centers.

Publications Program

In order to provide a publications opportunity and incentive for the PSR Department and BAME researchers, a Working Paper and Research Paper series was started in late 1983 (see Appendix 3 for a complete list of publications through 1987). The Working Papers present the tentative results of research programs and are intended for restricted circulation, while the Research Papers present the final results of research and are intended for wider distribution.

In 1986, ISRA and MSU agreed to publish a joint series of reprints in the MSU International Development Paper Series in order to make the PSR Department and BAME research results available to an international audience in both English and French. This reprint series reproduced (with editing and revisions) and translated all PSR Department and BAME papers that were authored or co-authored with a MSU researcher (see Appendix 3 for a list of reprints).

CHAPTER VI.
PRODUCTION SYSTEMS RESEARCH

Introduction

The AR&P project contributed to building a national program to regionalize and reorient agricultural research by supporting policy-relevant production systems (farming systems) research in two regions and by strengthening the administrative and scientific management of a national production systems research (PSR) department.

ISRA offered a ready terrain upon which to launch a farming systems research program. Senegal's experiment with the Unites Experimentales from 1968 through 1978 marked one of the first attempts in Africa to apply a systems approach, incorporating socio-economic analysis to farm-level or off-station agricultural research.^{3D} The Unites program had developed a better understanding of the technical feasibility and economic profitability of intensified farming in the Sine Saloum region, and it illustrated the contribution of socio-economists to research in the crop, soils and animal sciences. The program, however, was unable to expand geographically or become incorporated into ISRA's research organization.

Production Systems Research Approaches and Orientations

The MSU Approach. In order to launch ISRA's PSR program, MSU adopted a two-pronged approach. Instead of establishing Production Systems teams composed largely of MSU personnel or designating economists to join commodity-based programs, MSU

^{3D}See Benoit-Cattin, Michel. (Under the direction of). (1986). Recherche et Developpement Agricole. Les Unites Experimentales du Senegal. Montpellier: CIRAD.

assigned one economist to each of two PSR Teams.³¹ Second, MSU helped to establish the PSR Department's Central Systems Analysis Group as a headquarters unit of senior staff to support the regional PSR teams, develop a national PSR program and forge effective relationships between the PSR and Commodity programs and between the PSR teams and the regional agricultural development agencies.

MSU's orientation to production systems (farming systems) research drew heavily from the work of David Norman and from the experiences of the international agricultural research centers.³² This orientation emphasized the following: (1) a relatively limited definition of the "system" to be improved, focusing on the farm as the unit of analysis, and aiming to make marginal improvements in farm productivity given the constraints posed by existing resource levels and agricultural policies; (2) use of rapid informal surveys for initial diagnosis of farm problems and planning of on-farm experiments; and (3) a multi-disciplinary approach, but relying in practice on relatively few disciplines (agronomy, economics, sociology/anthropology).

Practitioners of this approach characteristically stressed the limited value of formal surveys and quantitative data collection which were felt to be unnecessary for arriving at an

³¹The model PSR Team was to include Senegalese and expatriate scientists in the following positions: Agronomist, Economist, Sociologist, Research-Extension, and perhaps Animal Scientist. See Appendix 4 for the staffing pattern for the PSR Department and the three PSR Teams.

³²Three papers were especially important: Michael P. Collinson (1982), Farming Systems Research in Eastern Africa: The Experience of CIMMYT and Some National Agricultural Research Services, 1976-1981, MSU International Development Paper Number 3, East Lansing: Agricultural Economics, MSU; David Norman, (1980), The Farming Systems Approach: Relevancy for the Small Farmer, MSU Rural Development Paper Number 5, East Lansing: Agricultural Economics, MSU; and, E. Gilbert, D. Norman and F. Winch, (1980), Farming Systems Research: A Critical Appraisal. MSU Rural Development Paper Number 6, East Lansing: Agricultural Economics, MSU.

adequate understanding of local farming systems, as well as being unduly costly in time and resources. They also tended to have an implicit expectation of relatively quick results.

Development of ISRA's Own Methodology

Because the goal was to establish a national farming systems research capability within ISRA, a major objective at the outset was to develop a set of PSR concepts and methods appropriate to Senegal. The PSR Department Director's desire to elaborate an ISRA methodology stemmed from three considerations, other than a simple concern to adapt "standard" PSR methods to local circumstances. First, the PSR Director had gained significant field experience with the Unites Experimentales from which lessons could be drawn for future PSR programs. Second, most of the personnel assigned to the three ISRA PSR teams had never worked on a systems-oriented research team and needed close guidance and support to get started. Third, many researchers associated with the PSR program were either French or French-trained and therefore had quite a different view of what farming systems research should be compared to the ideas promoted by MSU researchers. The PSR Director wanted to reconcile these contrasting views.

The MSU team perceived that the "Francophone" approach to PSR differed from the "Anglophone" approach in two major ways: (1) the system to be studied was defined more broadly to include levels above the farm (clan/lineage, village, and the agroecological system surrounding the village); and (2) a stronger emphasis was given to the evolution of the farming system over time, implying more attention to historical changes and to sociological factors. This greatly expanded the scope of the research to address a larger number of system components, several different levels of the system, and questions of changes in the system over time.

The "Francophone" approach was thus perceived as a heavier and more data-demanding and long-term type of research requiring

more research disciplines (e.g., soil science and geography). Because the system was defined more broadly, the rapid appraisal methodologies proposed by FSR economists such as Collinson and Hildebrand were considered too superficial to provide an adequate understanding of the system. From the point of view of the MSU researchers, the Francophone researchers seemed to feel that until they understood everything about the system they were unprepared to state the problems or identify likely solutions.

Considerable progress was made in reconciling these disparate views and in formulating an ISRA approach to PSR which incorporated suitable elements from the Anglophone and Francophone approaches. Numerous discussions of PSR methodology took place within the Central Systems Analysis Group and during meetings between CSAG members and the field PSR teams. In addition, two workshops were organized in Ziguinchor, one in early 1984 and one in late 1984.³³ The first workshop was particularly useful in providing the opportunity for all researchers to air their views and to gain an understanding of others' views. It was also recognized that each of the three PSR teams required a different approach, given the unique features of each region's farming system and differences in the experience and expertise of the team members.

The end result was that MSU team members were persuaded of the importance of looking at levels of the system other than the farm, of considering activities other than crop production (e.g., livestock), and of the sociological dimension (important to understand the complex structure of farm households in Senegal). Francophone researchers gained an appreciation of the Anglophone emphasis on achieving quick results, focusing only on the essential aspects of the farm system, and using a stepwise

³³Cf. D6partement Syst~mes, (1984). "Conception et mise en oeuvre des programmes de recherche sur les syst~mes de production: Atelier de Ziguinchor," Document de Travail 84-3, Dakar: ISRA; and Bingen, "Orientation de la recherche ... "

process of exploratory research before committing resources to costly data-intensive studies.

The computer support activities under the contract made an important contribution, since in practice the debates about PSR methodology were often played out during discussions of the design of field experiments and surveys. MSU staff had considerable expertise to offer in this area, lending weight to their suggestions regarding high- versus low-priority data and how to design the data collection to facilitate rapid analysis.

Support for PSR Programs

This section discusses the principal features of the Djibelor and St. Louis production systems research programs to which MSU agricultural economists were assigned and the Central Systems Analysis Group (CSAG) of the PSR Department in which the MSU rural social scientist and production (macro) economist were staff members.³⁴

Djibelor. During the 1970s, most development planning in Senegal looked to the Lower Casamance as the country's "rice bowl." The USAID-financed Casamance Integrated Rural Development Project, for example, was designed specifically to exploit the region's potential rice production capacity. On-station agricultural research, consistent with these priorities and in collaboration with WARDA and IRRI, concentrated principally on varietal testing of irrigated rice and complex

³⁴For a detailed discussion of the role of the CSAG and of each team's research program, including the organization and management issues raised by the teams, their relationships with the administration of the regional centers and with the CSAG of the PSR Department, see Faye and Bingen, 1988, Organisation et Gestion.

MSU team members, as members of the CSAG of the PSR Department, helped advise researchers on the Kaolack PSR team. Since an MSU researcher was not assigned to the Kaolack PSR program, it is not discussed in this section.

See Appendix 4 for the calendars of staffing for the research units to which MSU personnel were assigned.

physical, chemical and biological problems related to the region's saline soils.³⁵

Hence, when the MSU Production Systems Economist joined the SECID Agronomist and an ISRA Rural Economist in April 1982, it was generally expected that this new PSR team would prepare an off-station, multidisciplinary, applied research program which would contribute to the development of the region's role as a rice exporter to the rest of the country.³⁶ Drawing heavily on Norman's and CIMMYT's FSR methodology as described earlier, this new team, in advance of the establishment of the CSAG and with guidance from MSU agricultural economists, defined a research program that would distinguish the Djibelor PSR experience.³⁷

Following an extensive review of the literature covering the socio-economic development of the Lower Casamance³⁸ and the relevant agronomic research, discussions with other researchers at Djibelor and with representatives of the regional development agencies, the team undertook an informal, two to four month reconaissance survey which led to the identification of five

35See J.L. Posner (1985) "Contribution ~ la Connaissance Agronomique de la Basse Casamance." (Synthese Bibliographique). Travaux et Documents No.3. Dakar: ISRA, Departement Systemes de Production.

36The Senegalese Rural Economist had only recently returned from MS studies in Canada. The SECID Agronomist, who had worked with a FSR program in Honduras, had been assigned under the Lower Casamance Project to the Djibelor research center originally as a rice agronomist and not to the PSR Team.

37Michael Collinson, then with CIMMYT in East Africa, had reviewed the 'CIMMYT approach' to FSR with MSU faculty during a MSU campus visit in January 1982; these discussions had a strong influence on design of the Djibelor PSR program.

38This was supported by the provision of approximately 50 photocopied articles from MSU which had been identified as important background or resource materials in (1980). "An Annotated Bibliography of Rural Development in Senegal: 1975-1980." African Rural Economy Paper No. 23. East Lansing: Michigan State University, Department of Agricultural Economics, by Gail Kostinko and Josue Dione

recommendation domains or zones. These zones, defined in terms of the importance of rainfed or upland cropping, the gender division of labor and, the use of animal traction, set the framework for the team's core household economic and agronomic surveys, which were carried out in two villages per zone and initially with 237 households and on 1,300 plots. While the team reduced and modified the sample size for both types of surveys in 1984 and again in 1985, the economic surveys were based on a modified farm management study with emphasis on input data and non-agricultural activities. Three principal themes were identified during the initial informal surveys: agronomic studies of crop diversification, the use of abandoned, upland fields and the possibilities for residual moisture or post-rainy season crops. As the team grew to include a sociologist, an animal scientist and an agricultural machinery specialist, special studies and surveys covering household organization of agricultural labor, the role of livestock in the region's agricultural production systems, and the quantity, type and quality of farm-level equipment ownership were added to the core economic and agronomic program.

Very early in the course of the Djibelor experience, the team reported that upland rainfed crops, and not the traditional aquatic rice, were beginning to play a more important role in the household production strategies. The lack of available labor appeared as a major constraint on improved crop production and contributed to what was perceived as a growing household food deficit in the region. The orientation of the agro-economic research was modified accordingly; and discussions were held with the ISRA commodity researchers and with representatives of the regional development agency, SOMIVAC,³⁹ to suggest and examine appropriate modifications in their respective research and development programs.

