PDBAE 227

685-0223

SENEGAL

AGRICULTURAL RESEARCH AND PLANNING

Project Paper

FY 81

PROJECT PAPER

AGRICULTURAL RESEARCH AND PLANNING PROJECT

685 - 0223

USAID/SENEGAL
B.P. 49
DAKAR, SENEGAL

APRIL, 1981

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

AP IX 3A ATTACHMENT 1

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) | Amendment Number: | DOCUMENT CODE: 3

COUNTRY/ENTITY: SENEGAL

3. PROJECT NUMBER: 685 - 0223

4. BUREAU/OFFICE: AFR | 06

5. PROJECT TITLE (maximum 40 characters): Agricultural Research and Planning

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 12 DD 31 YY 86

7. ESTIMATED DATE OF OBLIGATION (Under "B" below, enter 1, 2, 3, or 4)
A. Initial FY 81 | B. Quarter 3 | C. Final FY 85

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 81 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	(719)	( )	(719)	(4,950)	( )	(4,950)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1. P.L 480 Title III		1,520	1,520		4,750	4,750
Other U.S. 2.						
Host Country					42,600	42,600
Other Donor(s)						76,700
TOTALS						129,000

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) SH	B292	052		0		1,500		4,950	
(2)									
(3)									
(4)									
TOTALS									

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 053 | 968 | 710

11. SECONDARY PURPOSE CODE:

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code		A/AG	BR	XII			
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters)

1. To develop Senegalese Agricultural Research capacity.
2. To assist in organizing and carrying out production systems research.
3. To carry out macro-economic research on food, nutrition and agricultural policies.

14. SCHEDULED EVALUATIONS: Interim MM 11 YY 83 | MM | YY | Final MM 05 YY 85

15. SOURCE/ORIGIN OF GOODS AND SERVICES: [X] 000 [ ] 941 [X] Local [ ] Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment)

17. APPROVED BY
Signature: David Shear
Title: Director USAID/Senegal
Date Signed: MM 05 DD 07 YY 81

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1350-4 (8-79)

S E N E G A L

AGRICULTURAL RESEARCH AND PLANNING PROJECT

PROJECT NO. 685-0223

TABLE OF CONTENTS

/-) B R E V I A T I O N S

BNDS	Banque Nationale de Developpement du Senegal (National Development Bank)
CGIAR	Consultative Group on International Agricultural Research
CDH	Centre de Developpement Horticole (Horticultural Research Center)
CGPA	Comite des Grands Produits Agricoles
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo (International Maize and Wheat Research Center)
CILSS	Comite Inter-Etats de Lutte contre la Secheresse dans le Sahel (Sahelian Drought Intergovernmental Committee)
CNRA	Centre National de Recherches Agricoles de Mbambey (National Agricultural Research Center)
CNRF	Centre National de Recherches Forestieres (National Forestry Research Center)
CPSP	Caisse de Perequation et de Stabilisation des Prix
CRODT	Centre de Recherches Oceanographiques de Dakar-Thiaroye (Oceanographic Research Center of Dakar-Thiaroye)
CSSG	Central System Support Group of ISRA
CTFT	Centre Technique Forestier Tropical (Tropical Forest Research Center)
DGPA	Direction Generale de la Production Agricole (Agricultural Production Department)
DRSSH	Direction de la Recherche en Sciences Sociales et Humaines (Social Science Research Directorate of SERST)
FAO	Food and Agriculture Organization
GOS	Government of Senegal
IADS	International Agricultural Development Service
IARC's	International Agricultural Research Centers
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
INDR	Institut National de Developpement Rural (National Rural Development College)
IRAT	Institut de Recherches Agronomiques Tropicales et des Cultures Vivrieres (Research Institute for Tropical Agriculture)
IRRI	International Rice Research Institute
ISRA	Institut Senegalais de Recherches Agricoles (Senegalese Agricultural Research Institute)
LNRV	Laboratoire National de la Recherche Veterinaire (National Animal Health Laboratory)
MDR	Ministere du Developpement Rural (Ministry of Rural Development)
MEU	Macro-Economic Unit of ISRA
OMVS	Organisation pour la Mise en Valeur du Fleuve Senegal (Senegal Valley Development Board Organization)
ORSTOM	Office de Recherche scientifique et Technique d'Outre-Mer (Foreign Science and Technology Research Institute of France)
PAPEM	Point d'Appui pour Experimentations Multiples (Large Scale Experimental Test Areas)

PSR	Production Systems Research
RDA	Regional Development Agency
SAED	Societe d'Amenagement et d'Exploitation des Terres du Delta du Fleuve Senegal
SERST	Secretariat d'Etat a la Recherche Scientique et Technique (Ministry of Science and Technology)
SODEFITEX	Societe pour le Developpement des Fibres Textiles (Cotton Development Agency)
SODESP	Societe pour le Developpement de l'Elevage dans la zone Sylvo-pastorale (Sylvo-pastoral livestock Authority)
SODEVA	Societe de Developpement et de Vulgarisation Agricole (Groundnut Basin Extension Agency)
SOMIVAC	Societe de Mise en Valeur Agricole de la Casamance (Casamance Development Agency)
SONED	Societe Nationale d'Etudes pour le Developpement (National Consulting Company)
STN	Societe des Terres Neuves (Land Settlement Agency)
TSU	Technical Services Unit
UNIFSTD	United Nations Interim Fund on Science and Technology for Development
USAID	United States Agency for International Development
WARDA	West Africa Rice Development Association.

FISCAL YEAR

Government of Senegal	: July 1 - June 30
ISRA	: July 1 - June 30
U.S. Government	: October 1 - September 30

PROJECT PAPER DESIGN TEAM

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III. PROJECT DESCRIPTION

A. Summary and Recommendations

A.	Country	: Senegal
B.	Project	: Agricultural Research and Planning (685-0223)
C.	Funding	: $4.95 million
D.	Life of Project	: 5 years
E.	Waivers	: Proprietary procurement of IBM 5120 micro-computer
F.	Conditions	: Decree establishing new ISRA structure
		: Appointment Project Coordinator

This Project Paper (PP) is for a grant of $4.95 million from the Sahel Development Program appropriation (SH) to Senegal for the Agricultural Research and Planning Project (685-0223).

This project is the keystone of AID support to the multi-donor financed program to decentralize and strengthen the research activities of the Senegalese Agricultural Research Institute (ISRA). The project defines and coordinates AID support to ISRA which also includes $5.6 million in local currency under the P.L. 480, Title III Program (1981-83) and approximately $10 million in foreign exchange and local currency from other bilateral and regional AID projects. The cost of ISRA's decentralization program over the next six years (1981-86) is estimated by the World Bank at $129 million of which Senegal will provide 33 percent.

Within the ISRA program the AID project goal is to increase the capacity of the GOS to more effectively plan and evaluate agricultural development policies and projects. This will be achieved in part through a long-term (10-15 year) program of institutional development.

The three purposes of this effort are:

(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 fully supports the AID development strategy for Senegal by utilizing a multi-donor project mechanism to improve the knowledge base needed to expand agricultural production in the three geographic regions in which AID will be working.

Although the impact of this institution-building effort is long term, the project will eventually benefit rural and urban households throughout Senegal. Rural women can be expected to benefit substantially from this project, especially through production systems research in the Casamance.

As conditions precedent to the disbursement of project funds the GOS will (1) promulgate the decree establishing ISRA's new administrative structure, (2) appoint a project coordinator, and (3) establish a management plan for Title III support funds. A condition precedent to disbursement of second-year funding will be the establishment of a research/extension agreement between ISRA and SOMIVAC. The Government of Senegal would also provide assurances that the Macro-Economic Unit will be maintained in Dakar, the question of degree equivalency will be addressed and resolved to USAID satisfaction, promotion for researchers will emphasize experience and performance rather than diplomas earned, Senegal will provide staff and resources for the Productions Systems Research (PSR) teams, the Central Systems Analysis Group (CSGA) and the Macro-Economic Unit.

B. Background

Senegal, which covers an area of about 196,700 km^2 in West Africa, lies in the Sudano-Sahelian Zone. Its population as of 1980 was estimated at 5.7 million and growing at 2.7% annually. About 72% of the population live in rural areas and although rural-urban migration has been quite high, the rural population continues to grow. Of the rural population, nearly 60% live in the Central Groundnut Basin, which covers about 25% of the country's land area. Pressure on the land in this area is becoming acute and the Government is undertaking various measures to promote migration to the less populated areas of Eastern Senegal. The Gross National Product (GNP) was US$462 per capita in 1980 with a real rate of growth of only 1.5% per annum over the period 1970 to 1980. In contrast to this average per capita income for the country, agricultural sector income was less than US$160 per capita. Agricultural and food production generally stagnated between 1960 and 1980, partly as a result of a series of droughts starting in the mid 1960s, partly because the agricultural technology is gradually becoming obsolete. Thus, despite increasing investment in the rural sector, Senegal has not been able to improve food production, and continued imports are increasing the pressure on foreign exchange reserves.

1. Role of Agriculture. The agriculture sector is central to Senegal's economy. Despite poor soils and erratic rainfall, which make agricultural production variable and risky, the rural sector employs over 75% of the labor force. In recent years, some 30-35% of GDP and 60% of export value has originated in the sector. Within the sector, about 78% of output has come from crops and livestock products, 15% from fishing and 7% from

forestry. The main cash crops are groundnuts and cotton. Almost 95% of rural output is produced by small-scale farm units from rainfed agriculture; however, there exists much diversity in farm size, labor availability, ownership of agricultural capital, productivity and revenues.

Over the past decade groundnuts and millet/sorghum have taken up close to 90% of the cultivated area (47% and 42%, respectively). Since 1974, the major export commodities have been groundnut products (75% of agricultural exports), fish products (14%), and cotton products (7%). On the import side, since 1974, food imports have made up 20-30% of total merchandise imports; of the total, rice has accounted for about 35%, wheat 13%, sugar products 25%, and fruits and milk products 9% each.

The yields of some crops such as groundnuts compare reasonably well with international norms, especially on those farmer fields where better crop husbandry is practiced. However, because of the constraints on the existing farming systems the majority of the farmers do not attain these yields. Research on these constraints is urgently needed. For the food crops, yields lag behind those in other countries and cereal deficits in Senegal are a recurrent feature of the economy. Regular cereal imports averaged about 370,000 tons in 1976/77 and 1977/78 with rice accounting for 246,000 tons of this. Additional imports (as food aid) are often made, averaging 40,000 tons in good weather years and over 200,000 tons in bad years. 1/ Rice has become an increasingly important foodgrain in Senegal. With the rapid urbanization in the country, the demand for rice has been rising. In 1974-80 an average of 75% of the rice consumed in Senegal was imported. Thus, even with an annual rate of growth of 6.3% in cereal production and growth of demand of 3.4% per annum, the cereal deficit would be about 283,000 tons by 1985. The rice deficit alone could be about 317,000 tons in 1985; the wheat deficit could also be 140,000 tons. With imports to correct such deficits, Senegal would remain vulnerable to world market price fluctuations and the foreign exchange commitment for the imports could be considerable.

Livestock production is important in all regions of Senegal. In 1977, the country had about 2.5 million cattle and 2.8 million small ruminants. The annual off-take is however quite low (10% for cattle and 25% for sheep and goats), due mainly to high death rates of young animals, low rates of fecundity from poor nutrition, inadequate disease control, and suboptimal management practices. Despite the size of the livestock population, meat

1/ For example, additional cereal imports of 247,000 tons were made in 1977/78 consisting of 36,000 tons of millet and sorghum, 21,000 tons of maize and 190,000 tons of other food aid.

consumption per capita is quite low--6-10 kg/capita overall, with 10-15 kg/capita for Dakar.

The government has intensified its efforts to (a) increase groundnut and millet production; (b) develop livestock in Eastern Senegal; (c) encourage migration to less heavily populated areas; and (d) develop irrigation, especially in the Senegal River Basin and in the Casamance Region. Irrigated agriculture would reduce reliance on imported foodgrains, mainly rice. A large potential for irrigation exists in the Senegal River Valley, and when all the perimeters are fully developed, the country could produce enough rice to fill substantial portion of the foodgrain deficit. Vegetable production could also become important with irrigation. Present costs for full water control irrigation schemes are excessively high.

2. Role of Agricultural Research

Government support of agricultural research in Senegal began in 1921 with the establishment of a research station in Bambey to produce improved varieties of groundnuts and to study cultural methods. In 1933 research was expanded to include millet, sorghum and cowpeas and in 1938 further expansion made Bambey the main station for agronomic research in French West Africa. When Senegal became independent in 1960, Bambey was the chief agronomic research station in Senegal but, by bilateral agreement, the administration remained in the hands of the French under the organization, Institut de Recherches Agronomiques Tropicales et des Cultures Vivrieres (IRAT). Senegal took over management of the station in 1975 when the Institut Senegalaise de Recherche Agricole (ISRA) was created, and the station became the Centre National de la Recherche Agronomique (CNRA) under the administrative direction of ISRA.

Animal research began in 1935 with the establishment of the Laboratoire National d'Elevage et de Recherches Vétérinaires (LNERV) at Hann near Dakar. This research station, like Bambey, had research responsibilites for all of French West Africa and with Senegalese Independence in 1960 administration of the station remained under the control of a French organization, Institut d'Elevage et de Médecine Vétérinaire des Pays Tropicaux (IEMVT). With the creation of ISRA in 1975, administrative control was transferred to Senegalese authorities. Throughout its history the main activities of this laboratory have been directed toward animal health, the production of vaccines, and animal nutrition.

In order to better guide and administer research efforts, the Government of Senegal created in 1973 the Délégation Générale à la Recherche Scientifique et Technique (DGRST). In 1979, the DGRST was transformed to the Secrétariat d'Etat à la Recherche Scientifique et Technique (SERST). Under the present administrative structure, the Minister for Science and Tech-

nology, who heads SERST, reports to the Minister of Higher Education. He has responsibility for planning, administering, coordinating and evaluating nearly all research in the country. The SERST has four main divisions, one of which is the Scientific and Technical Directorate, which administers the Senegalese research organizations, and includes the Senegalese Institute for Agricultural Research (ISRA).

ISRA is charged with overall responsibility for agricultural research (both crops and animals) and oceanographic research in the country. ISRA's research on millet, sorghum, groundnut, maize, cotton, cowpea, and soybean is carried out by CNRA, which conducts research nationwide. There are supporting research programs on soil and water management, soil fertility, plant protection, farming systems, and studies of techniques for transferring technology. Additionally, there are studies on agricultural machinery, post-harvest technology, seed production and diffusion, and animal husbandry. In the past Bambey (CNRA) has served, de facto, as the national crop research institute. Research at the Fanaye and Djibélor stations has been confined largely to rice although some limited research with other crops is going on at Fanaye. Crop research has had in the past several major characteristics: (a) it was concentrated in one research station at Bambey in an area with relatively low potential for production increase; (b) it had weak links with agricultural extension, concentrating most heavily on plant varieties and not based on farmers' perceived problems or needs; (c) it was organized along disciplines, limiting broadly oriented research programming and coordination; (d) it was concentrated on research stations with little research done on farmers fields; and (e) it included very little socio-economic research.

ISRA's Managing Director has a Board of Governors with 18 voting members and five consulting members whose president is appointed by the Prime Minister. Two committees assist the General Manager in his task: The Steering Committee, which is concerned with financial and administrative oversight; and the Scientific and Technical Committee, which oversees the plans and progress of ISRA's research operations. Currently, ISRA has seven scientific departments: agronomy and bioclimatology, agricultural economics and sociology, forestry and hydrobiology, veterinary medicine and animal science, oceanography, agricultural machinery and equipment, and soil science.

As of January 1979 there were 97 ISRA scientists in agriculture and livestock research of which 57 were attached to CNRA at Bambey and LNERV at Hann. Eight research stations have no staff at the scientific level residing at the station. About 26% of the total scientific staff are Senegalese. Foreign scientists in ISRA are supplied mostly by French assistance organization under bilateral agreements. There are only five scientific staff at ISRA Headquarters. The number and distribution of ISRA scientific staff in January 1979 were as follows:

Location of Institute	Number of Scientists	Location of Institute	Number of Scientists
Senegal River Valley	13	ISRA Headquarters	5
Dahra	2	LNERV (Dakar-Hann)	16
Bambey	41	CRODT (Dakar-Thiaroye)	14
Sine Saloum	11	CNRF (Bambey)	1
Djibélor	10	CFH (Dakar-Cambarene)	11
	Total	125	

Budgeted agricultural research expenditures in Senegal totalled about CFAF 4.39 billion 1/ (US$20.9 million) in 1979/80, to which Senegal contributed about CFAF 1.32 billion (US$6.3 million), 0.9% of the value of its agricultural production. France has continued to finance most of the agriculture research work in the form of expert staff from IRAT and IEMVT, but has gradually been reducing its share of capital and operating costs; recently French participation has remained constant in real terms and without the proposed assistance from other donors there would be little scope for any new research ventures.

Agriculture research is linked to extension efforts through Regional Development Agencies (RDA's) that cover most of the country. These RDAs are: SODEVA in the groundnut basin, SODEFITEX in Eastern Senegal, SOMIVAC in Casamance, SAED in the Senegal River Valley, and SODESP, an agency responsible for promoting livestock production in the sylvo-pastoral zone. Some of these agencies were originally organized to promote a specific enterprise (SODEFITEX for cotton production, for example), but recently they have been given broad responsibility for rural development in the general sense in their region. These development agencies are in various stages of evolution and, consequently, their ability to function in the extension role varies considerably. The development agencies are under the Agricultural Production Department (DCPA) of the Ministry of Rural Development, with independent Board of Management and Director. They all receive a large share of their funding from international donors. The agencies, to varying levels, operate with some autonomy.

1/ This figure represents only expenditures on ISRA, for all types of agricultural research. It includes all ISRA expenditures financed by external sources, mostly as grants in the form of technical assistance. The latter is normally excluded from the official ISRA budget.

Some extension services are also provided by two other organizations, the Department of Livestock and Animal Production within the Ministry of Rural Development and the Rural Development Centers (Centre d'Expansion Rurale Polyvalent-CER) under Promotion Humaine. CER operates in 27 departments, and 93 arrondisements in all eight regions and has a staff of about 270. These teams are not focused only on agriculture but work in all aspects of rural development.

The Department of Livestock and Animal Industries has a responsibility for national livestock health programs. It is responsible for free vaccinations, supervision of meat and milk processing operations, and animal production aspects, but its work is almost entirely oriented toward veterinary medicine.

Although considerable efforts have been made to create an effective interchange between the extension services of the RDAs and the research organization, this linkage needs to be improved and strengthened. One of the reasons for the poor communication between ISRA and the RDAs is that the development agencies are fairly new organizations and they operate with a large degree of autonomy. In mid-1979 a research-liaison officer was appointed in the Ministry of Rural Development to serve as a link between the RDAs and ISRA. This officer, a former research scientist, has the responsibility for keeping ISRA informed of research needs as perceived by the RDAs. The Scientific and Technical Committee in which the RDAs are represented, is another vehicle to make research needs known. However, the feedback from extension to research remains minimal.

Technical training in agriculture is offered at a number of institutes. The National School for Rural Officers (Ecole Nationale des Cadres Ruraux, ENCR) at Bambey accepts students with a secondary degree for a four-year study program that leads to careers in crop farming, animal production, agricultural engineering, water and forestry resources, and fisheries. This school, which has a capacity of 150 students, supplies many of ISRA's junior and senior technicians.

Until recently all Senegalese agricultural scientists have been trained at overseas universities where training programs are not usually oriented to Senegal's needs. A National College of Agriculture (Institut National de Développement Rural - INDR) is now being established under the World Bank Third Education Project. The college will have 200 students with 40 graduates per year, and be located in Thies, about 70 km from Dakar. Students will be recruited at the baccalaureat level for a five-year program--a first preparatory year at the Department of Science of the University of Dakar, followed by four years at the INDR. The first two years will be used to strengthen the students' science background and provide basic training in agriculture. During years 3-5 students will specialize in Agronomy, Animal Science, Agricultural Engineering, and Economics and Social Sciences. The training program will be practical and oriented

toward the needs of the RDAs, which will employ many of the graduates. In 1979 the first group of students was admitted to this program.

The Ecole Inter-Etats des Sciences et Medicine Veterinaires de Dakar of the University of Dakar was founded in 1968 and graduated its first class in 1974. The school is a regional facility which can accept students from 14 African francophone countries. Students having completed a baccalaureate du second degré or equivalent are considered for admission. The coursework includes one preveterinary year of basic sciences and mathematics followed by four years of classroom instruction in veterinary medicine. After successful completion of the coursework, students are allowed to continue for one year in a thesis program after which they are awarded the degree Docteur Veterinaire d'Etat. The program, although intensive, does not provide in depth speciality training nor does it allow extensive exposure to research methodology (other than the non-coursework thesis year). Therefore, graduates wishing to pursue a career in research usually require additional, post-graduate training.

3. Senegal's Program to Decentralize and Reorient Agricultural Research.

The 1978 GOS review of agricultural research led to the National Indicative Plan for Agricultural Research for decentralizing and reorienting research. The Plan was published in February 1979 and it assessed local research priorities in relation to development needs, reviewed these priorities in a series of regional meetings, and produced research recommendations for four areas: (a) on-station research to develop and test new production techniques in a controlled environment; (b) on-farm research to better understand farmer production goals and socio-economic and structural constraints; (c) on-farm testing of new technical innovations; and (d) macro-economic studies of the agricultural sector and sub-sectors.

Concurrent with the preparation of the National Indicative Plan, the GOS requested the help of the International Agricultural Development Service (IADS), a U.S. based agency funded by the Rockefeller Foundation, to work in collaboration with ISRA to prepare a Master Plan for implementing the National Indicative Plan.

The Master Plan was submitted to the Government and World Bank in January/February 1979, reviewed and found generally acceptable. The Plan made three major proposals; (a) reorganization of ISRA and regionalizing of agricultural research; (b) coordination and integration of commodity and production systems research programs; and (c) establishment of priorities for the regionalization of the above mentioned programs. Specifically, the Plan proposed that research be concentrated on four of the seven agro-ecological zones in the country as follows: (a) the Senegal River Valley for irrigated agriculture; (b) the Sahel Region for animal production systems; (c) the Central Region including the central and southern

parts of the Groundnut Basin; (d) and the Casamance Region in the higher rainfall areas of the South.

