AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

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

COUNTRY/ENTITY: Senegal River Basin (OMVS)

3. PROJECT NUMBER: 625-0957

BUREAU/OFFICE: AFR/SWA

5. PROJECT TITLE (maximum 40 characters): OMVS Agricultural Research II

PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 89

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 83 B. Quarter 2 C. Final FY 88

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

A. FUNDING SOURCE	FIRST FY B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	3,800	-	3,800	13,622	-	13,622
(Grant)	(3,800)	(-)	(3,800)	(-)	( )	(13,622)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1.						
Other U.S. 2.						
Host Country OMVS	-	400	400	-	2,400	2,400
Other Donor(s)	-			-		
TOTALS	3,800	400	4,200	13,622	2,400	16,022

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	S 121	080				13,622		13,622	
(2)									
(3)									
(4)									
TOTALS						-		-	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 080, 960, 970

11. SECONDARY PURPOSE CODE

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

A. Code	R/AG	BS	INTR	TECH	TNG		
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters)

1. To develop and strengthen OMVS agricultural research capacities in the Senegal River Basin.

2. To improve the combined effectiveness of national agricultural research programs in Senegal, Mauritania and Mali through regional coordination and prioritizing within the OMVS.

14. SCHEDULED EVALUATIONS
Interim MM YY — MM 05 YY 85 — Final MM 05 YY 87

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

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

17. APPROVED BY
Signature: Carole H. Tyson
Title: Acting Director, USAID/Senegal
Date Signed: MM 11 DD 19 YY 82

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

AID 1330-4 (8-79)

O M V S

AGRICULTURAL RESEARCH II

PROJECT No. 625-0957

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PROJECT PAPER DESIGN TEAM

This Project Paper was initially developed by the Consortium for International Development (CID) and submitted to AID/W in August of 1981. Based on the CID documents the Project Paper hereby submitted was designed and finalized by the following team:

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I. INTRODUCTION

A. Summary and Recommendations:

The OMVS Agricultural Research II project (625-0957) is the outcome of a design effort undertaken by the Consortium for International Development (CID), with AID financing, to assist the Organization for the Development of the Senegal River Basin (OMVS) in redesigning regional agricultural research in the Senegal River Basin. It has been designed to reorient agricultural research to the specific needs of farmers in Senegal, Mali and Mauritania. Designed initially by CID, the project paper has been developed by USAID/RBDO in collaboration with USAID's Senegal, Mali and Mauritania and with the OMVS 1/.

The research to be undertaken during this project will be mainly farm field trials intended to identify technology of increased yield potential for the localities to be developed in the Integrated Development Project of the OMVS. The research staff of this project will operate from the research stations of the Senegal Valley and work jointly with extension workers assigned to the responsible regional development agencies. Promising varieties, farming practices and cropping systems will be carefully evaluated to establish their potential benefits and to address local problems. Improved varieties and farming practices resulting from the project will be used by other development programs in the valley, thus establishing a technology transfer activity for a large number of farmers.

The project fully conforms to the AID development strategy for the region by strengthening regional and multi-donor collaboration within the OMVS and by seeking improvements of existing production systems consistent with the Senegal River Basin development plans. The proposed research is designed to build upon farmers' existing knowledge and practices, upon agricultural research results obtained during the past fifty years, which were not fully tested on local farms. This approach is cost-effective, socially sound and should yield results in a relatively short time. These results will be accessible to the developers of the Basin to verify and test in irrigation projects. Such access will help to establish strong linkages between the research centers and the development agencies working in the area.

1/ Following recommendations by AID/Washington and officials of the OMVS member states, the project's title was changed from the original "Agronomic Research Project II - Phase II" to "OMVS Agricultural Research II".

Although the widespread impact of this institution-building effort is long term, some research applications will begin to benefit farmers and rural inhabitants during the life of the project. The establishment of a research capabitility and subsequent improvement of crop varieties, cultural practices and irricated agricultural production systems will eventually have a favorable impact on all farmers in the Basin.

The Grant Agreements proposed for this project will be structured so as to assure individual responsibility of the three OMVS Member States for the national components of the project, and collective responsibility for the regional aspects. Four Grant Agreements will be negotiated. Each of these will contain a description of the overall project purposes, objectives, costs, and generally applicable conditions and covenants.

1. One Agreement will be negotiated between the River Basin Development Office and the OMVS Council of Ministers, for the regional aspects of the project and for activities which will be implemented by the OMVS High Commission. This Agreement will set forth conditions and covenants specifically pertinent to the OMVS, regional component/inputs including a detailed budget, and programmatic/managerial linkages to the national project components.

2. Three additional Agreements will be negotiated between the USAIDs in Senegal, Mauritania and Mali and the Governments in each of their respective countries. These Agreements will contain descriptions of each of the national program activities; a detailed national budget, country-specific conditions and covenants; and national responsibility vis-à-vis the regional aspects of the project.

3. Each component Agreement, upon signature, will represent an obligation of funds for US-financed activities in that particular country. The acceptance of a national component Agreement, however, commits each OMVS Member State government to the regional component of the project.

The authorized source of procurement for this project is AID Geograhic Code 000 (United States) and the respective cooperating countries. In addition, the authorized code for Mali is 941 (Selected Free World) and the cooperating country itself. Procurement of commodities from Geographic Code 935 (Special Free World) to include vehicles and other equipment, are covered by waivers, in Annex I.

Total project costs are estimated at $ 16.0 million. AID is requested to provide a grant of $ 13.6 million; the OMVS and Member States will provide approximately $ 2.4 Million in counterpart funds.

B. Project Purpose:

The program is built around a set of comprehensive agricultural research activities focused on adaptive research for small-scale farming systems. The aims of the project are:

1. To develop and strengthen OMVS agricultural research capacities in the Senegal River Basin.

2. To improve the combined effectiveness of national agricultural research programs in Senegal, Mauritania, and Mali through regional coordination and prioritizing within the OMVS.

The outputs of the project will be:

1. Improved crop varieties and technical packages developed and field tested.

2. Upgraded technical and professional skills for agricultural researchers.

3. Upgraded agricultural research facilities at three locations in the Senegal River Basin.

4. Strengthened regional research system integrating national research agencies and involving national development agencies.

Details of the specific tangible outputs expected from this project are provided in the revised economic analysis pp. 110-117.

C. AID Regional Development Strategy Statement

The AID Regional Development Strategy Statement (RDSS) endorses the project approach, stating that AID will give high priority to the development of irrigated agriculture and to river basin planning and feasibility studies necessary for future projects. The RDSS further emphasizes a regional approach to river basin development and expresses AID's desire to assist international organizations like the OMVS in formulating optimum strategies for river basin development. The formulation of optimum irrigation and basin development requires that data be gathered and analyzed on a wide range of factors affecting agricultural production in the Senegal River Basin.

In addition, as an institution building effort the present project will strengthen the capacity of the OMVS and Member States to plan and implement regional agricultural projects. It will directly affect OMVS and Member States officials as beneficiaries. The ultimate beneficiaries of this increased institutional capability will be the approximately 1.6 million residents of the Senegal River Basin. These benefits will derive from better development planning and implementation of agricultural research by the OMVS and the Member States.

D. Relation to Other Projects

AID is also funding through OMVS the Groundwater Monitoring Project (625-0958). This project will establish within OMVS and its Member States a system to define, analyze and monitor the regime of the Senegal River and the Basin's subterranean water resources. This project will be an essential element in safeguarding the considerable investments planned in the Basin. Other U.S. assistance to the OMVS has included funding of the Environmental Assessment Project (625-0617) which evaluated the environmental effects to the overall Senegal River Basin Development Plan, and funding for a UNDP-sponsored socio-economic study.

Further U.S. assistance to the OMVS is expected to include an Integrated Development Project (625-0621) now in the final stages of design. The Agricultural Research II project will complement the Integrated Development Project by providing decision-makers with vital information on agricultural systems in the areas to be developed by the IDP. In addition, the improved on-farm technologies, crop varieties, farming practices and cropping systems developed by the research centers will be systematically transferred to the farmers participating in the IDP.

II. PROGRAM FACTORS

A. The OMVS Development Strategy:

The overall OMVS progam was outlined in a 1974 report entitled "Senegal River Basin, Integrated Development Program" by Norbert Beyrard. The three main components of this program are:

a. Manantali dam - A multipurpose upstream reservoir of 11 billion cubic meters capacity, for irrigation of some 255,000 hectares plus hydroelectric power and river navigation, based on a regulated flow of 300 m3/second downstream from Kayes, Mali. Although Manantali will reduce flood peaks in most years, it cannot provide sufficient reduction of the highest probable flood peaks to eliminate unplanned flooding completely, since the storage effect of Manantali on the Baffing River will be partly offset by constructions on the flood plain due to road, levee and other construction. The flows of the Bakoye and Falémé will remain unchanged. Construction of Manantali is scheduled to begin in 1982 and be completed by 1989.

b. Diama dam - A low barrage to prevent salt water intrusion and permit irrigation of some 55,000 hectares. Until upstream storage is provided in a dam such as Manantali, Diama reservoir levels will fluctuate seasonally between 0 and 1.5 meters above sea level as its far more modest projected storage capacity of 250 million cubic meters is used to meet irrigation requirements in the Delta. After Manantali begins operation, Diama will be operated at a nearly constant water level of 1.5 meters to facilitate river navigation. Construction of the Diama dam began in November 1981. Its completion is expected by 1986.

c. A navigable waterway upstream to Kayes, Mali, plus nine river ports - OMVS foresees that this will provide year-round navigation to the sea for landlocked Mali.

The OMVS strategy is to strengthen agricultural research activities at the stations along the river in combination with the intensification of agricultural production, particularly the expansion of irrigated perimeters. Present plans call for an increase from about 29,000 hectares under irrigation in 1981, to 255,000 hectares in 2028. World Bank estimates place the potential for irrigation in the Basin at 430,000 hectares.

The OMVS feels that only large scale cultivation has the potential to meet long-term regional and national agricultural production goals. However, the OMVS emphasizes that large scale irrigation projects have not been as successful as smaller projects. Large-scale irrigation

techniques and organizational skills are lacking in the Senegal River Basin. The development of needed skilled manpower is most likely to appear with the evolution of small-scale irrigation in the Basin. With this in mind, the OMVS has evolved a strategy that involves a gradual progression from small irrigation projects to large projects.

For the first phase, the aim will be to introduce farmers to irrigation through the development of small irrigation projects. This is considered to be the most effective means of exposing the population of the Basin to the potential of irrigated farming while allowing the greatest latitude in matters of organization and technology. These small irrigation projects will occupy 60 per cent of the area brought under irrigation during the first phase. The OMVS feels that the potential of small projects as presently surveyed will be realized by 1986-1987.

As familiarity with and enthusiasm for irrigated farming increases and as the development agencies become more efficient in their extension and more successful with the farmers in the Basin, larger projects will be developed. Farmers on these small perimeters will be gradually introduced to more complicated forms of organization and schemes of water management but will still have their own plots.

During these first two phases, food crops will be emphasized: staple crops to meet subsistence needs for the farmer, and a surplus of food crops, including vegetables, to provide a cash income and thus integrate the population into the cash economy. After 1990, plans call for development to be focused more on the large irrigation projects, with emphasis placed on industrial crops and agribusiness.

Overall levels of irrigation in the Senegal River Basin are projected to reach 41,000 ha. by 1990. Of this, the majority will be concentrated in Mauritania (with 52% or 21,480 ha) and in Senegal (with 41.5% or 17,000 ha.). The remaining 6.1% will be in Mali and will primarily be small, pilot projects.

B. Agricultural Research in the Senegal River Basin

a. Regional Research

(1) History of Regional Research Activities

Since July 1967, France, Senegal and Mauritania through the Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières (IRAT)

have concentrated on improving traditional rainfed crops, irrigated rice, and sugar cane production. Mali later joined the research effort and the three experimental stations (Samé, in Mali; Guédé, Senegal;and Kaédi, Mauritania) were unified as a regional agronomic research unit. In 1968, FAO decided that research results obtained in IRAT's stations could be used in a four-year program (1969-1972) emphasizing extension to the farmer. FAO was also to concentrate on the improvement of traditional cultivation techniques including rice and sugar cane production in the delta area. By 1970, the results of this experiment were judged mediocre due principally to the irregularity of the rains. It was concluded that water remained the prime limiting factor for regional development of agriculture, and that agricultural research should be focused on irrigated agriculture or a "modern high yielding and rationally organized agriculture". (UNDP Review of Agronomic Research Project).

Given this new focus, the United Nations Development Program (UNDP) through its executing agency, the Food and Agriculture Organization (FAO), assumed full responsibility for the direction of agronomic research in 1970 under the policy guidance of the OMVS High Commission. Later, as UN funds became scarcer, the project found itself strapped for agricultural machinery and operating funds with which to expand the irrigated fields in each center.

Upon request of the OMVS, AID granted $960,000 in FY 1975 to the three centers to provide machinery ($600,000), an equipment advisor for one year ($60,000) and local operational funds for one year ($300,000). In FY 1977, another $300,000 was granted to the OMVS for an additional year of local cost support. In FY 1978, a third grant of $550,000 was accorded for local costs to the three centers.

AID inputs were successful in enabling the centers to continue functioning and even expand field trials. However, with the FAO project steadily declining, it became clear that a major re-orientation of the regional agronomic research effort would have to be developed. As a result, the Member States of the OMVS agreed that a new program should be launched, with each center managed by and responsible to its own nationals. The substantive program, however, including all donor assistance would be administered by the OMVS.

In FY 1978, AID executed a contract for the OMVS with the Consortium for International Development (CID) to design a cohesive agronomic research program (Agronomic Research Project II - Phase II) for three

research stations -- Fanaye, Senegal; Kaedi, Mauritania;and Samé, Mali-- representing the low, middle, and upper basins, respectively, of the Senegal River Valley. The design was to be based on the research objectives, cost estimates, and host country contributions of a four-year research program adopted at the 11th Extraordinary Session of the OMVS Council of Ministers in April of 1977 and presented for donor funding at the Club du Sahel meeting in Ottawa, Canada in May 1977 (OMVS DT 210/Rev.3). This research plan included a far-ranging, ambitious program embracing irrigated and other crop production, and including forestry, fisheries and livestock. After examining past and existing research activities and research needs, CID was to define a research program, develop the plans for the required infrastructure, and arrange for proper administrative procedures for implementation.

The work required took a year longer than the 18 months originally planned. A PP amendment was finally completed in August 1981 and reviewed by AID/Washington and the OMVS, both of whom requested substantial revisions and additions. These revisions were made between January and July 1982 by USAID/RBDO with contributions by the OMVS and USAIDs Mauritania, Mali and Senegal.

As a result of the delays in designing the Agronomic Research as a Project Paper Amendment for Phase II, the OMVS and Member States were faced with diminished operating funds for agricultural research. Nonetheless they chose to continue existing activities using their own limited resources and to seek other donor support. The OMVS direct funding support to the three stations was approximately $420,000 in 1981 and is about $400,000 for 1982. While Mali remains dependent on OMVS support for Samé, Senegal and Mauritania have been successful in mobilizing other donor funding for Fanaye and Kaedi. This interim period has thus demonstrated that there is a strong regional interest in agricultural research for the Basin and that a Basin-wide program must necessarily complement growing national research programs and have multi-donor involvement.