³⁹SOMIVAC, the "Societe de la Mise en Valeur de la Casamance", was the umbrella agency which included PIDAC, the "Projet Integre de Developpement Agricole en Casamance".

St. Louis. When the MSU Economist joined the PSR Department's agronomists, animal scientist and agricultural machinery specialist in early 1984, the design of their PSR program needed to account for: (a) the long history of different types of systems research along the river valley; (b) the aggressive role of the regional development agency, SAED,⁴⁰ in seeking to achieve the country's ambitious production objectives, including a quadrupling of the land under irrigated production by 2000, widespread double-cropping of rice and crop diversification with maize and selected vegetable crops; (c) the dominant role of WARDA⁴¹ in ISRA's rice research program in the region; and (d) some uncertainty within ISRA concerning the relocation of the Institute's regional center to either Fanaye in the Middle Valley or, as eventually happened, to St. Louis in the Delta.

Based on the logistic problems and costs of trying to run research programs in both the Middle Valley and the Delta, the team undertook a complete multi-faceted three to four month survey of all (112) villages only in the Delta. This exhaustive initial census substituted for a reconnaissance survey, as in Djibelor, and differed from SAED's view of the region based on its division into irrigated perimeters. In this way, the team hoped to gain a broader agro-socio-economic perspective which would inform their decisions on the organization and the kinds of investigations that would generate the most useful information in the short- and medium-term for SAED and for other regional development offices.

Of the seven agricultural zones which were defined from the results of the census, the team chose three in which to undertake a detailed and comprehensive FARMAP survey with 528 heads of household in 18 villages. Sixty-nine households were chosen

⁴⁰SAED, "Soci-t- d'Am-nagement et d'Exploitation des Terres du Delta, des Vallees du Fleuve S-n-gal et de la Fal-me."

⁴¹The West African Rice Development Association. WARDA also managed a production systems research program in the Middle Valley, independently of the the PSR Department's program.

for a FARMAP farm monitoring program that was designed to run from 1985 through 1987. Special surveys of fertilizer distribution, vegetable marketing and the use of animal by-products complemented this baseline monitoring program. An economic analysis was also added to much of the continuing on-station and on-farm agronomic work on land preparation, crop rotation and forage crop trials, and farm-level fertilization.

The Central Systems Analysis Group. This headquarter's group of senior scientists in the PSR Department continually struggled to find a constructive compromise between two roles: (1) responding to the bureaucratic and administrative requirements and challenges of establishing a new research department and (2) answering the need to provide constructive scientific guidance to the (largely junior) researchers who were responsible for launching the regional PSR teams.

Administrative questions preoccupied the CSAG through much of 1983; but as the MSc. students returned from their U.S. training, the CSAG, and especially the Macro (Production) Economist and the BAME Marketing Economist, turned more of their attention to supervising these junior scientists. The other scientific contributions of the CSAG, launching a publications program, establishing a departmental documentation center, organizing in-country workshops, and defining an orientation to a national program of production systems research and have been discussed in the respective chapters of this report.

Throughout 1985, the MSU Agronomist who was assigned to the CSAG played a key role in opening-up possibilities for greater collaboration between the PSR and Crops programs.

Contribution to Agricultural Research
Organization and Development Programs

Research Approach and Organization. The creation of the Production Systems Department (and the BAME), the relatively large number of expatriate scientists who joined the department

in a fairly short period, and the perception by others in ISRA of the Department's privileged access to significant financial resources (Title III) represented a serious bureaucratic challenge to ISRA's other research departments. Some concern was expressed that the perceived lead role of the Department would jeopardize its contribution to research programming in ISRA.⁴² Nonetheless, crop and animal scientists came to accept the farming systems approach as a complementary research strategy and one which was relevant for helping to define the content and orientation of on-station research programs.

Where there have been opportunities for crops and production systems researchers to work together closely, as in the Lower Casamance, the crops research scientists, especially in rice, have occasionally incorporated relevant farm-level information or farming systems typologies proposed by the PSR Team into their research programming. Crops scientists also use Team findings to identify and justify some of their research priorities.

Moreover, in response to the Djibelor Team's finding that farmers were shifting production to groundnuts and other rainfed crops on upland fields, ISRA redirected some of its financial and material resources in order to encourage more on-station work on rainfed crops. Similarly, in the St. Louis region preliminary research by the PSR Team led the WARDA rice research team to consider non-transplanted rice in their varietal testing program and to re-examine the feasibility of double-cropping rice, a key assumption of the government's development strategy for the region. Additional studies by the PSR animal scientist identifying some of the dimensions of livestock production systems in the Delta region of the Senegal River Valley have helped researchers gain a better appreciation of the role of livestock in the farming systems of the region.

⁴²See Carl K. Eicher (1982), "Reflections on the Design and Implementation of the Senegal Agricultural Research Project," MSU Department of Agricultural Economics Staff Paper 82-19.

Development Programs: Research-Extension Linkages. The development of an effective working relationship between agricultural research and agricultural extension was a principal concern during the preparation of the AR&P project. In order to address this problem directly, a covenant was added to the AR&P project paper making a second disbursement of funds under the project contingent upon the establishment of a research-extension link in the Lower Casamance. In early 1983, ISRA and SOMIVAC signed a "recherche-d-veloppement" protocol. By late 1983, ISRA and SAED also began a series of discussions concerning more effective collaboration between the two agencies in the Senegal River Valley.⁴³

The ISRA-SOMIVAC protocol agreement did open channels of communication between the two agencies. But more important, the value of some of the PSR Team's findings was recognized by the agency and incorporated into their extension program. This included:

- the use of selected, improved rice varieties which had been tested by the PSR Team under farm-level conditions;
- the promotion of a rice-sweet potato package to improve the security of food production through the maximum use of residual soil moisture; and,
- the adoption of the PSR Team's definition of agricultural zones as one means to adapt and make the extension messages more responsive to different farm-level conditions.

The creation of a formal channel of communication at the decision-making levels of both the research and extension agencies also facilitated collaboration between research scientists and field-level extension personnel at the village level. In the lower Casamance, the PSR Team worked closely with SOMIVAC

⁴³For a more complete discussion of the research-extension issue in Senegal and the ISRA-SOMIVAC and ISRA-SAED relationships, see R. James Bingen and Jacques Faye (1985), "Agricultural Research and Extension in Francophone West Africa: The Senegal Experience." Document de Travail 85-17. Dakar: ISRA, Departement Systemes de Production. (Also in French).

agents to identify research problems and trials; to set up and manage trials; and to evaluate and interpret the results. In the Senegal River Valley, joint ISRA-SAED demonstration field trials in farmers' fields, managed by a PSR agronomist, were designed to train future SAED agents and to gain experience with a method for running farmer-identified and managed trials.

Research-development work directly with farmer groups or village associations (in the spirit of the government's "responsibilisation" policy) is in its early tentative stages. The Djibelor PSR team (with support from CIRAD) works with a regional farmers' association (CADEF-Lower Casamance) to develop a collaborative research program which addresses the farm-level constraints identified by the association. The project seeks to be more responsive to farm household problems and to identify a more cost-effective means for doing farm-level systems research. The St. Louis team has also undertaken a series of collaborative trials ('essais dialogues) which have been identified and implemented in response to farmer requests in the Senegal River Valley.

In addition to the policy dialogue between ISRA and the local development agencies at the regional level, the PSR programs have created opportunities for more informed discussions of national government policies. In June 1985, for example, the ISRA-SOMIVAC Research-Extension Liaison Unit organized a national roundtable discussion on the policy for salt-water intrusion dams in the Lower Casamance. Based on joint ISRA-SOMIVAC fieldwork, this roundtable permitted a frank and open discussion of the government's preference for large dams versus the ISRA-SOMIVAC preference for small dams.

Various government agencies frequently requested the PSR teams to design trials and surveys that could generate information concerning the government's proposed agricultural policies and plans. In addition, PSR Department personnel regularly consulted with the planning and programming offices in the Ministry of Rural Development and the Executive Office of the

Presidency concerning PSR findings and the implications of the
Department's research for agricultural policy-making and
programming.

CHAPTER VII.
AGRICULTURAL POLICY ANALYSIS

The Mission and Objectives of the BAME

From independence in 1960 through the late 1970's, macro-economic studies had been left almost exclusively to planning agencies.⁴⁴ ISRA performed essentially no agricultural policy analysis. By the early 1980's, the GOS was undertaking a major reassessment of its agricultural development policies and programs.⁴⁵ Reflecting the importance given to this subject by the World Bank project, the BAME was established in 1982 as a unit reporting to the ISRA Director-General.⁴⁶

As initially defined in the Project Paper, the BAME's mission was:

to carry out macro-economic research on food, nutrition and agricultural policies in order to provide guidance to policy makers on economic and institutional constraints

⁴⁴The FAO sponsored a 1974 study to develop food balance sheets with the Institut de Technologie Alimentaire (ITA) a 1977 MSc. paper by Josue Dione focused on the food grain subsector. CRED carried out an analysis of foodgrain marketing in Senegal as part of a Sahel-wide study sponsored by the CILSS/Club du Sahel and, in 1977, SONED, a consulting firm in Dakar, completed a study on cereals marketing and storage for the Ministry of Rural Development.

⁴⁵NCAD was disbanded in 1980 along with the 1960-79 Programme Agricole, which provided credit for agricultural equipment and inputs. With the new government in 1981, discussions began which led to the 1984 Nouvelle Politique Agricole (NPA). During this time, donors encouraged the government to liberalize and privatize economic activity.

⁴⁶In practice, the BAME was closely linked to the PSR Department, sharing the same offices and Director. In 1986, the BAME was merged into the PSR Department, which was renamed the Directorate of Research on Agrarian Systems and Rural Economics.

on agricultural production and marketing with emphasis on the foodgrain subsector.

MSU staff and the BAME Director identified two necessary conditions for the BAME to become an effective policy analysis unit. First, the BAME should be located within ISRA. This would foster a scientific research orientation, rather than a focus on shorter-term "quick and dirty" and perhaps less objective studies.⁴⁷ It would also help ensure adequate attention to agricultural, rather than general, economic policy issues.

Staff of the Ministries of Plan and Cooperation and Scientific and Technical Research argued that "macro-economic analysis" should not be carried out by an agronomic research institute. Some wanted to eliminate the BAME; others wanted to have the BAME and its external resources placed within their agency. Fortunately, with the weight of the World Bank project behind it, ISRA was able to counter these arguments.

Second, the BAME needed a well-defined research program that addressed issues of current policy concern. The BAME's credibility clearly depended on its willingness to study issues of interest to GOS policy-makers, not just issues with academic appeal. A research plan would also serve as the basis for obtaining approval for BAME activities from GOS and donor agencies. A set of explicit priorities, ratified in this way, helped to ensure that the BAME was seen as responsive to the needs of policy-makers. At the same time, it was a basis for refusing requests for ad hoc studies motivated by special interests, thus protecting the BAME from becoming a "boite d'études" (consulting firm) or statistics collection agency.

Formulation of the BAME Research Program

With these concerns in mind, MSU staff and the BAME Director developed a strategy for identifying priorities for

⁴⁷These concerns flowed from some of the lessons learned from MSU's experience with the creation of the Economic Development Institute in Nigeria.