Following this general agreement, ISRA prepared more detailed proposals for a first phase implementation of the Master Plan. As priorities still needed to be established in terms of potentially available resources, the World Bank offered further assistance towards the preparation of a research project based on ISRA's proposals. In early March 1979, the GOS requested IADS to review and evaluate the ISRA proposals, and prepare the final project paper. Subsequently, $500,000 was granted by the World Bank to help finance preparation costs including IADS services, architectural and engineering designs for research buildings and land development, and prepare the final project paper. By the end of August 1979, IADS presented its final report to Senegal. In September, a World Bank mission discussed the report with Senegalese authorities and reached agreement in principle on the proposal. A World Bank appraisal mission visited Senegal in November/December 1979. The World Bank Staff Appraisal Report was issued in July 1980, reviewed, revised and reissued in December 1980 and conditionally accepted by the Government of Senegal in late February 1981. The Appraisal Report will be presented to the Bank's Board of Directors in June 1981.

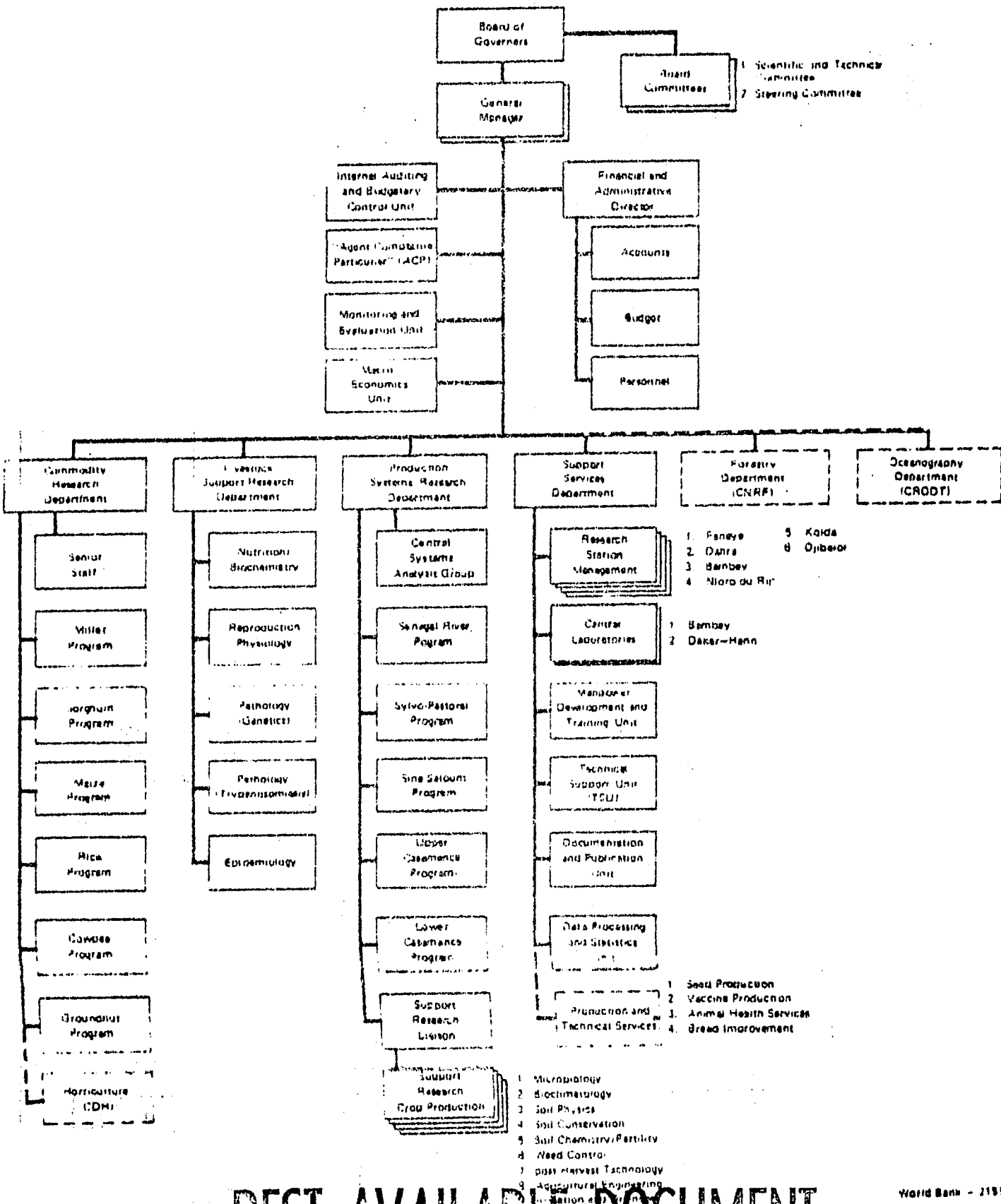
Meanwhile, USAID prepared the Project Identification Document (PID) for its support to ISRA's agricultural research and planning in November/December 1979 and the PID was approved in February 1980. Michigan State University was chosen in August 1980 as the project contractor under AID Collaborative Assistance Selection Procedures. The Project Paper was prepared during December 1980 to April 1981.

ISRA's new organization chart is shown in Figure III B. The present seven scientific departments would be reorganized and reduced to six: commodity research, production systems research, livestock support research, forestry, oceanography, and support services. All support research on crop production would be an integral part of the new Production Systems Department. The present Veterinary Medicine and Animal Science Department would only partially be integrated in the Production Systems Department, and the remainder would be regrouped to undertake support research for the latter. Central laboratories and research stations would be grouped in a new Support Services Department that would also be responsible for training and manpower development; publication, documentation and library services; construction, maintenance and purchase; and data processing and statistics. ISRA General Management would be reinforced through the creation of an Internal Auditing and Budgetary Control Unit and a Monitoring and Evaluation Unit. A Macro-Economic Unit would be established in ISRA's Headquarters.

The new research system would carry out the following research programs:

Figure III B

SENEGAL
AGRICULTURAL RESEARCH PROJECT
ISRA ORGANIZATION CHART



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World Bank - 21590

(a) five production systems research programs: at Fanaye for the Senegal River Valley; at Nioro du Rip for the South Groundnut Basin; at Djibélor for the Lower Casamance Zone; at Dahra for the sylvo-pastoral Zone; and at Kolda for the upper Casamance Zone. (The emphasis at the Fanaye Station would be on irrigated agriculture, the Nioro du Rip Station on rainfed agriculture, Djibélor on various techniques for rice production, and the Kolda and Dahra Stations on livestock production systems.)

(b) six nationally coordinated multidisciplinary commodity program on groundnuts, cowpeas, millet, sorghum, maize and rice; and

(c) A Macro-Economic Unit established in ISRA Headquarters in Dakar would carry out agricultural subsector studies with emphasis on the food-grain subsector and food security problems in close cooperation with the production systems teams.

The research agendas and budgets would be prepared by ISRA scientists and reviewed annually by workshops for ISRA research staff. Subsequently, the programs and budgets would be reviewed by the Scientific and Technical Committee prior to their presentation by ISRA's General Manager to the Board of Governors for approval.

To assure the desired coordination of donor support for the overall research effort, a Consultative Group on Agricultural Research in Senegal would be established to promote informal discussions on the annual program of work and needed financial support. The group would meet at least once a year three months before the end of each fiscal year to exchange views with GOS on progress of the program on agricultural development, and other matters related to the objectives of the program. Efforts would be made to hold the Group's meeting at the same time as the annual internal and external research program reviews. The Group would be convened by SERST and provided with an agenda and all relevant documents.

C. Project Description

1. Goal, Purpose and Outputs.

The goal of this project is to increase the capacity of the GOS to plan and evaluate agricultural development policies and projects. This goal would be accomplished through a long-term (10-15 years) institution-building effort with the Senegalese Agricultural Research Institute (ISRA) of which this project is the first phase.

The purpose of the project is:

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

(b) to assist in organizing and carrying out production systems research in major ecological zones in order to identify social, economic and technical and institutional constraints on present farming systems and develop improved technical packages which are biologically stable, privately profitable and socially acceptable;

(c) 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.

The project would support farming systems and macro-economic research, short- and long-term training and the development of research capabilities within the new decentralized structure of ISRA. At the end of this project the following outputs would indicate progress toward achieving the purpose and goal:

(a) production systems studies, on-farm trials of improved technology, and improved technical packages for "recommendation domains" 1/ in major ecological areas;

(b) macro-economic studies of the agricultural sector with emphasis in the foodgrain sub-sector and food security;

(c) upgraded technical and professional skills for agricultural researchers;

(d) expanded collection of socio-economic documents in ISRA's Documentation and Information Service, including the improvement of documentation services in two research stations;

(e) improved computer capacity for the PSR teams and macro-research programs.

1/ A "recommendation domain" is a homogeneous subgroup of farmers undertaking similar farming activities and having similar social customs, support facility access, marketing opportunities, and technology and resource endowment.

2. Project Activities

This project would contribute to the decentralized research program of ISRA by supporting production systems research in two locations, strengthening the Central Systems Analysis Group (CSAG), and conducting macro-economic research on the agricultural sub-sector.

The production systems research would:

(a) identify and quantify technical, economic and social constraints on existing production systems;

(b) carry out on-farm trials on new technological packages which are biologically stable, economically profitable and socially acceptable;

(c) assist in diffusing the improved technical packages.

The project would provide a production systems economist for a production systems research team in the Casamance and in a second area. Each team would consist of a production systems agronomist, a production systems economist, a rural sociologist, a research/extension liaison specialist and possibly a livestock specialist. Other specialists would be added as necessary.

Since the establishment of a decentralized PSR program requires a coherent national program of work, the Central Systems Analysis Group, Production Systems Department would provide valuable conceptual support to the PSR teams, serve as an important clearinghouse of information on other PSR work in Senegal and in other countries and help to address the research/extension links. This project would provide one Rural Social Scientist and operating support to the CSAG.

A macro-economic unit would be created as part of the headquarters staff in order to build on the research produced by the PSR teams and to develop sectoral-level analyses and recommendations. This unit would analyze policy and institutional level constraints on agricultural sub-sectors and develop recommendations for agricultural policy changes. The project would contribute technical assistance and operating support to this unit.

Project support for PSR teams, CSAG and the Macro-Economic Unit would come through the following inputs:

(a) Technical assistance:

The project would provide 21 person-years of long-term research technical assistance to be complemented by 9 person-years of research associate assistance and 30 person-months of consultants. An additional 1 1/2 person-years of U.S. technical support will be supplied to develop computer programs for field processing of PSR data.

-1 Rural Social Scientist (team leader), CSAG, 5 years;
-2 Macro-Economists, Macro-Economic Unit, 8 person-years;
-2 Production Systems Economists, PSR teams (1 in Casamance for 4 years and 1 in a second location for 4 years);
-6 Research Associates, PSR teams and Macro-Economic Unit, 9 person-years;
-Consultants in econometrics, marketing, farming systems, computer programming, documentation and information services, and rural sociology, 30 person-months.
(The Technical Analysis is presented in Section IV A.)

(b) Training.

Long-term academic training in the U.S. in the agricultural and social sciences would be provided for 24 participants at approximately 30 months each. All participants would be trained to the Masters of Science level and a few may be trained to the Ph.D. level.

Short-term training in the U.S. and third countries in production, systems research, macro-economic modeling, micro computers, data processing and documentation. (The Training Analysis is contained in Section IV A. 4)

(c) Other Project Support.

The project is being supported by local currency funds provided by the P.L. 480, Title III Program. Title III is financing construction, commodities and operating support for ISRA's decnetralization of research program. (The related activities of the Title III Program are presented in the Financial Analysis, Section IV. F).

3. Project Financing

AID financing for the project is as follows:

($ in thousands)

	Year 1	Life of Project
Technical Assistance	465	2756
Training	255	1239
Inflation and contingencies		995
Total	720	4950

This funding is all for foreign exchange costs. The local currency components are financed under Title III.

AID contribution to decentralizing and strengthening ISRA's research program is part of the multi-donor effort informally coordinated by the World Bank. According to the World Bank, overall financing for ISRA's decentralization program for a six-year period (1981-86) is $129.0 million. This is broken down as follows:

($ in millions)

	Amount	Percent of total
Senegal	42.6	33
France	42.1	33
AID	19.3 1/	15
World Bank	15.0	11
Belgium	3.4	3
Other	5.6	4
UNIFSTD	1.0	1
Total	129.0	100

4. Relevant Activities of AID and Other Donors

(a) AID Development Strategy.

This project supports the AID development strategy for Senegal as presented in the Country Development Strategy Statement (CDSS). It will contribute to the long-range goal of food self-sufficiency for Senegal by increasing the capacity of the GOS to more effectively plan and evaluate agricultural policies and projects. Initially this project will support the Central Systems Analysis Group, PSR team in the Casamance and in the southern Groundnut Basin, and the Macro-Economic Unit. The project supports the geographic concentration of USAID activities. Research undertaken by the project will emphasize the following areas of importance to AID strategy: food production and food security, agricultural policies, nutrition and the role of women in Senegal's rural economy. The project is designed as part of a larger

1/ This Figure does not include $1.5 million of Title III and $0.7 million of Cereals Production Phase II, as presented in Section III. G. 4.

multidonor program which will be coordinated by a Consultative Group for Agricultural Research in Senegal. This structure and mechanism reinforce the broader donor Consultative Group for Senegal proposed by the CDSS.

(b) AID Assistance for Agricultural Research.

USAID/Senegal has proposed an estimated total of over $20 million in financing for agricultural research in Senegal over the next five years (1981-1985). This total will likely be increased if PL 480, Title III Program is extended beyond 1983. The major AID projects supporting agricultural research are:

(1) This Agricultural Planning and Research Project, including the PL 480, Title III Program;
(2) the Casamance Regional Development Project (685-0205);
(3) the Cereals Production Project, Phase II (685-0235);
(4) the ONVS Agronomic Research Project (685-0605 and
(5) the Integrated Pest Management Project (625-0928) through FAO/CILSS.

This Agricultural Planning and Research Project is complemented by two local currency subprojects financed under the PL-480 Title III Program. The first subproject, Research Decentralization, will finance construction of houses and research buildings at several regional research centers and some of the support costs including equipment, vehicles, field research, and data processing for the Macro-Economic Unit, the FSR team at Djibélor, and one other FSR team and the Central Systems Analysis Group. This activity is funded at $4.75 million over three years.

The second subproject, Agricultural Policy Studies, will finance research on the marketing structure and pricing policies for major foodgrains. This subproject is funded at $0.9 million over three years.

The Casamance Regional Development Project provides support to the research program being undertaken by ISRA at the Djibélor Station. Research activities include trials and research on agronomic practices, plant protection, production economics and agricultural engineering. The project provides for 12 person-years of long-term and 18 person-months of short-term technical assistance; for training of 4 participants to the MSc level and 30 person-months of short-term training; for the construction of offices, laboratories and houses at Djibélor; and for some operating support. AID funding for these activities is $2.7 million over five years.

The Cereals Proudction Project, Phase II, will diversify and increase productivity of food crops and livestock by reinforcing the extension efforts of SODEVA. The project finances the off-station cooperative research between ISRA and SODEVA, and some seed multiplication research between ISRA and SODEVA, and some seed multiplication research at CNRA in Bambey. AID financing for research is approximately $0.7 million over five years.

The OMVS Agronomic Research Project will continue AID assistance to the OMVS (Organization pour la Mise en Valeur du Fleuve Sénégal) for agronomic research began in 1975. The design of a cohesive agronomic research program for three research stations - Fanaye, Senegal; Kaedi, Mauritania; and Same, Mali - is expected to be complted in FY 1981. The research program at Fanaye will emphasize cereals - especially wheat and triticale - legumes and forestry. Total funding and components of financing have not yet been finalized.

The Integrated Pest Management Project is designed to establish an integrated pest management (IPM) capability for protection of food crops within the CILSS (Inter-State Permanent Committee for Drought Control) states. IPM involves the use of non-chemical control methods through adjusted planting schedules, post harvest stalk destruction, crop rotation, animal traction for weeding, plant breeding, and seed soaking. It has been tested and proven effective elsewhere in the world. Under thi project IPM methodology will be tested and validated for application in the Sahel. The project will provide approximately $4.2 million of funding for Senegal over six years.

(c) Other Donor Assistance for Agricultural Research

Implementation of ISRA's decentralization program over the six-year period (1981-86) is estimated by the World Bank to cost $129 million with a foreign exchange component of 52%. Senegal would contribute $42.6 million which would finance all local staff, initial expenses, working capital and 50% of operating costs. Total external financing of $86.4 million (70% of total costs) would over 100% of foreign exchange costs ($67.1 million) and 31% of local costs. External financing would be provided by France ($42.1 million), AID ($15.1 million 1/), the World Bank ($15 million), Belgium ($3.4 million), FAO/CILSS 2/ ($4.2 million), UNIFSTD ($1.0 million), and WARDA and ICRISAT ($1.3 million). There is a shortfall of $4.3 million for which donor financing is being sought.

1/ This figure does not include $1.5 million of Title III and $0.7 millior under The Cereals Production Project, Phase II.

2/ This is the Integrated Pest Management Project funded primarily by AID and described above.

France would continue its funding at the present annual level of about $7 million. Part of these funds would be in the form of grants and part in the form of technical assistance. Of these funds, 11% would be for vehicles and equipment, 48% for expatriate research expenditures, 18% for operating costs, and the remaining 23% is reserved for inflation. Technical assistance would be concentrated on crop science support research at Bambey, commodity research, and headquarters support functions.

The World Bank would provide $15 million to ISRA through the Senegal Agricultural Research Project. This funding would be in the form of an International Development Association (IDA) credit. Of these funds, 77% would be for construction and site development, 6% for support staff and operating costs, 3% for refunding project preparation costs, and 14% for price contingencies. While this support is primarily for infrastructural development, the World Bank has also played an important role in informally coordinating donor support for the ISRA program.

Belgium would support livestock production systems research at the Dahra research station. Assistance would be used for infrastructure improvements and equipment (22%), expatriate research assistance (42%, operating costs (15%), and provisions for price increase (21%).

UNIFSTD would cover construction costs and two years operating costs of the Documentation Center at St. Louis, 7.5 person-months of consultants to strengthen ISRA's Scientific and Technical Committee, and 13 management training fellowships.

WARDA and ICRISAT are expected to continue to fund expatriate research staff.

5. Project Issues

The following issues were raised by the PID and PID Review (PID Review Cable is attached as Annex D.) and have been addressed in the design of the project.

(a) Coordination among Donors and Projects

Continuing coordination will be assured by ISRA's Consultative Group on Agricultural Research in Senegal which will meet at least once a year.

(b) Salary Levels for Scientists

In December 1980, the promulgation of a new status for researchers provides scientists with civil service status within the GOS, and regulates salary levels. However, the ISRA procedures now place too much emphasis

on diplomas as opposed to experience and performance as requirements for advancement. As a project covenant, USAID will push for modifications of these procedures to emphasize experience and performance and for clarification of the equivalency of American degrees.

(c) Recurrent costs

As a result of the ISRA's new program recurrent costs for the GOS would increase by approximately 25 percent annually or $0.5 million per year in real terms. It is unlikely that the GOS could support more, given its already sizeable contribution to agricultural research in comparison with other countries. Thus, a continuing support for Senegalese agricultural research by the international community will be required, as has been the case in the past.

(d) Need for Additional Macro-Economic Policy Studies

Project design undertook an inventory of farming systems and macro-economic agricultural research in Senegal (Annexes G & H), and found a clear need for further research.

(e) Relationship to Policy and Planning

The setting of agricultural and food policies will continue to be the responsibility of the Prime Minister and the Interministerial Council. The Comité des Grands Produits Agricoles (CGPA) is the primary source of policy recommendations to the Council. The CGPA includes representatives from the Caisse de Péréquation et de Stabilisation des Prix (CPSP), the National Development Bank, the RDA's and each of the Ministries. The Macro-Economic Unit of ISRA, working with the Social Science Research Directorate of SERST, will be the primary source of research recommendations for the CGPA.

(f) Research - Extension Linkage

To assure effective transfer of technology to small farmers each of the FSR teams would have a research/extension liaison specialist. To assure the closest possible links with the extension services he would have a staff function with regional RDA management and be seconded under a protocol agreement between ISRA and the RDA concerned. These research/extension liaison specialists would be supported by the Rural Social Scientist in the CSAC. As a project covenant, USAID will request that a protocol agreement be established between ISRA and the relevant RDA to formalize research/extension cooperation in each geographic area.

IV. FEASIBILITY ANALYSES

A. Technical Feasibility

1. Project Strategy

The strategy of this long-term institution-building project is to focus on two interrelated activities: (a) long-term training of 24 Senegalese agricultural researchers in order to speed up the nationalization of Senegal's agricultural research system and (b) provision of technical assistance in agricultural economics, 1/ rural social sciences, computer science and data processing. Researchers provided under technical assistance will help ISRA initiate production (farming) 2/ systems research and assist in the establishment of a macro-economic research unit in ISRA's headquarters. The two components of this project - training and technical assistance - will complement the construction program financed by the World Bank and Title III funds supplied by USAID.

Strengthening national agricultural research systems is a long-term process requiring a 10-20 years of sustained funding. The easy task in institution building projects is to build houses and research facilities - a 2 to 4 year task. The difficult tasks are to develop human capital and a research program which is relevant to farmers and herders, cost effective and responsive to the needs of the agricultural and industrial sectors and to society at large.

1/ Since this project will provide short- and long-term agricultural economists it is important to note that the term agricultural economist should be translated into French as économiste agricole or économiste rurale. The term agro-économiste in the French system refers to an agronomist with additional training in economics (frequently a one year certificate course in economics). In terms of this project, obviously, U.S. trained agricultural economists in the Macro-Economic Unit and in FSR teams will be économiste agricoles/ruraleo. The agricultural economists assigned to the multidisciplinary FSR team need to have a good grounding in technical agriculture.

2/ The recommended approach to production (farming) systems research in this project draws heavily on the following publications: David Norman, The Farming Systems Approach: Relevancy for the Small Farmer" MSU Rural Development Paper No. 5, Michigan State University 1980 and E. Gilbert, D. Norman and F. Winch, "Farming Systems Research: A Critical Appraisal", MSU Rural Development Paper No. 6, Michigan State University, 1981.