Donor funding for regional agricultural research during this period continued to come primarily from the UNDP through FAO. In 1978 a new project agreement (PNUD/FAO/RAF/78/030) was executed by the UNDP/FAO to provide technical assistance to the OMVS High Commission for establishing agricultural development methodologies in light of irrigated agricultural experience in the Basin and the future irrigation plans with the construction of the Diama and Manantali dams. This four-year project started in late 1978 with funding of $656,000 for 3 long-term experts, equipment and operating expenses. In 1979, the OMVS requested that the project be amended to provide additional assistance to study farming and management systems being used by irrigated perimeters, to establish low-cost model perimeters, to determine the feasibility of mechanized agriculture for irrigated perimeters, and to

study the integration of crop and livestock production within the irrigated perimeters. UNDP/FAO agreed to increase the project contribution by $473,556 for 2 more experts who would work at the research stations (an irrigation engineer and an animal husbandry specialist) plus a translator for the High Commission. Amounts were also included for establishing several self-governed village-level irrigated perimeters. These became known as CUMA-pilotes (Cooperatives d'Utilisation en Commun du Matériel Agricole).

Although the FAO project has been executed without major problems and the results appear promising, the future of the project is uncertain because of reduced UNDP funding. Project funding for the two field experts has ended, leaving only the central support to the OMVS High Commission. UNDP/FAO is now organizing an evaluation of the project. This evaluation will aid the development of specific programs and annual workplans for the Agricultural Research II Project.

C. Present Administrative Structure

The administrative structure that has been created to direct OMVS regional agricultural research activities is directed by CIERDA (Comié Inter-Etats de Recherche et de Développement Agricole de l'OMVS). CIERDA establishes agricultural research policies and priorities for the Senegal River Basin, reviews and divides program financing, evaluates the annual programs, and reports to the Council of Ministers which must give final approval for CIERDA actions. CIERDA is supported by a permanent secretariat which is the OMVS High Commission Division of Integrated Research. This Division receives, evaluates and approves for review by CIERDA the national research proposals, and then supervises implementation of research activities.

The Integrated Research Division also analyzes research reports, organizes research seminars, and keeps CIERDA informed of all research activities. Research proposals are prepared by researchers working under the supervision and coordination of their respective station directors and national research systems. Each agricultural research station is responsible for implementing the OMVS approved activities, preparing research reports and participating in regional seminars. A complete description of the administrative system and roles of each group is provided in the Implementation Plan, Section V. A.

D. The Research Program

The current OMVS research program as defined by the UNDP/FAO project has four major immediate objectives. These are:

(a) rational choice of crop and farming systems that are appropriate for each region of the Basin and that stress the intensification of cereal and forage production required to give a positive economic return from irrigation with complete water control;

(b) the selection, choice and introduction of varieties and cultural methods to improve present productivity and encourage profitable crop diversification;

(c) the refinement of irrigation development and operation, combining human and animal labor and machines to speed up the rate of development, as desired by the OMVS Council of Ministers;

(d) the refinement of techniques for integrating livestock production, intensive fish culture, and reforestation with irrigated crop production.

The current research is divided into two main themes — applied crop research and farming systems research. The application of crop recommendations from the research stations (particularly Kaedi and Guédé under two separate bilateral UNDP/FAO projects) on farmers' fields in irrigated perimeters has yielded the following results:1/

Rice (in the cool, dry season and wet season)

- average yields	4.5 - 5.5 t/ha/season
- best yields	6.5 - 8.0 t/ha

Corn:

- average yields in cool and dry season	1.3 - 2.5 t/ha
- best yields	2.0 t/ha

Wheat

- average yields	1.5 - 2.0 t/ha
- best yields	3.0 t/ha

Sorghum

- Little adapted because of bird attacks which are more devastating than for rice, wheat and corn.
- average yields without bird attacks 3.5 - 4.5 t/ha in cool dry season

1/"Rapport intérimaire", Assistance Technique au Haut Commisariat de l'OMVS pour le Développement Agronomique, FAO, Rome 1981.

Cowpeas

- average yields	1.0 - 1.5 t/ha
- best yields	2.0 - 2.5 t/ha

OMVS supported crop research has been concentrated on double cropping rotations that are now possible before the Diama and Manantali dams are built and on double and triple cropping rotations that will be possible after the construction of Diama and Manantali dams. The immediate double cropping program has tested cool-dry season corn followed by wet-season rice, and two systems of double cropping for rice (dry-hot-season followed by wet-season rice and cool-dry-season rice followed by wet-season rice). For the longer term program of double and triple cropping, five rotations are being tested; (a) cool-dry-season rice and wet-season rice; (b) hot-dry-season rice followed by cool-dry-season corn or sorghum (if there is adequate labor available to guard against birds); (c) triple culture of rice (varieties for the cool dry season are just being developed); and (d) triple cropping of cereals on lighter loam soils. Adaptive research underway for these rotations involves soil condition adaptations, transplanting techniques, soil fertility and conservation, and pest control.

The second general research theme has been the improvement of cropping systems, particularly those used for irrigated agriculture. The use of large and small perimeter techniques has been studied from a technical/economic viewpoint and a socio-economic viewpoint. The present lowest cost-per-hectare for irrigation development is 400,000 to 500,000 FCFA for small perimeters compared to 236,674 FCFA/ha for large perimeters and the yield per hectare has also being higher for small perimeters (4.5 to 5 t/ha)1/. The OMVS socio-economic studies have shown that small perimeters use more local labor than large perimeters (200 to 300 days of work per hectare compared to 40 to 50 days of work per hectare). The return to labor in the small irrigated perimeters is 15 kg of paddy rice per day of work when the average production is 4.5 to 5 t/ha; whereas in the traditional recession agriculture the average return for a day of work is only about 6 kg per day of work1/. Despite these encouraging statistics, considerable problems still exist for small irrigated perimeters. Additional research is needed to address: (a) the optimal size of areas allotted to a family within the producer groups, (b) the risk of flooding, (c) the lack of markets and poor monetization of production, and (d) the lack of amortization funds for replacing worn out equipment.

Present research methodology has used experimental farms in the Basin to address farming systems questions. The major research undertaken

1/ Etude Socio-economique OMVS/PNUD, 1979/1980.

so far has been at two pilot perimeters called CUMA-Pilotes (Coopératives d'Utilisation en Commun du matériel Agricole) in Senegal at Gaé (Dagana) and at Guédé. The pilot cooperative of Gaé is included in the irrigation network of the Dagana large perimeter. The Gaé CUMA encompasses 7 groups of 15 persons each or 105 farmers and has an investment of about 182,000 FCFA/ha. This CUMA has tested rice, wheat and tomato production schemes with rice posing the fewest technical problems and being the most profitable for the farmers. Wheat was abandoned by the farmers after the low return from the 1977/78 crop. The cooperative has established an amortization account in St.Louis for replacement equipment so that after three years it appears as if a farmer self-management of agricultural material is viable and can be self-financed if (a) the equipment is simplified, (b) farmers are given more management responsibility and more training in equipment maintenance and financial management, and (c) all farmers become involved in the operation of the cooperative.

At Guédé, the second CUMA-pilote was set up to test double cropping (and possible triple), since Guédé has water available year round, and to try an autonomous management scheme within a larger irrigation network. The lessons so far gained from Guédé are that: (a) a smaller area should be allotted to each family (Guedé used 2 ha pilots) so that they can handle the transplanting and other intensive labor needs with available manpower; (b) the farmers should choose their annual crop rotations (at Guédé farmers prefer double cropping of rice); (c) certain farmers (on light loam soils) could cultivate a third crop of sweet cron or even wheat in the cool dry season after the two crops of rice; (d) a more rational use of available equipment by the CUMA is needed; and (e) a forced savings system for the replacement of agricultural equipment should be established.

Using the experience of the CUMA-Pilotes at Gaé and Guédé, an experimental farm for Mauritania was designed for Sylla near Kaédi. This experimental farm has been slow starting because of the lack of credit and equipment that was expected from CNRADA*. Building on the lessons from Gaé and Guédé, the CUMA at Sylla will (a) utilize simpler agricultural material to reduce production costs and increase local labor use; (b) have farmer maintenance of the equipment and of the irrigation network; (c) test the reactions of villages to land tenure questions; (d) use the common diking system established for the national seed multiplication center; (e) use a plot allocation of 1 hectare per family; and (f) test a double rice crop.

Based on the CUMA experience, the creation of small self-managed cooperatives within the larger perimeters is now encouraged by several

*CNRADA: Centre National de Recherche Agronomique et de Développement Agricole

donors, the first of which is included in the new financing for the large perimeter at Nianga in Senegal. Six or seven medium size perimeters will be established within a large perimeter. They will share a common workshop and irrigation network that none could support individually. This type of regrouping is also planned for the Sylla-Rindjao-Bélinabé farmers in Mauritania and for the expansion of the Gaé CUMA within the Dagana perimeter.

E. Future Research Needs

Based on OMVS/FAO analysis,[1/] the four principal problems that have inhibited the realization of the agricultural objectives of the OMVS, particularly its pace of development are: (a) the high costs of irrigation development required for water control; (b) the high production costs of the irrigated perimeters; (c) the large recurrent costs to the national development organizations; and (d) the growing debt of farmers in the irrigated perimeters.

The FAO concludes that only appropriate varieties and production techniques for rice have been developed to the extent that they can be readily used by the farmers. Similar varieties and production techniques for other cereals have not been proven under actual farm conditions. For wheat, farmers have not obtained yields approaching research station results and are thus reluctant to expand cultivation. The problem of adapting the tropical varieties of CIMMYT* to on-farm Sahelian conditions has not been completely resolved. The wheat suffers most from the harsh dry desert winds, or "Harmattan", and the elevation of temperatures late in the coal-dry growing season. For sorghum the two major problems are the low return under irrigation relative to other cereals and the susceptibility of sorghum to attack by birds. The same two problems also exist for corn, but are not as severe. Cowpeas is an important inter-season crop much appreciated by the villagers, but it has not been studied for production under irrigated conditions, except for the testing of a few varieties obtained from IITA+. For all cereals, extensive on-farm trials are needed to support further adaptive research. Further detail is provided in the "Technical Analysis", Section VII.A.

For vegetable production, the FAO recommends that research be concentrated in the coastal, delta region, since the major marketing channels and areas of consumption are along the coast. For the middle valley, FAO recommends research on vegetables that are presently consumed locally like the sweet potato, cassava, cucurbit, peppers, etc. Fruit research has been successfully undertaken at Kaedi and should be continued, not for exportation but for local consumption in urban areas like Nouakchott and St.Louis which presently import foreign grown fruit.

1/ Rapport Intérimaire, FAO 1981.
* Centro International de Mejoramiento del Maiz y Trigo
\+ International Institutue on Tropical Agriculture

Another important area which has been ignored in much of the perimeter development is the integrated livestock production. Research is needed on the production of irrigated pasture crops adapted to the needs of herders (possibly a refined lowland recession forage production system), and on the on-farm raising of livestock, considering animal management, health, and the preservation and storage of fodder

Further, considering integrated mixed farming system and environmental concerns, the OMVS is also interested in promoting forestry and fishing activities for soil protection and conservation research, tree species and windbreak development. The OMVS program also included follow-up of the experimental village fish pond activities in Senegal with studies and research to integrate agriculture and intensive pisciculture in the Basin.

F. Research in Senegal

(1) Historical Development of the National Research System

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 cropping 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 Vivrières (IRAT). Senegal took over management of the station in 1975 when the Institut Senegalais de Recherche Agricole (ISRA) was created, and the station at Bambey 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 responsibilities for all 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 Medicine 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 Scientique et Technique (SERST). Under the present administrative structure, the Minister for Science and Technology, who heads SERST, reports to the Minister of Higher Education. He has the 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).

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. 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 for techniques in a controlled environment; (b) on-farm research to better understand farmer production goals and (c) macro-economic studies of the agricultural sector and sub-sectors.

Concurrent with the prepartion 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 Rockfeller Foundation, to work in collaboration with ISRA to prepare a Master Plan for implementating the National Indicative Plan.

The Master Plan was submitted to the Government and World Bank in January/Fabruary 1979, reviewed and found generally acceptable. The plan made three major proposals: (a) reorganization of ISRA and regionalization of agricultural research; (b) coordination and integration of commodity and production systems research program; 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; and (d) the Casamance Region in the higher rainfall areas of the south.

Following these general recommendations, 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. 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. The 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 was accepted by the Bank's Board of Directors in June of 1981.

Meanwhile, USAID/Senegal prepared a bilateral 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 as the project contractor under AID Collaborative Assistance Selection Procedures. The Project Paper was prepared during December 1980 to April 1981 and a Project Agreement was executed in June 1981. The USAID/Senegal Agricultural Research and Planning Project (625-0223), the complementary Title III Decentralization of Research Subproject, and the World Bank Senegal Agricultural Research Project are all now being implemented.