BAME research programs based on close collaboration and regular contact with Senegalese and donor officials. First, beginning in 1982, MSU made available three consultants who helped start a discussion of policy-relevant research priorities within ISRA and with GOS policy-makers and selected donor representatives. The consultants reviewed the methodology and findings of macro-economic studies completed in Senegal since 1970. They also examined ways to use micro-level research on farmers and traders to inform the macro policy analysis process, summarized the views of Senegalese policy-makers on agricultural research priorities, and outlined a tentative research program.⁴⁸

Two of these consultants--Newman and Crawford--took up long-term assignments in the BAME in 1983. Based on the previous consultancy reports and similar studies, on continued contacts with GOS and donor personnel, and on participation in the frequent policy workshops, Newman, Crawford, and J. Faye (BAME Director) prepared a draft document entitled "Research on the Macro-Economics Aspects of Senegalese Agriculture: Priority Questions and Proposed Plan of Work" (December, 1983).⁴⁹ This document identified three priority areas of research for the 1984-86 period: marketing (especially of cereals), economics of agricultural production, and the overall food situation of Senegal.⁵⁰ A dozen specific research activities were proposed

⁴⁸See Peterson (1982), Crawford (1982; 1983), and Newman (1983), as listed in Appendix 3.

⁴⁹Republique du Senegal, MRST/ISRA/BAME. (1983). "Recherches sur les aspects macro-economiques de l'agriculture senegalaise: questions prioritaires et proposition d'un plan de travail."

⁵⁰On-going BAME research activities incorporated into this program included: vegetable marketing studies by P. A. Seck at the Horticultural Research Center (CDH) at Camberene; fish marketing studies managed by Senegalese and French economists and sociologists based at ISRA's Oceanographic Research Center (CRODT); and cereals and fruit marketing studies begun in early 1983 by a U.S. economist (C. Jolly) assigned to ISRA/Djibelor under the USAID-financed Lower Casamance Development Project.

for the 1984-86 period, taking into account the Government's policy concerns and the scientific personnel and logistical resources available to ISRA.

A "food systems" framework was presented as the conceptual basis for implementing the research.⁵¹ The advantage of this approach was its focus on actors at all relevant levels in the system from producers to traders, processors, and consumers. It thus provided both a rationale and a methodology for linking the micro and macro levels in examining policy issues.

The proposed BAME research plan was circulated inside and outside of ISRA for comment. A Consultative Group for the BAME was set up, composed of representatives from key GOS agencies and the University of Dakar. In early 1984, the research plan was reviewed at the first meeting of the BAME Consultative Group. Some participants questioned the legitimacy of a policy analysis unit within ISRA and its ability to maintain sufficiently close contact with the policy process. These questions were effectively answered by the ISRA Director-General and BAME Director. The proposed research plan was approved with the recommendation that research on agricultural input distribution and use should receive a higher priority.

A second meeting was held to present the BAME program to donor representatives for discussion. Soon after, the BAME research program document was revised and detailed 1984 research plans and budgets were finalized for six BAME programs. Similar plans and budgets were prepared each subsequent year as part of ISRA's regular programming and budgeting process. These specific research programs and their major results are summarized in the next section.

Staffing of the BAME under the contract was completed in 1984 with the arrival of three MSU Research Associates. Three

510r. James Shaffer, an MSU agricultural economist and regular consultant to the project, played a key role in working with BAME researchers to define and incorporate the food systems approach in the BAME research plan.

Senegalese researchers (with MSc. degrees in agricultural economics from MSU) were also recruited for the BAME in late 1983 and early 1984. (See Figure 4.)

Summary of BAME Programs and Research Results

BAME research programs in which MSU personnel were directly involved included cereals marketing, economics of agricultural production, and studies of the food situation. A list of publications is attached in Appendix 3.

Cereals Marketing in the Peanut Basin. This program was coordinated by Mark Newman until mid-1985 and by Ismael Ouedraogo from January 1986. Ousseynou Ndoye was the principal Senegalese researcher.⁵² A subsector approach was used to examine the key actors in the cereals marketing system. The program included price collection in major rural and semi-urban markets and field studies of grain assemblers, wholesalers, and grain transactions in rural weekly markets. In 1986, a survey of farmer grain transactions was initiated. Results include:

1) Inconsistent and unclear government regulations acted as a strong disincentive to private sector involvement. Regulatory uncertainty raised traders' operating costs and in deficit areas, tended to make local cereals even scarcer than imported rice.

2) The involvement of private traders was also discouraged by unpredictable GOS cereals price policy, by the threat of dumping cheap food aid cereals in local markets, and by traders' limited resources and access to formal credit.

3) Most traders attempt to turn over their stocks quickly because they cannot afford to store grain in anticipation of future price increases.

4) Studies of producer cereals transactions showed that cereal and peanut production were complementary. Peanut

⁵²pape Alassane Sow also participated in the research during 1984.

FIGURE 4.

MACRO-ECONOMIC ANALYSIS
1982 - 1987

DISCIPLINE	STATUS	1982	1983	1984	1985	1986	1987	NOTES
Director: Sociologist (Faye)	SEN	4		1/4 time				
Marketing Economist (Nesamen; Ouedraogo)	MSU		6		9	1		Also filled for the PSR Dept. Vacant from 9/85 through 12/85.
Marketing Economist (Ndoye)	SEN		1					
Production (Macro) Economist (Crawford)	MSU		11			5		1/2 time BAPE - 1/2 time PSR.
Marketing Economist-Casamance (Jolly)	SEN	11			6			
Production Economist-Sine-Saloum (Gaye)	SEN			1				
Agricultural Economist-Research Associate-St. Louis (Morris)	MSU			3	10			
Agricultural Economist-Research Associate-Sine-Saloum (Kelly)	MSU			4		3		
Agricultural Economist-Research Associate-Dakar (Martin)	MSU					5		
Production Economist-Casamance (Ndiane)	SEN				6	4		Transfer to PSR Team; replaced by Sall from the PSR Team.
Livestock Economist-St. Louis (Ly)	SEN			1	6			
Livestock Economist (Mdione)	SEN							
Production Economist (Gaye)	SEN				1			

Key: SEN = Senegalese; FR = French; MSU = Macroeconomic Studies Unit; # = number of staff; * = start and end month.

*Excludes: 1) affiliated researchers and programs in the Oceanographic Research Department (CROOT); and, 2) from late 1983 through mid-1984, two Senegalese (MSc. level) Research Assistants were hired under contract to work with the MSU Cereals Marketing Economist and Production Economist. They subsequently found employment with other organizations (The World Bank and World Vision) working in Senegal.

revenues, along with animal sales and family remittances, are used to buy imported rice.

5) Recent studies of CSA (Commissariat à la Sécurité Alimentaire) buying activity in rural markets have shown that CSA intervention tends to support the price above its normal level, but still below the official support price at harvest. However, CSA resources do not permit it to carry out price support activities in many markets or for an extended period of time.

Cereals Marketing in the Senegal River Valley. Coordinated by Mark Newman and undertaken by Michael Morris (MSU Research Associate), this program included a census of village rice mills along the Senegal River, an analysis of the costs and returns of these mills, and a survey of the official and private trade in locally produced paddy rice. The principal results were:

1) In 1985, private traders intervened actively in local rice marketing. They paid higher prices to producers and charged lower prices to consumers, compared to official government prices.

2) Some 120 village-level rice mills were identified, most of them recently installed. The volume of paddy rice they processed was estimated to be 2.5 times the amount processed by SAED's industrial mills (Morris, 1985a, b).

3) Sale of rice bran, a by-product of rice hulling, was an important element of trader profits (Morris, 1987).

Economics of Agricultural Production. This program included a set of research activities coordinated by the MSU Macro (Production) Economist, Eric Crawford. Other researchers included Valerie Kelly (MSU Research Associate), Matar Gaye, Moustapha Gaye, Cheikh Ly, and Samba Sall.

At the request of and with financing from USAID/Dakar, a 1984 study of fertilizer distribution was conducted in the Casamance, Sine-Saloum, and Fleuve regions. Subsequent research activities focused on the acquisition and use of agricultural inputs (fertilizer, peanut seed, equipment) in the Sine-Saloum (Matar Gaye, V. Kelly), preparation of crop budgets for the Delta (Moustapha Gaye) and for the lower Casamance (Sall), and eco-

nomics of animal production and use of rice by-products in the Delta (Ly). Results include:

1) Fertilizer Distribution. This 1984 study showed many problems with the "retenue" system: low amounts distributed and used per farmer (except in the Fleuve); variability in the amount received relative to the "correct" amount; and significant delays in fertilizer deliveries relative to optimal planting dates. Deficiencies in program design and in financial and organizational arrangements made at the center were primarily responsible for these problems (Crawford, et al., 1985).

2) Farmer Demand for Fertilizer. In the Sine-Saloum, farmers face a significant purchasing power constraint. While the potential impact of fertilizer is understood by many farmers, they prefer to use their limited funds for higher-priority household and farm expenditures (Kelly, 1986, 1988; Kelly and Gaye, 1985; Gaye, 1987a).

3) Fertilizer Response. Kelly (1987) reviewed the agronomic research evidence on fertilizer response showing that the economics of fertilizer use depend on the zone and crop, ranging from favorable to unfavorable and often varying significantly within a small area. Fertilizing millet gives a greater percentage response than fertilizing peanuts, yet peanuts remain a more profitable crop overall.

4) Peanut Seed. Studies of peanut seed distribution and on-farm storage showed that the major problem with elimination of government distribution is how to ensure that farmers hit by drought can have access to seed in the following year, given that poor yields of both peanuts and cereal crops leave them without the funds to buy seed for cash. Seed storage in village- or SONACOS-run facilities is still not attractive to many farmers (Gaye, 1986, 1987b).

5) Village Sections. Studies in 1984-86 in the southern Peanut Basin and Lower and Middle Casamance showed that village sections, expected by the government to play a significant role in input distribution, credit dispersal, and output marketing, generally lacked the necessary physical resources and trained manpower to function effectively (Kelly, 1986; Gaye, 1987c).

6) Agricultural Credit. Studies by Matar Gaye (Sine-Saloum) and Fadel Ndiame (Casamance) revealed that farmers are generally not in favor of group credit (Gaye, 1987c; Ndiame, 1986). The good repayers feel penalized by the bad repayers in the group and hence prefer a system of individual loans.

Analysis of the Food Situation. Coordinated by Eric Crawford and undertaken largely by Frederic Martin (MSU Research Associate),⁵³ this program consisted of the following research activities:

- 1) analysis of national food supply and demand to the year 2000.
- 2) analysis of Senegal's trade in agricultural products and inputs, from 1974-85.
- 3) preparation of a comprehensive and consistent set of 181 crop budgets, covering 7 major crops (e.g., cereals, peanuts, cotton, and tomato), 11 production zones, 5 levels of technology, and yields under 15 alternative rainfall amount and distribution scenarios.
- 4) construction of 11 farm models (representing the 11 production zones) which were integrated into a national model of Senegalese agriculture. The models incorporated farm- and national-level food security, income, and risk aversion objectives. The purpose was to determine the feasibility and cost of achieving the GOS's target of increasing the cereals self-sufficiency (CSS) rate from under 50% at present to 80% by the year 2000.

Results include the following:

1) Projected Food Supply and Demand. Several earlier studies of projected future food supply and food demand were evaluated; all showed the gap between supply and demand increasing through time (Martin with Dieng, 1986; Martin and Crawford, 1987a). A new projection was carried out which included original analysis of food aid inflows and their regional distribution.

2) Trade in agricultural inputs and outputs from 1974-85. The study showed: Senegal's strong dependence on trade in general (exports representing 22% of GOP and imports representing 42% of Gross National Revenue) and on exports of peanut and fish products in particular; the large (42%) although stable share of cereals in total imports; and the small number of Senegal's trading partners (notably France, but also Asian rice suppliers) (Martin and Dieng, 1986).