Since only one-third of ISRA's scientific staff are Senegalese, the training component of this project must be comprehensive and long-term in nature. Moreover, since excellence in research can only be developed through first hand experience it is important to move beyond an ad hoc training program of individuals taking courses in scattered US universities to a comprehensive program, including seminars and workshops in Senegal, third-country training and long-term training in the U.S. Training under this project will include third-country training in International Agricultural Research Centers, USDA courses in Washington, D. C., and in special courses in U.S. universities.

Long-term training under this project includes several innovations. First, Michigan State University faculty members will interview ISRA nominees for long-term training. Second, all nominees without prior research experience will spend 6-12 months on an ISRA research station in order to gain field experience and identify a tentative research topic for their master's thesis and or Ph.D. dissertation. Third, students in long-term training in various U. S. universities will attend a five-week seminar on research methodology and data processing at Michigan State University during one summer of their two year course programs. Fourth, all MSc and Ph.D. candidates will return to Senegal to collect data for their MSc thesis (4-6 months) and or Ph.D. dissertation (9-15 months). Fifth, the training program will give initial priority to MSc training in the U.S. and later move on to Ph.D. training.

Technical assistance will be provided to help implement ISRA's new and decentralized research program. One MSU rural social scientist will be provided to the Central Systems Analysis Group - the unit in the Production Systems Department charged with conceptualizing production and livestock systems research. Micro economists will be provided to two production systems teams in order to assist in launching production systems research. Two macro economists will be provided to help ISRA set up a macro-economic research unit and launch macro-economic policy studies on the foodgrain sub-sector with emphasis on pricing policy, marketing, storage and food security. The macro-economic researchers will work closely with micro-economic researchers in the production systems teams. Michigan State University will also provide research associates and short-term consultants in computer science, data processing, documentation, and macro and micro economics in order to develop ISRA's data processing system, documentation centers and production systems and macro economic research programs.

Michigan State University computer specialists will spend a substantial amount of time developing software packages for the IBM 5120 micro computers during the first two years of the project. The micro computers will be an integral link in the five production systems research teams.

2. Production Systems Research

a. Background

Senegal has a long history of agricultural research going back to the establishment of a research station at Bambey in 1921. But, like many other African countries research has tended to be dominated by technical sciences and it has focused on increasing the physical productivity of crop, livestock and fishing enterprises.

Increasing awareness of the significance of the socio-economic aspects of farming and livestock production led IRAT in 1969 to embark on an experiment called the "Unités Expérimentales" (UE). (See Annex G). The Unites Experimentales--which were later taken over by ISRA after its creation in 1975--represent one of the first attempts in Africa to apply a systems approach to farm-level agricultural research. The orientation of UE research focuses on the creation and the diffusion of technology. The basic approach involves the identification of improved technological packages that are theoretically and technically possible. The packages are developed on the experiment sub-stations--called "Point d'Appui pour Expérimentation Multiple" (PAPEM's). Finally the technological package is tested through studying the adoption of the package--and fine tuning it--with farmers in the two UE's in the Sine Saloum.

Some promising results have been obtained by the UE's. Research in the UE's has developed a better understanding of the technical feasibility and economic profitability of the intensification of farming in the Sine Saloum region. But the UE approach has been relatively expensive and questions are being raised about alternative approaches in which the farmer plays a more active role in the research process. A comprehensive evaluation of the UE experience is being carried out in early 1981. Two points that are likely to receive prominent attention in the evaluation are:

(1) What has been learned about enlisting farmers in the research process in order that the constaints faced by farmers can be transmitted to researchworkers in an on-going exchange between farmers, RDA's and researchers?

(2) Is there a more cost effective way of undertaking production systems research? (The UE approach has been expensive).

b. Objective of Production Systems Research

The objective of production systems research is to increase the productivity of the farming system in the context of the entire set of private and societal goals, given the constraints and potential of

modifying existing farming systems. Productivity can be improved through the development of relevant production technology and the modification of policies and support systems to increase the welfare of farming families in ways that are useful and acceptable to them and society as a whole. Although PSR will focus on on-farm testing of new technologies rather than influencing the support systems, the participation of the research/extension liaison specialist in the PSR team provides a communication link with the RDA's. The RDA's are responsible for modifying agricultural technology.

c. The Conceptualization of Production Systems

A number of simplistic and erroneous assumptions have often been made about the goals of rural households and the environment in which small farmers operate in LDCs. In reality, the environment in which farmers and herders operate is extremely complex as illustrated in Figure IV A. The production system is the result of interactions among several interdependent components. At the center of the interaction is the rural household as a production/consumption unit. Farm families allocate certain quantities and qualities of inputs (land, labor, capital and management) to three processes (crop and livestock production and off-farm enterprises, including fishing) in a manner which will maximize attainment of their goal(s).

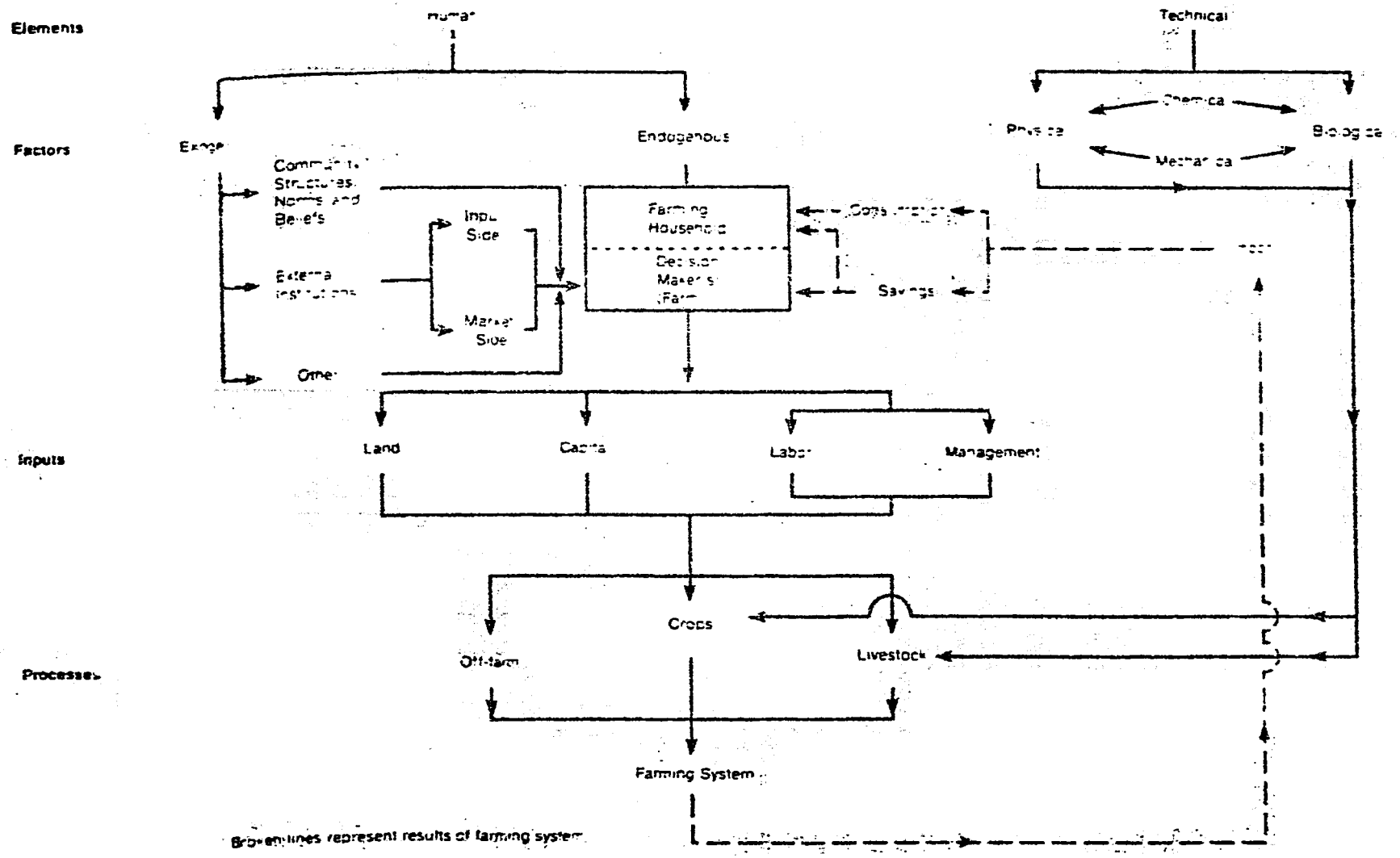
A production system has a number of environmental determinants. The environment can be divided into two elements: technical and human. The technical element determines the types and physical potential of livestock, crop and fish enterprises, and includes physical and biological factors that have been modified to some extent by man, often through technology development. The production system that actually evolves depends greatly upon what is possible as defined by the technical elements.

The human element is characterized by two types of factors: exogenous and endogenous. Exogenous factors (i.e., the social environment) which are largely outside the control of the individual farming family, will influence what it will be able to do. They can be divided into three broad groups: community structures, norms and beliefs; external institutions; and miscellaneous influences, including population density and location.

d. A Prototype Production Systems Research Team

It is anticipated that each PSR team will include the following

Figure IV A



Schematic Representation of Some Determinants of the Farming System

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1 Production Systems Agronomist and/or Animal Scientists
1 Production Systems Economist (Economiste Agricole in French terminology)
1 Rural Sociologist
1 Specialist in Extension/Research liaison

In addition to having a complete team to undertake PSR, the effectiveness of PSR will depend to a great extent on the following linkages:

(1) Because of the regional focus, each PSR team will have to study a range of crop, livestock and off-farm enterprises. Therefore it is essential for the team to work closely with the national commodity research teams (CRTs). For example, findings of the PSR teams will help determine the research priorities of the CRTs, and the CRTs in turn will provide technologies for adaptive testing by the PSR teams.

(2) Another important linkage in disseminating the results to farmers is between the PSR team and the development agency in the same region. This linkage is to be provided by a research/liaison officer who will be an integral part of the PSR team and also be responsible for helping the extension staff of the RDA in disseminating the new technology. He is the only member of the PSR team who will have a staff function with RDA management, to whom he is seconded under an agreement signed between ISRA and the RDA concerned.

e. Implementation of Production Systems Research (PSR)

The PSR or "bottom-up" approach consists of four stages: descriptive, design, on-farm testing, and extension as shown in Figure VI B.

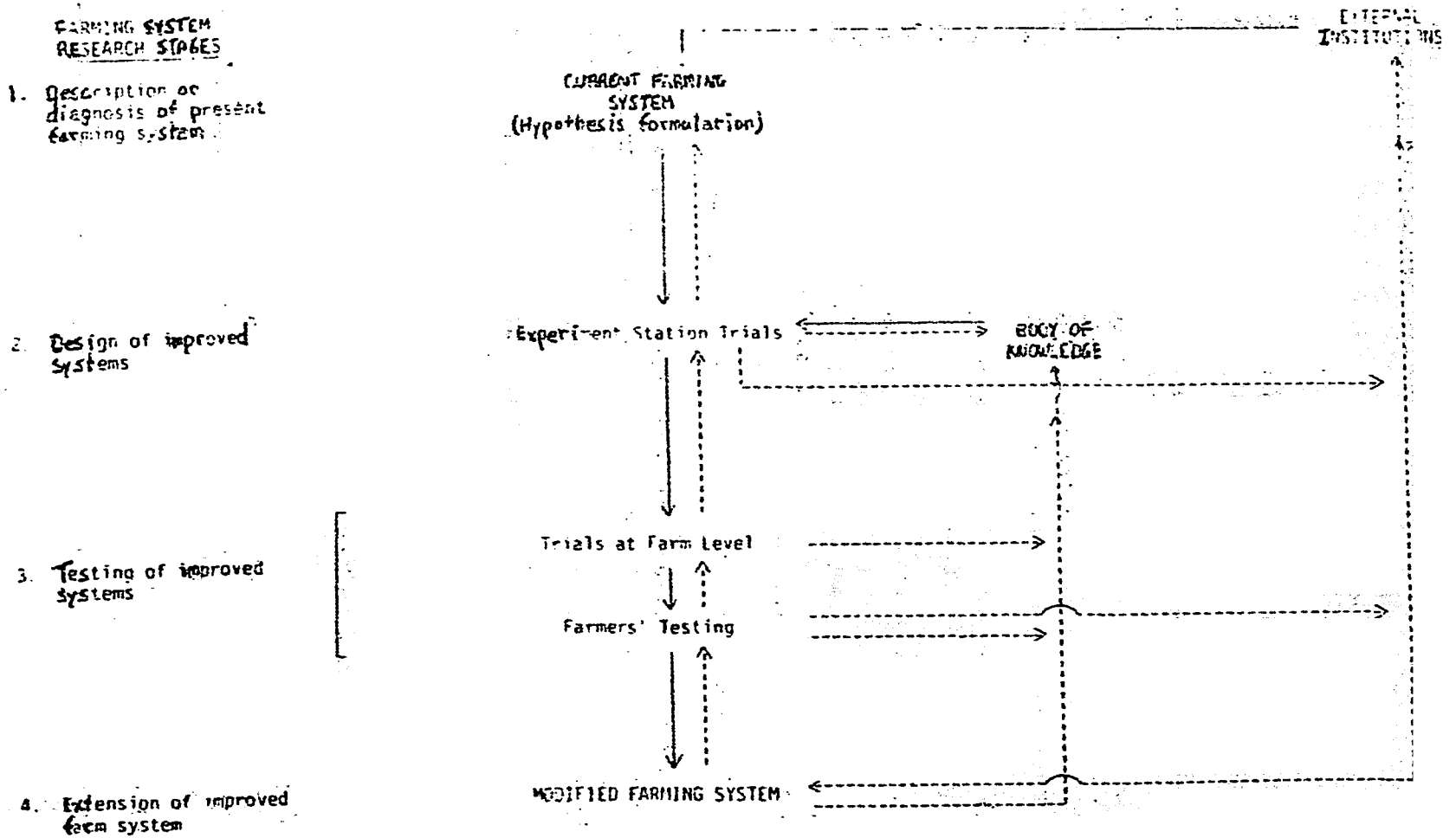
(1) The descriptive or diagnostic stage

In this stage the present farming system is studied through informal visits with farmers and village groups in order to identify constraints which farmers face and to ascertain the potential flexibility in modifying the farming system in terms of timing of operations, supply of labor, etc. The farm visits will also help the PSR team understand the goals and motivation of farmers. At this stage farmers are classified into homogeneous sub-groups ("recommendation domains") of farms with similar social customs, resource endowment, access to support systems, and comparable marketing opportunities. As a result, farming families within each "recommendation domain" should have roughly the same problems, opportunities for improvement and should react in the same way to new technological packages and policy changes.

(2) Design Stage

The design stage is primarily confined to work on the experiment

Figure IV B



SCHEMATIC FRAMEWORK FOR FARMING SYSTEMS RESEARCH AT THE FARM LEVEL
(Downstream Farming Systems Research)

BEST AVAILABLE DOCUMENT

station. Such technologies arise out of conventional research on experiment stations, by the CRT's in the Commodity Research Department; and the Livestock Support Research Department.

(3) The testing stage.

The testing stage consists of two parts : First, limited trials of promising technology are tested at the farm level with intensive guidance and advice by the PSR team; and later, extensive farmer testing to verify the full range of applicability of the new technology. In certain cases where both farmers and researchers are reasonably confident about a particular improved technology, the limited testing phase may be eliminated and attention immediately focused on extensive farmer testing.

(4) The extension stage.

This stage involves the diffusion of the improved technologies which were identified and screened during the design and testing stages.

In practice there are not necessarily clear boundaries between the four above stages. Design activities, for example, may begin before the end of the descriptive and diagnostic stage and may continue into the testing stage as promising alternatives emerge during farm trials.

3. Support for the Central Systems Analysis Group

The Central Systems Analysis Group is an integral part of the Production Systems Department. The main purpose of this group is to develop a coherent national and decentralized program of PSR in five locations. This requires a close working relationship between the CSAG, the PSR Teams, the CR teams, regional development agencies and the Macro-Economic Unit. The CSAG can serve as an important clearing house for the PSR teams by providing information on the operation of other PSRs in Senegal and in other countries. The CSAG is a useful mechanism to expedite the transfer of the results and PSR experiences from the international research centers and national agricultural research systems to Senegal's PSR teams.

Collectively and individually this group would serve as a resource base for the PSR teams and the individual PSR researchers. The CSAG would be able to respond to requests from PSR teams for support to facilitate computer analyses in the field, methodology to undertake special studies, and the development of effective linkages between PSR and Commodity Research Programs and between PSR and the local rural development agencies. As the PSR teams gain experience, it is expected that the CSAG will be called upon less to address institutional and methodological issues and more to assist with special studies based upon analysis of data from all or several of the PSR teams. Another important

activity of the CSAG is to facilitate the link between PSR and research carried out by the Macro-Economic Unit. The CSAG will work with the Macro-Economic Unit to synthesize the results of PSR research.

The composition of the CSAG would include :

- A System Analysis Specialist - an economist trained in systems modeling;
- A Farming Systems Specialist - an agronomist with experience in working with multi-disciplinary teams.
- A Rural Social Scientist - a social scientist with experience in working on the institutional constraints on agricultural production; and
- A Production Systems Economist - an agricultural economist with training and experience in production systems research.

4. Macro-Economic Research

a. Background

From independence (1960) to the mid-1970s, macro-economic assessments of Senegal's agricultural sector were almost exclusively left to planning institutions. Most of the efforts were concentrated on the selection, financing and implementation of projects consistent with the political objectives of the National Economic and Social Development Plans. The focus of macro-as well micro-research was on groundnuts until the drought of the early 1970s. In the face of lagging domestic food production and growing food imports, researchers, planners and policy makers turned their attention in the mid-seventies to the food-grain subsector.

Over the 1974-77 period four descriptive studies of food grain production and marketing were carried out. The first was sponsored by the FAO in conjunction with the ITA (Institut de Technologie Alimentaire) and carried out in 1974. National food balance sheets were developed to gain an understanding of production, storage, transportation and consumption patterns. The second study focused on the food grain subsector and it was carried out of Josué Dione "Le Deficit Cerealier au Sénégal : Situation et Perspectives" - ISRA. 1975. The third study was carried out by the CRED of the University of Michigan (Ann Arbor) at the request of the CILSS/Club du Sahel in 1976. The CRED study analyzed the marketing of foodgrains in the Sahel, including a chapter on Senegal. The fourth study, marketing and storage of cereals, was completed by SONED for the Ministry of Rural Development in 1977. The four studies made a signi-

ficant contribution in bringing together secondary data and scattered information about the food sector and the foodgrain subsector in particular. But the value of these studies is limited by the lack of reliable farm level data. Moreover, these studies are now out-of-date because of the October 1980 dissolution of ONCAD. (See Technical Annex H for an inventory of Macro-Economic Research on the Agricultural Sector).

b. Objectives of Macro-Economic Research

The objectives of ISRA's Macro-Economic Unit should be to:

(1) identify sectoral-level constraints on the ability of the agricultural sector to contribute to national economic objectives and to increase food and livestock production, rural and urban nutrition and rural employment objectives,

(2) analyse the consequences of pursuing alternative agricultural policies over time with emphasis on the foodgrain sub-sector and food security,

(3) develop recommendations for improving pricing policies, investment policies, input supply and rural institutions.

The research pursued by the Macro-Economic Unit should take account of the existing and projected expansion of macro-economic research capacity in Senegal, including DRSSH (la Direction de la Recherche en Sciences Sociales et Humaines) in SERST which is mandated to coordinate macro-economic studies of the total economy. Other organizations carrying out macro-economic studies include CREA (le Centre de la Recherche Appliquée) at the University of Dakar, and SONED (Société Nationale des Etudes de Développement) a quasi-government consulting firm. SONED contracts for various research studies relating to agriculture and nutrition.

c. Location of Macro-Economic Research Unit

The Macro-Economic Unit will be part of the headquarters staff of ISRA under the current Organization Chart (Figure III B). The macro-economic staff should also be located in proximity to the ISRA computer facility for data analysis and to the Central Systems Support Group for linkage to the FSR teams. The systems analyst in the Central Systems Support Group can provide support to the macro-economic unit. All of these factors suggest that the macro-economic unit should be located in Dakar even if the ISRA headquarters is moved to another location.

5. Training

Training of Senegalese scientists on the ISRA staff is the cornerstone of this project. Currently, about one fourth of the total scientists

on the ISRA staff are Senegalese; France supplies most of the expatriate ISRA scientists under the Senegalese-French bilateral agreement.

Long-term academic training under this project is the most effective way to provide a critical mass of graduate-level Senegalese scientists. The aim of the training program in this project is to enable ISRA to fill more of its scientific positions with Senegalese researchers and to provide Senegalese staff of ISRA with the essential scientific, technical and administrative skills needed to carry out research which is relevant and cost effective.

The project would provide long-term training in the United States for 24 Senegalese in various disciplines such as agronomy, animal husbandry, agricultural economics and rural sociology. Most of the trainees would spend about 2 months in language training in Dakar and then 2-2 1/2 years in the U.S. on a master's degree. A few will pursue a Ph.D. degree. Trainees would receive 6 - 12 months of experience in ISRA prior to leaving for long-term training. Upon completion of all course work for master's degrees in the United States, all trainees would return to Senegal for masters thesis and/or Ph.D. degree research.

The project agreement will contain a covenant to ensure proper subsequent employment in ISRA of personnel trained under the project, and to assure equivalency for MS and Ph.D. degrees. Long-term training will also be an excellent way to help improve the ISRA research program through exchanges between Senegalese researchers and researchers in other institutions.

Short-term training under the project will consist of courses at International Agricultural Research Centers, USDA and U.S. university-sponsored short-term courses. These courses will include macro-economic modelling, production systems research, and the use of micro-computers in field locations and research administration.

Within Senegal, in-service training sessions from one day to two weeks duration are envisaged. In-service training will be principally for research supervisors, assistance, field interviewers and data analysts, plus joint sessions with researchers and development agencies. Workshops, seminars and lectures would be planned, managed and taught by ISRA and project staff personnel, including short-term consultants. All training programs within Senegal will be financed by Title III funds.

6. ISRA's Data Processing Capability

a. Background

ISRA is in the process of establishing a computer center (known as Centre de Traitement de l'Information or CTI) at the Center of Oceanographic Research (CRODT). Up until now, all computer work has been done on the Ministry of Finance computer system. Some money became available to ISRA to increase their computing capability and they have used it to purchase a central computer and five microcomputers.