(2) Present Administrative Structure

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

ISRA's research program for the Senegal River Basin consists of production systems and commodity research. This research will primarily be undertaken at Fanaye, where new research facilities are being built. The production systems team for the Senegal River Region will consist of a general agronomist, agronomist for weed control, animal production scientist, agricultural economist (farming systems), rural sociologist, agricultural engineer, and extension specialist. Commodity research will be undertaken by a breeder who will spend half time on sorghum and half time on maize; and a rice team consisting of two breeders, a pathologist and an entomologist. Planned staffing for these positions is the following:

Farming Systems Team:

- General Agronomist : France
- Agronomist (weed control) : Senegal (financed by WARDA)
- Animal Production Scientist : Senegal
- Agricultural Economist* : USAID/Senegal (Senegalese counterpart)
- Rural Sociologist : Senegal
- Agricultural Engineer : Senegal
- Extension Specialist* : USAID/Senegal (Senegalese counterpart)
- 7 Senior Technicians : Senegal
- 7 Junior Technicians : Senegal

Commodity Research:

- Sorghum and Maize Breeder : France
- Rice Breeder : WARDA (Senegalese counterpart)
- Rice Breeder : Senegal (financed by WARDA)
- Pathologist : Undetermined
- Entomologist : Senegal (CILSS financed)

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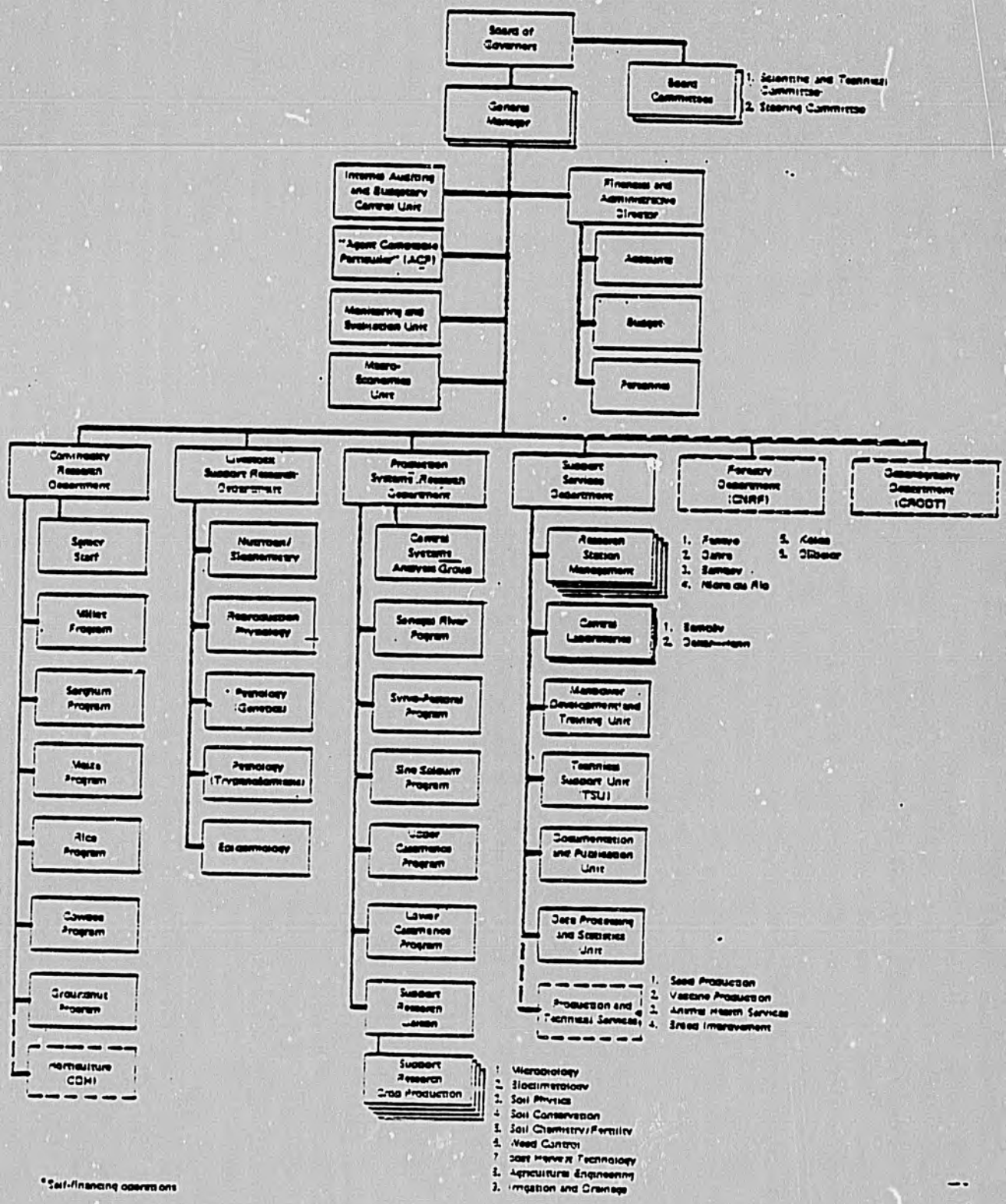
* Funded under Present Project

Figure II - A

SENEGAL
AGRICULTURAL RESEARCH PROJECT
ISRA ORGANIZATION CHART



*Self-financing operations

(3) The Research Program

The ISRA research program involves the following .

(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 is 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 programs on groundnuts, cowpeas, sorghum, maize and rice; and

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

Within the context of the overall program, specific research projects are proposed by the research scientists and coordinated by the Research Station Director. These projects are submitted to ISRA headquarters for approval by their respective departments, Production Systems and Commodity Research. The research programs and budgets are reviewed annually by workshops for ISRA research staff. Subsequently, the programs and budgets are 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 is being formed under the World Bank Agricultural Research Project. This group will promote informal discussions on the annual program of work and needed financial support. It will meet at least once a year, three months before the end of each fiscal year to exchange views with the Government of Senegal on progress of the program and on other matters related to the objectives of the program. Efforts will be made to hold the Group's meeting at the same time as the annual internal and external research program reviews. The Group will be convened by SERST and provided with an agenda and all relevant documents.

The implementation of ISRA's decentralization program over the six-year period (1961-86) is estimated by the World Bank to cost $129 million with a foreign exchange component of 52%. Senegal is contributing $42.6 mil-

lion which will finance all local staff, initial expenses, working capital and 50% of operating costs. Total external financing of $86.4 million (70% of total costs) will cover 100% of foreign exchange costs ($67.1 million) and 31% of local costs. External financing is being 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 other donor financing is being sought.

For the Fanaye Research Station the World Bank estimates costs over the next six years to be the following:

(CFAF '000)	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6	Total
Capital Costs	381,771	605,268	84,429	38,914	56,714	25,414	1,192,51
Research Staff	135,000	231,000	234,300	205,050	163,050	158,100	1,126,5C
Operating Costs	120,691	129,893	122,246	111,610	101,901	89,997	676,33
Total	637,462	966,161	440,975	355,574	321,665	273,511	2,995,34

(4) Research-extension Linkages

Agricultural research is linked to extension efforts through Regional Development Agencies (RDA's) that cover most of the country. These RDA's are: SODEVA in the groundnut Basin, SODEFITEX in Eastern Senegal, SOMIVAC in Casamance, SAED in the Senegal River Valley, SODESP, an agency responsible for promoting livestock production in the sylvo-pastoral zone, and STN for vegetable production in the coastal area north of Dakar. 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 agricultural extension. Most recently the RDA's have been

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1/ This figure does not include $1.5 of Title III, $0.7 million under the Senegal Cereals Production Project, Phase II, and the increased amount financed by this project.

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

given more management autonomy, and more specific output targets but less autocratic control over production and marketing as part of a government decentralization policy. The development agencies are under the Agricultural Production Department (DGPA) of the Ministry of Rural Development, with independent Boards of Management and Directors. They all receive a large share of their funding from international donors and to various levels, operate with some autonomy.

Some extension services are also provided by two other organizations, the Rural Development Centers (Centre d'Expansion Rurale Polyvalent-CER) and the Department of Livestock and Animal Production within the Ministry of Rural Development under the Ministry of Promotion Humaine. CER operates in 27 departments, and 93 districts in all eight regions of Senegal 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 RDA's and the research organization, this linkage needs to be improved and strengthened. One of the reasons for the poor communication between ISRA and the RDA's is that the development agencies are fairly new organizations and they operate with some 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 RDA's and ISRA. This officer, a former research scientist, has the responsibility for keeping ISRA informed of research needs as perceived by the RDA's. The Scientific and Technical Committee of ISRA on which the RDA's are represented, is another vehicle to make research needs known.

Within several bilateral agricultural development projects, USAID/Senegal is strengthening regional research-extension linkages by requiring that a protocol agreement be established between ISRA and the relevant RDA. The use of such agreements is already widely used in the Senegal River Region of Senegal for accompanying research (recherche d'accompagnement) that is contracted by SAED from ISRA. This type of contractual research supports nearly half of the ISRA/Fanaye's current research.

(5) Agricultural Training

Technical training in agriculture is offered at a number of institutions. 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 has a capacity of 150 students and 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 for Senegal. The college will have 200 students with 40 graduates per year, and be located in Thies, about 70 kms from Dakar. Students will be recruited at the baccalaureat level for a five-year program - a first year at 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 three to five, 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 RDA's which will employ many of the graduates. In 1981, the first group of students was admitted to this program.

The Ecole Inter-Etats des Sciences et Médecine Vétérinaires 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 francophone countries. Students having completed a "Baccalauréat - Second Degré"(*) 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 Master's Degree in Veterinary Science intensive, does not provide in-depth speciality training nor does it allow extensive exposure to research methodology (other than the non-course work thesis year). Therefore, graduates wishing to pursue a career in research usually require additional, post-graduate training.

(6) Constraints on Effective Agricultural Research in Senegal

In the past, Bambey (CNRA) has served, de facto, as the national crop research center. Research at the Fanaye and Djibelor stations has been confined largely to rice although some limited research with other crops has taken place in Fanaye. Crop research has had in the past several major characteristics: (1) it was concentrated in one research station at Bambey in an area with relatively low potential for production increases, (2) it had weak links with agricultural extension, concentrating most heavily on plant varieties and not based on farmers' perceived problems or needs; (3) it was organized along disciplines, limiting broadly oriented

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(*) "Baccalauréat" = 12th Year H.S. + 1 Year College Equivalent.

research programming and coordination; (4) it was concentrated on research stations with little research done on farmers fields; and (5) it included very little socio-economic research.

The new ISRA structure and the decentralization of research program being coordinated by the World Bank have been designed to address these problems. The OMVS Agricultural Research Project will contribute to this effort by aiding the reorganization and strengthening the research program at Fanaye for the Senegal River Region of Senegal.

G. Research in Mauritania

(1) Historical Development of the National Research System

Although the French conducted some earlier agricultural research in Mauritania through their research facilities in Senegal, the first major research effort in Mauritania started in 1949 with studies on African palm at Kankossa. These studies led to the biological control of the white scale and the rehabilitation of selected palm orchards in the Adrar, region of Mauritania. In 1959, the French financed the creation of a permanent research station at Kankossa to continue research on African palms. This research began to branch into other areas including rainfed agriculture. However, the Kankossa location was not well suited for a diversified research program. The station has since been abandoned.

The French had also established research activities in Kaedi starting in the mid-60's. This research was administered as a substation of IRAT,(*) centered at Bambey, Senegal. In 1974, Mauritania created the National Agricultural Research Center - CNRADA (Centre National de Recherche Agronomique et de Développement Agricole). Most research from Kankossa was moved to Kaédi which became the headquarters for CNRADA. It was given the mandate of organizing, executing and disseminating all research concerning agriculture and the promotion of agriculture in Mauritania. This mandate included research in plant selection, seed production, production techniques, farming systems, mixed animal and crop production, soil and water conservation, crop protection, and agricultural engineering. CNRADA was also given the responsibility for introducing new varieties, developing extension methods, conducting economic agricultural sector studies, documenting and disseminating research results, and providing short-term training in the areas covered by the center. This was a broad mandate that has never been fully realized because of the continual lack of funding and trained personnel for CNRADA activities.

(*) Institut de Recherches sur l'Agronomie Tropicale et des cultures vivrières.

(2) Present Administrative Structure

The National Agricultural Research Center was created as an autonomous institute within the Ministry of Rural Development. CNRADA is governed by an Administrative Council (Conseil d'Administration) that has twelve members and includes representatives of the Ministries of Rural Development, of Plan, and of Finance. The Center has its headquarters at Kaédi and is managed by a Director and an Assistant Technical Director. CNRADA's organization chart is shown in Figure II C. There are four major services: (1) Administration and Finance, (2) Plant Improvement, (3) Soil Improvement and Environmental Study, (4) Rural Economy and Extension. The Plant Improvement Service is further divided into nine Divisions for subsistence crops, vegetables, fruits, crop protection, rice, industrial crops, research applications, pasture, and forestry. The Soil Improvement and Rural Economy Services have two divisions each. In addition to the principal research fields at Bélinabé and the fruit station at Rindiao, CNRADA administers four substations located at Sélibaby, Kankossa, Nema and Barkeol.

CNRADA staff currently consists of 3 Mauritanian researchers (one of whom is the Director), 3 expatriate researchers, 7 research assistants, 7 research technicians and a support staff of about 77. The FAO finances one researcher (for rice) and GERDAT and FAC have each provided one researcher (for cereals and vegetables). CNRADA has managed to develop a sound research program in several areas, but the continuity and quality of this program has been hampered by low national funding and by diverse and uncertain international donor support. In 1980, CNRADA received approximately $100,000 from the Mauritanian government for operating expenses, and in 1981 the national budget contribution was increased to about $140,000. This is supplemented by the following existing or expected contributions from international donors:

(a) FAC has provided financing of about 5.5 million FF for the construction of research facilities in Kaédi. The architectural design has been approved by the Mauritanian government and the invitation for bids for construction has been issued. Construction is expected to begin later in the year. FAC also provides one researcher CNRADA and has recently decided to send an evaluation team to Kaédi to explore possible additional support.

(b) GERDAT[1/] signed an agreement with CNRADA in 1976 to provide 2 researchers in vegetable and fruit production. The vegetable production expert is presently working at Kaédi.

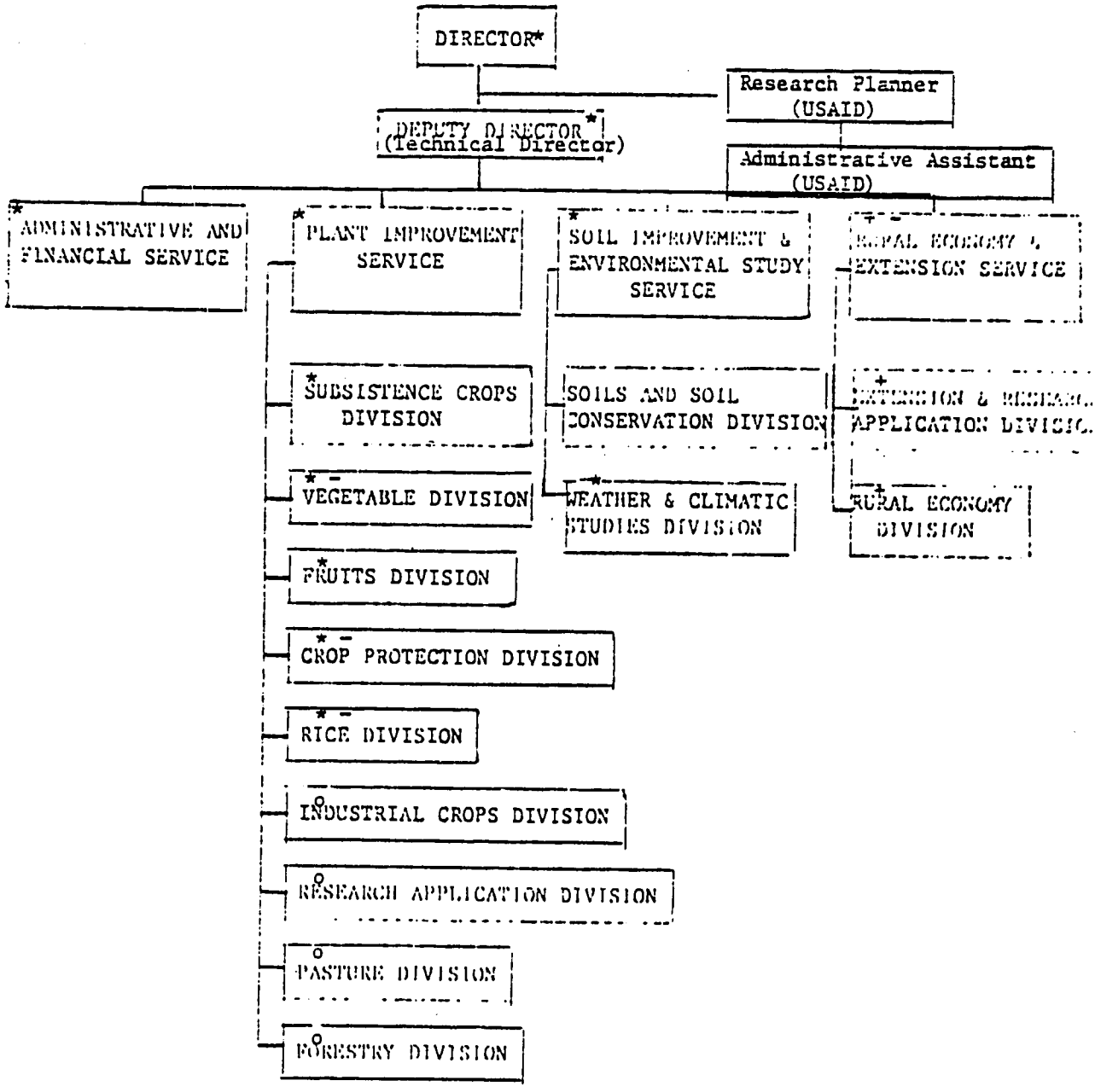
(c) FED[2/] funds a varietal improvement program administered by CILSS that is contributing $40,000 in 1981/82 for millet, sorghum, corn and cowpea trials.