⁵³Alioune Dieng, ISRA Research Assistant, provided valuable support for this research.

⁵⁴Martin was assisted in this study by Crawford, and by Stephen Harsh (MSU consultant).

3) Food Security Modelling. The model results showed a limited cereals supply response. Even when cereals prices were doubled, the CSS rate increased from 47% to only 56%. Allowing production to expand onto available marginal land, and assuming an optimistic rate of increase in land under irrigated rice, increased the CSS rate to 64% (Martin and Crawford, 1987b, 1988; Martin, 1988).

The limited response is caused mainly by limited land available for irrigated rice and by the continued profitability of peanuts relative to cereals. Moreover, virtually all of the increased cereals output called forth by higher prices is from maize, resulting in a substantial surplus relative to the foreseeable levels of consumer and industrial demand.

A general conclusion is that price policy alone is not enough to bring about cereals self-sufficiency. It is likely that improvements in marketing and input distribution, production technology, irrigation efficiency, and farmer support institutions will also be required.

Livestock and Meat Marketing. Coordinated and undertaken by Cheikh Mbacke Ndione, the research focused on the important Dahra-Dakar market channel. Results include:

- 1) traditional intermediaries perform important marketing functions of assembly, credit, and risk-bearing.
- 2) demand for fattened beef is limited, stemming only from high-income expatriates and Senegalese.

The BAME Contribution to Agricultural Policy.

Support provided by the contract helped establish the reputation of the BAME as a Senegalese institution capable of conducting timely policy-relevant research. By demonstrating the value of such research, the BAME helped create a demand for more and better information on which to make policy decisions. Improvements to both the supply of and the demand for policy-relevant analysis are vital in strengthening national policy analysis capabilities.

The work of the BAME has had an impact on decision-makers within ISRA, at middle- and top-level positions in GOS Ministries, and in donor agencies. GOS and donor staff have

regularly consulted with BAME researchers or sought BAME involvement in specific studies.

The significant impact of BAME research can be attributed, not just to the quality and relevance of the studies, but also to procedural innovations such as the use of working papers and information notes designed to get information to policy-makers rapidly.⁵⁵ This strategy quickly showed that policy-makers appreciated the dissemination of preliminary findings (sometimes only tables or graphs with a minimum of text).

The impact of the BAME's work stemmed also from the participation of BAME researchers on government task forces, from public presentations of research results, and from briefings of USAID/Dakar personnel. For example, the BAME is represented on many government task forces, including cereals marketing and fertilizer policy; and BAME researchers frequently contribute to the many conferences and workshops on agricultural policy in Senegal and West Africa.

In addition, BAME researchers made public presentations of cereals marketing, agricultural inputs, and the food security situation. These meetings were attended by GOS and donor staff and were written up in Le Soleil. A number of briefings of USAID/Dakar and USAID/Washington personnel were held to discuss specific policy issues as well as to report on contract progress.

The BAME's research approach can therefore be seen as a successful blend of traditional scientific research with its high quality but long turnaround time and ad hoc consultancy studies which sacrifice quality for timeliness. By investing in well-designed field studies, the BAME has been able to help answer questions that could not be addressed by the typical consulting study. With a commitment to timely relevant research and policy

⁵⁵The ability of BAME researchers to analyze and write up their studies quickly depended to a considerable degree on the availability of microcomputers for data analysis and document preparation.

dialogue, the BAME has been able to deliver answers to questions while they are still useful to policy-makers.

Specific Examples of Policy Impact

Cereals Marketing. Key GOS officials have written to the BAME expressing appreciation for and interest in BAME working papers on cereals marketing. The CSA has adopted the BAME's method for collecting and reporting producer and market cereals prices, information now being published in Le Soleil. BAME reports on the impact of the CSA were excerpted and included in a policy document presented at the November 1987 Interministerial Council. In addition, the government is studying the use of credit programs which would encourage traders to hold cereals stocks and make them available during periods of short supply.

Agricultural Inputs. The 1984 study of fertilizer distribution has often been mentioned as putting the BAME "on the map" as a credible policy research unit, given its quality and timely execution. The relevance of this study led to requests by USAID/Dakar for follow-up studies in 1985 of fertilizer and peanut seed use in the southern Peanut Basin (see Kelly and Gaye). The results of these studies (along with other inputs from MSU on-campus and in-country researchers) were used by the USAID Mission in preparing the Agricultural Production Support Project and in continuing its dialogue with the GOS concerning input distribution, marketing, and credit policies.

The detailed review and analysis of past agronomic research on fertilizer, finalized in consultation with ISRA agronomists in December 1987, has been used in current discussions of fertilizer policy. Kelly and her ISRA colleague Matar Gaye were asked by USAID/Dakar representatives on the GOS Groupe de Reflexion sur les Engrais to review and rewrite the terms of reference for a national study of fertilizer demand and marketing commissioned by the President of Senegal in late 1987.

food Situation. The food security modelling study carried out by Martin and Crawford has aroused considerable interest for the insights it provides on the likely response of Senegalese farmers to increases in cereals prices, and hence on the feasibility of the government's stated goal of 80% food self-sufficiency by the year 2000. The results of the study have reached a broad audience. Martin and Crawford were invited to present papers on this and related topics at two international conferences (one co-sponsored by ISRA) attended by Senegalese policy-makers. Crawford was also invited by USAID/Washington to make a presentation of the supply response results at a workshop on cereals policy in the Sahel, held in October 1987.

CHAPTER VII.

LESSONS LEARNED: KEY ASPECTS OF DESIGN AND IMPLEMENTATION

Certain features of the design and implementation of this project may be instructive for future agricultural research projects. Several features seem to have contributed significantly to the achievement of project objectives. Others concern critical design or implementation issues.

Project Design Process

The collaborative assistance mode (Title XII) used to design the project had two very positive effects. First, by jointly involving the three parties who would participate in project implementation (USAID/Dakar, MSU, and ISRA), the collaborative design mode resulted in a project whose content and implementation approach were relatively well thought out and responsive to the interests of those concerned.

Second, by permitting continuity between members of the design team and members of the technical assistance team, the collaborative design mode helped establish a base of mutual understanding and trust between USAID/Dakar, MSU, and ISRA which contributed to the constructive resolution of issues during the early stages of project implementation.

On-Campus Administrative and Professional Support

Providing for significant on-campus support was critical to the achievement of project objectives. The personnel included: (1) experienced project management and administrative staff, and (2) core faculty and technical staff who could advise on research design, research methods, use of computers, etc. In our experience, such support contributed greatly to the productivity

of the in-country technical assistance team, and has not often been provided in similar research or development projects.

Technical Assistance

Several points are worth noting. First, all members of the in-country technical assistance team combined three elements necessary for good performance: technical competence, appropriate language skills, and relevant prior experience.

Second, the MSU Research Associates made a major contribution to the research program. They also had relevant prior experience and solid technical and language skills, plus a commitment to doing ISRA-relevant research. Such individuals are generally more flexible in terms of required living conditions, and can be less costly than senior staff.

Third, both senior staff and research associates assumed low-profile assignments within ISRA. They were considered as ISRA researchers first, and as MSU team members second. There was no "MSU Project Office" per se.

Training

Two factors contributed importantly to the 100% degree completion rate of the 21 ISRA researchers trained in the U.S. First, MSU faculty members interviewed many candidates in Senegal prior to project implementation, thus gaining a relativeJy thorough appreciation of the candidates' educational background, capabilities, and training objectives. Second, early in the project, the administration of the training programs was transferred from the USDA to MSU. This made it possible to capitalize on the Agricultural Economics Department's previous experience with training of Sahelian students at the MSc. level. It also improved the matching of the trainees with appropriate institutions and programs, as well as the quality of the support to the trainees during their programs (e.g., through the MSU Summer Institutes).

Research Support Services

The project design included an investment in research support services--computers and software, documentation, development of publications series--which contributed significantly to the productivity of both ISRA and MSU researchers. This small complementary investment proved to be very worthwhile in realizing the full benefit of the much larger investment in technical assistance, as well as in the programs of the ISRA researchers with whom the technical assistance team worked.

Research Focus and Modus Operandi

The emphasis given in project design to supporting both micro- and macro-level research activities had a significant payoff in terms of research relevance. Improving agricultural productivity clearly requires attention to both micro and macro issues. Support for both the production systems research and applied economics (BAME) programs made this possible. (The fact that both units were housed in the same office, and directed by the same ISRA scientist, also contributed to the integration of the two research programs.)

Also critical in ensuring the policy relevance of the research was the use of working papers and information notes as a means of disseminating results quickly, promoting policy dialogue, and encouraging review of preliminary findings and modification of research activities while still underway. The concept of the working paper was a real departure for many government officials, but it was quickly accepted within ISRA, by other GOS agencies, and by the donors as a valuable mechanism for exchanging ideas.

Funding of In-Country Research Costs

An important design issue for research projects is the funding mechanism for in-country research activities. Our experience outside this project suggests that neither of the two

polar approaches is desirable, i.e., (1) setting up a self-contained project unit which controls all funds required by the TA team and their collaborators, or (2) channelling all funds through the host country institution.

In this project, all in-country costs were initially funded with Title III money, administered by ISRA and a government committee. Difficulties experienced by ISRA in paying promptly for the housing costs of the TA team led to an amendment to put those expenditures under the MSU contract. Since MSU researchers were integrated into ISRA programs, their travel, per diem, and field research expenses were paid with Title III funds, as was the case for the Senegalese researchers in the PSR and BAME programs.

Administrative difficulties with the Title III funding mechanism in 1985 led to the establishment by USAID of a "Special Fund" which covered the in-country costs of research programs in which TA team members participated. With the agreement of ISRA, this Fund was administered by the MSU Field Team Leader. The availability of this Fund made it possible to continue important field work, and aided in the achievement of project objectives.

The management and technical assistance approach followed in this project represents one way to administer an institution-building project. Project experience shows the importance of addressing the issue of funding in-country research activities, the relationship between sound scientific program management and financial administration. A balance must be achieved between institution-building activities and the need to produce policy-relevant research results in a timely manner. In this way, national agricultural research agencies like ISRA can be in a better position to derive the full benefits from the investment made in long-term technical assistance, in training national scientists, and in sustaining well-designed research activities with policy results.