The central computer will be an IBM 4331-1 with 1 Mbyte of memory, one 3370 disk drive with 570 Mbytes of storage, one 8809 tape drive, one 3262 line printer (speed of 625 lpm), one operator terminal, one character printer, one diskette drive, and five user terminals. This will all be located in a building which is currently being remodeled for it at CRODT headquarters.

CRODT currently has one programmer and about 25 researchers doing computer-aided research. They will be hiring one more programmer, a computer operator, and four terminal operators by May 1981. Their current programmer, Mr. Hayeck, will be in charge of CTI. IBM will provide training for these people (using a similar computer at a bank in Dakar) before the 4331 is installed at CRODT in July 1981.

There are about 200 existing programs and an unknown number of data files that will need to be converted to the 4331 for CRODT alone. They have also purchased a statistical package, known as GENSTAT, from and independent software supplier. This will give them a capability that was lacking on the Ministry of Finance computer. There will also be other groups using the 4331, including CNRA (Bambey), Office of Fisheries, CERFR, and the Livestock Laboratory. Some of these have their own programmers, other do not. It is not yet known when they will start using the computer or how extensive their use will be.

The micro-computer model ISRA has purchased is the IBM 5120 with 48 Kbytes of memory, dual 8" disk drives, and the IBM 5120 printer. Each diskette can contain 1.2 Mbytes of information. The printer has a speed of 120 characters per second. These are to be delivered to CTI in August 1981.

ISRA has tentatively determined five locations where these microcomputers will be placed. One researcher at each location will

be chosen as the person with primary responsibility for the computer. An unknown number of potential users will also be identified at each location. All of these people will be trained by IBM in the operation and programming of the 5120 at CTI between June and December 1981. Meanwhile the physical locations chosen for the 5120's will be modified to meet the necessary electrical and environmental conditions. The 5120's are scheduled to be installed at those locations by January, 1982.

b. Evaluation of Current Resources

This project will require the collection and analysis of large quantities of data. In past projects that we have seen, the amount of computer equipment, personnel and time required for such analysis has often been underestimated. This has at times seriously hindered the research effort. It is crucial that sufficient computer resources and personnel be available to project researchers.

The central 4331 could best be described as an intermediate computer in IBM's product line. In term of speed, memory size, disk space, and quantity of peripheral equipment it is probably capable of doing all of SSRS's data processing. However, this is an area where it is difficult to make evaluations. The general rule in electronic data processing is that expanded capability creates expanded demand. It is not uncommon for a new installation to become overloaded within one or two years. That possibility exists at CTI but it seems remote.

There are two ways the 4331 can be easily upgraded without requiring any software changes. Additional disk drives can be added up to a capacity 16 times as large as what they presently have ordered. Each additional disk drive would cost approximately $20,000 plus maintenance. The additional drives would also require additional space in the computer room, which might not be available. The Central processor could be replaced with the 4331 - 2 which is twice as fast and can have twice as much memory. This would cost about $90,000 plus additional maintenance. They already plan to add another disk drive and another tape drive by the end of 1981. This is certainly a good idea.

Our best guess is that within four to five years, when the research effort is fully under way, the 4331 will become overloaded. ISBA would need to add more disk drives (possibly as many as three) and upgrade the central processor at a total cost of $110,000 to $150,000.

The IBM 5120 is not a state-of-the-art microcomputer. It is somewhat expensive for the performance it offers. However, it is specifically designed for inexperienced users and IBM supplies a great deal of training material and documentation for it. In addition it appears that IBM offers the best local technical expertise and service. These are areas where many other microcomputers are sadly lacking and they are probably more important to this project than simple computing speed.

The 5120's are capable of up to 64 Kbytes of memory but for monetary reasons, ISRA has ordered them with only 48 K. Small memory size is one of the disadvantages of microcomputers and can be very frustrating to users. It would cost about $1100 per machine to upgrade them and we recommend that this be done.

Microcomputers are very sensitive to power problems. A brief 20% drop in voltage is enough to shut the computer off, perhaps causing the loss of several hours or a day's work. Bob Fishbein has been using a Radio Shack microcomputer in Dakar and experienced several such incidents until he purchased a regulator. A voltage spike, which can be caused by something like an air-conditioner turning on, can actually burn out some of the equipment causing it to require repair or replacement. The problems caused by these situations are so frustrating and time-consuming that they discourage anyone from using the equipment at all. For about $500, equipment can be purchased to alleviate most power problems. The local IBM representative had not recommended that any equipment be installed for this purpose. IBM should be made to understand that we want this installed with every microcomputer and they should be able to give advice on exactly what equipment to get.

c. Computer needs

The most immediate work to be done at CRODT is to get their current work operating on the new 4331. This includes setting up an operating protocol to keep the computer running smoothly. Up until now, they have only been users of an existing computer system, not managers of their own system. They will also be converting their existing programs to operate on the 4331. Mr. Hayeck will be very busy handling all this.

In addition CRODT seems to be planning to expand their computer use beyond its current level. They are hiring another programmer and are setting up terminals in anticipation of use by their researchers. The work for CRODT will probably require all of the available time of the CTI staff.

This means that they cannot be expected to devote very much time or effort to the use of the 5120's. They will be participatin in the IBM training sessions concerning the 5120 but shortly thereafter the microcomputers will be moved to their field locations and CETI will not be involved directly in their use. They will not be doing any programming for the 5120's and probably will not have the expertise to solve problems in the field.

The 5120's are designed for inexperienced users so we expect that a field researcher with moderate aptitude and patience should have few problems operating the computer using existing programs and packages. Close communications among the stations about their use of the microcomputers is to be strongly encouraged. This will minimize the duplication of effort and allow each station to benefit from the experiences of the others. Perhaps scheduled meetings should be held on the subject or regular visits should be made to other stations. Someone at one of the stations should be identified as being responsible for maintaining this communication.

We recommend that the project purchase for MSU an IBM 5120 identical to those to be used at the stations. The computer service at MSU would adapt the VARSAP system for use on the 5120, write or modify other programs as needed by field researchers, and develop detailed documentation and operational guidelines for their use. We would distribute these to the stations as needed and try to maintain equivalent systems at all locations.

Mr. Hayeck also says that they will be providing help to any ISRA researchers who need to use the 4331. This is to be expected to be very minimal. CECRT has repeatedly emphasized that all researchers must learn to use the computer. The researchers who need to do statistical analysis will need to learn the use of the GENSTAT package on the 4331. This should not be too difficult or time-consuming. Many other specific data analysis needs can be handled by having the MSU staff write programs for the 5120 for this purpose.

We agree that it is a good idea for all of the researchers to learn to do some computer work. It gives them a greater appreciation of the capabilities and limitations of computers. It helps them to communicate better with programmers about what they are trying to accomplish. However, there are many tasks that require so much specialized computer knowledge or so much time that it is not cost-effective for the researchers to do them. In addition, the PSR teams will be located so far from the central computer that they would waste a great deal of time travelling if they had to do all of their own work on that computer. We strongly believe that ISRA should hire a programmer to do computer work on the 4331 for both the macro-

economic unit and the PSR teams. There seem to be several sources of trained programmers within the country and within the region. Mr. Hayeck might be called upon to find such a person for ISRA.

CRODT will be charging all of the different groups for the use of the central computer. They have not yet decided whether this will be a flat fee or proportional to each group's use of the computer. Either way ISRA will have to pay for the use of the 4331 and must plan for this in their budget.

d. Summary of Recommendations

(1) ISRA should hire a programmer specifically to do scientific programming for them on the central computer.

(2) The memory capacity of the microcomputers should be increased to 64 K bytes.

(3) Voltage regulators and surge/spike suppressors should be installed for all of the microcomputers.

(4) MSU should purchase an IBM 5120 to be used for developing software.

(5) A programmer at MSU should work half time for the first two years of the project to adapt the FARMAP package and develop other software for the microcomputers.

(6) The 5120 at MSU should also be used for training Senegalese students in computer use.

(7) That computer should be returned to ISRA after year 5 of the project.

B. Economic Feasibility

1. Types of Economic Benefits

Since the proposed project is not revenue producing in nature, it is difficult to analyse from a strictly economic viewpoint. Therefor no attempt is made in this analysis to quantify the ex-ante economic rate of return for the proposed project. While the costs of the project can be estimated it is much more difficult to estimate the benefits because of the following:

(1) Outcomes from research activities are uncertain and any attempt to impute values to expected results would be subjective and speculative.

(2) The benefits that will arise during the project will result in intermediate products (e.g. improvement in human capital such as trained Senegalese, redirected research priorities, etc.) which only in the long run will bring about improvements in the welfare of rural families. Benefits will also accrue to the national economy in the form of reduced food imports resulting from increases in domestic food production.

(3) For the ultimate goal of improvement in the welfare of farmers and consumers to be attained, preconditions other than those under the purview of the project need to be fulfilled. For example, the project will contribute economists to two PSR teams but the success of these teams will be contingent upon the inputs from other members of the teams. Likewise the adoption of improved technical packages will be contingent upon the availability of credit, extension assistance, etc.

Although it is impossible to estimate a priori the benefits that eventually will arise from this project, numerous studies in both high- and low-income countries have demonstrated the high pay-off to public investment in agricultural research (See Figure IV C). In virtually all cases the estimated internal rates of return have been higher than the opportunity cost of capital and higher than the rates of return which have been estimated for most development projects in those countries. For example some crop research programs in Latin America and Asia have yielded internal rates of return between 35% and 102%.

2. Cost-Effective Research

Because of the difficulty of measuring benefits with any degree of accuracy, the alternative is to pursue the least-cost method of achieving project purposes and goals. The following activities of the project have been designed in a least-cost manner:

(1) Training of Senegalese is a major component of the project. In the long-run there is no doubt this is the least-cost way of providing the necessary skills. Continuing to have expatriate researchers is simply not a viable alternative.

Figure IV C

SENEGAL

AGRICULTURAL RESEARCH PROJECT

Estimated Internal Rates of Return to Agricultural Research Expenditures

Commodity	Country	Study	Time Period	Internal Rate o Return (%)
Maize	U.S.A.	Griliches (1958)	1940-55	35-40
Sorghum	U.S.A.	Griliches (1958)	1940-57	20
Sugar cane	India	Evenson (1969)	-	60
Wheat	Mexico	Ardito-Barletta (1970)	1943-63	90
Maize	Mexico	Ardito-Barletta (1970)	1943-63	35
Cotton	Brazil	Ayer (1970)	1924-67	77
Maize	Peru	Hines (1972)	1954-67	25-40
Maize and Cultivation Package	Peru	Hines (1972)	1954-67	50-55
Rice	Columbia	Ardila (1973)	1957-72	58-82
Rice	Columbia	Scobie (1978)	1957-74	79-101
Rice	Asia	Evenson (1978)	1960-75	75-102
		Aggregate Studies		
All Agriculture	U.S.A.	Evenson (1968)	1949-59	47
All Agriculture	India	Jha & Evenson (1970)	1953-71	40
Crops	Mexico	Ardito-Barletta (1970)	-	45-93
	International	Kisley and Evenson (1973)	1955-1968	
Applied Research	LDC[a]			~1
	DC[a]			21
Agriculture Scientific Research	LDC[a]			60
	DC[a]			36

Source: Senegal Agricultural Research Project Preparation Report by IADS, July 1979

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(2) The "top-down" approach to developing improved technology that has to date characterized agricultural research in Senegal has not proved a cost-effective way of addressing the problems of the majority of the small farmers. The restructuring of research around national commodity research teams with linkages to production system research teams provides a more cost-effective way of addressing the problems of farming families in different agro-ecological zones. This "bottom-up" approach to technology development is now being implemented in many countries because it is thought to be the only cost-effective method of developing improved technologies relevant to the needs of different groups of farmers who traditionally have not had a "voice" in determining research priorities. Just how cost effectiv this approach will be is an empirical question but the fact remains that the "top-down" approach has been ineffective.

(3) A common problem in many countries has been the dichotomy between research and implementation. As a result, technolo has often been developed that has not been delivered to and disseminated by the extension service in a timely manner. The inclusion of research/extension specialists in the production systems research teams promises to provide the necessary bridging functions between research and RDA's.

C. Social Analysis

1. Institution Building

This project is designed to help the Government of Senegal strengthen its agricultural research institutions through training and technical assistance. Title III counterpart funds will also be used to construct offices and living facilities, and to support research programs. It is explicitly assumed that Senegal's national agricultural research system can effectively be strengthened only though a long-term effort coordinated by the World Bank. France, Belgium and the United Nations Interim Fund for Science and Technology in Development are also providing assistance.

Since the Belgian, IBRD and USAID projects involve a large amount of construction, it is expected that the improved working conditions will help attract young Senegalese to pursue a career in agricultural research. But the newly passed Statut des Chercheurs may compromise the chances for the long-term success of the decentralized research program. This Statut links career advancement to diplomas rather than research experience and excellence. If this Statut is not

revised, ISRA may risk losing many experienced researchers.

2. Improving the Welfare of Rural and Urban Households

The welfare of the Senegalese people is closely linked to food production. Since Senegalese urban consumers may spend from one-half to three fourths of their income on food, it follows that research which drives down the real costs of food production and distribution can assist in improving overall well-being. Both commodity and production systems research (PSR) can contribute to this objective through a "bottom-up" applied research program which identifies and helps to solve site-specific problems. The production systems research, will be closely linked to strong national commodity research programs and to macro-economic research which focuses on agricultural sub-sector studies and macro-food and nutrition modeling.

3. Spread Effects

The spread effects of the PSR program will depend largely on the (1) the ability of the development agencies to deliver diverse technology packages appropriate to the needs of rural households, (2) the extent to which PSR results contribute to ISRA's macro-economic research program, and (3) the extent to which PSR and macro economic research will lead to improved policies for the agricultural sector.

4. Women in Development

Women in development will be addressed in the training program for ISRA scientists, in production systems and macro-economic research and in special studies. A vigorous attempt will be made to identify female researchers for overseas training under this project. Two of the first 16 candidates proposed by ISRA for overseas training are females.

Production (farming) systems research by its nature attempts to understand rural families and the local environment in which they are operating. Because labor is the most important input in traditional farming, PSR research will give special attention to the present labor allocation of men, women and children in crops, livestock and off-farm enterprises. PSR will identify the constraints on improving the productivity of labor which may lead to a reduction of female labor inputs in some menial tasks (thereby increasing their leisure) such as hand pounding of food grain. Since the ultimate goal of production is consumption, including leisure, it follows the PSR research should contribute to an improved understanding of how women can increase their productivity, their income and possibly their leisure. Since women dominate rice production in the Casamonce, production systems research will examine how women can become better farm managers, can increase their productivity, and improve the well-being of their families.

Special studies will be undertaken of high priority research topics facing women. These topics include problems women face in gaining access to land, to inputs such as credit, agricultural processing and migration.

D. Environmental Analysis

Since this is an institution-building project, the basic components include studies, training and model building to improve understanding and recommend improvements in farming systems and Government agricultural policies. An Initial Environment Examination (IEE) was prepared with the PID and a Negative Determination was approved by the Assistant Administrator for Africa. The basis for that determination remains valid. No further environmental analysis is required.

E. Administrative Analysis

1. ISRA Organization

The decree to reorganize ISRA (Figure III B) has been conditionally accepted by the GOS and will be issued soon. This decree specifies the powers of the Board of Governors, Steering Committee, Scientific and Technical Committee, and General Manager and establishes the Macro-Economic Unit and Production Systems Research Department that are to be strengthened by this project.

The Board of Governors for ISRA is headed by a president who is appointed by the President upon the nomination of the Minister of Scientific and Technical Research. The Board consists of 18 members representing the Presidency, the Prime Minister's Office, the National Assembly and the Ministries of Plan and Cooperation, Rural Development, Finance, Higher Education, Public Health, Social Affairs, Industrial Development, and Equipment. The Department Heads of ISRA attend meetings of the Board as non-voting observers. Members are appointed for a two-year term which may be renewed without limitation.

The Board of Governors meets at least three times per year to oversee the ISRA research program, its staff training plan, the budget, the relationship of ISRA to other Government services, the ISRA Annual Report and to discuss general legal and financial concerns.

Under the Board of Governors there are two standing Committees. The Steering Committee, with the General Manager of ISRA as its secretary, is responsible for ISRA operational matters.

The Scientific and Technical Committee reviews and makes recommendations to the Board of Governors concerning the content and execution of the ISRA research program. The Committee also reviews and selects

the research studies that will be published by ISRA. This Committee meets at least twice a year at the request of the President of the Consultative Commission on Agricultural and Agro-Industrial Research. The Committee includes the General Manager of ISRA, the Departmental Directors of ISRA, representatives of SERST and the University of Dakar, and several invited non-Senegalese scientists to be appointed by the Minister of Scientific and Technical Research.

The General Manager of ISRA is nominated by the Minister of Scientific and Technical Research and serves under the supervision of the Board of Governors and the Steering Committee. The General Manager is responsible for preparing the ISRA program, annual work-plans, and budget, implementing the approved program and budget, negotiating contracts and agreements and administering the daily activities of ISRA.

The Executive Office of the General Manager consists of the Deputy General Manager, Administrative and Financial Director, Auditor, Scientific Coordinator, Management Officer, and Macro-Economic Unit. As headquarters staff offices, these units report directly to the General Manager.

In addition, the new ISRA reorganization plan establishes six scientific departments: Crop Production Research, Forestry Production Research, Animal Production Research, Hydrobiology and Fish Production Research, Production Systems Research, and Support Services. The Departmental Directors are nominated by the General Manager with the consent of the Scientific and Technical Committee and the Board of Governors.

2. Research Programming

One scientist on the Production Systems Research Team would be responsible to prepare and present, under the direction of the Station Director and in collaboration with the other members of the PSR team, the annual PSR team research program. Representatives from the Research Development Liaison Group in each location will also participate in the elaboration of the annual PSR program in order to identify research priorities and thereby help to assure close and mutually beneficial participation by both the research and development agencies. Under the direction of the PSR Department Head, the Central Systems Analysis Group will assist each PSR Team in the preparation of their research programs and will coordinate, when appropriate, the participation of technical scientists from other ISRA Departments in the development and implementation of the PSR programs.

The Head of the Macro-Economic Unit, working under the direction of the ISRA General Manager and in collaboration with the Production Systems Research Department Head, will develop the annual macro-economic

research program and report. The head of this unit will establish a process by which specific macro-economic research questions can be identified through consultations with the PSR Teams as well as ministerial agencies such as the DGPA.

Subsequent to ISRA's Annual Research Review, the Board of Governors will approve the PSR and Macro-Economic Research Programs upon the recommendation of the Scientific and Technical Committee.

3. Research Staffing

By 1985, the PSR teams will be staffed largely by Senegalese scientists. Approximately 45 Senegalese are now in long-term advanced degree programs in the U.S. and Europe, and will begin returning to ISRA in late 1981 and early 1982. These ISRA researchers are following programs in over 15 fields ranging from Agricultural Economics, Rural Sociology and Extension to Microbiology, General Agronomy and Range Management. It is expected that in the first years of the project, one or two of the ISRA scientists being trained in economics will return to join the Macro-Economic Unit.

In order to launch a program of PSR, the research stations will need at least one Agronomist/Animal Production Specialist, one Agricultural Economist and one Sociologist to work full-time as a PSR team on a joint research program. Since collaborative, multidisciplinary research at the farm-level will be a more important contributing factor to the development of an effective PSR program than the addition of an agricultural economist or a sociologist to classical, on-going commodity-based research, the Production Systems Department Head, working through the Central Systems Analysis Group (especially the Farming Systems Specialist, the Agricultural Production Systems Economist and the Rural Social Scientist) will play a key role in helping the Research Station Director to forge this new collaborative research effort.

At the Headquarters level, the Rural Social Scientist, the Production Systems Economist and at least one Economist in the Macro-Economic Unit will be in key positions to help establish a working liaison between the micro- and macro-economic research programs and agricultural development policy-making. Working together, these individuals will be able to identify the relevant and common economic, social and institutional factors for defining a coherent, nation-wide applied farming systems research program. In addition, the Head of the Central Computer Facility within SERST will play a critical role in helping to develop and support on-station computer analysis and the programs for macro-economic data processing.

4. Project Management

The effective implementation of this project requires an ISRA project coordinator for routine project management and for helping to assure the integration of the several AID and other donor contributions to the ISRA reorganization program. The ISRA coordinator will be the principal ISRA contact for project matters for the USAID project manager and the MSU project team leader, and will play an especially critical role in linking the Title III Research Decentralization activities with the execution of this project.

a. Technical Assistance

The MSU Team Leader's job is defined in Annex F. By the 3rd year of the project, this individual will manage an office consisting of a bilingual secretary, a part-time administrative assistant, a part-time translator and part-time maintenance person. The Team Leader will be part of the MSU technical assistance team as well as the on-campus support group which includes the project director, the campus coordinator, a part-time administrative assistant and part-time secretary. The campus coordinator will play an important role in maintaining contacts among the long-term participants during their US training, organizing the annual MSU seminar on data collection/field research, and facilitating the contribution of consultants and research associates to the ISRA research program.

For the technical assistance team in Senegal under the overall direction of the ISRA General Manager:

(1) the Rural Social Scientist (contract team leader) would work under the direction of the Head of the Production Systems Department and the Chief of the Central Systems Support Group. As team leader for the MSU contract, he would also serve as the administrative leader for all MSU project assistance;

(2) the Production Systems Economists would work within the research guidelines developed by the Research Station Director and under the policy supervision of the PSR Department Head;

(3) the Macro-Economists would work under the supervision of the Head of the Macro-Economic Unit; and

(4) the research associates would work under the supervision of the PSR team leader or Head of the Macro-Economic Unit, depending on their particular assignment;

(5) consultants would work under individual terms of reference to be developed collaboratively by ISRA and the contract team leader with USAID approval.

b. Training

Candidates for long-term training would be identified by ISRA and selected by a joint ISRA/MSU committee. This committee would also define a training program for each trainee. The USDA/OICO/ITD would be responsible for the placement of the long-term participants. The first 12 candidates have already been selected and processed for training. The second 12 candidates would be selected in the fall of 1981 and would be employed by ISRA as research associates assigned to field research stations until June of 1982. They would undergo a special intensive 8 week language training program at the American Cultural Cente in Dakar prior to leaving for the U.S.

c. Project Support

USAID project support will be coordinated by the USAID project manager. This support will include technical assistance contracting, project backstopping the USAID Project Support, office and some contract support services by the American Embassy (i.e. health unit, pouch mailing check cashing).