1/ GERDAT = Groupement d'Etudes et de Recherche pour le Développement de l'Agronomie Tropicale (France).

2/ FED = Fonds Européen de Développement.

FIG. II-B

CENTRE NATIONAL DE RECHERCHE AGRONOMIQUE ET
DE DEVELOPPEMENT AGRICOLE - KAEDI, MAURITANIE
RESEARCH CENTER ORGANIZATION CHART.



KEY:

- * Position occupied
- - Staff in training or to be trained
- o Vacant
- + Planned but not approved

(d) SAGFRAD has provided funding to be administered by FAC for 1 year for a cereals agronomist and $25,000 in operating support. An agronomist has not yet been found for this position.

(e) UNDP/FAO has provided a rice agronomist and operating costs of about $26,000 per year under a bilateral agreement and a livestock and an irrigation specialist under a regional agreement with the OMVS that has recently ended due to lack of UNDP funding.

(3) The Research Program

The present research program of CNRADA is focused at Kaédi and nearby research fields. Research activities include experiments for the selection of plant varieties, production of selected seeds, improvement of farming practices, studies of factors affecting production (such as climate, soil, water requirements, fertilizers, etc.) as well as experiments on vegetable and animal production, and on the use of agricultural machinery.

The best research results have been achieved in those areas where external funding and expatriate research assistance has been continually available. This is primarily due to meager and uncertain national funding (CNRADA receives less than one third of its annual budget request). The most effective programs have been in vegetable, fruit and rice research. (The research results to date are given in the "Technical Analysis", Section VII A).

(4) Research-Extension Linkages

In the past, linkages between research and extension were almost non-existant or very limited at best. The primary linkage was at the top through the Administrative Council for CNRADA that includes representatives from each of the major national services having extension responsibilities. At the field and operational level, linkages that existed were informal and largely on personal contacts between the research and extension services. There were almost no formal connections or coordinating mechanisms except that in some instances individuals were designated as contact personnel with coordinating responsibilities.

The research-extension liaison problem is complicated by the existence of five different extension agencies with overlapping and sometimes conflicting mandates. CNRADA itself has an ambiguous title (National Center for Agronomic Research and Agricultural Development) that includes agricultural development and a mandate that involves the introduction of new species and varieties, and studies of extension in rural areas concerning application of research results in farming systems and use of new production

techniques. In the past, CNRADA approached on-farm testing by organizing pilot perimetes near Kaédi and hiring farmers to work under CNRADA supervision. Because of budgetary and management problems these farmers are now working on their own with advice and monitoring from CNRADA. The experimental farm system was never expanded beyond the Kaédi area. More recently, certain aspects of pre-extension testing, like fruit testing at Sany, have been detached to development projects where funding is more assured.

In the future, the research-extension linkages will become more formal and stronger, particularly between CNRADA and SONADER which is responsible for irrigation development in Mauritania all along the Senegal River. SONADER has recently designated an expatriate technician at the national level to coordinate activities between SONADER and CNRADA. Furthermore a protocol agreement was recently signed by CNRADA and SONADER which is designed to rationalize and improve research - extension linkages between the two organizations.

(5) Agricultural Training

At the present time Mauritania offers very limited opportunities for pursuing a career in agricultural research. In general, advanced training for upper level technicians is undertaken overseas in countries such as Morocco and France.

Training for lower level agricultural research personnel, however, is carried out within Mauritania. The National Training and Extension School (Ecole National de Formation et Vulgarisation - ENFVA) at Kaédi trains lower and middle level agricultural agents. This school presently has 106 students and graduates 30 to 40 students per year. These graduates become agricultural agents and technicians with CNRADA, SONADER, or one of the other extension services in the Ministry of Rural Development.

Because of the availability of several scholarship programs, Mauritania is now beginning to build up its national research personnel. Three students left in 1977 under FAC financing to study cereal, vegetable, and fruit production in France and will return to CNRADA in September 1982. In addtion, five more scholarships were provided by FAC in 1981 for training through GERDAT. Three students left in September 1981 and should return in 1984. The two remaining scholarships have not yet been awarded. SAFGRAD has also provided a scholarship for graduate training in crop protection. This candidate has been nominated and is scheduled to leave for a two-year program starting in September 1982.

(6) Constraints on Effective Agricultural Research

The agricultural research program in Mauritania faces major financial and human resource constraints. The principal financial constraint is due to generally low budgets for the rural sector in recent years. Although CNRADA's budget has experienced a recent increase (from $100,000 in 1980 to $140,000 in 1981), it is significantly lower than requested by CNRADA in 1980 ($320,000) and in 1981 ($440,000). Consequently, CNRADA has had difficulties in developing a good research program and even in paying suppliers and salaries. In view of these financial constraints much of the research program, has not been executed and creation of the physical infrastructure has been delayed until external financial support was found.

A second major constraint is finding and training personnel for agricultural research. Although CNRADA has been the beneficiary of several scholarships (as noted above) it has had difficulty in recruiting candidates with the bachelor's degree required. In the future, training programs need to be long-term oriented and to start with lower initial training, in order to get qualified candidates and not to create temporary critical manpower shortages while participants are off in training.

The third major constraint has been the lack of applied research and linkage to extension activities.

In summary, Mauritania has established a broad, extensive national research program but lacks the financial and human resources to support it. Agricultural Research II will help fill the support gap, and will also help Mauritania orient national activities within a regional, Senegal River Basin focused program.

H. Research in Mali

(1) Historical Development of the National Research System

The existing Government structure for agricultural research was established in November 1960 by the creation of the Institute of Rural Economy (Institut d'Economie Rurale - IER) under the authority of the Ministry of Agriculture. The IER was mandated to direct research, evaluation, study and planning for rural development, by serving as a permanent coordinating body among the services directly responsible for research, planning and evaluation. IER has four specific functions: (a) national programs for agronomic research and for farming system research; (b) studies for agricultural development projects; (c) planning and evaluation of agricultural projects; and (d) technical supervision of all actions to introduce and extend new agricultural technologies.

The principal agricultural research program was established at Sotuba just outside Bamako and later expanded to include a national network of stations specialized by research field. The station at Samé was started in 1965 as a state farm. It later became a training center and seed production farm and finally a research and training center in 1968. The seed production and training operations still exist at Samé, but are now administratively separate operations.

Until 1976 all SRCVO activities (Section de Recherches sur les Cultures Vivrières et Oléagineuses) were conducted by IRAT. The national emphasis was in varietal listing of sorghum, millet, and maize lines provided from IRAT's regional stations in Senegal, Niger, Upper Volta and Ivory Coast. Mali was a satellite of the larger regional IRAT program. The agronomic emphasis stressed plowing using animal traction and fertility trials. It was under IRAT's supervision that the PARS (Points d'Appui de Recherche) and the PEPS (Points d'Experimentation Preliminaire) were established. The PARS are research substations of 20-30 hectares, staffed by Malian researchers. The PEPS are smaller, less fully equipped stations wherein experimentation is done under farm conditions.

Research on food crops was not included in the Malian national budget until 1976. At this time there was a shift to a more integrated approach involving collaboration with CGIAR[1/] centers, including ICRISAT,[2/] IITA and CIMMYT. Since 1976 the Malian research objectives have emphasized self-sufficiency in food grains, use of indigenous rock phosphates, and improved cultural techniques.

(2) Present Administrative Structure

The organization chart for IER is shown in Figure II C. There are six divisions: (a) administration and finance, (b) documentation and information, (c) planning and evaluation, (d) technical studies, (e) agronomic research, and (f) farming systems research. All crop research is carried out under the Agronomic Research and Farming Systems Research Divisions. The Agronomic Research Division is the major division of IER. It contains six sections which direct all crop research in the country. The Farming Systems Division is a new division established in 1979 to direct a multidisciplinary research effort in the South of Mali. This program is being implemented with donor assistance as a test program which could later be expanded to other areas of the country.

Within the Division of Agronomic Research there are six sections:

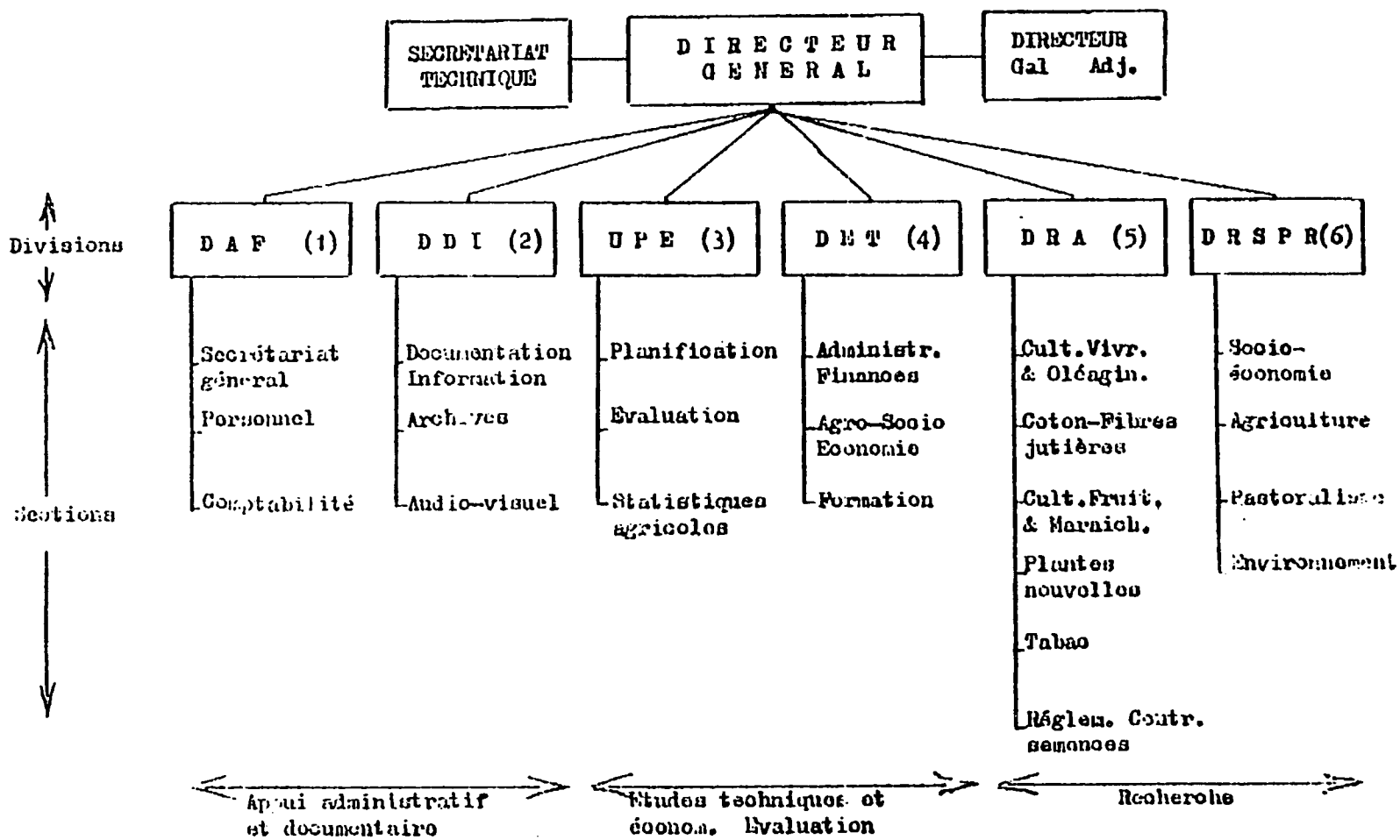
(a) Research on cereal and oil crops, including millet, sorghum, maize, rice, groundnuts, and cowpeas. (Under this section are the Research Stations at Sotuba. Kogoni and Diré and five substations around the country. The sections coordinate national programs for varietal improvement, cultural techniques, multi-local trials, and crop protection).

1/ CGIAR = Consultative Group on International Agricultural Research.

2/ ICRISAT = International Crop Research Institute for the Semi-Arid Tropics.

ORGANIGRAMME DE L'INSTITUT D'ECONOMIE RURALE

ANNEXE n° 2



(1) Division administrative et Financière
(2) Division de la Documentation et de l'Infozmation
(3) Unité de Planification et Evaluation
(4) Division des Etudes Techniques
(5) Division de la Recherche Agronomique
(6) Division de la Recherche sur les Systèmes de Production Rurale

Figure II - C

(b) Research on cotton and fibrous plants undertaken at two stations at N'Tarla and Kogoni, two substations and two demonstration sites.

(c) Research on fruits and vegetables undertaken at Bamako, two sub-stations and two demonstration points.

(d) Research on new plants, particularly local tea at Sikasso.

(e) Research on tobacco at Samanko (20 kms from Bamako), and activities for the quality control and certification of improved seeds directed by the Station at Sotuba.

Mali's research program for the upper Senegal River valley is located at Samé, near Kayes in the First Region, and has included cultival selection trials for wheat, sorghum, millet and maize during the last few years. The research station includes two sites, the main station at Samé with about 60 has and additional fields of 11 has at Kamenkolé, about 5 kms west of Samé. Current staffing at the Samé Station includes only two professional researchers (the Station Director and his assistant), 4 technicians, and about 15 labors, drivers, etc. This skeletal research operation is currently financed completely by the OMVS (approximately $210,000 in 1981). For the start of the project, planned station staffing is the following:

- Director (Malian)
- Chief of Administration and Finance (Malian)
- Crop Research:
  - Agronomist (Expatriat)
  - Agronomist (Malian)
  - Horticulturalist (Malian)

(3) The Research Program

At Samé, research has been principally focused on agronomic and varietal questions pertaining to irrigated crops, particularly wheat, rice, corn and pigeonpea. Agronomic questions have been focused on planting dates, fertility levels, and plant populations. Varietal screening has been facilitated by nurseries provided by international and regional research institues such as CIMMYT[1/], IRRI[2/], WARDA[3/], and ICRISAT. Research results have generally been consistent across seasons and similar to results elsewhere in comparable zones. Limited dryland crop research has been conducted at Samé as OMVS funding stressed irrigated crop along the river. Dryland agricultural is, however, very important to the area as rainfall is within 650 and 800 mm. Dryland research is, therefore, of great relevance to the farmers of the area. The Samé station has conducted sorghum, pearl millet, cowpea and groundnut trials in collaboration with SRCVO and with ICRISAT/Mali.