APPENDIX 1.
TRAINING

AGRICULTURAL RESEARCH AND PLANNING PROJECT
MICHIGAN STATE UNIVERSITY

Participant Trainee Thesis Titles

1983

- SARR, Desir~ Vande. "Rainy Season Labor Migration in the Experimental Units of Koumbidia and Thysse KaymorjSonkorong of Sine-Saloum Region in Senegal." (June)
- DIENG, Salla Dior. "Effects of Tillage Depth and Frequency on Weed Population" research paper. (August)
- NIANE, Aminata. "Iron Oxide Mineralogy and Properties of Selected Soil Clays." (August)
- DIAW, M. Chimere. "Social and Production Relationships in the Artisanal Maritime Fisheries of West Africa." (October)
- BOYE, Cheikh. "Nutritive Value of Kochia Scoparia and Performance of Cattle Grazing Kochia at ~ucumcari, New Mexico." (December)
- DIALLO, Medina Ina. "Women, Men and Irrigated Agriculture: A Case Study of Gamadji Village Senegal Middle River Valley." (December)
- NDOYE, Ousseynou. "An Economic Study of Supply and Demand for Peanuts and Peanut Oil: Implications for Senegalese Agricultural Policy." (December)
- NDIONE, Cheikh M. "Cow Frame - Size and Profitability under Range Conditions" research paper. (December)

1984

- FALL, Alioune. No thesis or research paper was required. (January)
- YOUM, Ousmane. Unavailable. (July)
- BERTHE, Jean-Louis. "BLUE GRAMA (Bouteloua gracilis (H.B.K.) Lag. ex steud.) Leaf Removal and Corresponding Growth Responses." (August)
- FAYE, Raymond. No thesis or research paper was required. (December)

1985

- NDIAME, Fadel. "A Comparative Analysis of Alternative Irrigation Schemes and the Objective of Food Security: The Case of the Fleuve Region in Senegal." (April)
- GUEYE, Samba. "Socio-Economic Survey of Wood Utilization in the Rural Community of Kaymor, Sine-Saloum Region, Senegal." (May)
- LY, Cheikh. "The Behavior of Livestock Owners in Senegal: A Microeconomic Model." (May)
- DIOUF, Moustapha. "A Sociological Approach to Peasant Systems of Production in the Fuladu: A Case Study of Two Villages: Lenguewal and Sare Yoro Bana." (December)

1986

- FALL, Abdou. "Feasibility Evaluation for Improved Livestock Sector of the Agropastoral Production System of the Upper Casamance, Senegal." (February)
- DIOP, Mamadou. "A Systems Approach to Pastoral Production in Senegal." (March)
- DIEDHIOU, Mamadou. Unavailable. (June)
- DEME, Moustapha. Unavailable. (July)

1987

- SIDIBE, Mamadou. "Crop Supply Responses under Uncertainty in Two Senegalese Regions: A Comparative Study." (December)

AGRICULTURAL RESEARCH AND PLANNING PROJECT
MICHIGAN STATE UNIVERSITY

Participant Training
Short Courses

USDA

Small Ruminant Production Techniques, June 20-July 29, 1983: Cheikh Boye (TCI30-10) .
Economic Forecasting for Agricultural Policy and Decision Making, June 11-July 20, 1984: Moustapha Deme {TCI40-22}.
Integrated Pest Management, June 13-July 22, 1983: Salla Dieng (TCI30-8).
Small Ruminant Production Techniques, June 20-July 29, 1983: Cheikh NDione {TCI30-10}.
Application and Diffusion of Agricultural Research Results to the Community Level, August 23-October 1, 1982: Desire Sarr {TCI10-I4}.

IRRI

Small Farm Machinery, July 25-August 12, 1983: Alioune Fall.
Soil Chemistry Department, Research, September 1, 1983-February 28, 1984: Aminata Niane.

Other

International Rural and Community Development Seminar, May 16-June 10, 1983: Moustapha Diouf.
Tiller's Small Farm Program (Animal Traction), April 7-April 14, 1985: Fadel NDiamé.

Research and Consultation Visits

International Center for Marine Research at the University of Rhode Island, October 1982: Chimere Diaw.
USDA and Library of Congress, Washington, DC, December 1983: Samba Gueye.
Winrock International and University of Michigan, November/December 1984: Cheikh Ly.
Sahel Documentation Center at Michigan State University, August 1983, Ousseynou NDoye.

All long-term participants except the last Agricultural Economist who did not arrive in the U.S. until June 1985, attended at least one MSU Summer Institute.

All attended at least one AID-sponsored Mid-Winter Community Seminar.

All attended one professional meeting each year.

AGRICULTURAL RESEARCH AND PLANNING PROJECT
MICHIGAN STATE UNIVERSITY

Project long-Term Trainees:
Assignment with ISRA

<u>Degree Area</u>	<u>Current Status</u>
<u>Agricultural Economist</u>	
1	Agrarian Systems Team-Djibelor
2	Agricultural Policy {Livestock}-St. louis
3	Agricultural Policy (Livestock)-Bambey
4	Cereals Marketing-Dakar
5	Agricultural Policy-Dakar
<u>Animal Scientist</u>	
Range Management	Resigned
Animal Nutrition	Animal Production-Dahra
Animal Scientist	
1	Animal Production-Dahra
2	Animal Production-Kolda
<u>Agricultural Engineer</u>	Agrarian Systems Thematic Research-Djibelor
<u>Biometrician</u>	Crop Production-Dakar
<u>Computer Scientist</u>	Resigned
<u>Crops and Soils</u>	
Entomologist	Resigned
Soil Scientist	Agrarian Systems Thematic Research-Bambey
<u>Fisheries Economist</u>	Oceanographic Research-Thiaroye
<u>forestry Economist</u>	Resigned
<u>Sociologist</u>	
1	Agrarian Systems Team-Kaolack
2	Artisanal Fisheries-Djibelor
3	Resigned
4	Resigned
5 (Ag Ext)	Resigned

SENEGAL PROJECT SUMMER TRAINING INSTITUTE. FARMING SYSTEMS RESEARCH IN WEST AFRICA
 July 6 - August 6, 1982 Michigan State University
 Course Outline and Schedule of Events

Date	Hour	Location	Topic	Readings Assignment (Remarks)	Responsibilities (if any) (if only one person, list name)
7/7	8-10 10-12	304EBH	Course Objectives and Procedures Introduction To Farming Systems Research	1-20	Finup, Vincent, Franzel, Crawford Freed**
	3-5	100 CIP	Orientation: African Studies Center		Kelly, ASC Staff
		Main library	Orientation: Sahel Documentation Center		Library Staff
	8-10	100 CIP	Introduction to Microcomputers	1-2	Wolcott
	10-12	100 CIP	Introduction to Farming Systems with Special Reference to Senegal	1-20	Vincent, Franzel, Crawford, Freed,
	3-5	304EBH	Field Lab (Groups 1 & 2)	(Study Period) 1-20	Wolcott
	8-10	304EBH	Field Lab (Groups 3 & 4)	(Study Period) 1-20	Wolcott
7/9	10-12	304EBH	Field Lab (Groups 1 & 2)	(Study Period) 1-20	Wolcott
	1-3	304EBH	Field Lab (Groups 3 & 4)	(Study Period) 1-20	Wolcott
	8-10	304EBH	TI-59 Programmable Calculator, Today's Electronic Calculator Manual Operations	1-20	Hepp
7/12	10-12	304EBH	Problem Identification and Research Priorities for FSR: Informal Surveys for FSR	1-20	Franzel, Freed, Hineson Crawford*
	3-5	215 CC	Microcomputer Statistical Programs	1-20	Kelly
	8-10	304EBH	TI-59 Programmable Calculator: Field Trip using Existing Programs	1-20	Hepp
7/13	10-12	304EBH	Field Trip Planning and Informal Surveys	1-20	Hepp
	1-3	304EBH	Informal and Verification Surveys in FSR	1-20	Vincent, Franzel, Crawford, Freed,
	1-5	304EBH	Microcomputer Lab (Group 1)	1-20	Franzel, Freed
	1-5	304EBH	Microcomputer Lab (Group 2)	1-20	Kelly/Hineson
7/14	10-12	Barry County	FSR Field Trip and Informal Survey	(Study Period for Groups 2-5)	Hepp, Vincent, Franzel, Crawford, Freed, Kelly/Hineson

SENEGAL PROJECT FSR TRAINING INSTITUTE COURSE OUTLINE AND SCHEDULE OF ACTIVITIES

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Date	Time	Location	To, CC	Activities (Remarks)	Responsible
TH 7/15	8-10			TI-59 Programming Basics	Hepp
	10-12			Informal Survey Findings; Field Trip	Hepp
	1-3			Formal Surveys: Survey Questionnaire	Hepp
	3-5			Microcomputer Lab (Group 2)	Hepp
	8-10			TI-59 Advanced Programming Techniques	Hepp
7/16	10-12			Formal Surveys: Non-Sampling Errors During Conduct of Survey in the Field	Hepp
	1-3			Mimeo Handouts	Hepp
	3-5			Microcomputer Lab (Group 3)	Hepp
	8-10			Agonomic Research Field Trip	Hepp
7/19	8-10			Class Picnic with Faculty	Hepp
	10-12			TI-59 Internal Routines & Library Modules	Hepp
	1-3			Formal Surveys: Non-Sampling Errors in Data Handling/Processing/Analysis	Hepp
	3-5			Microcomputer Lab (Group 4)	Hepp
7/20	8-10			TI-59 Printer Application Programs	Hepp
	10-12			Formal Survey: Special Measurement Field Trip Planning and Preparation	Hepp
	1-3			Microcomputer Lab (Group 5)	Hepp
7/21	7:30 - 5 PM	Hastings Michigan		Support Institutions for Barry course Farmers	Hepp
TH 7/22	8-10			Microcomputer Lab (Group 6)	Winder, Kelly
	10-12			Discuss Field Trip Findings	Vincent
	1-3			Conducting On-Farm Research	Crawford, Freed
	3-5			VISICAL; Spread Sheet Programs	Brown
7/23	8-10			Microcomputer Lab (Group 1)	Winder, Kelly
	10-12			Analyzing On-Farm Research	Freed, Crawford
	1-3			Analyzing On-Farm Research	Freed, Crawford
	3-5			Microcomputer Lab (Group 2)	Winder, Kelly

SENEGAL PROJECT FSR TRAINING INSTITUTE COURSE OUTLINE AND SCHEDULE OF ACTIVITIES

Date	Hours	Location	Topic	Remarks	Instructor
M 7/26	8-10 10-12 1-3	1 A.P. 304 EBH	Microcomputer Lab (Group 3) Issues in Farming Systems Research	(Study Period for Groups 1,2,4-6) Shaner, et al: chapters 8 and 9 Collinson Gilbert, Norman, Winch	Winder, Kelly Crawford, Rohrbach, Franzel
F 7/27	3-5	1 A.H	Microcomputer Lab (Group 4)	(Study Period for Groups 1-3,5,6)	Winder, Kelly
F 7/27	8-10	1 A.H	Microcomputer Lab (Group 5)	(Study Period for Groups 1-4,6)	Winder, Kelly
M 7/29	10-12	Various	Campus - Consultations	(By appointment)	Fienup
M 7/29	1-3	1 A.H	Field Trip Planning		Crawford, Hepp
M 7/29	3-5	1 A.H	Microcomputer Lab (1st time)	(Study Period for Groups 1-1)	Winder, Kelly Hepp, Crawford
M 7/29	7:30 - 5 PM	Various	Revisit to Field Trip		Hepp, Crawford
M 7/29	8-2	1 A.H	Introduction to Basic Programming		Fienup
M 7/29	1-2	304 EBH	Field Trip Discussion; Hand Out Exam		Crawford, Hepp
M 7/29	3-2	304 EBH	Microcomputer Lab (Group 1)	(Study Period for Groups 1,1)	Winder, Kelly
M 7/29	3-2	304 EBH	Microcomputer Lab (Group 2)	(Study Period for Groups 1,1)	Winder, Kelly
M 7/29	3-2	304 EBH	Microcomputer Lab (Group 3)	(Study Period for Groups 1,1)	Winder, Kelly
M 7/29	3-2	304 EBH	Microcomputer Lab (Group 4)	(Study Period for Groups 1-1)	Winder, Kelly
M 7/29	3-2	304 EBH	Microcomputer Lab (Group 5)	(Study Period for Groups 1-1)	Winder, Kelly
M 7/29	3-2	304 EBH	Microcomputer Lab (Group 6)	(Study Period for Groups 1-1)	Winder, Kelly
M 8/2	1-2	Various	Campus Consultations (Take Home Final Exam to be turned in)	(By appointment)	Fienup
T 8/3	8-12	304 EBH	Field Trip		Crawford
M 8/4	1-5	304 EBH	Field Trip		Crawford
M 8/4	8-12	304 EBH	Field Trip		Crawford
M 8/4	1-5	304 EBH	Field Trip		Crawford