ISRA would provide office space; office and field research equipment support personnel like research assistants, enumerators and secretaries; and administrative support for the technical assistance contract team. AID would be financing much of this support cost through the Title III program.

MSU would take care of support needs directly related to contractor support like shipping household effects, leasing housing, household furnishings, and utilities.

d. Construction

A firm of executive architects has been hired in agreement with the World Bank to prepare the plans for building construction and site development, implementation schedules, bidding and contract documents, to carry-out bid analysis, to advise on the award of contracts and to supervise construction. The Chief of ISRA's Technical Support Unit would supervise the executive architects and liaise closely with research staff on building design. Although, AID is not funding any construction under this project, the Title III Decentralization of Research subproject finances housing, offices and research facilities that support project activities. USAID expects to be kept informed of design and bidding activities in order to insure timely completion of the work.

5. Monitoring

The major responsibility for the USAID Agricultural Development Office would be monitoring of project implementation. This will be handled by the USAID Project Manager who will also be responsible for the Title III Research Decentralization Project. The Project Manager will maintain communications between USAID and ISRA. Formal monitoring will be done through the quarterly implementation reports which would be reviewed jointly at the national level by ISRA and USAID.

F. Financial Analysis

1. Explanation of Cost Elements

(a) Technical Assistance

The project provides 21 person years of long-term research technical assistance calculated at $83,000 per person year. The $83,000 per person year is the estimated total support package for a technical assistant to be funded under a university contract. This amount does not include housing, house furnishings, utilities and vehicle maintenance support costs that are being provided by ISRA using Title III local currencies. A detailed breakdown of this figure is provided as Table IV D, Average Annual Technical Assistance Cost.

A second technical assistance component is for computer assistance. This line item includes the procurement of an IBM 5120 micro computer with 64 Kbytes of memory, dual 8" disk drives, the IBM 5130 printer and operating supplies for a total estimated cost of $20,000. This micro-computer system will be purchased by MSU1/ and used on campus to develop a program to be used to process farming systems data at field locations in Senegal. The 5120 micro computer will be given to ISRA when the program development is completed. The line item also includes 12 months of technical assistance by a programmer, 6 months by a computer scientist and 3 months of consultants in Senegal. Using the same salary, per diem, airfare, staff benefits and university overhead rates cited for the long-term technical assistance, the personnel costs for computer program development amount to $70,000.

Approximately 6 research associates (graduate students working on their Ph.D. dissertations) would work in production systems research

1/ A waiver justification for proprietary procurement of an IBM 5120 system is attached as Annex I.

and macro-economic research for an estimated 18 months each. The project pays salary, transportation and certain benefits for the research associates and dependents. These are detailed in Figure IV E. The field support costs including housing, house furnishings, utilities and other support costs are to be paid in local currency from Title III. These costs are included in Figure IV F, local currency costs of Title III.

For the 30 person months of consultants planned under the projec $12,000 per person month has been budgeted. This is based on average salary of $170/day, a $100/day Dakar per diem, a $1,500 roundtrip airfare, Defense Base Act Insurance, 12% fringe benefits and 25% university overhead.

Other technical assistance costs include $36,000 per year for in-country MSU contract support, which will include a small office and secretary in Dakar, and $50,000 for outside evaluation. For the evaluations the assistance of a farming systems economist and a macro-economist would be required for one month each, for each evaluation.

b. Training

The project provides long-term training for 24 participants. All would be trained to the Masters level and a few to the Ph.D. level. An average training period of 3 years at a cost of $20,000 per year has been used. The total amount budgeted has been reduced by $316,000 since this amount was provided under the Sahel Manpower Development Project (625-0936) to initiate the training component before project authorization. The project also provides $15,000 in the first year and $25,000 per year thereafter ($115,000 total) for short-term training which would include third-country courses sponsored by the International Agricultural Research Centers, USDA, and U.S. universities. Special in-service seminars and training sessions in Senegal will be financed with Title III funds. (See Figure IV F.)

c. Equipment and Operating Support

Project equipment and operating support costs are to be financed through the local currency funds of the Title III program. The equipment includes: office equipment, field research equipment, vehicles, house furnishings, and miscellaneous materials. Operating costs include: in-country support of the technical assistants, the graduate research associates and the research assistants; operating support for the PSR team at Djibelor and a second location, the Rural Social Scientist in the CSAG, and the Macro Economic Unit; and funding for documentation, printing, and computer services. These costs are detailed in Figure IV F.

2. Summary Cost Estimate and Financial Plan
($ in thousands)

	Cost Item	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
1.	Technical Assistance	465	455	621	596	619	2756
	a. long-term (21 person/years	(264)	(264)	(440)	(440)	(440)	(1848)
	b. computer assistance	(55)	(35)	--	--	--	(90)
	c. research associates	(38)	(48)	(48)	(48)	(46)	(228)
	d. consultants (30 months)	(72)	(72)	(72)	(72)	(72)	(360)
	e. in-country MSU contract support	(36)	(36)	(36)	(36)	(36)	(180)
	f. Evaluation			(25)		(25)	(50)
2.	Training	255	429	265	265	25	1239
	a. long-term (24 participants	(240)	(404)	(240)	(240)	--	(1124)
	b. short-term	(15)	(25)	(25)	(25)	(25)	(115)
	Subtotal	720	884	886	861	644	3995
	Inflation and contingency (11% per year compounded)	--	106	204	314	331	955
	Total	720	990	1090	1175	975	4950

3. Project Expenditure Schedule

($ in 000's)

Fiscal Year	Project (foreign exchange)	Title III (local currency)	Total
1981	300		300
1982	1,150	370	1,520
1983	1,200	320	1,520
1984	1,100	500*	1,600
1985	800	500*	1,300
1986	400	500*	900
Total	4,950	2,190	7,140

*These are estimates based on continuing needed extrapolated from estimates for the first two years. Availability of these funds will depend on the continuation of the Title III Program beyond 1983.

TABLE IV D

Average Annual Technical Assistance Cost FY 81

The estimate of the average cost of one person year of long-term technical assistance assures an average assignment of 3 years and an average family size of 2 adults and 2 children of primary school age.

A.	Salary	$ 32,000
B.	Transportation (1 roundtrip/yr. at $1,500 x 4 persons)	6,000
C.	Household Effects transportation (surface and air)	7,000
D.	U.S. storage	1,000
E.	Post Differential (15%)	4,800
F.	Post Cost of Living Allowance (10%)	3,200
G.	Educational Allowance	3,000
H.	Defense Base Insurance (4.64%)	1,500
I.	Staff Benefits (17%)	5,500
J.	Temporary Lodging	1,000
K.	Retirement, FICA (6.65%)	2,100
L.	In-country travel	3,300
	Sub total	70,400
M.	Overhead (25%)	17,600
	Total	$ 85,000

Table IV

Average Research Associates Costs

(18 months)

A.	Salary	$ 22,500
B.	Transportation	3,000
C.	Shipping and Storage	1,400
D.	Temporary Lodging	1,500
E.	Insurance	2,000
	Subtotal	$ 30,400
F.	Overhead	7,600
	Total	$ 38,000

Figure IV-F

/-AGRICULTURAL RESEARCH & PLANNING PROJECT

(685 - 0223)

LOCAL CURRENCY COSTS OF TITLE III

(CFA in 000's)

I T E M	Project Year 1 (Yr. 2 Title III)	Project Year 2 (Yr. 3 Title III)	TOTAL
I. Production Systems Research in Casamance	35,772	32,902	68,674
1. Office operations	2,880	2,880	5,760
2. Equipment	2,400	-	2,400
1. Field Research	(1,200)	-	(1,200)
2. Office	(1,200)	-	(1,200)
3. Vehicles	3,800	6,070	9,870
1. Pick up trucks (2)	(1,920)	(1,920)	(3,840)
2. Station wagon	-	(2,160)	(2,160)
3. Fuel and oil	(400)	(1,410)	(1,810)
4. Maintenance	(100)	(400)	(500)
5. Mobylettes (5) and bicycles (10)	(1,380)	(180)	(1,560)
4. Technical Assistance Housing	5,520	1,440	6,960
1. Micro Economist (1)	(3,600)	-	(3,600)
2. Research Associate	(720)	(1,440)	(2,160)
3. House furnishing for Res. Associate	(1,200)	-	(1,200)
5. Personnel	6,120	9,600	15,720
1. Senior Technicians	(2,640) (2)	(2,640) (2)	(5,280)
2. Junior Technicians/Enumerators	(2,400) (5)	(4,800) (10)	(7,200)
3. Drivers	(540) (1)	(1,620) (3)	(2,160)
4. Secretary	(540)	(540)	(1,080)
6. Travel per diem	4,692	5,712	10,404
1. Researchers	(1,512) (3)	(1,512) (3)	(3,024)
2. Senior Technicians	(2,520) (5)	(2,520) (5)	(5,040)
3. Junior Technicians	(300) (5)	(600) (10)	(900)
4. Drivers	(360) (1)	(1,080) (3)	(1,440)
5. Mobylette & bicycle indemnity	?	?	?
7. Micro-computer	7,960	3,600	11,560
1. Infrastructure (30m2) (2)	(4,600)	-	(4,600)
2. Office Furnishings	(960)	-	(960)
3. Operating costs	(2,400)	(3,600)	(6,000)

H. Documentation/Publications	1,200	1,200	2,400
I. PSR In-country training seminars and workshops	1,200	2,400	3,600
II. Macro-Economic Unit	27,412	27,282	54,964
A. Office operations	720	1,440	2,160
1. Office space	?	?	?
2. Office operations	(720)	(1,440	(2,160)
B. Equipment	(1,680	-	(1,680)
1. Office equipment	(1,200)	-	(1,200)
2. Field research equipment	(480)	-	(480)
C. Vehicles	2,660	3,244	5,904
1. Station wagon	(2,160)	-	(2,160)
2. Pick up truck	-	(1,920)	(1,920)
3. Fuel and oil	(400)	(1,024)	(1,424)
4. Maintenance	(100)	(300)	(400)
D. Technical Assistance Housing	16,720	10,000	26,720
1. Macro-Economist	(7,000)	(7,000)	(14,000)
2. Research Associates	(3,000)	(3,000)	(6,000)
3. House furnishing for Macro-Economist	(4,800)	(-)	(4,800)
4. House furnishings for Res. Associates	(1,920)	(-)	(1,920)
E. Personnel	3,180	7,740	10,920
1. Economist/Director	Sen	Sen	Sen
2. Computer programmer	Sen	Sen	Sen
3. Senior Technicians	(1,320) (1)	(2,640) (2)	(3,960)
4. Junior Technicians/Enumerators	-	(2,700) (5)	(2,700)
5. Bilingual Secretary	(1,320)	(1,320)	(2,640)
6. Drivers	(540) (1)	(1,080) (2)	(1,620)
F. Travel Per Diem	772	3,178	3,950
1. Director	(126)	(126)	(252)
2. Computer Programmer	(70)	(70)	(140)
3. Senior Technicians	(336) (1)	(672) (2)	(1,008)
4. Junior Technicians	(-	(1,650) (5)	(1,650)
5. Drivers	(240) (1)	(660) (2)	(900)
G. Computer Support	Sen	Sen	Sen
H. Documentation/Publications	480	480	960

:. In-country training Seminars and workshops	1,200	1,200	2,400
:II. Central Systems Analysis Group	18,450	10,390	28,840
۱. Office operations	720	720	1,440
1. Office space	?	?	?
2. Office operations	720)	(720)	(1,440
۱. Equipment	1,200	-	1,200
:. Vehicle	2,660	600	3,260
1. Station wagon	(2,160)	-	(2,160
2. Fuel and oil	(400)	(400)	(800
3. Maintenance	(100)	(200)	(300
. Technical Assistance Housing	11,800	7,000	18,800
1. Rural Social scientist	(7,000)	(7,000)	(14,000
2. House furnishings	(4,800)	-	(4,800
. Personnel	(1,860	1,860	3,720
1. Bilingual secretary	(1,320)	(1,320)	(2,640
2. Driver	(540)	(540)	(1,080
. Travel Per Diem	210	210	420
1. Driver	(210)	(210)	(420
TOTAL	81,634	70,574	152,208
(240 CFA = $ 1)	($ 340,142)	($ 294,058)	($ 634,200

۱) Housing being constructed at Djibélor will be available in project year two. House furnishings will be provided under the Casamance Regional Development Project.

?) Two additional offices are needed at Djibélor.

V. Implementation Plan

A. Schedule of Research Activities

1. Establishment of the Central Systems Analysis Group

When the Central Systems Analysis Group in the Production Systems Department is established in late 1981 or early 1982 one of its first tasks will be to develop a coherent plan of work for a national production systems research program. Lessons and insights from the Unité Expérimental program in Senegal and insights from FSR research in the third world should be brought to bear on the basic decisions on how to organize and carry out FSR in Senegal. The team leader of the MSU contract team will fill the position of rural social scientist on the Central Systems Analysis Group. In addition to developing backward linkages to the FSR teams the CSAG will develop forward linkages to the macro-economic research unit in ISRA headquarters.

2. Initiating Productions Systems Research

a. The Research Program in the Casamance. Rice receives considerable emphasis in the research program undertaken at the Djibélor research station. This research station was opened in 1967 and serves both the Lower and Middle Casamance. The emphasis on rice is justified because it is a staple food in the region and because of the GOS policy of increasing rice production. Past research activities have focused on the development of high-yielding varieties and the improvement of agricultural practices for the rainfed and flooded rice production systems. The source of the rice breeding material include both local varieties and new varieties from the International Rice Research Institute through the West African Rice Development Authority.

Some results have been achieved in selecting improved varieties, introduction of animal traction using the NDama oxen, and the utilization of chemical weed control. Information has also been obtained on the chemical composition and structure of soils, control of excess salt concentration, and the potential for improving soil fertility. In addition, some research is also done on other cereals such as millet, sorghum and maize. Livestock research for the Casamance is mainly done at the Kolda station. Research in the area of fisheries and forestry is still limited in the region.

Short-and medium-term research plans at the Djibélor research station include the following:

(1) Development of high-yielding rice varieties tolerant to high levels of salt concentrations;

(2) Improvement of the plant pathology and entomology research program;

(3) Development of improved agronomic practices in flooded rice production, including chemical methods of weed control;

(4) Soil studies to improve mangrove rice production;

(5) Studies on the socio-economic constraints on increased rice production in the Casamance.

The research staff at the Djibélor station in April 1981 includes:

2 Soils Scientists

2 Plant Breeders

1 Plant Pathologist

1 Entomologist

1 Agricultural Economist

Fielding a functional PSR team for the Casamance will require in addition to the production systems economist to be supplied by MSU, a production systems agronomist, a research/extension liaison specialist and a rural sociologist. There is a sociologist who is currently undergoing training. In addition, support staff will be required.

At the present stage, the plan of work for the PSR team at Djibélor is tentative and will have to be refined by the PSR team. But the basic components of PSR include the four phases spelled out in the Technical Analysis and reported in David Norman, "The Farming Systems Approach" MSU, 1980.

b. Processing data locally. Steps will be taken to ensure the data processing requirements of the PSR team will be done at the Djibélor Research Station by utilizing one of the IBM 5120 micocomputers. Software for the 5120 will be developed by MSU computer specialists and a programmer on an IBM 5120 at Michigan State. The MSU Programmer will have the software package ready to be installed on the Djibélor 5120 by April 1982.

c. The Second Production Systems Team. The second production systems economist will be supplied by a team to be activated during the third year of the project.

3. Initiating Macro-Economic Research

The Macro-Economic Unit is to be initially staffed by a macro-agricultural economist and supplemented by a MSU research associate and Senegalese economists as they become available. The Systems Analyst in

the Central Systems Analysis Group will provide analytical support to the Macro-Economics Unit as well as to the FSR teams in the field.

While a flexible and evolving set of research priorities are recommended for the Macro-Economics Unit, it is necessary to specify initial priorities. The first macro-economist would focus on macro-food systems modeling, including price analysis, marketing, consumption and food security. The development of the best possible estimates of price and income elasticities are crucial to improvement of the SONED pricing policy model which, in its current plan, assumes no consumption response to price or income changes. While the data base will not permit great precision, estimates can be developed from available data and used for pricing policy. Additional macro-studies are contingent upon the availability of staff members.

B. Timing of Activities

Month 0	- Project Paper approval.
Month 1 - 2	- Sign Project Agreement with GOS. - Arrival of USAID Project Manager.
Month 3 - 4	- Conditions Precedent met by GOS. - PIO/T finalized for technical assistance. - ISRA prepares bids for first year commodities (Title XII).
Month 5	- USAID negotiates technical assistance contract with Michigan State University (MSU). - Commodity list for FSR Teams prepared and commodities ordered. - MSU purchases IBM 5120 and begins program development.
Month 6	- Short-term visit of one or two contract team members to clarify project management and logistic issues, and to begin development of plans of work for the macro- and socio-economists and for the rural social scientist.
Month 8	- Project commodities purchased by ISRA.

Month 9	- Arrival of 3 MSU long-term researchers Rural Social Scientist (Team Leader), Production Systems Economist (Casamance) and Agricultural Economist (Macro-Economic Unit). Terms of reference developed for short-term documentation assistance.
Month 10	- PSR team is organized and reviews secondary data studies on the Casamance region; team discussions held on the objectives of, and the methodology to be used in the research process; research priorities identified and PSR program devised in collaboration with the ISRA SOMIVAC Research Development Liaison Committee. - Short-term documentatist arrives for 30 days TDY. - Terms of reference developed for short-term computer specialist. - Macro-economic research unit reviews recently completed and on-going research and develops research plan.
Month 11 - 12	- 1. PSR started with an informal, unstructured exploratory survey of the Lower Casamance region. (The objective would be to delineate major constraints on traditional farming systems-- with emphasis on rice-- and subsequently to divide the farming families of the region into homogeneous sub-groups or "recommendations domains"). - 2. a one-shot formal structured questionnaire. (The objectives of this survey would be to confirm the conclusions of the informal exploratory survey and obtain some quantitative bench mark information for relevant single point registered data.
Month 12	- Short-term computer specialist arrives. Terms of reference for 1 - 2 research associates proposed and approved.

Month 12 (con't)

- First year project review.

- FSR design stage undertaken concurrently with the initial completion of the description and diagnostic stage. The design stage, which would be of planning rather than action nature, would consist of decisions with reference to the following:

  1. The type and number of "recommendation domains" to be studied;

  2. possible technological interventions, in collaboration with SOMIVAC. (To obtain initial credibility with both farmers and CRT's, preference would be given to selecting a very limited number of "best-bet" technological interventions related to the major product-- rice.)

Year 2

- This period would be devoted to testing technological interventions at the farm level, using empirical information to help verify the conclusions derived from the descriptive and diagnostic stage, and providing data to design and test activities for the following cropping year. The activities which would take place during the year include:

  1. Selecting a limited number of villages-- possibly five--which contain representatives of the different "recommendation domains" on which research work is to be concentrated

  2. Selecting six or seven farming families in each of the "recommendation domains" on which research work is to be concentrated. these farmers would constitute the case studies.

  3. Conducting trials at the farm level and/ or farmer testing in each of the case studies.

  4. Collecting detailed resource and output flow data from the case studies on the trials and farmer test plots.

5. Providing information as necessary to the CRT's, Central Support Unit and the RDA, PIDAC in the Lower Casamance.

6. Repeating the design stage towards the end of the period, and determining testing activities for the 1983 - 84 cropping year.

Macro-economic research unit would initiate research on the foodgrain sub-sector, including consumption and marketing surveys.

Second group of participants complete training-research program with ISRA and leave for U.S. training.

Supplementary commodities for PSR team purchased by ISRA.

1 - 2 research associates begin work.

1st MSU Seminar in field research/data collection and analysis to be held at East Lansing.

Short-term training in English/Economics Computer Programming, Agricultural Research Administration, etc. for selected ISRA staff to begin.

Year 3

ISRA prepares annual project workplan, including project need for consultants and research associates.

Arrival of second Production Systems Economist for second PSR team.

PSR research initiated in second area following the procedures and stages outlined for the first team in years 1 and 2.

Evaluation to be conducted after 2 1/2 years of project implementation. Outside contract team to conduct completion of the consumption and marketing surveys.

- Second Macro-economist arrives for Macro-Economic Unit.

- First group of participants return from training and are assigned to PSR teams and Macro-Economic Unit.

- Supplementary commodities received for second PSR team.

- Consultants and research associates provided by MSU according to the ISRA project workplan.

Year 4 - 5

- For PSR in Casamance design and testing activities would be repeated in later years, possibly including farmers in other villages and other "recommendation domains". Successful completion of the testing of specific technological interventions would be followed by extension and monitoring the adoption process At this time the agricultural agents from PIDAC would play an active and direct role.

- PSR would be initiated in other areas to test technological interventions using the methodology refined in the Casamance.

- Macro-economic research would focus on priorities identified by the PSR teams.

- Consultants and Research Associates provided by MSU according to the ISRA annual workplan.

- Second and 3rd MSU Seminars in field research/ data collection and analysis to be held at East Lansing.

- Second evaluation by outside contractor after fourth year. Evaluation finding will be used to prepare PID for second phase of project if appropriate.

- Second group of students return from training in the U.S.

- Replacement vehicles and equipment procured by ISRA as necessary.

F. Procurement Plan

The Technical Support Unit (TSU) of ISRA has the primary procurement responsibility for the project. This procurement includes the vehicles, research and office equipment and house furnishings to be purchased under the Title III program. This local currency procurement is not affected by USG and AID procurement regulations. However, the USAID Project Manager and USAID Project Support Office (PSO) will assist ISRA in procurement planning as required.

The only major commodity financed by this project will be an IBM 5120 micro-computer system to be purchased by MSU under the technical assistance contract. This system consists of an IBM 5120 micro computer with 64 Kbytes of memory, dual 8" disk drives, an IBM 5120 printer, diskettes and operating supplies. The estimated cost is $20,000. An IBM 5120 model is required, since this unit will be used to develop a program for the IBM 5120's that Senegal has already purchased and are to be placed in field locations for processing data on farming productions systems. A waiver justification for proprietary procurement from IBM is presented in Annex I.