1/ CIMMYT = Centro Internacional para el Mejoramiento de Maïz y Trigo.

2/ IRRI = International Rice Research Institute.

3/ WARDA = West African Rice Development Association.

These results are, however, limited to the ecologies bordering the river. The Samé OMVS Research program can, in the future, initiate its own strategy for dryland research in concert with the ongoing programs of SRCVO and associated agencies (ICRISAT, IFDC, SAFGRAD, IITA, etc.). In order to reflect the ecological realities of the upper Senegal Basin, additional sites representative of the other important agro-ecologies must be identified for conducting multilocational, relatively modest research.

There are basically three crop ecologies in the area: dryland, decrue, and irrigated. The Samé research station could serve as the coordinating unit for research conducted at stations representing these three zones. Recently, ODIC (Office de Developpement Intégré des Productions Arachidières et Céréalières) has reopened the substations of Sadiola and Bafoulabe. ODIK (Operation du Développement Intégré du Kaarta) has opened a station at Bema. OVSTM (Operation Vallée Senegal du Terekole et du Magui) is also in the zone. To represent the ecologies of the area, 6 to 8 substations have been identified as test sites.

Future research will emphasize the following:

Maize—testing of CIMMYT composite lives;
Cowpeas—testing of introduction from Nigeria for Bruchid resistance and yield increase;
Sorghum—ICRISAT/Mali is developing a seires of breeding populations based on local disease-resistant cultivars. Emphasis has been on yield and culinary quality. Testing of photoperiod sensitive lines is expanding;
Millets—testing of high tillering and disease resistant millets crossed from among local collection;
Agronomy—intercropping of sorghum and cowpeas, and maize and cowpea. Water management studies associated with INTSORMIL and ICRISAT.

Current financing for the Institut d'Economie Rurale (for 1980) is about 1,242 million FM ($2.5 million). Of this amount 37% is financed from the national budget, 58% from external donor financing, and 5% from self-generated funds (sale of seeds, etc.). The agronomic research program accounts for approximately 63% of the total budget costs.

The total external financing for cereal and oil crop research of 502 million FM (about $1 million) in 1981 is broken down among several donors as follows:

	(000's FM)
- Canada, Niébé Project	48,257
- CILSS, Integrated Pest Management	112,253
- International Fertilizer Development Center	15,000
- CILSS, Millet, Corn, Sorghum, Cowpea Improvement	10,131
- WARDA, Rice trials	6,078
- Kuweit, Soils Analysis	14,000
- FAC, Laboratory construction	15,000
- FAO, Diré Station assistance	19,270
- ICRISAT, Mali Project	106,000
- SAFGRAD, Mali Project	122,787
- FIRMES, Pesticide Experiments	450
- CIBA-GEIGY, Equipment for Cinzana Station	32,667
	501,893 FM
	(US$ 836,000)

For the Samé Station the current operating budget is completely financed by the OMVS. This budget is broken down as follows:

	1981	1982
Personnel	141,000	116,000
Supplies	58,000	48,000
Equipment	11,000	-
	210,000 FM	164,000 FM
	(US$ 350,000)	(US$ 273,000)

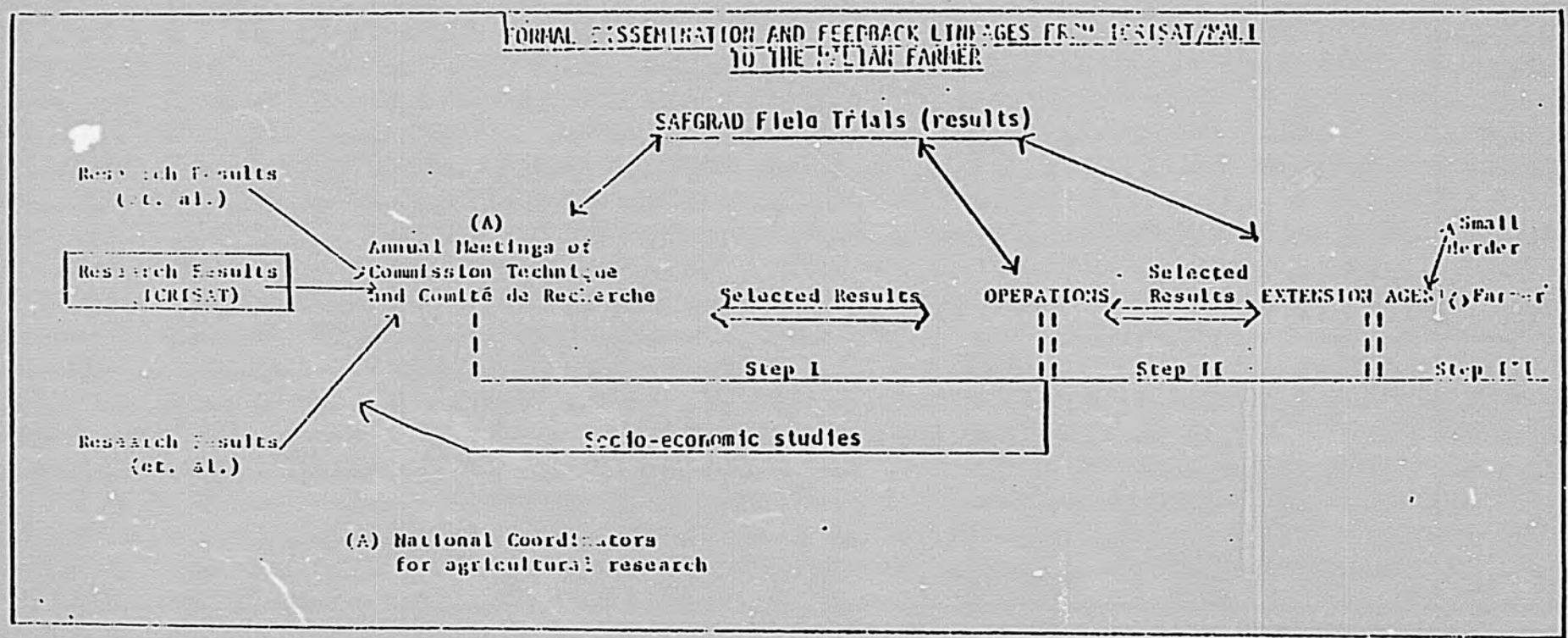
With the completion of the capital development and staff expansion at Samé, the recurrent costs will be approximately $300,000. This is an increase of about 50% over current costs, but is a level required if a meaningful program is to be developed and maintained at Samé. The costs are in line with recurrent costs within the rest of the research systems.

The IER has a considerable staff and infrastructure in place and has managed to keep it functioning. If there is no further deterioration in the general economic situation over the life of this project, it is expected that Mali will be able to keep the salaries and basic programs functioning. However, as in the past, a continuing support for Malian research from the international community will be required. Along with economic and administrative reforms planned, the present move to reduce state operations in certain areas could result in additional resources in the general budget. Given the general recognition at the cabinet level of the importance of research to the agricultural sector, it is likely that IER will be one of the organizations to benefit from these funds.

(4) Research -Extension Linkages

Agricultural research is linked to extension efforts through Regional Development Agencies or "Operations" that cover most of the country. For the First Region, covering the area surrounding the research station at Samé, the regional development organization is the "Office Vallée du Sénégal Térékolé-Magui" (OVSTM). OVSTM has been responsible for the organization of cooperative groups and the extension of agricultural technologies in the

Figure II - D


FORMAL DISSEMINATION AND FEEDBACK LINKAGES FROM ICRISAT/MALI
TO THE MALIAN FARMER
SAFGRAD Field Trials (results)
Research Results
(et. al.)
Research Results
(ICRISAT)
(A)
Annual Meetings of
Commission Technique
and Comité de Recherche
Selected Results
OPERATIONS
Selected
Results
EXTENSION AGENTS
Small
Farmer
Farmer
Step I
Step II
Step III
Research Results
(et. al.)
Socio-economic studies
(A) National Coordinators
for agricultural research

Kayes area. OVSTM presently suffers from limited financing and from organizational and managerial weaknesses, but will soon be assisted and strengthened through the USAID/OMVS Integrated Development Project.

The Samé research staff participates in both the Commission Technique and the Comité Nationale de la Recherche and gives an annual report. It is through this process that all research, including that conducted by CGIAR centers, is approved and coordinated by the ministry of agriculture. Samé has up to now been considered somewhat apart from IER in the future the Samé research personnel should be considered under IER supervision to insure fuller integration. This integration should also be achieved by collaboration with the operations of the upper Senegal Basin--ODIC, OVSTM, and ODIPEC--and in coordinating their research activities.

This formal dissemination and feedback linkage has not been effectively applied in the First Region around Kayes. The research station at Kayes is presently undertaking some vegetable trials at the request of a nearby cooperative for an irrigated perimeter. This is an hoc arrangement. There are no continuing or formal arrangements for cooperation between research and extension in the Kayes area. The creation of these linkages is an important element of this project and the OMVS Integrated Development Project. The Samé research station and the OVSTM will execute a protocol agreement under which a program of joint field trials and systemtic monitoring of new technology introduction will occur.

(5) Agricultural Training

Technical agricultural training is offered at a number of institutions in Mali. The lower-level technical training schools are administered by the Ministry of National Education and the higher-level professional training school is administered by the Ministry of Higher Education. Technical training available for junior-level agricultural staff (moniteurs d'agriculture) consists of three Agricultural Apprenticeship Centers (Centres d'Apprentissage Agricole - CAA) and two specialized centers for rice and for vegetable production. The three CAA's are located at Samé (First Region), Samanko (Second Region) and M'Pessoba (Third Region) within the principal ecological zones of the country and permit the cultivation of different crops and the practice of animal husbandry at each center. CAA's offer a three-year training program in applied agriculture, that includes classroom and field work. The CAA's have had difficulty in supplying the number of agents requested from the agricultural services as they have suffered from inadequate facilities, teaching staff and operating budgets. The AID Agricultural Officers Training Project (688-0207) is providing assistance to the CAA's for renovation and expansion of two centers, training of instructors, technical assistance, equipment and operating support.

At the higher level, senior and middle-level administrative and planning staff are trained in two coordinated, but independent education and training programs at the Rural Polytechnical Institute at Katibougou. Senior level personnel follow a four-year post-BAC, or post-secondary, training program which permits them to specialize in agricultural, forestry, livestock or rural engineering. Middle-level staff follow o four-year post-primary , training program with similar specializations.

Although many of the current Malian researchers were trained at PRI, the training program does not provide sufficient training for research so that students wanting to pursue a career in research must go abroad for more advanced agricultural training.

(6) Constraints on Effective Agricultural Research

The project design team noted four major constraints to effective agricultural research, particularly for the research station at Samé.

(a) Research is mostly on station. A cooperative research program has not been established with the regional development agency, OVSTM, nor with farmer cooperatives to field test and monitor use of new varieties and technological packages.

(b) Research is organized along disciplinary lines and concentrated on themes which reflect interests of the researchers, but not necessarily needs of the farmers.

(c) The Samé research program has lacked continuity and depth because of poor facilities, small staff and inadequate operating budget. Several research efforts have been abandoned because of limited funding.

(d) The research at Samé has been isolated from much of the other national and regional research. The Samé director participates in national research commissions and programs, but Samé has been considered somewhat independent in the national system since it started as an OMVS station and is still funded by the OMVS. On the other hand, the station has not been effectively integrated into any regional research network. CIERDA forms a high-level review committee, but there is no system of regional research seminars or conferences for research scientists, nor any systematic regional documentation program.

(e) A basic lack of higher training within the IER (Institute d'Economie Rurale). This lack of personnel has been partially compensated for by direct and indirect contacts with researchers from international institutions. The training components of the project will be heavily stressed.

(f) The irregularily of financing by donors and inadequate financing for maintenance of equipment and facilities.

These constraints are being addressed by the OMVS Agricultural Research II project. They are further discussed under the "Technical Analysis", Section VII A.

III. Project Description

A. Goal, Purpose and Outputs

The goal of this project is to improve the capacity of Senegal, Mauritania and Mali to more effectively plan and implement agricultural development activities in the Senegal River Basin. This goal will be accomplished through a long-term (10-15 years) institution-building effort with the OMVS and the national research stations at Fanaye, Kaédi and Samé.

The purpose of the project is:

a. to develop Senegalese, Mauritanian and Malian agricultural research capacities in the Senegal River Basin through training, facilities development, and participation in the design and implementation of adaptive research and farming systems research programs; and

b. to improve the combined effectiveness of national agricultural research in the Senegal River Basin through regional coordination and prioritizing within the OMVS.

The project will support farming systems research in Senegal, adaptive crop research and on-farm trials of improved technology in Mali, and research planning/management and farming systems research in Mauritania. At the end of this six year project, the following outputs will 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 of the Senegal River Basin;

b. upgraded technical and professional skills for agricultural researchers, research assistants and research technicians;

c. upgraded agricultural facilities for the three research stations located at Fanaye, Senegal; Kaédi, Mauritania; and Samé, Mali.

d. strengthened regional research coordination among national research agencies and involving national development agencies.

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 resources endowment.

This project will be undertaken to identify and refine improved farm production practices which can be utilized in the Integrated Development Project of the OMVS. Project inputs will be provided for establishing extensive field trial programs and research management activities in the three existing research stations. Since the research programs at the three stations will continue under the administrative jurisdiction of the respective countries, the project will have linkages to the research information available in all three national research organizations. The OMVS agricultural offices will provide for technical and professional collaboration among the researchers working in this project thus facilitating coordination and efficiency in research methods and application of results. The field trial programs will build working linkages with the regional development agencies to facilitate the application of improved technologies on farms not involved in the field research program.

Certains terms are frequently used in this project and clarification of their use in this situation may facilitate project understanding and management.

Cooperating farmers - Farmers nominated by the regional development agencies for selection by the research staff as cooperators in the conduct of the field trials and farming systems research studies.

Field trials - Crop performance tests conducted in farmers fields by farmers under observation by extension and research workers.

Farming systems research - This farm may include field trials, but most frequently it is used to refer to studies of combination of crops and their interdependency. This research is conducted by careful observation of a wide range of farm performance factors and frequently includes substitution of factors to achieve improvement in farm efficiency, productivity or economy.

Target group - The target group for this project consists of the cooperating farmers. These individuals will be selected as representatives of the farming enterprises in the Senegal River Basin.

Adaptive research - A term sometimes used to describe field trials and farming systems research. Generally includes applied research and very little if any basic research. Also sometimes used to classify the transition stages of technology development from the research laboratory to the farmers fields.

B. Project Activities

The project will establish a regional adaptive research program for the Senegal River Basin. This program will be initiated by selecting a group of technologies for extensive field trial in the valley. Promising practices under research at the various stations in the valley, the international agricultural research centers, and at other stations will be reviewed and evaluated in preparing the field trial and demonstration recommendations. (Current research results are presented in the Technical Analysis, Section VII A). These packages of practices will be drawn up to carefully match the agro-economic conditions of the trial/demonstration locations. For example, the research team will develop a list of five to ten rice varieties together with planting, fertilization, water management and insect controls for each distinct agro-climatic zone of the valley. Similar goals will be set for other crops. These recommendations will be extensively reviewed by the development agencies and others familiar with the farming systems of the region in refining the basic package of practices for initiating the adaptive research system. A review of the recommended farming practices and research results will be repeated within the annual workplan and CIERDA review cycles.