SENEGAL PROJECT FSR TRAINING INSTITUTE COURSE OUTLINE AND SCHEDULE OF ACTIVITIES

Sl. No.	Topic	Location	Date	Remarks
1	Introduction to the Project	Senegal	15-16-17	15-16-17
2	Objectives of the Project	Senegal	18-19	18-19
3	Organizational Structure	Senegal	20-21	20-21
4	Financial Management	Senegal	22-23	22-23
5	Human Resource Management	Senegal	24-25	24-25
6	Marketing and Sales	Senegal	26-27	26-27
7	Production and Quality Control	Senegal	28-29	28-29
8	Transport and Logistics	Senegal	30-31	30-31
9	Health and Safety	Senegal	32-33	32-33
10	Environmental Management	Senegal	34-35	34-35
11	Community Relations	Senegal	36-37	36-37
12	Project Evaluation	Senegal	38-39	38-39
13	Final Report	Senegal	40-41	40-41

APPENDIX 2.
DOCUMENTATION SUPPORT

BOOKS FOR HIE AGRICULTURAL RESEARCH CENTERS

- Acharya, Meena. Time Use Data and the Living Standards Measurement Study.
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- Gittinger, J. Price. (1982). Analyse Economique des Projets Agricoles.
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- Gomez, Kwanchai A., and Arturo A. Gomez. (1976). Statistical Procedures for Agricultural Research.

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PROFESSIONAL JOURNAL SUBSCRIPTIONS FOR THE PSR
DEPARTMENT AND BAME DOCUMENTATION CENTER*
LNERV - DAKAR-HAHN

Agricultural Administration
Agricultural Systems
American Economic Review
American Journal of Agricultural Economics
Canadian Journal of Agricultural Economics
CERES FAD Review of Agriculture and Development
Commodity Trade and Price Trends
Datamation
Economic Development and Cultural Change
European Review of Agricultural Economics
FAD Commodity Review and Outlook
FAD Production Yearbook
FAD Trade Yearbook
Feedstuffs
Food Policy
Food Research Institute Studies
Foreign Agricultural Trade of the United States
Journal of Agricultural Economics
Journal of Developing Areas
Journal of Economic Literature
Journal of Rural Studies
Oil World
PC World
World Development

*Funded under the MSU Contract

APPENDIX 3.
PUBLICATIONS LIST

ISRA PUBLICATIONS, 1982-87

Departement de Recherches sur les Systemes de Production
et le Transfert de Technologies en Milieu Rural

Bureau d'Analyses Macro-Economiques²

(Published with support from the Agricultural Research and Planning Project and the MSU Technical Services Contract 1981-1987).

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¹Now called the "Direction de Recherches sur les Systemes Agraires et l'Economie Agricole."

²Now a division of the Direction de Recherches sur les Systemes Agraires et l'Economie Agricole.

³Citations in italics are available in French and English as ISRA/MSU International Development Paper Reprints.

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APPENDIX 4.

PRODUCTION SYSTEMS RESEARCH DEPARTMENT STAFFING

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Key: SEN = Senior; FR = French; MSU = Michigan State University; # = Period of enrollment; and end month.

KAGLACK PRODUCTION SYSTEMS TEAM

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Key: SEN = Senegalese; FR = French; MSU = Michigan State University; # = # of observations; and end month.

PRODUCTION SYSTEMS TEAM

1982 - 1987

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DJIBELOR PRODUCTION SYSTEMS TEAM

1982 - 1987

DISCIPLINE	STATUS	1982	1983	1984	1985	1986	1987	NOTES
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Key: EN = English; FR = French; DEV = Development; # = # of period of activity; EN = end month.

APPENDIX 5
CONSULTANT REPORTS

SENEGAL AGRICULTURAL RESEARCH AND PLANNING PROJECT

Department of Agricultural Economics

Michigan State University

CONSULTANT REPORTS*PRODUCTION SYSTEMS RESEARCH

Eric CRAWFORD	Final Report on Consulting Mission	May 31 - June 17, 1982
Carl EICHER	Reflections on the Design and Implementation of the Senegal Agricultural Research Project	October 14, 1982
Eric CRAWFORD	Report on Consulting Mission (Also with Macro-Economic Research)	February I-March 4, 1983
Dunstan S.C. SPENCER	Report of a Consultancy Mission to Senegal	October 3-10, 1984
Richard BERNSTEN	Consultancy Report: Summary Overview Observations; Mission Report	January 29-February 16, 1985
Lorna BUTLER	Trip Report	January 13-February 10, 1986
Christopher K. VANDERPOOL	Consultancy Report to the Production Systems Research Program	February 7-27, 1986
Eric CRAWFORD	Trip Report (Also with Macro-Economic Research)	November II-December 4, 1986
Eric CRAWFORD	Trip Report (Also with Macro-Economic Research)	March 15-29, 1987

MACRO-ECONOMIC RESEARCH

Wesley PETERSON	Research Program Proposal for the Macro-Economic Unit of ISRA	August 20-September 19, 1982
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*Copies of these reports in English are on file in the Department of Agricultural Economics, Michigan State University; copies in French of most reports are also on file in the Agrarian Systems Department, ISRA.

Eric CRAWFORD	Report on Consulting Mission (Also with Production Systems Research)	February I-March 4, 1983
Mark NEWMAN	Establishing a Marketing- International Trade Research Program in the Macro-Economic Analysis Bureau of ISRA	March 4-25, 1983
James SHAFFER	Consulting Report	February 23-March 8, 1984
Michael WEBER	Short Term Consultancy Report	October 3-11, 1984
Lester MANDERSCHIED	Consulting Report	November 26-December 16, 1984
Jim SHAFFER and John STAATZ	Mission Report - Senegal	January 15-31, 1985
James D. SHAFFER	Consulting Report	May 22-June 5, 1986
Eric CRAWFORD	Trip Report (Also with PSR)	November II-December 4, 1986
Eric CRAWFORD	Trip Report (Also with PSR)	March 15-29, 1987
John S. HOLTZMAN	Livestock Economics Research Program	June 29-July 21, 1987

COMPUTER PROGRAM SUPPORT

Chris WOLF & Edouard K. TAPSOBA	Description of ISRA's Current Computer Plans	April 1981
Paul WINDER	Report on Consulting Mission to Senegal and Liberia	November 12-December 10, 1982
Paul WINDER	Consulting Mission Report	October 18-29, 1983
Joe TOHME	Report on the MSTAT Workshop	January 15-27, 1985
Malcolm A. VERSEL	Microcomputer Capabilities, Competencies and Future Directions	March 4-30, 1986
Alan JOHNSTON	Exploration of Data Communication Potentials for ISRA	September 6-17, 1987

Margaret BEAVER	Consultancy Trip Report	October 28-November 28, 1987
<u>OTHER</u>		
Darrell F. FIENUP	ISRA Staff Development and Training Needs	September 19-October 8, 1982
Janet L. MUNN	Senegal Trip Notes	December 9-19, 1982
Darrell F. FIENUP	Notes on Senegal Trip	March 20-April 6, 1983
Ardell WARD	Visit to Participant Trainees	December 4-9, 1985
Darrell F. FIENUP	Notes on Meeting with SARPP Field Team	June 25, 1984
Mulumba KAMUANGA	On-Campus Consultation at MSU	November 25-December 9, 1985
T.W. SCHILLHORN-VANVEEN	Trip Report and Comments	February 4-9, 1986
Valerie KELLY	Background Notes for a Discussion of Fertilizer Policy in Senegal	November-December 5, 1987
<u>RELATED PROGRAMS</u>	(Missions supported by the MSU Institute of International Agriculture)	
Vincent BRALTS	Trip Report (Agricultural Engineering)	June 11-24, 1987
Michael GOLD	Trip Report (Forestry)	August 27-September 9, 1987
Tom ISLEIB	Plant Breeding Research Opportunities in Senegal	August 31-September 10, 1987
<u>TRIP REPORTS</u>		
P.1. THIONGANE	Report of Visit to MSU	August 3-11, 1982
H. HAYECK	Report on the visit to MSU	July 18-August 1, 1983
Mamadou SIOIBE	Rapport de Mission, Seminaire FARMAP	June 18-July 13, 1984

APPENDIX 6.
BUDGET AND EXPENDITURE REPORT

Special Account # 100508

Period: 12/23/81 - 12/23/81

Department of Agricultural Sciences - Michigan State University - Lansing, Michigan 48824-1039

Financial Report

Total of Columns 1 through 5

Expenditures to Date

Monthly Expenditures

Total Accumulated Expenditures

Obligated Funds

Remaining Funds

Items	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount		
CARAGE	557.90	\$1,439,599.00	501.53	\$1,396,866.64	0.00	1.00	501.53	\$1,396,866.64	56.35	\$42,732.36
GRINDE BENEFIT	22,828.00	28,630.49			0.00			28,630.49		10,197.51
STUDENTS	8.20	31,678.00	7.80	45,101.05	0.00	0.00	7.80	45,101.05	0.10	(13,483.05)
TRAVEL	309,003.00	413,784.69			0.00			413,784.69		96,118.31
UTILITY COSTS	55,505.00	540,239.73			0.00			510,239.73		16,266.27
OTHER DIRECT COSTS	392,811.00	338,101.14			0.00			338,107.14		54,788.86
NON-FINANCIAL SERVICES	1,224.00	87,227.13			0.00			87,227.13		(24,014.13)
PERSONNEL TRAINING	60,051.00	636,544.57			0.00			636,544.57		28,500.43
INDIRECT COSTS (OVERHEAD)	29,323.00	88,621.64			0.00			865,621.64		53,701.36
TOTAL	566.10	1,000.00	509.33	\$4,605,183.08	0.00	50.00	509.33	\$4,605,183.08	56.75	\$264,816.92

3

	Expenditures to Date		Monthly Expenditures		Total Accumulated Expenditures		Remaining Obligated Funds	
	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount
Aboubacar Karouma	00	00	00	00	00	00	00	00
Warren J. Cook	00	00	00	00	00	00	00	00
Wesley Peterson	00	00	00	00	00	00	00	00
Mark Neuman	00	00	00	00	00	00	00	00
Warren Vincent	00	00	00	00	00	00	00	00
Dunstan Spencer	00	00	00	00	00	00	00	00
John Holtzman	00	00	00	00	00	00	00	00
Evelyn Delmaet	00	00	00	00	00	00	00	00
Malcolm Versel	00	00	00	00	00	00	00	00
Michael Morris	00	00	00	00	00	00	00	00
Donald Larson	00	00	00	00	00	00	00	00
Philippe Lambrecht	00	00	00	00	00	00	00	00
Alan Johnston	00	00	00	00	00	00	00	00
Valerie Kelly	00	00	00	00	00	00	00	00
Linda Bingen	00	00	00	00	00	00	00	00
Washington State (Butler)	00	00	00	00	00	00	00	00
TOTAL	7180	\$45,161.05	0.00	\$0.00	7180	\$45,161.05	0.00	(\$13,483.05)