Contracting will follow direct-AID contracting procedure. Under the Collaborative Selection Procedures of AID(AIDPR 7-4.58), Michigan State University was selected as the project contractor and a contract was executed for designing the project. For project implementation following approval of the PP, USAID intends to negotiate a second contract with Michigan State for the technical services described in Annex F, Technical Assistance Scope of Work. The determination to use direct AID contracting is in accordance with the exceptions permitted to AID Policy Determination 68 for Host-Country Contracting.

VI. Evaluation Plan

A. Description of Overall Evaluation Plan

Two evaluations are planned during the five-year life of this project. The first evaluation will occur after two and a half years and the second after four years of project implementation. Both evaluations will focus on the implementation of (a) third country and long-term training and (b) ISRA's FSR and macro economic research programs. Because of the long period of time (10-15 years) to expand and improve national agricultural research systems, progress toward the project goal will not be clearly measurable in this first phase of the project.

B. First Evaluation (30 months).

The first evaluation will be conducted at mid-way (30 months) of the five year project. A three person evaluation team will consist of a USAID evaluation officer, a production systems economist and a macro

economist. The production systems economist and macro economist will be contracted using short-term consulting funds provided under the project for a total of two person/months. The USAID evaluation officer will direct the evaluation in collaboration with ISRA's evaluation and monitoring Unit.

The evaluation will focus on the progress achieved on two key issues in the overall project strategy - development of ISRA's human capital and research capacity at the micro (FSR) and macro economic levels. The training program should be evaluated according to the implementation rate of the comprehensive training program which includes the following components:

(a) Screening of all ISRA's long-term training candidates by MSU faculty members;

(b) field experience for 6 - 12 months for all of ISRA's nominees without previous research experience;

(c) operation of a five-week summer institute at MSU for all ISRA's students. The institute will focus on research methodology, data processing on the IBM 5120 micro computer, financial and personnel management, etc. Each ISRA student will attend one of the Summer Workshops during his long-term training in the US;

(d) execution of Master's and Ph.D. dissertation research in Senegal after students have completed their course work in the US;

(e) ratio of success of students in completing Master's and Ph.D. degrees and the ratio of students who return to ISRA as research scientists.

The second issue in the evaluation of training is third-country training.

The research component of the project should be evaluated according to progress achieved in implementing production systems research, macro economic research program, data processing and documentation. The critical issue at the micro level in the first evaluation is the FSR program at the Djibelor research station. By the end of 30 months, the FSR team should be an effective operating team which has completed informal surveys in year one and is working with farmers with on-farm trials (managed by farmers) of promising technical packages. The evaluation teams should assess the performance of the FSR team and recommend (a) what can be done to improve the performance of the FSR team in the Casamance, (b) progress of the FSR team in developing effective working links with the

SOMIVAC, and (c) what lessons from the PSR team can be incorporated into the program of work for the PSR team in the second location.

The third part of the PSR evaluation should focus on the performance of the MSU computer specialist and programmer in developing software package (FAO's FARMAP program) for the IBM 5120 micro computer, and in developing programs which technical scientists can use to process their experimental data on the 5120. The evaluation should include the success of training ISRA scientists to utilize the 5120. The final part of the data processing evaluation should include an assessment of the assistance provided by MSU in developing programs (eg linear programming), for use by the Macro-Economic Unit.

The fourth part of the PSR evaluation should assess the success of MSU in improving the social science collection and the documentation center at Djibelor and Bambey.

The evaluation of the Macro-Economic Unit should assess the performance of the Macro Unit in developing a coherent plan of work with emphasis on the foodgrain sub-sector and food security. Special emphasis should be placed on (a) the quality and relevancy of the studies completed by the Macro Unit, (b) the working linkages between the Macro-Economic Unit and the PSR teams and other macro-economic research organizations, including SONED, University of Dakar's Faculty of Economics, etc.

C. Second Evaluation

The second evaluation will be conducted at the end of the fourth year of the project. The three member team for the second evaluation should preferably consist of the same individuals who were on the first evaluation mission. In addition to evaluating the training program and the expanded PSR and macro-economic research programs the team will analyze the documentation and computer services provided under the project. The team will also make recommendations on the continuation of the project.

IV. Conditions, Covenants and Negotiating Status

As conditions precedent to the disbursement of project funds the GOS will (1) promulgate the decree establishing ISRA's new administrative structure, (2) officially appoint a project coordinator, and (3) develop to USAID satisfaction and financial management plan and procedures for the use of Title III funds to support the local costs of the MSU contract.

As a condition precedent to the disbursement of second-year project funds a protocol agreement will be established between ISRA and SOMIVAC (or relevant RDA for areas outside the Casamance) concerning research/extension linkages in conducting of product systems research.

The GOS will also provide assurances to AID that:

(a) the Macro-Economic Unit will be maintained in Dakar;
(b) the question of degree equivalency will be addressed and resolved to USAID satisfaction;
(c) ISRA procedures will be modified to place more emphasis on promotion by experience and performance and less on diplomas earned;
(d) the PSR teams and Macro-Economic Unit will be fully staffed in accordance with the staffing plan and implementation timetable.

AID also endorses the conditions and recommendations of the World Bank Agricultural Research Project concerning the strengthening of ISRA's Board of Governors Scientific and Technical Committee, establishing a functioning Consultative Group on Agricultural Research, and holding an annual review of ISRA staff training needs.

ISRA will not be required to establish a local bank account for this project since the project will only be handling the foreign exchange elements of AID support for ISRA. Local currency, Title III funds are being used for local expenditures. However, ISRA will be expected to comply with the project planning and reporting requirements including annual project workplans and quarterly reports. The project evaluations will likewise incompass the complete project package, including Title III funds.

ANNEX A.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Life of Project :
From FY 1981 to FY 1985
Total US Funding 4.95 million
Date Prepared 4/9/81

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

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

ANNEX A.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Life of Project :
From FY 1981 to FY 1985
Total US Funding 4.95 million
Date Prepared 4/9/81

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

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS.	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose : C. 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.	Conditions that will indicate purpose has been achieved : End of project status : 3) Macro-economic research on food, nutrition and agricultural policies produced and recommendations adopted by policy makers.		Assumptions for achieving purpose : 1) a) ISRA with assistance from other donors, will supply adequate personnel financial support and equipment, and coordinate the implementation of [illegible] Teams. b) Farmers will be able to put into practice the improved agricultural production technologies. c) The output of PSR Teams will pr[illegible] d[illegible] relevant micro-information for the macro-unit, commodity researchers, and extension personnel. 2) ISRA will provide adequate support for the macro-economic unit, including effective GOS support and coordination of agencies concerned with using improved macro-economic analyses.
Outputs : 1) Production systems studies on-farm trials of improved technology, and improved technical packages for "recommendation domains" in major ecological areas.	1) Studies of performance of improved technical packages.	1) Reports and publications by PSR Teams and other researchers.	
2) Macro-economic studies of the agricultural sector and sub-sectors.	2) Macro-economic policies and programs for the agricultural sector.	2) Reports and Publications by macro-economic researchers and GOS documents.	
3) Upgraded technical and professional skills for agricultural researchers.	3) a) 24 researchers trained to MS and/or PhD levels. b) 25 pm Third Country Training.	3) Training records for US and 3rd country participants.	
4) Expanded collection of socio-economic documents in ISRA's Documentation and Information Service, including the improvement of the documentation and information service in two research stations.	4) Number of books, documents and micro-fiche items in the socio-economic collection of ISRA's library.	4) Reports of the ISRA Documentation and Information Service.	

ANNEX A.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project :
From FY 1981 to FY 1985
Total US Funding 4.95 million
Date Prepared 4/9/81

Project Title & Number Senegal Agricultural Research and Planning Project (685-0233)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs :) Improved computer capacity for the PSR and macro-economic programs.	Magnitude of Outputs 5) Computer hardware and software capacity.	5) Interviews with data processing staff and reviews of computer programs and hardware.	Assumptions for achieving Outputs : 3) GOS will identify and release qualified candidates. 4) ISRA will provide recurrent costs to maintain an effective Documentation and Information Service. 5) ISRA will provide recurrent costs and human resources to maintain computer capacity.
inputs : USAID Technical Assistance :) Technical Assistance 1 Team Leader/Rural Social Scientist, 5 person-years. 2 Macro-Economists, 6 person-years 2 Production Systems Economists, 8 person-years. 8 Research Associates, 9 person-years Consultants (30 pm) in econometrics, macro-economics, marketing, farming systems, computer programming, documentation and information services and rural sociology, 1 1/2 person-years of computer program development.	1) Inputs A. $ 1.85 million for long-term technical assistance. $ 258,000 for research associates. $ 360,000 for consultancies. $ 90,000 for computer program development.	Records of TA Contractor	1) Qualified technical assistance will be identified and will be able to join the contractor team. 2) Adequate supplies, commodities and equipment can be purchased and delivered. 3) Local currency will be available for research support and to purchase additional and replacement vehicles and other equipment

91

ANNEX A.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Life of Project :
From FY 1981 to FY 1985
Total US Funding 4.95 million
Date Prepared : 4/9/81

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

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS .	MEANS OF VERIFICATION	. IMPORTANT ASSUMPTIONS
Inputs :	Implementation Target (Type and Quantity) :		Assumptions providing inputs
2) Training :			
Long-term academic training in the agricultural and social sciences in the US (approximately 864 pers-months at approximately 36 months/participant for 24 participants).	2. $ 1.1 million for long-term training.		
	$ 115,000 for short-term training.		
Short-term training in the U.S. in-country and in 3rd countries (25 pm).	(Title III)		
In-country training.			
3) Commodities and operating Support	(Title III)		

5C(2) - PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects with FAA funds and project criteria applicable to individual fund sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Economic Support Fund.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE?
HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PRODUCT?

A. GENERAL CRITERIA FOR PROJECT

1. FY 79 App. Act Unnumbered; FAA Sec. 653 (b); Sec. 634A. (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure)?

a) The project was included in the Congressional Presentation for FY 1981.
b) An Advice of Program Change has been prepared to show the changes in project scope and funding from that presented in the FY 8 CP.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

Necessary plans and cost estimates have been established.

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

The promotion of a Government decree formally establishing the new administrative structure of ISRA is expected momentarily. The Government officially endorsed the present reorganization in a letter to the World Bank on June 1 1980.

4. FAA Sec. 611(b), FY 79 App. Act Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

NA

6. FAA Sec. 209. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.

The project is part of a program to decentralize and strengthen agricultural research in Senegal. This program is being supported by France, the World Bank, Belgium, UNIFSTD, and other donors.

	B - a) NA b) Production Systems Research (PSR supported by the project will address constraints on increased farmer productivity and profitability. c) PSR will primary concern improving production technologies rather than influencing the support systems, but a research/extension liaison specialist will work with the Rural Development Agencies who have the responsibility for developing these areas. d) NA e) NA f) NA
7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	US enterprises will be used to the maximum extent possible for providing project goods and services.
9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.	Senegal is financing 33 % of the total cost of the ISRA reorganization program. Local currency operating support for this project are funded by a P.L 480, Title III Project.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	The U.S. does not own excess foreign currency in Senegal.
11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes. Michigan State University was choosen for the technical assistance contracting using competitive selection under AID's Collaborative Assistance Selection Procedure.
12. FY 79 App. Act Sec. 608. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar, or competing commodity?	The project will try to increase agricultural production to reduce Senegal's food deficit. It is very unlikely that a food surplus would be produced.
FUNDING CRITERIA FOR PROJECT 1. Development Assistance Project Criteria a. FAA Sec. 102(b); 111; 113; 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained	a) Project supported research will address improvements in the productivity and profitability of farming systems and in the nutrition of rural people. This research will help relieve social, economic, technical and institutional constraints to development and help to insure wide participation of the poor in the benefits of increase of agricultural production.

3.1.a.

basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

b) PSR will address the institutional constraints to improving farmer productivity and profitability and recommend development of cooperatives and other local institutions as required.
c) The project supports initiatives of the GOS taken by ISRA.
d) Women will be important project participants and beneficiaries.
e) The project will encourage greater regional cooperation through research information exchange and third-country training.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.)

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers; — NA

(2) [104] for population planning under sec. 104(b) or health under sec. 104(c); if so, extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research. — NA

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development; — NA

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is: — NA

(i) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

(ii) to help alleviate energy problems;

(iii) research into, and evaluation of, economic development processes and techniques;

(iv) reconstruction after natural or manmade disaster;

B.1.b.(4).

(v) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(vi) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

c. [107] Is appropriate effort placed on use of appropriate technology?

Yes. PSR will use a "bottom up" approach that stresses farmers' perceived needs in the development of new technology.

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

This requirement does not apply to the Sahel Dev. Appropriation. However, GOS is financing 33% of the total cost of the ISRA decentralization program.

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to the Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?

This requirement does not apply to the Sahel Development Appropriation.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental and political processes essential to self-government.

The project involves farmers directly in production systems research and uses their perceptions of needs and constraints to guide research.

g. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase or productive capacities and self-sustaining economic growth?

Yes, through the development of new appropriate agricultural technologies.

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.

NA

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

NA

B.

3. Project Criteria Solely for Economic Support Fund

a. FAA Sec. 531(a). Will this assistance support promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102? NA

b. FAA Sec. 533. Will assistance under this chapter be used for military, or paramilitary activities? NA

5C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?	Yes
2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?	Yes
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the United States on commodities financed?	Yes, However, Senegal does not discriminate against US Marine Insurance Companies.
4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?	No offshore procurement of an agricultural commodity is to be financed.
5. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?	Yes, the USAID/Senegal Project Support Unit will determine the practicability of such procurement.
6. FAA Sec. 603. (a) Compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	Yes. The Project Agreement will contain this requirement.
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the	Technical Assistance contracting will be with Michigan State University under the Title XII Collaborative Assistance Contracting Method.

facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?	
8. International Air Transport. Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?	Yes
9. FY 79 App. Act Sec. 105. Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States?	Yes. This provision will be included.
B. Construction	Construction will not be financed by this project.
1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?	NA
2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?	NA
3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the United States not exceed $100 million?	NA
C. Other Restrictions	
1. FAA Sec. 122 (e). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?	NA
2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?	NA Controller General will have audit rights for project
3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foriegn aid projects or activities of Communist-bloc countries, contrary to the best interests of the United States?	Yes
4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or guaranty of such transaction?	Yes

5. Will arrangements preclude use of financing:

a. FAA Sec. 104(f). To pay for performance of abortions or to motivate or coerce persons to practice abortions, to pay for performance of involuntary sterilization, or to coerce or provide financial incentive to any person to undergo sterilization?

b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property?

c. FAA Sec. 660. To finance police training or other law enforcement assistance, except for narcotics programs?

d. FAA Sec. 662. For CIA activities?

e. FY 79 App. Act Sec. 104. To pay pensions, etc., for military personnel?

f. FY 79 App. Act Sec. 106. To pay U.N. assessments?

g. FY 79 App. Act Sec. 107. To carry out provisions of FAA sections 209(d) and 251(h)? (Transfer of FAA funds to multilateral organizations for lending.)

h. FY 79 App. Act Sec. 112. To finance the export of nuclear equipment, fuel, or technology or to train foreign nations in nuclear fields?

i. FY 79 App. Act Sec. 601. To be used for publicity on propaganda purposes within United States not authorized by the Congress?

Yes. All these are precluded from project financing.

PIT/...
RÉPUBLIQUE DU SÉNÉGAL

PRIMATURE

SECRÉTARIAT D'ÉTAT A LA RECHERCHE SCIENTIFIQUE ET TECHNIQUE

INSTITUT SÉNÉGALAIS DE RECHERCHES AGRICOLES

Rue de Thiong X Valmy
Boîte Postale 3120 — DAKAR
Tél. 22-15-20 21-24-25 21-19-13

ANNEX C

N° 1 1 5(... /DG - ISRA

685-23

Dakar, le 11 AVR. 1981

APR 13 RECD

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Monsieur le Directeur
de l'USAID/Sénégal
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OBJET : Demande d'aide - Projet USAID de Planification et de Recherche Economique des Systèmes agricoles.

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Monsieur le Directeur,

Ayant procédé à la révision de l'Avant-Projet USAID en vue de consolide la recherche socio-économique de l'ISRA pour le programme de décentralisation des recherches, j'ai l'honneur de vous faire part de mon approbation sur les propositions suivantes du projet :

- Elever les niveaux technique et professionnel des chercheurs agricole par la formation à long et à court terme.

- Participer à l'organisation et à l'exécution des études sur les systèmes de production en Casamance et dans d'autres régions.

- Procéder à des recherches macro-économiques du secteur agricole.

- Exploiter la puissance des ordinateurs afin d'améliorer les travaux de l'équipe dans le domaine de systèmes de production et du programme de recherches macro-économiques.

- Diffuser le maximum des documents socio-économiques, non seulement au Centre de Documentation de l'ISRA, mais également dans deux autres centres (stations) de recherche, ainsi qu'au niveau des sociétés et services de dévelo pement rural.

Le projet servira à développer le potentiel des recherches agricoles du Sénégal et contribuera à une meilleure planification et élaboration des politiques des projets de développement agricole. Par conséquent, je vous serais reconnaissant de bien vouloir nous aider à obtenir le montant de 4.950 de dollars, nécessaire au financement de ce projet.

Je vous prie d'agréer, Monsieur le Directeur, l'assurance de ma considération distinguée.

Le Directeur Général
de l'ISRA

D. I. THIONGANE

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Tel. ... & ...
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ANNEX E

MISSION DIRECTOR'S 611 (e) CERTIFICATION

I. Project Data :

A. Country	: Senegal
B. Project	: Agricultural Research and Planning Project (685-0223)
C. Funding	: $ 4.95 million
D. Life of Project	: 5 years

II. Justification :

This project is the keystone of AID support to the multi-donor financed program to decentralize and strengthen research activities of the Senegalese Agricultural Research Institute (ISRA). Over the last decade, the Government of Senegal has maintained a high level of support for agricultural research in comparison with neighboring West African countries. The continuing Government commitment to agricultural development and need for new agricultural technology indicates that this support will continue. Senegal fulfilled support agreements for other similar AID-financed project and has expressed strong commitment for this project during the collaborative project design effort.

III. Certification :

As the principal officer of the Agency for International Development in Senegal, I affirm that, in my judgement, Senegal has both the financial capability and the human resources to effectively maintain and utilize the goods and services being provided by the Agricultural Research and Planning Project (685-0223).

David Shear

David Shear,
Director
USAID/Senegal

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TAGS:

SUBJECT:RESULTS OF AGRICULTURAL RESEARCH AND PLANNING PID (685-0223) REVIEW

1. SUBJECT PID WAS REVIEWED BY REPRESENTATIVES OF PPC, DS/N, DS/AGR, DS/RAD, GC/AFR, USAID/DAKAR, BIFAD, AFR/DP

AFR/DR, AND AFR/SWAP ON FEBRUARY 29. REVIEW RESULTED IN RECOMMENDATION FOR APPROVAL, AND PID IS HEREBY APPROVED BY AA/AFR ON BASIS THAT POINTS RAISED BELOW WILL BE ADDRESSED IN PROJECT PAPER (PP). ON THIS BASIS, PP MAY BE AUTHORIZED BY THE USAID.

2. PROJECT GOAL : THE COMMITTEE ACCEPTED THE PROJECT GOAL TO INCREASE THE CAPACITY OF THE GOS TO MORE EFFECTIVELY PLAN AND EVALUATE AGRICULTURAL DEVELOPMENT POLICIES AND PROJECTS.

3. PROJECT PURPOSE : THE PROJECT PAPER SHOULD CLARIFY AND EXPAND PID'S THIRD STATED PURPOSE CONCERNING DEVELOPMENT OF SENEGALESE RESEARCH INSTITUTIONS AS EFFECTIVE AGENCIES FOR PROVIDING AND INTEGRATING DATA AND ANALYSIS INTO RELEVANT AGRICULTURE/NUTRITION DECISION-MAKING CHANNELS. THIS PURPOSE IS SEEN AS IMPORTANT TO GOS INSTITUTION BUILDING AND THUS TO LONG-TERM VIABILITY OF THE PROJECT.

4. PROJECT CONTENT AND OUTPUTS : THE COMMITTEE AGREED ON THE NEED FOR AN OVERALL LOGICAL FRAMEWORK TO DEFINE INTENDED PROJECT IMPACTS AND IMPLEMENTATION PLANS FOR EACH RESEARCH INSTITUTION AND AGRO-ECOLOGICAL ZONE, TO INCLUDE AS A MINIMUM :

A. ZONE RESEARCH IMPLEMENTATION PLAN SCHEDULES, INCLUDING DESCRIPTION OF GOS AND OTHER ORGANIZATIONS TO BE RESPONSIBLE FOR IMPLEMENTATION;

B. SPECIFIC IDENTIFIABLE TARGETS AND RESULTS EXPECTED AT END OF LIFE PROJECT;

C. EVALUATION BENCHMARKS TO BE USED IN ANNUAL REVIEWS OF PROGRESS AS BASIS FOR APPROVAL/ALTERATION IF NECESSARY OF FUTURE YEAR RESEARCH PROGRAMS;

D. GOS PLAN FOR FINANCING RECURRENT COSTS OF ZONE AND RESEARCH INSTITUTION ACTIVITY; AND

E. PLANS FOR INTEGRATING RESEARCH INSTITUTION INTO NATIONAL AGRICULTURE/NUTRITION DECISION-MAKING CHANNELS.

5. THE REVIEW EXPRESSED THAT THE PROJECT SHOULD FOCUS FARMING SYSTEMS ANALYSIS AT THE MICRO LEVEL NOT ONLY ON PHYSICAL CROPS (E.G., PRODUCTION AND SALES OF CEREALS AND LIVESTOCK PRODUCTS) BUT ALSO ON ISSUES OF HOUSEHOLD CONSUMPTION, NUTRITION AND INCOME AS WELL AS RESOURCE ALLOCATION AND EMPLOYMENT (BY SEX). SINCE THE PID IS UNCLEAR ABOUT APPROACH TO FARMING SYSTEMS IS INTENDED, THE PP SHOULD FURTHER DESCRIBE THE MODEL OF MOBILE OR STATIONARY FARMING SYSTEMS ANALYSIS TO BE EMPLOYED IN THE VARIOUS ZONES. THE UNITED EXPERIMENTAL PROGRAM OF THE SENEGALESE INSTITUTE FOR AGRICULTURAL RESEARCH (ISRA) IS A FARMING SYSTEMS-BASED RESEARCH PROGRAM WHICH SINCE 1960 HAS TRIED TO CREATE NEW TECHNOLOGIES SUITABLE TO FARMERS IN VARIOUS AGRO-ECOLOGICAL ZONES AND TO DIFFUSE THE IMPROVED TECHNOLOGY PACKAGES THROUGH ON-FARM TESTING AND EXTENSION. HOW WILL THE PROPOSED FARMING SYSTEMS RESEARCH DIFFER FROM OR COMPLEMENT THIS ONGOING PROGRAM? OTHER MODELS OF FARMING SYSTEMS RESEARCH WHICH MIGHT BE ADAPTED IN SENEGAL ARE THOSE USED BY CIMMYT IMPLEMENTATION IN KENYA AND BY ICTA IN GUATEMALA. ARE ELEMENTS OF THESE APPROACHES SEEN AS APPROPRIATE COMPLEMENTS TO OR SUBSTITUTES FOR THE CURRENT ISRA APPROACH?