The second step in the research program will be the establishment of a system of joint field trials to be undertaken by the research and development agencies. A prototype for this step exists in the agreement between the Institut Sénégalais de Recherches Agricoles (ISRA) and the Société de Développement et de Vulgarisation Agricole (SODEVA) (See Annex G). Under the agreement the researchers contribute potential improved technology and the development agency organizes trials with cooperating farmers. The three parties involved in this program jointly learn what the technology will do in the hands of farmers in each region that the work is undertaken. The trial program is jointly planned, conducted and evaluated. The results provide a basis for wider application of the best technology, and indicate where further research is needed for some of the technologies and where continued field trials are needed to verify results that may not be distinctive in a single year's trial. The results of each year's work become an important base of information for planning the next season's field trials under the Accord as well as the next season's research plans for station trials, the next season's extension program for the development agency, and the farming plans of the individual farmers.

The third step in the research development process will be the systematic compilation of reference data on farming systems and problems. As a result of frequent contact with farmers during the field trial program, and during the course of evaluating those trials, it will be possible to greatly expand the information base on farming operations and technology constraints. For example, the field trials may clearly demonstrate the

conflicts in labor demands between two crops suggesting that one or the other might be a candidate for research to develop longer or shorter growing season varieties. Or, certain insect or disease problems may develop in field trials that had not appeared on the experiment station. This third step expands the research information base and feed-back loop for up-dating the information bank. This feed-back loop will become more important to research planning as time passes and the data base is strengthened through the accumulated multiple year data.

The fourth step in development of the research system will be strengthening of station resources and facilities. This strengthening will include staff development through participant training which can be initiated concurrently with the steps above. It will also include basic construction and station development which can also be undertaken concurrently with the initiation of field trials. The objective of this station development program is to put into place the basic facilities that can address the research problems that are identified during the early field trials. The station development will be building upon existing physical plants and programs. An inventory of these resources has been undertaken in the project design. The station directors, administrators of national research agencies, OMVS staff and others have been consulted in review of these facilities, consideration of future facility requirements, and review of the plans proposed in this project paper. There is a broad consensus that the facilities to be established will provide the working base for effectively addressing the urgent research problems identified in the field trials.

The fifth step will be the establishment of a smoothly coordinated system of research among the stations in the OMVS. The method of coordination is expected to occur at several levels; first at the level of the research workers through periodic professional exchanges of results and methodologies; and second, at the level of the inter-state coordinating committee (CIERDA) as it assigns research responsibility and allocates project resources among the several stations. The CIERDA is a functioning body which has contributed significantly to the coordinated development of the research program for the Basin and to this paper. The CIERDA and its permanent Secretariat (OMVS Division of Integrated Research) will have increasing responsibility during the implementation of this project as they allocate project resources and monitor implementation. It is presumed that the OMVS staff and CIERDA will develop the capacity to channel additional funds from other sources and expand the research system. It is also expected that the OMVS will sponsor with the research stations regular, perhaps semi-annual research conferences for the presentation of professional papers and informal exchange of information. These two levels of exchange are expected to ensure efficient utilization of research facilities, and rapid dissemination of information and rapid adaptation of technology across the national borders and boundaries of the research organizations that will make up the research system of OMVS.

The sixth step will be improved integration of the numerous research programs that can contribute to the solution of the problems of the Valley. WARDA, SAFGRAD, CILSS, FAO, ICRISAT, and other programs support research that is contributing to solving problems of this region. In fact, this project builds on their experiences and physical plant and program contributions. A key factor in increasing the benefit of these programs will be the effectiveness of their integration into a multidisciplinary research system. In general these various projects have specialized on particular problems and have been quite effective in so far as their specialized approach can contribute to new technology. Since it is expected that future research work will require an expanding multi-disciplinary approach, the sixth step will refine the role of the specialized projects as they contribute to wider research objectives and systems and increasingly integrate them into the research system of the Basin.

The seventh step will be the establishment of wider links with the agro-industrial enterprises of the region; i.e.; the seed trade, the fertilizer industry, the food processing industries and others. This step can be initiated in this first phase of the project but will not become a major component of the project. Periodic seminars involving agro-industry and researchers is an excellent cost-effective linkage. The consultation by researchers with industrialists benefits both sides. The research agencies must follow the development of these industries and establish appropriate relationships in order to fully transfer technology elements that farmers require to adopt modern farming methods.

These seven steps provide for the establishment of the agricultural research program of the Senegal River Valley. It is anticipated that it will take 10-20 years to fully develop this system. During the first six-year period the priority assigned to these steps will be in their order of presentation; step one will be given highest priority and step seven will receive the lowest priority. Subsequent periods may divide attention more equally between research and field trials and shift priority attention to steps 4-7. The experience of this initial project will lay the base for planning and implementing the future years' plan of work.

a. Clarification of Farming System Research (FSR)

The Africa Bureau has endorsed the farming systems approach as described in the Monograph entitled "Institutionalizing the Farming Systems Approach to Research". This paper describes farming systems research as the "development and dissemination of relevant improved practices (technologies)." The essential characteristics are (a) the farm as a whole as the subject of analysis, (b) priorities for research are based on farm analysis, (c) sub-system studies may be undertaken based upon the priority in the farm enterprise, and (d) research results are evaluated in the context of the farm enterprise. The farming systems methodology includes "upstream" research (such as commodity development and conventional agricultural research programs) and "downstream" research (the farm enterprise analysis and development). The downstream program recommended should contain

four basic steps: 1) diagnostic, 2) design, 3) testing, and 4) extension. David Norman, the presenter of the Monograph has emphasized in a recent publication that Farming Systems Research requires a multidisciplinary team and that the team must include social scientists.

The Technical Adivsory Committee of the Consultative Group for International Agricultural Research (CGIAR) conducted a study of Farming Systems Research at the International Institute of Tropical Agriculture. The proceedings of their workshop on this topic listed five steps in FSR:

a) The collection and analysis of base data;
b) The study of existing farming systems;
c) The design of new farming systems;
d) Farm systems experimentation; and
e) The evaluation and monitoring of new farming systems.

The key words are farm enterprise, systems perspective, team research, physical and social evaluation of technology.

The Consortium for International Development (CID) Guidelines for Developing Countries on Farming Systems Research provides helpful information on adapting the methodolody for various types of farming systems, institutional environments and research objectives. These guidelines suggest procedures to follow in evaluating host government policy for the purpose of planning the farming systems research program, adaptation of on-going research methodology, staffing of appropriate multi-disciplinary teams, and program management of the farming systems research.

The Project Paper for OMVS Agricultural Research II provides for a seven step research program that improves the upstream and downstream research in the Senegal River Valley. This program is adapted to the research institutions in the Basin using the guidelines on farming research for developing countries that were developed by CID and CGIAR. The program places emphasis on the above-mentionned step 2 (design), step 3 (testing) and step 4 (extension) and introduces an additional step of feedback to the upstream commodity and technology research on the stations. The project description also presents the variations in application of these principles in the research conducted in the three countries as a result of design accommodation and adaptation to the individual country, institutional capability and technological requirements. The first step of this project is equivalent to the second (design) step recommended by the Africa Bureau; the second step is equivalent to the Africa Bureau's third (testing) step; the fourth step provides for feedback on commodity and technology research to the upstream program; the fifth step develops further upstream capability uniquely available from the OMVS structure; the sixth step takes this upstream connection an additional step to the world-wide netwrok, as necessary; and the seventh step broadens the farming system to include off-farm enterprise (See pp 35-37).

The Farming Systems Research literature advocates application of this methodology to the complete farming system. There are no restriction as to types of crops or dryland versus irrigated agriculture and so forth. Except in Mauritania, the project does not propose an explicit diagnostic first step as there are now numerous studies in the valley which can be drawn upon for proceeding directly to step 2 of the Africa Bureau's recommended approach. In Mauritania, however, agricultural research is in its nascent phase and it will therefore be necessary to begin with the recommended first step in the FSR methodology, as described below on pp. 73-75 of this Project Paper. The Mauritanian component is thus different, placing a much greater emphasis on planning for research and training at Kaedi. However, the project does provide for greater feedback from the field trials to the research service and it also provides an institutional linkage between research and extension via a protocol agreement. These applications of the David Norman outline for the methodology are in line with the recommendations formulated in the Strategy Implementation Workshop which emphasized "primary focus on FSR in projects", and "for FSR to complement the existing commodity and disciplinary structure."

A review of the literature reveals that the farming system research method is well suited to "transition from rainfed to irrigated agriculture". However, this is not a fully accurate characterization of the transition which will occur in the Senegal River Basin. There will be several transitions taking place as follows :

1. Traditional agriculture for self-consumption to modern agriculture for self-consumption and surplus for marketing.

2. Transition from flood recession agriculture to irrigation.

3. Transition from monoculture to polyculture.

4. Transition from a combination of flood recession cum irrigation to either irrigation alone or a combination of irrigation and dryland agriculture.

5. Single cropping to double and triple cropping.

6. Ad hoc farm management organization to formalized organization (i.e. coops legally recognized).

Dryland farming will continue to occupy the bulk of the land area within the river basin for many years and irrigation methodology of evaluating the social-economic-agronomic aspects of the system is very well suited to analysis, design, testing and extension of appropriate techniques.

Project support to these seven stages of research program development will come through the following inputs :

a. Technical Assistance :

The project will provide 25 person-years of long- term research technical assistance, 29 person-years of long-term managerial and administrative technical assistance and 60 person-months of consultants.

- Fanaye, Senegal:

  - 1 Agronomist with extension expertise (4 years);
  - 1 Farming Systems Economist (4 years);
  - 1 Country Project Officer (based in USAID/Dakar) 6 years;
  - Consultants in farming systems, computer programming, marketing, equipment maintenance, documentation, etc. (15 person-months).

- Kaédi, Mauritania:

  - 1 Agricultural Research Planner/Ag. Economist (4 1/2 years);
  - 1 Administrative Assistant (4 1/2 years);
  - 1 Country Project Officer (based in USAID/Nouakchott) 6 years;
  - Consultants in irrigation engineering, statistics, marketing, economics, equipment maintenance, documentation, etc. (15 person-months).

- Samé, Mali:

  - 1 Agronomist, emphasis on millet, sorghum, wheat (4 years);
  - 1 Agricultural Engineer, irrigation and maintenance (4 years);
  - 1 Country Project Officer (based in USAID/Bamako) 6 years;
  - Consultants in economics, marketing, statistics, documentation, soils science, etc. (15 person-months).

- Regional

  - 1 Management Specialist, a financial management specialist for first two years; research management specialist for 3 years (5 years);
  - 1 Deputy Project Officer (based in USAID/RBDO in Dakar) 6 years;
  - Consultants in research programming, financial management, documentation, evaluation, etc. (15 person-months).

b. Training

Long-term academic training in the U.S. in the agricultural and social sciences (e.g., agricultural economics, [illegible], plant breeding, agronomy/soils, anthropology) will be provided..." for 12 participant 4 from Mali, 2 from Senegal, and 6 from Mauritania at approximately 26 months each.

Short-term training in the U.S. and third countries for research assistants and support personnel in research methods, specific disciplines, data processing, documentation, accounting, management, equipment maintenance and other areas identified during implementation of the project. (The training analysis is presented as part of the Technical Analysis, Section VII A).

c. Construction:

- Fanaye, Senegal:

  - 4 houses for researchers (Richard-Toll);
  - 4 houses for research assistants (Fanaye);
  - 1 office building for researchers (Fanaye);
  - 1 office building for assistants and library (Fanaye).

(The World Bank is financing the other necessary infrastructure for Fanaye under the Senegal Agricultural Research Project).

- Kaédi, Mauritania:

  - 4 houses for researchers at Kaédi.

(Construction of the headquarters buildings at Kaédi is being financed by FAC).

- Samé, Mali:

  - 5 houses;
  - office building for 6 offices and support;
  - soils and plants laboratory;
  - storage sheds;
  - repair of existing buildings;
  - electrical and water supply systems;
  - land development and dike repair.

(The construction program is presented as part of the Technical Analysis, Section VII A.5.).

d. Other project support:

The project will provide vehicles for use by the contractors and some limited equipment (See Implementation Plan, for Commodity listing).

The project will also provide annual operating support (approximately $300,000 per year) to the stations for the farming systems and applied research programs approved by CIERDA. The program content and the implementation mechanisms are described in the Technical Analysis (Section VIIA) and the Implementation Plan (Section V), respectively.

C. Project Financing

AID financing for the project for foreign exchange and local currency costs is as follows:

(000's dollars)

	(FY 83) First Year			Life of Project		
	FX	Local	Total	FX	Local	Total
Technical Assistance	393.1	-	393.1	6,396	-	6 396.0
Training	305.4	-	305.4	1,657.5	-	1,657.5
Construction	2,252	-	2, 252.0	2,504	-	2,504.0
Equipment	449.0	-	449.0	1,486.6	-	1,486.6
Operating Support	400.4	-	400.4	1,578.2	-	1,578.2
Total	$3,799.9	-	$3,799.9	$13,622.3	-	$13,622.3*

The OMVS will maintain its current level of support to the three stations at about $400,000 per year for equipment and operating support for a six-year life of project contribution of $2.4 million.

Although not counted as a direct project contribution, considerable other donor support will be provided to the OMVS and to national programs at Fanaye and Kaédi. These contributions are presented in the description of each national program, Section III B.

* The latest revisions incorporate certain necessary increases in the Mauritanian component of the project. The revised total project cost is now $13,622,469. (See Financial Table 1 and Financial Table 2, pp. 46a & g.)

D. Project Issues

The following issues were raised by the review of the original PP by the AID/Washington Project Committee and by the OMVS. The Project Committee concerns (review cable is attached as Annex D)as well as subsequent revisions requested by AID/Washington in accordance with State 242891(attached as Annex J) were addressed in the final design of this Project Paper.

a. National Research Systems

This project has been designed to integrate OMVS regional research programming and financing with national research programs. Section IIIB and Section IV presents the implementation mechanisms whereby the project will coordinate and prioritize research to be implemented nationally.

b. Research-Extension Linkage

The OMVS Agricultural Research II Project will build upon existing experiences in each country in the project area and strengthen linkages through protocol agreements between the research and extension agencies in each geographic area. Two protocol agreements have been signed already in both Mauritania and Senegal and it is expected that a similar protocol agreement will be signed in Mali before the beginning of project implementation. The project implementation is sufficiently flexible to allow for the careful application of the protocol's terms.

The national research programs in the three countries are cognizant of the needs for strong research-extension liaison and are taking steps to strengthen these relationships. In Senegal, for example, under the World Bank Agricultural Research Project, each ISRA production systems research team will have a research-extension liaison specialist. To assure the closest possible links with the extension services he will have a staff function with regional development agency management and be seconded under a regional agreement between ISRA and the development agency concerned. In addition, these research-extension specialists will be supported by a rural social scientist in the Central Systems Support Group in ISRA headquarters.