	Expenditures to Date		Monthly Expenditures		Total Accumulated Expenditures		Remaining Obligated Funds	
	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount
Domestic								
Field Staff at MSU (Orientation, Work Status during R&R and Home Leave) and Consultants	10,889.00	15,306.37	0.00	0.00	10,889.00	15,306.37	0.00	0.00
Recruitment	7,194.97	7,194.97	0.00	0.00	7,194.97	7,194.97	0.00	0.00
International Travel/Excess								
Long-Term Employees	20,000.00	13,117.72	0.00	0.00	20,000.00	13,117.72	0.00	0.00
MSU Consultants	8,623.00	6,052.47	0.00	0.00	8,623.00	6,052.47	0.00	0.00
Consultants	17,981.00	15,113.73	0.00	0.00	17,981.00	15,113.73	0.00	0.00
Inspection Trips								
Seminars and Conferences								
In-country Travel	166,560.00	120,257.47	0.00	0.00	166,560.00	120,257.47	0.00	0.00
Shipment of Project Materials To/From Senegal								
TOTAL	200,573.00	\$413,784.69	0.00	\$0.00	200,573.00	\$413,784.69	0.00	\$96,118.31

Description	Total Expenditures		Expenditures to Date		Monthly Expenditures		Total Accumulated Expenditures		Remaining Obligated Funds	
	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months
ALL FCB										
Post Differential	15,022.00		126,596.15		0.00		126,596.15			
Post Allowance	19,175.00		26,011.96		0.00		26,011.96			
Temporary Lodging	32,558.00		10,546.27		0.00		10,546.27			
Supplemental Post Allowance	3,313.00		1,125.00		0.00		1,125.00			
Quarters (Housing)	309,388.00		319,247.40		9.99		319,247.40			
Education Allowance	60,777.00		56,584.95		9.00		56,584.95			
TOTAL ALL FCB	555,506.00		\$540,239.73		1.00		\$540,239.73			\$16,266.27
OTHER DIRECT COSTS										
OGA	16,698.00		16,698.04		0.00		16,698.04			
Travel	10,500.00		6,243.27		0.00		6,243.27			
Postage	169.00		15,608.53		0.00		15,608.53			
Telephone/Telegraph	28,800.00		33,317.11		0.00		33,317.11			
Photocopying	15,100.00		17,206.26		0.00		17,206.26			
Reference (Library) Materials	15,458.00		18,697.33		9.99		18,697.33			
Printing	9,454.00		2,618.04		0.00		2,618.04			
Supplies	10,046.00		13,256.59		0.00		13,256.59			
Printing/Reproduction	2,111.00		23,703.99		0.00		23,703.99			
Language Training	4,199.00		4,199.00		0.00		4,199.00			
In-Country Expenses	2,129.00		186,558.98		0.00		186,558.98			
TOTAL OTHER DIRECT COSTS	137,284.00		\$338,107.14		9.99		\$338,107.14			\$54,788.86

Description	Total Obligation		Expenditures to Date		Monthly Expenditures		Total Accumulated Expenditures		Remaining Obligated Funds	
	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount	Person Months	Dollar Amount
IBM 5120										
Xerox 860 WP										
IBM PC										
IBM AT										
Other										
RELATIVE SOFTWARE										
		\$63,277.00		\$63,277.13		\$0.00		\$87,227.13		(\$24,014.13)
PARTICIPANT TRAINING										
Masters Program		566,046.00								
Seminars/Conference		30,933.00								
USDA/Other Specialized Training		37,091.00								
Visitation Travel to P.I.'s		5,892.00								
Summer Institutes at MSU (1982 & 1983)		25,092.00								
TOTAL PARTICIPANT TRAINING		636,046.00		\$636,544.57		\$0.00		636,544.57		\$28,509.43
INDIRECT COSTS (OVERHEAD)										
TOTAL INDIRECT COSTS (OVERHEAD)				865,521.64		010.00		865,621.64		701.36

APPENDIX 7.
LIST OF EQUIPMENT

LIST OF EQUIPMENT
 SENEGAL AGRICULTURAL RESEARCH AND PLANNING PROJECT
 CONTRACT 685-0223-C-00-1064-00

ITEMS =====	NUM- BER =====	FCFA AMOUNT =====	U.S. \$ AMOUNT =====	SUPPLIER =====
PURCHASED IN COOPERATING COUNTRY				
HOUSEHOLD FURNISHINGS				
MARTIN HOUSEHOLD				
CUISINIERE	1	87,763	187.00	CGE
MACHINE A LAVER	1	193,870	413.37	CGE
REFRIGERATEUR	1	303,100	661.79	HUSSEIN AYAD
FILTRE A EAU	1	53,450	116.70	PEYRISSAC
CHAISES ET COUSSINS	4	32,000	69.87	AMECA SENEGAL
TABLE DE JARDIN	1	7,000	15.28	AMECA SENEGAL
PARASOL	1	14,000	30.57	AMECA SENEGAL
MOBILIER DE SALON	1	220,000	480.35	AU GRENIER
MATELAS	1	55,000	117.52	POSNER
TISSU MOBILIER	1	34,325	73.34	LA DENTELLIERE
LAMPE	1	4,054	8.66	MARCHE KERMEL
GRILLAGE (MOSQUITO NETTING)	1	12,645	27.02	BUHAN ET TEISS.
ETAGERE	1	75,000	160.26	MEDINA MEUBLE
ETAGERE	1	105,000	224.36	MEDINA MEUBLE
ETAGERE	1	60,000	128.21	MEDINA MEUBLE
BRIQUETTES	3	13,500	28.85	MEDINA MEUBLE
TISSU	1	34,755	74.27	AZIZ TALL
LAMPION	1	5,000	10.68	GALERIES ORIENT
BUREAU	1	65,000	138.89	MEDINA MEUBLE
ETAGERE	1	35,000	74.79	MEDINA MEUBLE
TRETAUX BOIS ROUGE	1	65,000	138.00	MEDINA MEUBLE
LAMPION	1	5,000	10.68	GALARIES ORIENT
MATERIAUX RIDEAUX	1	25,100	53.63	PEYRISSAC
CHAISE	1	6,000	12.00	AU GRENIER
TABLE DE CHEVET	1	3,500	7.00	MARCHE KERMEL
CORBILLE A PAPIERS	1	500	1.07	MARCHE KERMEL
LAMPES	2	14,000	21.00	MARCHE KERMEL
TABLE DE NUIT	1	3,500	7.00	MARCHE KERMEL
TISSU MOBILIER	1	35,645	82.00	LA DENTELLIERE
TABLE	1	160,000	372.00	SAIB
CHAISES	4	172,000	400.00	SAIB
VENTILATEUR	1	20,000	42.64	PEYRISSAC
CLIMATISEUR	1	215,134	458.71	CGE
CLIMATISEURS	2	285,120	607.93	CGE
MATELAS	1	58,961	125.72	SINCOLIT
CRA~FORD HOUSEHOLD				
ETAGERE	2	140,000	340.63	MEDINA MEUBLE
ARGENIER	1	95,000	231.14	MEDINA MEUBLE
BUFFET	1	40,000	97.32	MEDINA MEUBLE
BUFFET	1	35,000	85.16	MEDINA MEUBLE
COMMODE	2	10,000	243.31	MEDINA MEUBLE
COMMODE	1	35,000	85.16	MEDINA MEUBLE
CANAPE	1	124,600	303.16	SOCIETE ROTIN
CANAPE	1	88,500	215.33	SOCIETE ROTIN
FAUTEUILS	2	112,200	272.99	SOCIETE ROTIN
TABLE BASSE	1	51,600	125.55	SOCIETE ROTIN
TABLETTES	2	48,200	117.27	SOCIETE ROTIN
CHAISES	10	310,000	754.26	SOCIETE ROTIN
CHAISES	2	69,400	168.86	SOCIETE ROTIN
BIBLIOTHEQUE STEREO	1	175,000	425.80	AMADY SO'./
COMMODE	1	110,000	267.64	AMADY SO'./
COMMODE/TABLE	1	50,000	121.65	AMADY SO'./
LIT	1	179,300	427.92	SOCIETE ROTIN
TABLETTE	2	69,400	165.63	SOCIETE ROTIN
CONGELATEUR	1	128,000	311.44	HUSSEIN AYAD
SECHOIR	1	115,000	279.81	HUSSEIN AYAD
VENTILATEUR	1	26,500	63.25	PEYRISSAC
VENTILATEURS	2	66,000	157.52	PEYRISSAC
CLIMATISEURS	4	974,940	2,395.43	CGE
CLIMATISEUR	1	369,580	908.06	CGE

ITEMS	NUM- BER	f' CFA AMOUNT	U.S. \$ AMOUNT	SUPPLIER
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CUISINIERE	1	179,060	439.95	HUSSEIN AYAD
REFRIGERATEUR	1	474,000	1,164.62	HUSSEIN AYAD
MACHINE A LAVER	1	230,000	565.11	HUSSEIN AYAD
BARRES A RIDEAU	2	26,680	64.91	CCS
TISSU MOBILIER/CONFECTION	1	111,750	271.90	IBRAHIMA SAGNA
SUPPORT RIDEAUX	1	7,120	18.94	HYPERSAHM
TISSU MOBILIER PLUS	1	26,000	63.88	FAYCAL
TABLE A MANAGER	1	131,200	322.36	SAIB
BUFFET	1	364,500	1,187.30	SAIB
BUREAUX	2	137,000	336.61	MEUBLE AFRIQUE
LITS	2	293,600	721.38	MEUBLE AFRIQUE
MATELAS	2	83,860	206.04	SINCOLIT/M. AFR.
TABLES DE CHEVET	4	122,000	299.75	MEUBLE AFRIQUE
COMMODE	1	61,500	151.11	MEUBLE AFRIQUE
COMMODOES	3	128,400	315.48	MEUBLE AFRIQUE
FILTRE A EAU	1	37,000	90.90	PEYRISSAC
ARMOIRE	1	105,000	257.99	MEDINA MEUBLE
COMMODE/TABLE	1	40,000	98.28	MEDINA MEUBLE
COMMODOES	2	150,000	368.55	MEDINA MEUBLE
VENTILATEUR	1	26,500	63.25	PEYRISSAC
ETAGERE	1	75,000	184.28	MEDINA MEUBLE
REGULATEUR DE TENSION	1	27,000	66.34	HUSSEIN AYAD
CHAISES DE BUREAU	2	43,000	105.65	MEUBLE AFRIQUE
POSNER HOUSEHOLD				
FAUTEUIL	1	47,333	100.92	SOCIETE ROTIN
CANAPE	1	84,083	179.28	SOCIETE ROTIN
CANAPE	1	120,417	256.75	SOCIETE ROTIN
TABLE BASSE	1	49,667	105.90	SOCIETE ROTIN
TABLETTES	2	39,500	84.22	SOCIETE ROTIN
CLIMATISEUR	1	272,658	570.41	CGE
MEUBLE DESSERT	1	235,500	514.19	SAIB
BAHUT	1	330,000	720.52	SAIB
TABLE A MANGER	1	146,000	318.78	SAIB
CHAISES DE TABLE	6	264,000	576.42	SAIB
PLACARD	1	65,000	141.92	MEDINA MEUBLE
COMMODE	1	75,000	163.76	MEDINA MEUBLE
PLACARD	1	75,000	163.76	MEDINA MEUBLE
COMODE	1	75,000	159.91	MEDINA MEUBLE
TABLE DE CHEVET	2	45,000	95.95	MEDINA MEUBLE
LIT	1	183,200	400.00	HARZA ENG (FREY)
MATELAS	1	35,145	76.74	SINCOLIT
CLIMATISEURS	4	210,700	440.39	CGE
LIT	1	--	--	N.D. GUEYE (NEYMAN)
MATELAS	1	--	--	SINCOLIT (NEYMAN)
BUREAU	1	95,000	202.56	MEDINA MEUBLE
BUREAU/TABLE	1	70,000	149.25	MEDINA MEUBLE
ETAGERE	1	170,000	363.25	MEDINA MEUBLE
FILTRE A EAU	1	60,695	132.53	BUHAN ET TEISS.
CUISINIERE	1	177,715	388.02	HUSSEIN AYAD
CONELATEUR	1	190,000	414.85	HUSSEIN AYAD
REFRIGERATEUR	1	327,428	714.91	CGE
PLACARD	1	30,000	63.97	MEDINA MEUBLE
PLACARD	1	--	--	(SECID)
TABLE ET CHAISES	4	62,000	135.37	MOUSSA DIOP
TISSU	1	167,240	356.59	SAGNA
TISSU	1	58,000	126.64	COTOA/CITEC
LAMBRECHT HOUSEHOLD				
CLIMATISEUR	1	199,680	435.98	CGE
REFRIGERATEUR	1	242,320	529.08	CGE
CLIMATISEURS	3	463,680	1,012.40	CGE
BIBLIOTHEQUE DE RANGEMENT	1	34,500	80.23	A. SAMB
BIBLIOTHEQUES DE RANGEMENT	2	86,620	201.44	A. SAMB
RIDEAUX	1	21,600	50.23	LA DENTELLIERE
MEUBLE A MUSIQUE	1	44,500	103.49	A. SAMB
LIT	1	43,900	102.09	A. SAMB
TABLES DE CHEVET	2	33,280	77.40	A. SAMB
COMMODE	1	30,200	70.23	A. SAMB
BUREAU	1	115,650	268.95	A. SAMB
CHAISE	1	12,500	29.07	A. SAMB
TRINGLES A RIDEAUX	3	2,700	6.28	PEYRISSAC
MATELAS	1	41,930	104.30	SINCOLIT
MATELAS	1	49,400	122.89	SINCOLIT
LIT	1	190,000	457.83	MAISON MEUBLE
ARMOIRE	1	360,000	867.47	MAISON HEUBLE