6. THE WAY IN WHICH "FARMING SYSTEMS" RESEARCH WILL RELATE TO THE OVERALL OPERATION OF ISRA IN GENERAL, ITS ECONOMICS AND SOCIOLOGY UNIT, AND THE PLANNING AND POLICY ANALYSIS FUNCTIONS/ACTIVITY IN THE GOVERNMENT AT-LARGE SHOULD BE MADE CLEAR. THEREFORE, A PLAN OF WORK FOR THE ECONOMICS AND SOCIOLOGY UNIT SPELLING OUT THESE ROLES AND LINKAGES FOR BOTH THE FARMING COMPONENT AND THE MACRO-ECONOMICS COMPONENT AND THE WORK TO BE DONE BY EACH IS NEEDED.

7. THE PP SHOULD STATE HOW PROJECT RESEARCH WILL BE PROGRAMMED TO ADVANCE THE GOVERNMENT'S LONG-RANGE DEVELOPMENT STRATEGY WHICH IS BASED ON PROMOTING AND DIVERSIFYING AGRICULTURE AND EXPORT-ORIENTED ACTIVITIES. TO THIS END, PROJECT SCOPE SHOULD DESCRIBE THE EXTENT THAT RESEARCH WILL FOCUS ON (A) AREAS LESS AFFLICTED BY DROUGHT (CASAMANCE AND EASTERN SENEGAL), WHERE CASH CROPS OTHER THAN PEANUTS CAN BE GROWN; (B) THE ARID NORTHERN PART OF SENEGAL WHERE IRRIGATED AGRICULTURE WILL BE NECESSARY; AND (C) THE HEAVILY POPULATED PEANUT BASIN WHERE AGRICULTURAL PRODUCTIVITY IN THE REGION AS A WHOLE HAS NOT SIGNIFICANTLY FOR DEVELOPMENT OF CROP SELECTION CRITERIA WHICH TAKE INTO ACCOUNT MICRO-ECONOMIC AND SOCIAL FACTORS (BY SEX), AND WHICH ARE SUITABLE FOR USE BY THE GOS IN SELECTING CROPS
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FOR PHYSICAL RESEARCH PROGRAMS; (B) INDICATE THE EXTENT TO WHICH RESEARCH FINANCED BY THE PROJECT WILL FOCUS ON FOOD, FEED OR CASH CROPS IN THE SEPARATE AGRO-ECOLOGICAL ZONES; (C) PROVIDE FOR DEVELOPMENT OF MARKET STRATEGIES FOR KEY CROPS IN THE PHYSICAL RESEARCH PROGRAMS; AND (D) DESCRIBE HOW PROGRAMMED AGRICULTURAL RESEARCH AIMED AT LOWERING COST OF TECHNOLOGY AND AT ADAPTING ADVICE TO FARMER'S NEEDS CAN MATERIALLY CHANGE THE LIVES OF THE RURAL POPULATION IN TERMS OF FOOD AND INCOME LEVELS.

8. PLANS OF WORK, COMPATIBLE WITH THE OVERALL PLAN FOR THE ECONOMICS AND SOCIOLOGY UNIT, SHOULD BE PREPARED FOR EACH FOREIGN ADIVISOR. THE PP SHOULD DESCRIBE FUNCTIONS AND RESPONSIBILITIES OF U.S. ADVISORS IN UNDERTAKING RESEARCH THEMSELVES AND/OR IN TRAINING OF COUNTERPARTS AND PARTICIPANTS IN RESEARCH METHODS AND PROGRAMS.

9. THE COMMITTEE CONCURRED IN THE MISSION'S NEGATIVE RECOMMENDATION REGARDING THE EFFECT OF THE PROJECT ON HUMAN ENVIRONMNET. MEMBERS AGREED THAT THE PP SHOULD PROVIDE FOR ENVIRONMENTAL CONCERNS TO BE FACTORED INTO THE RESEARCH WORK FROM THE INCEPTION OF UNDERTAKINGS. IT IS EXPECTED THAT EFFECTS OF ALTERNATIVE CHOICES AND USES OF FERTILIZERS AND PESTICIDES, MEASURES FOR RESOURCE CONSERVATION AND PRESERVATION, AND OTHER ENVIRONMENTAL CONSIDERATION CAN BE ACCOMMODATED IN RESEARCH PLANS.

10. THE ABOVE-MENTIONED LOGICAL FRAMEWORK SHOULD PROVIDE FOR AN EVALUATION SCHEME WITH AN AGENDA, TIMEFRAME AND MEASURES FOR RESEARCH TO BE UNDERTAKEN AND RESULTS TO BE REALIZED FROM THE RESEARCH (E.G., BY REGION, BY CROP, AND BY TYPE AND AMOUNT OF CHANGE IN NUTRITIONAL INTAKE AND/OR INCOME LEVELS OF PERSONS WHO WILL USE THE RESEARCH RESULTS). THE EVALUATION SCHEME SHOULD IDENTIFY INSTITUTIONAL CHANGES TO BE EFFECTED THROUGH THE RESEARCH AND PLANNING PROJECT. EVALUATION MEASURES SHOULD INCLUDE SUCH FACTORS AS NAMES AND NUMBERS OF INSTITUTIONS THAT WILL DEVELOP CAPABILITIES TO PROGRAM AND CONDUCT RESEARCH, KINDS AND AMOUNTS OF INFORMATION THAT THE RESEARCH PROCESS WILL GENERATE, AND TYPES AND NUMBER OF END-USER ONGANIZATIONS, DECISION-MAKERS, RISK TAKERS AND PRIVATE OPERATORS WHO ARE EXPECTED TO MAKE USE OF AND CONTRIBUTE TO THE RESEARCH PROCESS. OF SPECIAL INTEREST HERE WILL BE PROVISION FOR ASSESSING THE EXTENT THAT SMALL-SCALE OPERATORS, BY TYPE AND SEX, WILL EMPLOY AND CONTRIBUTE TO THE DECENTRALIZED RESEARCH PROCESS.

11. THE PP SHOULD DESCRIBE THE MECHANISMS FOR CONVERTING RESEARCH INTO PRACTICAL POLICIES AND PLANS. IN THIS REGARD, QUESTIONS THAT REQUIRE ANSWERS INCLUDE (A) WHAT ARE THE LINKAGES BETWEEN ISRA AND OTHER GOVERNMENTAL AGENCIES/ UNITS THAT MAKE POLICY AND PLANNING? (B) WHAT IS THE ROLE OF ISRA IN THIS SYSTEM? (C) SIMILARLY, WHAT ARE THE LINKAGES AND RELATIONSHIPS BETWEEN THE VARIOUS UNITS WITHIN ISRA, I.E., THE CROP SCIENCE UNIT, ANIMAL SCIENCE

UNIT, FARMING SUSTEMS UNIT, AND NATURAL RESOURCES UNIT IN ADDITION TO AN ECONOMICS UNIT WITH A FARM SYSTEMS COMPONENTS? HOW THESE UNITS INTERACT AND COMPLEMENT ONE ANOTHER SHOULD BE MADE CLEAR. THE PP SHOULD DESCRIBE LIAISON ARRANGEMENTS THAT EXIST OR WILL BE ESTABLISHED BETWEEN GOS AND PRIVATE RESEARCH AND EXTENSION AGENCIES. IT SHOULD ALSO DESCRIBE PLANS FOR MAKING KNOWN RESEARCH CONCLUSIONS AND RECOMMENDATIONS TO GOS AND INTERNATIONAL CONSULTATIVE GROUPS, PARTICIPATING DONORS, TECHNICAL ADVISORY GROUPS AND THE CAVS COMPLEX.

12. THE PP SHOULD DESCRIBE EXISTING OR NEW MECHANISMS THAT WILL BE USED FOR MOVING RESEARCH RESULTS TO SENEGALESE POLICY-MAKERS AND FINAL END-USERS, I.E., HERDERS AND FARM OPERATORS, MALE AND FEMALE. PROVISION SHOULD ALSO BE MADE FOR ACQUIRING INFORMATION ON THE EXPERIENCE OF PERSONS WHO USE THE RESEARCH ADVICE AND TECHNOLOGY PACKAGES. IN THIS CONNECTION, IT WILL BE PARTICULARLY IMPORTANT FOR HEADQUARTERS AND FIELD RESEARCHERS TO ESTABLISH WAYS TO LEARN ABOUT END USER EXPERIENCE WHICH HAS BEEN NEGATIVE HARMFUL OR UNECONOMIC.

13. THE TRAINING NEEDS (NUMBERS OF PARTICIPANTS, DISCIPLINES, LEVELS OF TRAINING, ETC.) MUST BE RELATED TO THE ABOVE-MENTIONED PLAN OF WORK FOR THE ECONOMICS AND SOCIOLOGY UNIT. THE FIELDS OF EXPERTISE REQUIRING PARTICIPANT TRAINING WILL BECOME APPARENT AFTER THE FRAMEWORK AND RESEARCH AGENDA ARE DESIGNED. FIELDS OF PARTICPANT TRAINING NOT SPECIFIED IN THE PID BUT APT TO BE REQUIRED FOR PROJECT SUCCESS AND IMPACT INCLUDE SUCH DISCIPLINES AS NUTRITION/CONSUMPTION/MARKETING ECONOMICS, INFORMATION, SYSTEMS MANAGEMENT, AGRICULTURAL EXTENSION COMMUNICATIONS, AND AGRICULTURAL ENGINEERING. AG ENGINEERS, FUSING THEIR KNOWLEDGE OF AGRONOMY, BIOLOGY, ECONOMICS, SOIL CONSERVATION AND SOIL SCIENCE, WOULD BE CONCERNED WITH SOIL AND WATER CONSERVATION, MECHANICAL POWER AND MACHINERY, ELECTRIC POWER, FARM IMPLEMENTS, LIVESTOCK PRODUCTION, AND FARM STRUCTURES SUCH AS STORAGE, HOUSING AND SHELTERS.

14. THE COMMITTEE ASKED WHAT PROVISION COULD BE MADE FOR PERSONS TRAINED TO THE MAJOR PID LIMIT TO COMMIT THEMSELVES TO LONG-TERM ASSIGNMENT IN FIELD POSTS. THE PP SHOULD DISCUSS SALARY INCENTIVES, RELATIONSHIP OF SALARIES TO
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THE CIVIL SERVICE PAY SCALE, AND COSTS OF SOCIAL AMENITIES IN REGIONAL POSTS. IT SHOULD SPECIFY NUMBERS AND LEVELS OF PERSONS TO BE TRAINED TO THE PHD, MAJOR LESSER LEVELS, BY FIELD OF SPECIALITY AND INTENDED ULTIMATE LOCATION.

15. THE PP DESIGN SHOULD REFLECT TRAINING REQUIREMENTS FOR PREPARING SENEGALESE STAFF TO SELECT AND DISSEMINATE RESEARCH FINDINGS AND RECOMMENDATIONS TO GOS AND INTERNATIONAL CONSULTATIVE GROUPS, TO PROVINCIAL GOVERNORS AND MINISTRY TECHNICAL FIELD TECHNICIANS, AND TO HERDSMEN AND FARM OPERATORS. SENEGALESE RESEARCH PLANNERS AND MANAGERS LIKEWISE MUST BE TRAINED TO ORGANIZE WAYS AND MEANS TO OBTAIN FEEDBACK FROM THE ABOVE-MENTIONED RESEARCH END-USERS.

16. THE COMMITTEE RECOGNIZED THE NEED FOR INITIATING TRAINING NOW FOR SOME SENEGALESE WHO WILL BE NEEDED IN THE PROJECT PRIOR TO THE TIME THE PROJECT AGREEMENT IS SIGNED. TO FILL THIS NEED, THE MISSION MAY PROPOSE USE OF PARTICIPANT TRAINING MECHANISMS OUTSIDE THE PROJECT.

17. PROJECT EVALUATION : END OF PROJECT EVALUATION SHOULD FOCUS ON PROJECT IMPACTS INCLUDING EFFECTIVENESS OF GOS RESEARCH INSTITUTIONS IN ASSISTING SENEGALESE TO INCREASE PRODUCTION, MARKETING AND CONSUMPTION OF AGRICULTURAL PRODUCTS AND TO PRESERVE NATURAL RESOURCES THROUGH IMPLEMENTATION OF TIMELY POLICIES AND PRACTICES.

18. PROJECT FINANCING : PP SHOULD INCLUDE A PAL FOR GOS COVERAGE OF RECURRENT COSTS, INCLUDING A TIMETABLE, THE IDENTIFICATION OF SOURCE OF FUNDS, AND A STATEMENT ON THE NATURE OF COMMITMENT TO BE MADE BY AN AUTHORIZED GOS OFFICIAL OR BODY. TO DEMONSTRATE WHY LONG-TERM GOS INVESTMENTS IN SALARIES AND OTHER COSTS OF RESEARCH ARE WARRANTED, THE PP SHOULD PROVIDE ILLUSTRATIVE PRODUCTION INCREASES THAT COULD BE ACHIEVED BY APPLICATION OF RESEARCH FINDINGS OVER THE NEXT TEN TO TWENTY YEARS.

19. THE PP TEAM WILL REVIEW POSSIBILITIES FOR REDUCING PROJECT DOLLAR COSTS BY LOCAL PROCUREMENT, BY REBUDGETING, OR BY TRIMMING COSTS WHICH THE PID ASCRIBES TO INFLATION. THE PP TEAM MAY FIND IT HELPFUL TO CONSULT WITH OTHER DONORS (E.G., IBRD) ON FORMULA OR METHODS THAT CAN BE USED TO MINIMIZE COSTS INCURRED DUE TO INFLATION. IN ANY CASE, THERE SHOULD BE CLOSE COLLABORATION WITH OTHER DONORS DURING DESIGN AND IMPLEMENTATION OF THIS ACTIVITY.

20. PROCUREMENT : NECESSARY WAIVER REQUESTS FOR VEHICLES, SERVICES AND COMMODITIES MUST BE INCLUDED IN THE PP. A WAIVER OF REQUIREMENT TO ADVERTISE IN THE U.S. MAY BE NEEDED. PROPRIETARY PROCUREMENT WAIVERS MAY ALSO BE NECESSARY. FYI. IT IS DOUBTFUL THAT A WAIVER WILL BE APPROVED FOR THE 22 VEHICLES. PP WILL ASSESS THE NEED TO INCLUDE PROJECT CAPABILITY TO MAINTAIN VEHICLES AND PROVIDE OTHER GSO TYPE ACTIVITIES INCLUDING ANY NECESSARY TA,

LOCAL STAFFING, TRAINING OF MECHANICS, TOOLS, EQUIPMENT, COMPONENT ASSEMBLIES, AND FACILITIES, I.E., MAINTENANCE SHEDS. PP DESIGNERS SHOULD CONSIDER PROVISIONS FOR REPLACEMENT VEHICLES TOWARD END OF PROJECT TO SUPPORT CONTINUATION OF ACTIVITIES STIMULATED BY THE PROJECT.

21. IN ORDER TO EXPEDITE COMMODITY PROCUREMENT CRITICAL ITEMS SHOULD BE SUFFICIENTLY DESCRIBED IN THE PP TO ENABLE USAID TO ORDER CRITICAL ITEMS AT EARLIEST POSSIBLE DATE. THIS MAY REQUIRE VARIOUS PP TEAM MEMBERS TO PREPARE NECESSARY TECHNICAL SPECIFICATIONS.

22. PROJECT IMPLEMENTATION : COMMITTEE MEMBERS CONCURRED IN USE OF COLLABORATIVE TYPE CONTRACT ARRANGEMENT WITH TITLE XII INSTITUTION TO ASSIST IN PREPARING THE PROJECT PAPER AND IN PARTICIPATING IN PROJECT IMPLEMENTATION.
- IMPLEMENTATION
23. PP TEAM : IN ADDITION TO DESIGN SPECIALISTS IDENTIFIED IN THE PID, ARRANGEMENTS SHOULD BE MADE TO OBTAIN EXPERTISE FROM COMPLEMENTARY DISCIPLINES FOR PREPARATION OF THE PROJECT PAPER FOR THIS MAJOR U.S. GOS UNDERTAKING. DISCIPLINES THAT SHOULD BE DRAWN UPON FOR THE PURPOSE.

INCLUDE SOCIOLOGY/ANTHROPOLOGY, AGRICULTURAL ENGINEERING, MICRO-ECONOMICS (MARKETING AND FARM INCOME), HOUSEHOLD NUTRITION AND CONSUMPTION AND INFORMATION SYSTEMS MANAGEMENT AND ORGANIZATION. IT WAS RECOGNIZED THAT DESIGN TEAM WOULD BE STRENGTHENED BY ENLISTING SENEGALESE QUALIFIED IN THESE DISCIPLINES TO EXTENT POSSIBLE.

24. NEXT STEPS : THE MISSION MAY DESIGN AND APPROVE A PROJECT WITH AN AID DOLLAR CONTRIBUTION OF UP TO DOLS. 4.885 MILLION. RECOGNIZING THAT THE PROJECT AGREEMENT IS TO BE SIGNED IN THE LAST QUARTER OF FY 80, THE AMOUNT OF THE FY 80 OBLIGATION SHOULD NOT EXCEED DOLS. 500,000, THE AMOUNT OF SEWA'S CYB AND THE FY 1980 CONGRESSIONAL PRESENTATION. THE PID IS APPROVED AS MODIFIED BY THE ABOVE ADDITIONS AND CHANGES WHICH BECOME AN INTEGRAL PART OF THE PROJECT IDENTIFICATION DOCUMENT. VANCE
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ANNEX E

MISSION DIRECTOR'S 611 (e) CERTIFICATION

I. Project Data :

A. Country	: Senegal
B. Project	: Agricultural Research and Planning Project (685-0223)
C. Funding	: $ 4.95 million
D. Life of Project	: 5 years

II. Justification :

This project is the keystone of AID support to the multi-donor financed program to decentralize and strengthen research activities of the Senegalese Agricultural Research Institute (ISRA). Over the last decade, the Government of Senegal has maintained a high level of support for agricultural research in comparison with neighboring West African countries. The continuing Government commitment to agricultural development and need for new agricultural technology indicates that this support will continue. Senegal fulfilled support agreements for other similar AID-financed project and has expressed strong commitment for this project during the collaborative project design effort.

III. Certification :

As the principal officer of the Agency for International Development in Senegal, I affirm that, in my judgement, Senegal has both the financial capability and the human resources to effectively maintain and utilize the goods and services being provided by the Agricultural Research and Planning Project (685-0223).

David Shear,
Director
USAID/Senegal

Annex F

Scope of Work for Technical Assistance

1. Objectives

An important objective of this contract is to provide short- and long-term technical assistance to ISRA for implementation of the Agricultural Research and Planning Project (685-0223).

2. Composition of Contract Team and Location

The contractor will supply an initial team of three long-term researchers; the number will be increased to four in year two and five in year three of the project.

A rural social scientist will be team leader of the MSU contract team and will be a member of the Central Systems Analysis Group, Production Systems Department. The second member of the initial three member contract team will be a macro economist assigned to the Macro-Economic Unit in Dakar. The third long-term advisor will be a production systems economist assigned to the Djibelor research station as a member of the multi-disciplinary Production Systems Research Team. The Casamance was selected because of the GOS and USAID interest in expanding food production in the Lower, Middle and Upper Casamance. A second production systems economist will be supplied by the contractor in year two to a location to be determined. A second macro-economist will be assigned to the Macro-Economic Unit in year three of the project.

3. Job Descriptions

The contractor agrees to make available long-term technical assistance and consultants to assist in the planning and implementation of the production systems and macro-economic research programs of the Senegalese Agricultural Research Institute (ISRA). The contractor will provide personnel for the following positions:

A. Rural Social Scientist/Team Leader

1. Under the direction of the Head of Production Systems Research Department and the guidance of the chief of the Central Systems Analysis Group, the Rural Social Scientist would:

- Assist in conceptualizing and preparing guidelines for the planning and execution of production systems research;

- Serve as senior advisor to the PSR agricultural economist, rural sociologist and the extension specialist;

- Assist the PSR teams in the planning and execution of field surveys, special studies and analysis of field data;

- Assist in the synthesis of results of production systems research team in cooperation with Central Systems Analysis Group and economists in the Macro-Economic Unit; and,

- Assist in developing effective linkages between production systems teams and development agencies.

2. As Project Coordinator for the MSU contract, the Rural Social Scientist would:

- serve as administrative leader of the team of contract social scientists (long-term, short-term and Research Associates), including liaison with the GOS and USAID/ Senegal;

- assist in the recruitment of long-term researchers, consultants, and research associates;

- assist in identifying and placing Senegalese in long-term training programs in the U.S. and facilitating their return to Senegal to undertake MSc and Ph.D. thesis research for 3-12 months after completion of all course work for MSc and Ph.D. prog

- assist in placing Senegalese scientists in short-term training in third countries and in the United States.

3. The qualifications and experience of the Rural Social Scientist is:

- a Ph.D. in rural sociology, development administration or related fields;

- five to seven years experience in rural social science research in Africa and preferably some experience in agricultural extension and/or training;

- knowledge of the French language at FSI 3 level.

4. Duty Station: ISRA Headquarters.

B. Production Systems Economists

1. Under the policy supervision of the Production Systems Department Head and the guidance of the Research Station Director, the Production Systems economists would:

- participate with other members of the multi-disciplinary production systems research team and extension workers (in regional development agencies) in the planning, supervision and implementation of on-farm surveys, trials and evaluation of improved technologies for elite specific locations.