Lastly, it should be noted that members of the Design Team emphasized the importance of research-extension linkages in all discussions with officials of the host countries involved. These officials are well aware of the importance of improving research-extension linkage and they have strongly endorsed all project activities designed to improve this relationship.

c. Regional Research Coordination

The OMVS presently provides for regional research coordination through CIERDA as well as program review and approval for OMVS financed regional research. This coordination mechanism will be strengthened and expanded by the project to include more research exchange among scientists and better research documentation.

As noted on p. 49 below, various types of data will be generated by this project and CIERDA will take an active role in its dissemination. At the national level, the agricultural centers will be responsible for initial data collection and compilation and for its dissemination to nationel agencies and the respective USAIDs. At the regional level the data will be handled by the Integrated Division of the OMVS and the RBDO.

These data and accompanying reports will be one of the principal mechanisms of reporting to the CIERDA on the status of research in the Senegal River Basin and on whether or not research carried out at each of the three national research centers is achieving regional research objectives. The establishing of an interlocking system of research data analysis and sharing is intended to promote the efficient allocation of resources by the OMVS states; avoiding duplication of research efforts; maximizing dissemination of research results while at the same time understanding and responding to the different hydrological, pedological and climatic conditions that govern agricultural production in the Basin. The CIERDA, which is made up of representatives from each of the OMVS Member States is the sole research coordination instrument in the Basin.

A broader question also exists concerning the coordination of donor support for agricultural research within the Senegal River Basin. Most current donor support for Fanaye and Kaédi is provided through bilateral projects. Such assistance has not been well coordinated by OMVS or other organizations. The OMVS and CIERDA are designed to improve this. The issue of donor coordination for Senegal River Basin agricultural research will be presented by USAID as an issue for discussion within the Donor Consultative Group of the OMVS.

d. Bilateral Research Implementation

The implementation of research activities under Agricultural Research II will be by the national research agencies. They will be assisted in the administration of project inputs by a Deputy Project Officer, by a regional Financial Management Specialist, and by each of the national USAID's as presented in Section V, the Implementation Plan, as revised.

e. Recurrent Costs

The recurrent cost analysis has been revised and is provided in pp. 108-117 of this Project Paper.

f. Research Strategy

One of the initial tasks of the technical assistance teams in each national research station will be to develop a research station strategy. These discrete strategy statements or plans will then be coordinated with the OMVS in developing a master agricultural research plan for the entire SRB which will incorporate a long term time horizon, as suggested in para 3.H. of the AID/W Review Committee's cable (attached as Annex D.).

g. I.E.E.

An I.E.E. was prepared for this Project Paper but without a full risk/benefit analysis as requested in the AID/W review committee cable (para 3.D. of State 314925 - attached as Annex D). This risk/benefit analysis will be performed before any field activities are undertaken and it will be provided for through the short-term technical assistance provided under the project.

h. Open bidding for Long-Term Technical Assistance.

The three Missions have concluded that the Title XII Universities are the most appropriate and best suited institutions to provide technical assistance to this project.

The Missions also decided that each USAID will contract separately f the technical assistance required under each national component of the project.

i. The design team noted the AID/W Review Committee's interest in nutrition. (State 314925, para 3.C. - See Annex D). However, since a nutritic component will be included in the Integrated Development Project currently in the design phase, nutrition will not be addressed in this project so as not t duplicate the effort.

IV. Project Budget

A. Explanation of Cost Elements

a. Technical Assistance

The project provides 25 person-years of long-term research technical assistance calculated at about $128,000 per person-year in FY 1984. This amount per person year is the estimated total support package for a technical researcher with a Masters of Science degree and several years of research experience to be funded under a contract with a U.S. firm or university. This amount does not include housing, furnishings, utilities and vehicle maintenance support costs that will be provided by the agricultural research stations and are budgeted separately. A detailed breakdown of this figure is provided as Financial Table 2, Personnel Cost Breakdown.

The project also provides for several regional and in-country support personnel. These include:

(1) Deputy Project Officer; this is a regional staff position with USAID/RBDO that will be filled by a local hire for which the total annual cost is estimated as $40,000 in FY 1983.

(2) a Financial Management Specialist; this is a regional staff position in the OMVS Division of Integrated Research to be filled by an individual with a BS degree in administration/finance, several years of African experiences, and French and local language capability. The total annual cost (including vehicle maintenance and travel expenses for half-time travel) is estimated to be $60,000 per year in FY 1983. After two years this person will be replaced by a specialist in research management.

(3) three Deputy Project Officers. These individuals will handle project administration for the three country programs including liaison between the USAID's and national research agencies and other national government organizations. A BS degree with several years of experience and French and local language capability are required. The total annual cost for each is estimated as $40,000 in FY 1983.

(4) For the 60 person months of consultants (45 person months for national contracts and 15 person months for regional OMVS assistance), $15,000 per person month has been budgeted. This is based on an average salary of $180/day, roundtrip airfare, incountry per diem and travel, and a 180% estimated overhead.

In-country support cost by the research stations and the OMVS are entered under the operating costs and not as technical assistance.

FINANCIAL TABLE 1

a.

	FY 83	FY 84	FY 85	FY 86	FY 87	FY 88	Total
I. Technical Assistance							
A. Country Contracts							
(1) Long-term (23 py)	-	550 834	908 574	1 317 127	704 230	300 494	3 781 239
(2) Short-term (45pm)	86 328	139 851	151 506	361 611	21 109	20 000	730 205
(3) Deputy Project Officers (one in each USAID)	177 999	157 599	167 967	274 564	132 100	59 099	969 328
Subtotal	264 327	848 284	1 228 047	1 953 302	857 439	379 593	5.530 992
B. Regional Contracts-OMVS and RBDO							
(1) Deputy Project Officer ($40,000/yr; 6 years)	40 000	43 100	46 656	50 388	34 419	40 000	274 563
(2) Management Specialist ($60,000/yr; 5 years)	60 000	64 800	69 984	75 583	60 000	-	330 367
(3) Consultants (15 pm)	28 776	46 617	50 502	75 537	58 703	-	260 135
Subtotal	128 776	154 517	167 142	201 508	173 122	40 000	865 065
II. Training							
A. LT (36 py@$30,000/yr-12 partic.- 6 Maur.; 4 Mali; 2 Senegal)	150 000	560 000	222 000	148 000	-	-	1 080 000
B. ST (62 pm at Int. Insctitutes or US @$3,700/mo.- Mauritania, 42 pm; Mali, 10pm; Senegal, 10pm)	155 400	-	37 000	37 000	-	-	229 400
C. Research Assistants (12,000 per Station per yr. beginning FY 85)	-	-	56 250	31 500	20 400	-	108 150
D. In Country trg., seminars, conferences US observations tours (3countries&OMVS)	-	60 000	60 000	90 000	30 000	-	240 000
Subtotal	305 400	620 000	375 250	396 500	50 400	-	1 657 550
III. Construction							
A. Senegal							
(1) Civil Works	667 000	-	-	-	-	-	667 000
B. Mauritania							
(1) Civil Works	335 000	76 000	-	-	-	-	411 00
C. Mali							
(1) Civil Works	1 250 097	175 903	-	-	-	-	1 426 000
Subtotal	2 252 097	251 903	-	-	-	-	2 504 000
IV. Commodities							
A. Senegal							
(1) Vehicles	40 000	-	-	40 000	-	-	80 000
(2) Furnishings	36 000	100 000	-	-	-	-	136 000
(3) Equipment	50 000	22 000	-	-	-	-	72 000
Subtotal	126 000	122 000	-	40 000	-	-	[illegible]
B. Mauritania							
(1) Vehicles	50 000	-	-	50 000	-	-	100 000
(2) Furnishings	45 000	122 000	-	-	-	-	167 000
(3) Equipment	-	67	-	-	-	-	67 000
Subtotal	95 000	189 000	-	50 000	-	-	334 000
C. Mali							
(1) Vehicles	50 000	-	-	50 000	-	-	100 000
(2) Furnishings	43 000	329 000	-	-	-	-	372 000
(3) Equipment	52 000	121 000	-	-	-	-	173 000
Subtotal	145 000	450 000	-	50 000	-	-	645 000
D. Regional							
(1) Vehicles	34 000	-	-	44 000	-	-	78 000
(2) Equipment	8 000	-	-	-	-	-	8 000
Subtotal	42 000	-	-	44 000	-	-	86 000
Commodities Subtotal	408 000	761 000	-	184 000	-	-	1 353 000
Commodities + 10% Contingency	41 000	76 000	-	16 600	-	-	133 600
Subtotal	449 000	837 000	-	200 600	-	-	1 486 600
V. Operating Costs							
A. Senegal	130 000	97 000	104 000	113 000	81 795	41 205	567 000
B. Mauritania	130 000	97 000	104 000	33 131	28 682	14 449	407 262
C. Mali	130 000	97 000	104 000	113 000	81 795	41 205	567 000
D. Regional	10 400	3 800	6 300	6 300	4 000	3 700	37 000
Subtotal	400 400	296 800	318 300	265 931	196 272	100 559	1 578 262
VI. Project Total	3 300 000	3 008 304	2 088 739	2 927 341	1 277 233	520 132	13 622 749

FINANCIAL TABLE 1

PERSONNEL COST BREAKDOWN - OMVS Agricultural Research Project

I. Long-term researcher

Assumptions: MS plus several years experience;
Married, no children; Few household effects (1/2 authorized level); no personal vehicle;
Language near S-3, R-3; refresher training only;
Located at agricultural research station (Richard Toll, Kaédi, Samé).

Cost Breakdown:

	FY 83 (1/2 yr)	FY 84	FY 85	FY 86	FY 87	FY 88 (1/2 yr)	Total
A. Recurring							
1. Salary/Benefits							
(a) Salary	17,000	34,000	34,000	34,000	34,000	17,000	170,000
(b) Post Diff.	4,250	8,500	8,500	8,500	8,500	4,250	42,500
(c) FICA, Insurance	1,500	3,000	3,000	3,000	3,000	1,500	15,000
2. Post Allowance	2,500	5,000	5,000	5,000	5,000	2,500	25,000
3. Educ. Allowance	-	-	-	-	-	-	-
4. Housing/Utilities	(to be provided by research station)						
Subtotal	25,250	50,500	50,500	50,500	50,500	25,250	252,500
B. Non-recurring							
1. Travel & Transport (pst assignement)	13,000	-	-	13,000	-	-	26,000
2. R&R	-	3,500	-	-	3,500	-	7,000
3. Repartition/ Separation	-	-	9,000	-	-	9,000	18,000
4. Language Training	2,500	-	-	2,500	-	-	5,000
Subtotal	15,500	3,500	9,000	15,500	3,500	9,000	56,000
C. Operational Support							
1. Operation travel	1,500	3,000	3,000	3,000	3,000	1,500	15,000
2. Other operations	(to be provided by research station)						
Subtotal	1,500	3,000	3,000	3,000	3,000	1,500	15,000

	FY 83	FY 84	FY 85	FY 86	FY 87	FY 88	Total
D. Overhead Fee, G A (180% base salary)	30,600	61,200	61,200	61,200	61,200	30,600	306,000
E. Uninflated Cost	72,850	118,200	123,700	130,200	118,200	66,350	629,500
F. Inflation (8% py)	-	9,456	21,029	33,852	42,552	31,185	138,074
G. Total Cost per researcher	72,850	127,656	144,729	164,052	160,752	97,535	767,574

II. Consultants

Assumptions: Average daily rate of $180;
Average TDY of 1 month - 5 days in capital, rest in field;
Number of consultancies - 15 total for each station.

Cost Breakdown:

A. Salary	7,920 (2)	11,880 (3)	11,880 (3)	11,880 (3)	11,880 (3)	3,960 (1)	59,400 (15)
B. Travel	4,000	6,000	6,000	6,000	6,000	2,000	30,000
C. Per Diem	2,600	3,900	3,900	3,900	3,900	1,300	19,500
D. Overhead Fee	14,256	21,384	21,384	21,384	21,384	7,128	106,920
E. Uninflated Cost	28,776	43,164	43,164	43,164	43,164	14,388	215,820
F. Inflation (8% py)	-	3,453	7,338	11,223	15,539	6,762	44,315
G. Total Cost	28,776	46,617	50,502	54,387	58,703	21,150	260,135

FINANCIAL TABLE 3

Details of Estimated Construction Costs (Projected to October 1982)

	Number of Units	Cost	Total Cost ($U.S.)	
A. FANAYE & RICHARD-TOLL				
1. Civil Works -				
a. Housing for researchers) Richard-Toll	4	240,000		
b. Housing for assistants) Fanaye	4	180,000		
c. Office buildings) Fanaye	4	160,000	580,000	
d. Contingencies (15%)			87,000	
2. Subtotal for Fanaye/Richard Toll			667,000	667,000
B. KAEDI & BELINABE				
1. Civil Works - KAEDI				
a. Housing	4	336,000		
b. Generator sheltor		5,000	341,000	
c. Architectural & Engineering Services			26,500	
d. Contingencies			43,500	
e. Subtotal for Kaédi				411,000
C. SAME				
1. Civil Works				
a. Housing (3 bed room/$75,000 each)	5	375,000		
b. Office	1	90,000		
c. Equipment Storage	1	25,000		
d. Laboratory	1	40,000		
e. General Hangar	1	20,000	550,000	
f. Storage area Rehab		9,000		
g. Guest house Rehab		40,000		
h. Machine shop Rehab		20,000		
i. Spare parts Rehab		12,000	81,000	
j. Fuel storage tanks		11,000		
k. Electric power system		55,000		
l. Water supply-system		275,000		
m. Air contidioning units and cooling fans for Office & Lab.		10,000		
n. Waste disposal system		80,000		
o. Recreational facilities		15,000		
p. Equipment maintenance		50,000	496,000	
Total costs civil works			1,127,000	
q. Site preparation & Landscaping (10%)			113,000	
Subtotal			1,240,000	
r. Contingency (15%)			186,000	
Subtotal for Samé				$1,426,000

FINANCIAL TABLE 4

COMMODITY LIST (U.S. $)