ITEMS	NUM- BER	FCFA AMOUNT	U.S. \$ AMOUNT	SUPPLIER
=====Z=====	a====	:::=====	=====	=====C=====
CHEVETS	2	104,000	250.60	MAISON MEUBLE
SECHOIR	1	128,660	280.92	HUSSEIN AYAD
BAHUT	1	275,000	656.32	SAIB
TABLE A MANGER	1	165,000	393.79	SAIB
CHAISES	8	293,200	699.76	SAIB
BIBLIOTHEQUE	1	609,500	1,454.65	SAIB
RIDEAUX	1	21,750	51.91	CHIRARA
COMMODE	1	112,000	269.88	MAISON MEUBLE
SOMMIER	1	46,000	110.84	MAISON MEUBLE
ELEMENT HAUT	1	84,590	201.89	MAISON MEUBLE
OREILLERS CARRES	4	39,040	93.17	MAISON MEUBLE
FILTRE A EAU	1	47,950	127.53	PEYRISSAC
TUYAUX GAS + DETENDEUR	1	4,925	13.10	PEYRISSAC
VENTI LATEUR	1	33,000	87.77	PEYRISSAC
BARRES A RIDEAUX	1	58,295	155.04	BUHAN & TEISSEI
CHAISES	4	35,000	87.06	NDIAYE
TABLE	1	30,000	74.63	NDIAYE
MACHINE A LAVER	1	218,000	542.29	HUSSEIN AYAD
CUISINIERE	1	103,500	257.46	NOSOCO
CONGELATEUR	1	158,000	393.03	NOSOCO
RIDEAUX, NECESSAIRES	1	15,145	40.39	BUHAN & TEISSEI
ELEMENT HAUT	1	84,590	210.42	MAISON MEUBLE
MORRIS HOUSEHOLD				
MATELA	1	41,930	100.07	SINCOLIT
MATE LA	1	51,675	123.33	SINCOLIT
CUISINIERE	1	87,763	209.46	CGE
REFRIGERATEUR	1	242,320	578.33	CGE
CLIMATISEUR	1	154,560	368.88	CGE
BUREAU	1	110,000	262.53	A. SAMB
BUFFET	1	87,500	208.83	A. SAMB
MEUBLE DE RANGEMENT	1	85,000	202.86	A. SAMB
COMMODE	1	70,000	167.06	A. SAMB
VENTILATEUR	1	26,600	63.48	PEYRISSAC
LIT	1	30,000	71.60	MBAYE DIENG
FAUTEUIL	6	96,000	229.12	CHERIF SECK
TABLE BASSE	1	20,000	47.73	A. SAMB
LIT	1	30,000	71.60	MBAYE DIENG
TABLE DE CHEVET	1	16,000	38.19	MBAYE DIENG
MIROIR	1	2,750	6.56	MBAYE DIENG
FILTRE A EAU	1	37,950	90.57	PEYRISSAC
DETENDEUR, TUYAUX GAZ	1	4,000	9.55	PEYRISSAC
ETAGERE	1	25,000	59.67	ADAMA DIA
ARMOIRE	1	50,000	119.33	MBAYE DIENG
TABLE A MANGER	1	80,000	190.93	ABO. DIAGNE
TOILE	1	36,100	86.16	CHIRARA
LAMPES	2	16,300	38.90	MARCHE
KELLY HOUSEHOLD				
FAUTEUILS	2	22,000	53.53	MOBILIA
FAUTEUILS	2	22,000	53.53	MOBILIA
LITS DE PLAGE	2	54,000	131.39	MOBILIA
CHAISES	2	20,000	48.66	MOBILIA
LAMPE	1	23,400	58.21	PEPETERIE VIALE
BIBLIOTHEQUE	1	55,000	133.82	AU GRENIER
SALON	1	90,000	218.98	AU GRENIER
BUREAU	1	58,500	142.34	AU GRENIER
BUREAU	1	55,000	133.82	AU GRENIER
TABLE	1	19,000	46.23	AU GRENIER
TABLE RONDE	1	12,500	30.42	AU GRENIER
CLASSEUR	1	25,000	63.83	AU GRENIER
LIT	1	30,000	73.00	BADARA HDIAYE
TABLE A CHEVET	1	15,000	36.50	BADARA HDIAYE
CHAISE	1	27,500	66.91	BADARA HDIAYE
MATELAS	3	13,000	31.63	BADARA HDIAYE
NATTE	1	8,000	19.46	ADNAN EZZEDINE
VENTI LATEUR	1	25,000	60.83	ADNAN SABBABH
LIT	1	20,000	48.66	BADARA HDIAYE
TABLE A MANGER + CHAISES	1	55,000	133.82	BADARA HDIAYE
VENTILATEUR	1	24,000	58.39	ADNAN SABBABH
CLIMATISEUR	1	238,860	521.53	CGE
CLIMATISEUR	1	154,560	337.48	CGE
CUISINIERE	1	60,175	131.39	CGE
CONGELATEUR	1	127,950	279.37	CGE
REFRIGERATEUR	1	147,695	322.48	CGE

ITEMS c=====z==:aK:=====	NUM' BER C==	FCFA AMOUNT 61:=====	u.s , \$ AMOUNT c:=====	SUPPLIER C=====CC=====Z==
NE, JMANHOUSEHOLD				
BUREAU	2	183,000	447.43	MEDINA MEUBLE
TABLE DE CHEVET	3	60,000	146.70	MEDINA MEUBLE
LIT	1	40,000	106.38	AMIDOU BADGI
LIT	1	158,000	420.21	NDIAWAR GUEYE
TABLES DE CHEVET	2	48,000	127.66	NDIAWAR GUEYE
TABLES DE CHEVET	2	48,000	127.66	NDIAWAR GUEYE
LITS	2	70,000	186.17	NDIAWAR GUEYE
MATELA	1	41,930	111.52	SINCOLIT
MATELAS	2	53,800	143.09	SINCOLIT
BAHUT	1	550,000	1,388.20	SAIB
TABLE A MANGER	1	258,300	628.47	SAIB
CHAISES (TABLE)	8	456,000	1,109.49	SAIB
PLACARDS	4	280,000	687.96	MEDINA MEUBLE
BUFFET	1	40,000	98.20	MEDINA MEUBLE
REFRIGERATEUR	1	474,460	1,261.86	HUSSEIN AYAD
MACHINE A LAVER	1	209,000	555.85	HUSSEIN AYAD
CANAPE	1	197,100	524.20	SAPEM
FAUTEUILS	2	252,000	670.21	SAPEM
TABLE BASSE	1	42,300	114.36	SAPEM
REGULATEUR DE TENSION	1	22,500	59.84	HUSSEIN AYAD
CLIMATISEURS	3	731,205	1,944.69	CGE
CLIMATISEUR	1	369,580	982.93	CGE
CUISINIERE	1	228,407	607.47	CGE
TABLE ET CHAISES	1	38,000	101.06	NDIAYE
VENTILATEURS	3	58,500	155.59	MOHAMED BEDEIRI
TRANSFORMATEUR	1	12,420	33.00	GDCI
BARRES A RIDEAUX	2	16,680	44.36	QUIN. CLEMENCEAU
FILTRE A EAU	1	37,000	98.40	PEYRISSAC
KAMUANGA AND BINGEN HOUSEHOLDS				
CLIMATISEUR	1	278,587	740.92	UNIMES-ZIG.
TABLE ET CHAISE	1	50,000	132.98	NDIAYE
REGULATEUR DE TENSION	1	27,000	57.69	HUSSEIN AYAD
FAUTEUILS	2	100,000	213.68	SOSEPPA
TOTAL PURCHASED IN COOPERATING COUNTRY			\$61,008.78	
PURCHASED IN UNITED STATES				
XEROX 860 WORD PROCESSING SYSTEM	1		14,909.00	XEROX CORPORATION
LAP-TOP COMPUTER	2		3,469.99	ZENITH DATA SYSTEMS
IBM MODEL 50 COMPUTER	1		2,943.00	IBM CORPORATION
COLOR MONITOR FOR IBM MODEL 50 COMPUTER	1		549.00	ENTIRE SUPPLY, INC.
IBM PC AT COMPUTER	1		3,819.00	IBM CORPORATION
IBM PC COMPUTER	1		2,092.60	IBM CORPORATION
HEWLETT-PACKARD LASERJET PRINTER	1		2,105.46	PROCOMP COMPUTER PRO
DIABLO 630 PRINTER	1		2,013.00	MTI SYSTEMS CORPORAT
EPSON FX-286 PRINTER	1		552.45	ACR
EPSON FX-80 PRINTER	1		584.76	MCS INC.
SURGE SUPPRESSORS (5) AND AND MINUTEMAN UPS WAVE SYSTEM	1		1,524.n	SUTTON DESIGNS INCOR
DATA SAVER BACKUP POWER SUPPLY	4		3,170.13	CUESTA SYSTEMS, INC.
FILE CONNECTION DISK SYSTEM FOR IBM PC	1		1,395.00	FLAGSTAFF ENGINEERIN
TOTAL PURCHASED IN UNITED STATES			\$39,128.16	
GRAND TOTAL			\$100,136.94	