- assist in the timely processing and analysis of the results of farm level surveys, and on-farm trials with micro computers at the research stations;

- assist in the provision of information and interpretation of results for regional development agencies, commodity research teams, the Central Systems Analysis Unit, Macro-Economic Unit, and policy makers through unpublished and published papers, seminars and workshops;

- assist in training Senegalese counterparts .

2. The qualifications and experience of the Production Systems Economist would be:

- Ph.D. in Agricultural Economics with specialization in farm management/production economics;

- three to five years in farming systems research or as a member of a multi-disciplinary team undertaking farm level surveys in the Third World,

- fluency in French at FSI 3 level.

3. Duty Station: The first agricultural economist to be appointed will be stationed at Djibélor in the Lower Casamance. The location for the second production systems economist, to be appointed in year two will be decided later.

C. Macro-Economists

1. Under the direction of the Head of the Macro-Economic Unit, the Macro-Economist would:

- develop a research program in close cooperation with the Central Systems Analysis Unit and the Production Systems

Department of ISRA, Ministry of Planning, Ministry of Rural Development, SERST/DRSSH and Development Agencies;

- organize and carry out high priority macro studies of agricultural pricing, trade, and nutrition policies and agricultural subsector studies with emphasis on the foodgrain subsector;

- assist in developing a data processing system in order to generate timely research results;

- interpret results to policy makers, development agencies;

2. The qualifications and experience of the Macro-Economist would be:

- Ph.D. in agricultural economics or economics, with emphasis on macro modeling of food systems, sub-sector studies, marketing and pricing policy;

- three to five years experience and an understanding of quantitative techniques appropriate to the data available and the research needs of Senegal;

- fluency in French at FSI 3 level.

3. Duty Station: Dakar

D. Research Associates: Research associates will be provided from MSU to assist in the conduct of micro and macro economic research. The six research associates will be fluent in French and have previous field research experience in Africa. Three associates will be integral members of the PSR teams and three will join the Macro-Economic Unit. The average length of tour will be 18 months.

E. Consultants: Consultants will be provided in econometrics, agricultural planning and policy, marketing, farming systems, computer programming, documentation and information services, and rural sociology.

F. Computer program development: The contractor will purchase an IBM 5120 micro computer with 64 kbytes of memory, dual 8" disk driver and IBM 5120 printer and use this system to adapt the FARMAP system for use on the 5120, write or modify other programs as needed by ISRA field researchers, and develop detailed documentation and operational guidelines for use of the programs. This work will primarily be performed in the U.S. by a computer scientist and programmer, although 3 trips to Senegal of two weeks each will be required for field installation and follow up. The work is expected to take two years. Following completion of the program development the IBM 5120 will be given to ISRA.

G. Level of Effort

1.	Rural Social Scientist/Team Leader	- 5 years
2.	Production Systems Economist/Casamance	- 5 years
3.	Production Systems Economist/Second Location	- 3 years
4.	Macro-Economist	- 5 years
5.	Macro-Economist	- 3 years
6.	Research Associates	- 9 years
7.	Consultants	- 30 months
8.	Computer program development	- 18 months

H. Reports Required

1. Quarterly reports: The Team Leader will provide a quarterly report covering the following:

- progress measured against planned objectives;
- problems encountered;
- major activities during the period;
- actions planned for the next reporting period;
- recommendations for revisions in project activities.

2. An annual workplan with clearly defined objectives, time-frame, and designation of persons responsible.

3. Semi-annual project reports.

4. Research reports (jointly with ISRA) on results of research activities.

Annex G

Inventory of Production Systems Research in Senegal

The purpose of this annex is to review Production Systems Research (PSR) and a number of disciplinary studies which have made a contribution to PSR in Senegal. To date valuable PRS-type research has been carried out in ISRA's Unités Experimentales project in the Sine Saloum region. The results of research on the Unités Expérimentales is found in ISRA/CNRA publications. This review focuses on the methodology used in studies of the Unité Expérimentale program. Some of OSTOM's research by various social science disciplines-e.g. anthropology, geography is reviewed here because the results contribute to an understanding of farming and livestock systems in various agro-ecological zones of Senegal. Much of the relevant work has been compiled in a recent bibliographical note, "Cahiers ORSTOM" by F.S. Seck (July 1980); "Farm level Studies in the Semi Arid Tropics of West Africa, by Newman, M., Ouedraogo, I., and Norman, D. ICRISAT, 1979; Maitrise de l'Espace Agraire et Développement en Afrique Tropicale, ORSTOM, Ouagadougou Seminar 1978

ORSTOM Socio-Economic Research

The general orientation of ORSTOM research at the farm level has been through geographical inventories and specialized farm surveys in the Northern Senegal. These studies have provided background information for some development projects now underway in the region. Future research should be directed toward a better understanding of the dynamics of changing farming and livestock systems through the introduction of technical innovations Some of the more important studies by OSTROM include the following:

Boutillier, J. L.: Cantrelle, P. et al. 1962. "la Moyenne Vallée du Sénégal," ORSTOM, PUD.

The authors interpret the results of a series of surveys dealing with demography, health and farm budgets.

Delpech, B., and Gastelu. J. M. 1974. "Organisation du Travail Agricole en milieu Serer." Travaux et Documents de l'ORSTOM.

The authors investigate the evolution of social relationships in different production systems. Labor organization is described for a cluster of 13 hamlets. Community and exchange labor groups are also described in relation to major agricultural activities.

Couty, P.H. 1977. "Emploi du Temps et Organisation du Travail Agricole dans un Village Wolof: Darou Rahmane II."

A socio-economic study of a Mouride Islamic village with emphasis on the agricultural activities performed by men and women.

Maymard, J. 1974. "Structures Africaines de Production et Concept d' Exploitation Agricole." Part I: Un exemple de terroir Africain.

An analysis of the evolution of the agricultural production structure in the traditional African environment. The first part of the work shows how deeply rooted and complex peasant structures can coexist with modern technology.

Roch, J. 1969. "Emploi du Temps et Organisation du Travail Agricole dans un Village Wolof Mouride: Research." ORSTOM. Dakar.

The author outlines the difficulties in collecting labor data on a small sample of 7 households.

Rocheteau, G. 1978. "Pionniers Mourides: Un Exemple de Colonisation Agricole Spontanée des Terres Neuves au Sénégal." Mémoires ORSTOM No. 89.

A summary of socio-economic determinants and geographical mobility among Mouride settlers. The social organization of the production system is geared toward agricultural colonization, territorial expansion and speculative accumulation of wealth.

Minvielle, J.P. 1978. "Méthodologie d'une Etude sur les Systèmes de Production Paysans dans la Moyenne Vallée du Sénégal." ORSTOM.

Detailed description of the methodology employed in a study of the Matam production system. Data were collected on a wide range of socio-economic activities including agricultural production, handicrafts, food consumption, exchange of consumer goods and migration. The production system is also described from a historical point of view.

The Unité Experimentale Program

Increasing awareness of the significance of the socio-economic dimension of rural change led IRAT in 1969 to embark on an experiment to assess the relevancy of technologies developed on experiment stations for small farmers in the Sine Saloum area. The Unités Expérimentales (UE)--later taken over by ISRA after its creation in 1975--were at the time of their creation unique and represented one of the first attempts in Africa to use a systems approach to agricultural research at the farm level. Although research on the UE has produced a better understanding of the technical feasibility and economic profitability of the intensification process, the cost of the UE approach is relatively high. There are also questions about the UE's "top-down" approach to research. A major review of the UE research program in early 1981 will provide guidance on the future of the Unité Program. Major publications on the UE are listed below.

Reboul, C. 1972. "Structures Agraires et Problèmes du Développement au Sénégal: Les Unités Expérimentales du Sine Saloum." Report No. 17, Département Economie et Sociologie Rurale, INRA. Paris 1972.

This 164 page report is perhaps the most detailed analysis of the socio-economic aspects of the production systems developed in the UE in Sine Saloum. The UE is thoroughly examined with emphasis on the structure of the rural population, land distribution, variation in size, inputs and animal traction equipment.

ISRA-GERDAT. 1977. "Recherche et Développement: Les Unités Expérimentales du Sine Saloum." May 1977.

A summary of reports and papers presented at the May 1977 Seminar on the Unités Expérimentales. The objective of the seminar was to present an inventory of research and to plan the future orientation of the UE program. Original papers from the six working groups are compiled in a separate report; Bilan et Perspectives des Recherches sur le Développement Rural Menés dans les UE, CNRA-Bambey, August 1977. Technical themes include: (a) agronomy: intensification program, (b) animal production: intensification program, (c) land improvement and consolidation program. The socio-economic themes discussed were: (a) socio-economics of production systems, (b) land reform and consolidation and (c) research extension linkages.

Faye, J. 1978. "la Recherche sur le Développement Rural au Sénégal: Le Système Création-diffusion." In "Approche Socio-économique des Exploitations Agricoles au Sénégal," ISRA No. 1.

The author discusses ISRA's approach to research on the Unités Expérimentales. The UE approaches assumes that: (1) a true understanding of the dynamics of an existing production system can only be gained when the system is confronted with technical change, and (2) modernizing traditional farming system must be viewed with a long-term iterative process.

Demus, P. and Tchakerian, E. 1978. Approche Technico-économique de Deux Structures d'Exploitation Intégrant l'Elevage. In L' Approche Socio-économique des Exploitations Agricoles au Sénégal." ISRA.

A case study of the introduction of a livestock enterprise into farming systems in the Sine Saloum. The authors argue that it is imperative to analyze farmers' motivations and asperations toward the livestock enterprise as well as the technical and economic constraints.

Poethier, G. 1978. "Le Rôle de la Recherche et le Transfert des Techniques au Sénégal." ORSTOM: collogue de Ouagadougou, Décembre 1978. "Maitrise de l' Espace Agraire et Développement en Afrique Tropicale,"

The author recommends a methodology to transfer research results to the farm level by drawing on various case studies undertaken by IRAT

and ISRA in Senegal. In general the approach is presented as follows: Regional development plans are prepared on the basis of agronomic research and tested for their technical and economic feasibility "in site." The participation of farmers in the design and testing is a strong incentive for them to continue to participate in improving the program. The final point of the argument is that a dialogue must be institutionalized between researchers, development agencies and farmers.

Faye, J.; Poethier, G.; and Valenza, M. 1978. "Projet de Développement Rural en Zone Agricole au Sénégal." Presented at the "Colloque sur l'Amélioration des Systèmes de Production au Niveau des Exploitations Agricoles dans les Pays du Sahel." February 1978. Bamako.

An analysis of the evolution of animal production within the Unités Experimentales.

Faye, J. T. Gallali and Billaz, R. 1977. "Peasant Agronomy: A Challenge to Planners' Models." In African Environment Vol. II, 4 and III.

Three illustrative examples from the Maghreb, Sahelian Africa and Tropical America are presented to make a common point: that agricultural planning is often based on poor information about peasant behavior. They note that many projects with high ex-ante internal rates of return turn out to be failures because of the lack of information about farmers' goals, indigenous technology and institutional constraints. In the West Africa case, the authors are critical of the erroneous hypothesis that peasant farms are profit maximizers. They conclude that peasant farms will usually give priority to producing enough food for their family before they will introduce or expand cash crop production.

Faye, J. and Niang, M. 1977. "An Experiment in Land Consolidation and Senegalese Rural Planning." In African Environment Vol. II, 4

The article summarizes the results and the methodology used in a land-tenure study that was conducted within the Unités Expérimentales and one village outside the UE.

Monnier, J. and Taltbart, P. 1971. "Premiers Résultats Socio-économique Détaillés Enterprise en 1971 dans le Sine Saloum: Cas d'une Exploitation de la Zone de Nioro du Rip." IRA/CNRA.

A ten month survey of 20 farms, including household, farm and non-farm activities in 1971/72. Generation of labor profiles and labor allocation to various crop enterprises, and and analysis of animal traction.

Rigot, Y. 1974. "Revenues Agricoles, Diffusion des Innovations Techniques dans les Unités Expérimentales et Conséquences Immidiates de Gestion Individuelle et de Politique Agricole pour le sud du Sine Saloum." CNRA, Bambey.

Analysis of a 60 farm sample on the UEs over the 1963-73 period with t aim of determining the most important technical and economic factors influencing crop income. It was found that crop income is correlated with area cultivated per capita, yield, and density of equipment and draft animal utilization.

Dione, J. 1975. "Les Conditions du Développement des Céréales sur l'Unité Expérimentale du Thyssé-Kaymor de 1969-1975."

The author analyzes the evolution of cropping patterns and yields of cereals and cash crops for the 1969-75 period. Primary emphasis is on marketing, and storage.

ISRA/CNRA - Technical Documents & References on the Unités Expérimentales

- Progrès Technique et Gain de Productivité. 1975.

- Proposition Méthodologique pour l'analyse des Systèmes de Production. 1975.

- Effets Socio-économiques du Progrès Technique sur les Exploitations Agricoles au Sénégal. CNRA, 1977.

- La Mécanisation des Exploitations Agricoles au Sénégal, le cas des Unités Expérimentales du Sine Saloum. CNRA, 1977.

- Types d'Exploitation et Niveaux d'Equipement dans l'Unité Expérimentale du Sine Saloum au Sénégal: Mécanisation et Agro-Socio-Economie. CNRA, 1977.

Beye, C.

- Projet de Modélisation des Exploitations dans les Différentes Situations Agricoles du Sénégal. CNRA, 1977.

CNRA

- Bilan Succint d'un Essai de Développement Expérimental: les UE du Sine Saloum 1963-73. 1974.

- Première Approche Agro-Socio-Economique de l'Exploitation Agricole en Pays Wolof, Saloum-Saloum: Conséquences sur les Possibilités d'Intensification des Systèmes de Production Traditionnels et Post Traditionnels. 1975.

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INVENTORY OF MACRO-ECONOMIC RESEARCH ON ACRICULTURE IN SENEGAL

From independence (1960) to the mid-1970s, macro-economic analysis f Senegal's agriculture was carried out almost exclusively by the lanning institutions. Most of the research was carried out in conjuction lth the selecti n, financing and implementation of development projects onsistent with the objectives of the four-year National Economic and ocial Development Plans. The major focus of macro- and micro-research as on groundnuts, Senegal's cash and export crop par excellence.

The orientation of agricultural research was, however, revised to substantial extent following the drought of the early 1970s. In the ace of lagging food production combined with increasing food imports wheat and rice in particular), researchers, planners and policy makers urned their attention to food policy, particularly the cereal subsector. ince then, two distinct periods and three broad categories can be defined n relation to macro-agricultural research in Senegal.

The first period covers the 1974 to 1977 period. Four major such tudies were carried out during this period. The first was sponsored y the FAO in conjuction with the ITA (Institute de Technologie Ali- entaire) and carried out in 1974. National food balance sheets were onstructed and used to examine production, storage, transportation and onsumption. The second study by Josue Dione was entitled "Le Déficit éréalier au Sénégal: Situation et Perspectives" - (ISRA. 1975). This tudy was expanded and subsequently released as "Résorption du Déficit éréalier du Sénégal - Voies et Moyens - M.S. thesis. Université aval, Québec 1977). The third study was carried out by the CRED of the niversity of Michigan (Ann Arbor) at the request of the CILSS/Club u Sahel in 1976. The study examines marketing, storage, production, mports and prices of foodgrains in the Sahel, including a chapter on enegal. The fourth study of the 1974-77 period was carried out by ONED for the Ministry of Rural Development and completed in 1977. The tudy covers institutional, technical and demographic aspects of ereal marketing, costs and margins of the marketing channels for the ajor commodities (millet, rice, maize and wheat), storage and supply egulation policies, and pricing policy. The study projects a cereal eficit of 200,000 to 550,000 tons for 1981. The four studies make significant contribution in bringing together secondary data and cattered information about the cereal subsector. The value of these hese studies is limited by the quality of the secondary data. These bove studies of cereal marketing are now out-of-date because of the issolution of ONCAD in October, 1980.

The second period of macro-economic studies of agriculture covers he 1977-81 period. Three major macro models of the agricultural sector

have been developed. The first, "Modèle Régionalisé de Simulation d' Agriculture Pluviale Sénégalaise", INRA, 1978 by M. Labonne and B. Legagneux is a linear programming model relating units of the production system to agricultural and nutritional policy objectives of the country. The basic tool of the model is the "module", defined as the area cultivated by a unit of labor within a given land use pattern and a given technical level. After a satisfactory simulation of the 1974-75 campaign, the model shows that the 1980-81 and 1984-85 objectives for cereal production are far beyond expectations, and predicts that the objective of cereal self-sufficiency by 1985 will not be achieved.

The second study was carried out by C. Jabara and Robert Thompson and summarized in the American Journal of Agricultural Economics (May 1980) Jabara uses an L.P. model to generate an optimal distribution and exchange of major agricultural commodities among the different regions of Senegal. The model shows that the country's comparative advantage in groundnut over cereal production holds only under certain conditions. Depending on the source and degree of uncertainty in international prices, a trade strategy of less groundnut specialization and greater cereal self-sufficiency may be superior to free trade.

The third study focusing on agricultural prices is now being carried out by SONED. The methodology of the study involves the building of an L.P. model which will determine a product price structure which insures equilibrium between production levels, farm incomes, domestic marketings and exports, and the withdrawals from and deposits to the price stabilization fund (CPSP). A final objective of the study is to determine producer costs and income as a function of input prices, by commodity and by region. A preliminary report is available at SONED, "Modélisation des Prix Agricoles, Rapport de Fin de 1Ère Phase, Méthodologie et Données de Base, November 1979". The SONED study concentrates on the supply side. Consumption is explicitly assumed to be exogenous and demand is seen as being perfectly price inelastic. The supply equation is determined through an iterative procedure which consists of trying successive price structures in a production-decision sub-model until the objective function (gross margin) is maximized. C. Jabara points out in the "Terms of Reference for Pricing and Marketing Studies PL-480 Title III" USAID War (Nov. 1980), that, the SONED model has no provision for interreg[illegible] trade and has only weak provisions for grain marketing.

The third category of major macro-economic studies deals [illegible] food security. The Food Investment Strategy, 1977-85 was published by the Ministry of Rural Development in 1977. On the basis of food balance sheets, it is argued that the nutritional status in Senegal is adequate on the average, although per capita energy and protein availability in rural areas is very close to minimum requirements. Based on consumption surveys and clinical data, the study concludes that malnutrition affects some of the most vulnerable groups of the population, namely pregnant and lactating women and children from age 0 to 5. A food policy centering

on expanding consumption of domestic cereals is considered the most efficient way to improve nutrition and reduce the foreign trade deficit. The study calls for a $1 billion plan for the period 1977-85 with the objectives of expanding both irrigated and rainfed production of cereals, the processing of local cereals, fostering the consumption of domestic foodgrain and cereal products and reducing imports through pricing policies. A nutrition education program is recommended to solve the problem of malnutrition among vulnerable groups. M. Miracle, ("Food Consumption and Nutrition Components of Development Efforts in Senegal", USAID/Senegal, September 1980) is critical of the quality of the data base and some of the conclusions and recommendation of the 1977 food investment strategy.

In June, 1980 the FAO carried out a Study Mission on Food Security in Senegal. The study points out that 20 to 47% of cereal consumption in Senegal was covered by imports during the last decade, mainly because of the lag of domestic production (1.3% annual increase) relative to population growth. A study by G. Yacink, "Survey of Post-Harvest Technology in Rural Areas" (CNRA/ISRA), 1977, provides interesting insights on some of the technical aspects of cereal threashing and storage at farm level. Another study carried out by A. H. Tuluy, "Comparative Costs and Incentives in Senegalese Rice Production, 1979", Stanford University. It shows that domestic rice production is not competitive with imports on the Dakar market and that the most productive zone is in the Casamance Region. The author concluded that in most cases, the social costs exceed the benefits of rice cultivation in Senegal.

A recent study by A.D. Niane is the Supply and Demand of Millet and Sorghum in Senegal (M.S.U. AREP Working Paper No. 32, September 1980). Niane develops an econometric model of supply and demand of millete and sorghum which is then used to forecase the situation in 1981 and 1985. The elasticity of supply with respect to the lagged price is very high (2.5). The price elasticity of demand is also high (-1.1) and the income elasticity is found to be statistically insignificant. Cross price elasticity of millet with respect to imported broken rice is estimated at 1. The study recommends an increase in producer price of millet/sorghum, and rice and the establishment of a buffer stock scheme.

Annex I

Justification for Non-competitive Procurement

For proprietary procurement of an IBM 5120 micro-computer system.

I.	A. Cooperating Country	:	Senegal
	B. Authorizing Document	:	Project Agreement to be executed
	C. Project	:	Agricultural Research and Planning (685-0223)
	D. Nature of Funding	:	Grant
	E. Nature of Goods	:	IBM 5120 micro computer
	F. Approximate Value	:	$20,000
	G. Source	:	U.S.
	H. Waivers Previously Granted	:	None
	I. Presently Authorized Sources	:	Code 00 and Cooperating Country

II. Discussion.

The subject project will provide training and technical assistance to develop Senegalese agricultural research capacity, to assist in organizing and carrying out production systems research, and to carry out macro-economic research on the agricultural sector. Within the framework of Senegal's program to decentralize and strengthen agricultural research, the project will strengthen field level capacity for processing research data. Senegal has purchased an IBM computer system which is being established as a computer center within the Senegalese Agricultural Research Institute (ISRA). This system consists of an IBM 4331-1 which will be located in Dakar and five IBM 5120's to be placed in outlying research stations.

In order for this system to become operational in support of the production systems and micro-economic research financed by the project, considerable software development is required. It is, therefore, recommended that the technical assistance contractor, Michigan State University, develop this software by adapting the FARMAP program system of the FAO for use on the 5120, by writing or modifying other programs as needed by field researchers, and by developing detailed documentation and guidelines for use of these programs. To achieve this, the project will purchase an IBM 5120 identical to those to be used at the ISRA stations. This 5120 micro computer will be used by the computer service at MSU to develop the required programs and then given to ISRA after the programs are developed.

In order to develop the computer programs needed by ISRA, the project must procure a micro computer identical to that which will be used by ISRA. This is the IBM 5120 with 64 Kbytes of memory, dual 8" disk drives, and the IBM 5120 printer. The required programs and user guides cannot be developed on another system.

III. Recommendation.

For the above reasons, it is recommended that the project negotiate with IBM for the procurement of an IBM 5120 computer system and that the authorizing officer certify that this procurement is within the exceptions to normal negotiation procedures permitted by AID Procurement Regulations 7-3.101-50(d)(3) - sole source of supply.