A. Fanaye, Senegal	
- 1 motor cultivator (walking tractor), approx. 10 HP with attachments and 25% spare parts.	4,000
- 4 pick-up trucks at $ 16 000 each in FY 83 (for use of contract team — two are replacement in yr. 4) plus 25% spare parts	80,000
- 8 small motorcycles at $1,000 each in FY 83 (4 plus replacements in year 4)	10,000
- 2 diesel-powered electric generators 50 KW	50,000
- Miscellaneous hand tools	1,000
- Laboratory equipment, including ovens, scales, glassware supplies	5,000
- Office equipment, including typewriters and a small copy machine	2,000
- Housing and Office furnishings	136,000
Subtotal	288,000
B. Kaédi, Mauritania	
- 1 motor cultivator (walking tractor), approx. 10 HP with attachments and 25% spare parts.	4,000
- 4 all-terrain, 4-wheel-drive vehicles in FY 83 (for contract term - 2 are 4th year replacements) plus 25% spare parts	100,000
- 8 small motorcycles (4 plus replacements in year 4)	10,000
- 2 diesel-powered electric generators 50 KW	50,000
- Miscellaneous hand tools	1,000
- Office equipment including typewriters and a small copy machine	2,000
- Housing and office furnishings	167,000
Subtotal	334,000
C. Samé, Mali	
- 1 Tractor, approx. 60-70 HP with attachments and 25% spare parts (inc. shipment).	70,000
- 4 all-terrain, 4-wheel-drive vehicles at 20,000 each in FY 83 - plus 25% spare parts (for contract team - 2 are 4th year replacements)	100,000
- 8 motorcycles (4 with replacements in year 4)	10,000
- 2 diesel-powered electric generators 50 KW	50,000
- Miscellaneous hand tools	2,000
- Equipment Maintenance	26,000
- Laboratory equipment, including ovens, scales, glassware, and supplies	10,000
- Office equipment, including typewriters and small copy machine	5,000
- Housing and office furnishings.	372,000
Subtotal	645,000
D. Regional	
- 4 all-terrain, 4 wheel drive vehicles at $19,500 each in FY 83 and 25% spare parts (2- in FY 83 and 3 replacements in FY 87)	78,000
- Office equipment - typewriters, copy machine, desks, files, etc.	8,000
Subtotal	86,000
E. Contingency (10%)	135,000
F. Total Commodities	$1,488,000

FINANCIAL TABLE 5

Illustrative Operating Budget for Annual Project Support to a National Research Station (U.S. $)

I.	**Personnel**	
a.	Senior Technicians	14,000
b.	Junior Technicians	22,000
c.	Drivers	4,000
d.	Secretary	800
e.	Accountant	1,200
f.	Labors	5,000
	Subtotal	47,000
II.	**Personnel Operating Costs**	
a.	Perdiem travel for researchers, technicians, and drivers	15,000
b.	Pensions, social security, insurance, etc.	6,000
c.	Medical care	2,000
	Subtotal	23,000
III.	**Station Operating Costs**	
a.	Office supplies	1,500
b.	Water-electricity	1,000
c.	Communications	1,000
d.	Building maintenance	2,000
e.	Gas and oil	5,000
f.	Vehicle and pump maintenance	5,000
g.	Farm supplies	3,500
h.	Other - contingencies	1,000
	Subtotal	20,000
IV.	**Total**	$90,000

Financial Table 6.(g)

	Mauritania	Senegal	Mali	Regional/OMVS	Total
Country Contracts					
Long-Term TA (25 p.y	1 388 203	1 196 528	1 196 528	-	$ 3 781 259
Short-term (45 p.m)	260 135	260 135	260 135	-	780 405
Deputy Project Officer (PSCs)	420 000	274 664	274 664	-	969 328
					$ 5 530 992
Regional Contracts-RBDO & OMVS					
RBDO Deputy Project Officer (40,000/yr; 6yrs.)	-	-	-	274 563	$274 563
Management Specialist (60,000/yr; 5yrs.)				330 367	330 367
Consultants (15 p.m)	-	-	-	260 135	260 135
					$865 065
Training					
Long-term Training (36 p.y. $ 30,000/yr.)	540 000	180 000	360 000	-	$1 06 000
Short term trg.(62 p.m $12,000/mo.)	155 400	37 000	37 000	-	22 400
Research Assistants($8,250/yr/station)	33 000	37 575	37 575	-	103 150
In country trg. seminars, Conferences	40 000	40 000	40 000	40 000	160 000
US Observation tours	20 000	20 000	20 000	20 000	80 000
					$ 1 657 550
Construction	411 000	667 000	1 426 000	-	$ 2 504 000
Commodities	334 000	288 000	645 000	86 000	$ 1 353 000
Commodities (+10% Contingency)	33 000	28 000	64 000	8 600	$ 133 600
					$ 1 486 600
Operating Costs	407 262	567 000	567 000	37 000	$ 1 578 262
Country Totals	$ 4 042 000 (30%)	$ 3 595 902 (26%)	$ 4 927 902 (36%)	$ 1 056 665 (8%)	$13 622 469 (100%)

costs.

b. Training

The project provides long-term for 12 participants. Eight will be trained to the Masters level, the remainder will be trained to the Bachelors level. An average training period of 3 years at a cost of $30,000 per year (including contract administration) has been used. The project also provides for third-country training of research assistants budgeted at $9,000 per year for each station beginning in FY 1984. For short-term training $10,000 per year is budgeted for third-country courses sponsored by the International Agricultural Research Centers, USAID, and U.S. universities. Special in-country seminars will be provided as part of the technical assistance contracts.

c. Construction

Construction cost estimating procedures were presented in the Construction Program, Section VII A.5. A budget breakdown is provided in Financial Table 3. The estimation procedures and results have been verified with the USAID engineers in Senegal and Mali.

d. Commodities and Operating Support

The commodity list and illustrative operating budget are presented in Financial Table 4 and 5.

V. IMPLEMENTATION PLAN

A. Programming and Fiscal Procedures

The Grant Agreements proposed for this project will be structured so as to assure individual responsibility of the three OMVS Member States for the national components of the project, and collective responsibility for the regional aspects. Four Grant Agreements will be negotiated. Each of these will contain a description of the overall project purposes, objectives, costs, and generally applicable conditions and covenants.

1. One Agreement will be negotiated between the River Basin Development Office and the OMVS Council of Ministers, for the regional aspects of the project and for activities which will be implemented by the OMVS High Commission. This Agreement will set forth conditions and covenants specifically pertinent to the OMVS, regional component/inputs including a detailed budget, and programmatic/managerial linkages to the national project components.

2. Three additional Agreements will be negotiated between the USAIDs in Senegal, Mauritania and Mali and the Governments in each of their respective countries. These Agreements will contain descriptions of each of the national program activities; a detailed national budget; country-specific conditions and covenants; and national responsibility vis-à-vis the regional aspects of the project.

Each component Agreement , upon signature, will represent an obligation of funds for US-financed activities in that particular country. The acceptance of a national component Agreement, however, commits each OMVS Member State government to the regional component of the project.

The project will be reported as one project. The project number will be the same (625-0957) but with country-specific numerals to identify each sub-component. The Senegal, Mali and Mauritania project numbers will be 625-0957.1, 625-0957.2, and 625-0957.3, respectively.

It will be necessary for budgeting purposes, for regional and national USAID Project Officers to meet at the beginning of each fiscal year to agree on budget allocations for each project component. These budgets, once cleared with host country management units, will be submitted to AID/Washington and will form the basis for annual budget allowances. The budget allowances will be transmitted by AID/W directly to each of the USAID missions.

Certification and payments of all vouchers will be the responsibility of each of the Mission controllers who will report on the project's financial status directly to AID/W. Copies of the Controller's reports will be simultaneously transmitted to the River Basin Development Office in Dakar for aggregation, consolidation and reporting of the project as a whole.

A review of AID's Audit Files relating to a prior OMVS Project (625-0605), Agronomic Research) leads the Mission to conclude that OMVS's accounting system cannot be certified at the present time. It is therefore necessary to establish a system for local currency disbursements under this project outside of the normal OMVS system.

The USAID/RBDO intends to establish a disbursing mechanism within the project to handle all requirements for local currency disbursements. This system would be organized around the Financial Management Technician being funded by the project and would likely include three or four Foreign National assistants-one for each accounting station (Research Centers) and one or two at OMVS or RBDO Headquarters. These individuals will be employed by the primary Technical Assistance Contractor under this project but will provide disbursing/accounting services for all USAID-funded OMVS activities. Each of these assistants, working under the technical supervision of the US Financial Manager, will be charged with the accounting, reporting and control of a local currency bank account. They will also be responsive to the requirements of the Project Officer located in each country.

Each Project Officer will have to approve all vouchers dealing with the local currency account(s) in each country. These accounts will be established and replenished from funds allotted to each Mission and will therefore be subject to the direct control of the respective Missions. As the project progresses it will be possible to gradually shift some of the accounting functions at the various centers to the OMVS. Any such transfers would, of course, be subject to Mission certification of the accounting system controlling the USAID funds.

Project implementation progress and rate of expenditures will be the subject of bi-annual review by the three Mission Directors and the RBDO Coordinator. Corrective actions will be determined by this group on the recommendations of the Project Officers. Major modifications in the programmatic and budgetary aspects of the project will be undertaken only upon agreement of, and direction from the Mission Directors and the Coordinator acting in concert.

B. Project Management Plan

1. RBDO's Responsibilities

The River Basin Development Office (RBDO) in Dakar will have coordinating responsibility for this project and direct management responsibility for its regional component. The USAID bi-lateral missions in Senegal, Mali and Mauritania will have direct management responsibility for the respective national components of the project. The RBDO coordinating responsibility includes:

a. Programmatic and managerial interaction with the OMVS Integrated Research Division:

b. Reception, aggregation and analysis of project implementation reports. These include financial, contractor performance, supply management, MIS reports, etc. of the national components of the project;

c. Reception, aggregation and analysis of research data generated at the national level;

d. Regional policy coordination, including interaction with the OMVS Interstate Committee for Agricultural Research and Development (CIERDA);

e. Management of relations with the OMVS Consultative Committee;

f. Management of regional project meetings;

g. Coordination of in-country training activities sponsored by OMVS;

h. Management of project-wide evaluations.

Within the River Basin Development Office, an AID Direct Hire Project Officer (PO) will be responsible for this project. The RBDO Project Officer will be responsible for working closely with the OMVS, its specialized institutions and with other donor agencies financing agricultural research activities in the Basin. He will also be the principal point of contact for OMVS for interpretation of AID implementation policy and procedures of this project. He will maintain close liaison with USAIDs Senegal, Mauritania, and Mali regarding every aspect of this project and will provide them with advice and counsel as appropriate.

The Project Officer (PO) will also prepare regional project documentation including Project Grant Agreement and amendments, project implementation orders, and project orders; supervise the work of regional contractors, and, monitor overall project implementation by the OMVS.

The RBDO Project Officer (PO) will be assisted by a Deputy Project Officer (funded under this project) and by the various support offices of USAID/Senegal. The Deputy Project Officer will be based in the RBDO in Dakar. He/she will be responsible for administrative, logistic, budgetary and procurement actions necessary for the implementation of the regional component of the project.

The USAID/Senegal Controller's Office, Supply Management Office, and the Engineering Office will provide specialized project support as necessary.

C. <u>USAID's Senegal, Mauritania and Mali</u>

The USAID's in Senegal, Mauritania and Mali will have responsibility for implementation of the respective national components of this project. In each Mission a Direct Hire Project Officer (PO) will have responsibility for management oversight of the OMVS Agricultural Research II project as well as all other Senegal River Basin project activities financed by USAID in his/her respective country.

Responsibilities of the national Project Officer will include:

a. Preparation of national project documentation, including Project Agreements and amendments, project implementation orders, and project reports;

b. Supervision of the work of national contractors;

c. Monitoring of national project implementation activities and reporting to RBDO on their status;

d. Reception, aggregation, and analysis of project implementation reports. These include financial, contractor performance, supply management, etc. of the national components of the project;

e. Reception, aggregation, and analysis of research data generated at the national level;

f. Coordination of in-country training activities;

g. Supervision of nation-wide evaluations.

The national Project Officer will be assisted by a cont employee (funded under this project) who will be designated as the Deputy Project Officer. There will be one Deputy Project Officer in each of the three Missions and he/she will assist the national Project Officer in all administrative, logistic, budgetary and procurement actions necessary for the implementation of the national component of the project.

In each USAID the Controller's Office, Supply Management Office, and the Engineering Office will provide specialized project support as necessary.

Since various types of data will be generated by this project, special attention will be given to the dissemination of these data. The two major types of data to be generated — research and implementation data — will be dealt with both at the national level and at the regional level.

At the national level, the agricultural centers will be responsible for initial data collection and compilation and for its dissemination to national agencies and the respective USAIDs. At the regional level the data will be handled by the OMVS' Integrated Research Division and the RBDO.

These data and accompanying reports will be one of the principal mechanisms of reporting to the CIERDA on the status of research in the Senegal River Basin and on whether or not research carried out at each of the three national research centers is achieving regional research objectives. The establishing of an interlocking system of research data analysis and sharing is intended to promote the efficient allocation of resources by the OMVS states; avoiding duplication of research efforts; maximizing dissemination of research results while at the same time understanding and responding to the different hydrological, pedological and climatic conditions that govern agricultural production in the Basin. The CIERDA, which is made up of representatives from each of the OMVS Member States is the sole research coordination instrument in the Basin.

D. Implementation Schedule

1. Timing of Activities

Month 0 -- Project Paper approval

Month 1 -- Project Agreement executed with the OMVS

-- USAID/RBDO finalizes and issues IFB for architectural and engineering design of Kaédi and Samé.

Month 2 -- OMVS/Member State project agreements are executed.

-- All conditions precedent are satisfied.

-- ISRA issures IFB for Fanaye construction.

-- PIO/T executed by each USAID for Country Project Officer.

-- PIO/T exectued for OMVS Management Specialist.

-- PIO/T executed for USAID/RBDO Deputy Project Manager Contract negotiated and executed.

Month 3 -- Contracts signed for Country Project Officers.

-- Contract signed for OMVS Management Specialist.

-- Mali nominates two candidates and Mauritania nominates three candidates for long-term participant training -- PIO/P's prepared Coordination of departure of remaining participants. Schedule English classes for month 7 below.

-- Annual work plan for 1983 prepared by each Ag. Research Station.

-- PIO/C issued for first group of commodities including furnishings

Month 4 -- Contract negotiated and signed for A and E for Kaédi and Samé Construction Design.

-- ISRA selection of construction contractor for Fanaye.

-- PIO/T's issued for TA for the three research stations (short-term

-- Annual Workplans sent to the OMVS by each country.

-- CIERDA holds meeting and reviews workplan for each station.

Month 5 -- RFP's issued for long-term TA contract for the three research stations.

-- Short-term training in the creation and maintenance of the project accounting system for research station accountants and the OMVS accountants.

-- Contract executed for Fanaye construction

-- AID/OMVS approve construction design for Samé and Kaédi.

Month 6 -- OMVS Council of Ministers approve annual Workplan for 1983 program and operational budgets.

-- First advance to research stations accounts for operating expenses of 1983 budgets.

Month 7 -- IFB for Kaédi and Samé construction issued.

-- Two Malian and three Mauritanian long-term participants start English language training.

Month 8 -- Construction at Fanaye starts.

-- Submission for technical assistance contracts evaluated.

-- Laboratory and other technical equipment ordered for Fanaye.

Month 9 -- Evaluation and selection of contractor for Kaédi and Samé construction.

Month 11 - Construction contract executed for Kaédi and Samé.

- Laboratory and other technical equipment ordered for Samé.

Month 12 - Start of technical assistance contracts with short-term consultancies.

- First commodity order arrives from U.S.

Month 14 - Contracts executed for technical assistance for three research stations.

Months 14 - 18 - Short-term TA helps with program design and implementation and establishes training programs for station.

- Workplan and budget for 1984 prepared by stations and sent to OMVS for CIERDA review and approval by Council of Ministers.

- Vehicles and equipment for contractor ordered.

- Candidates nominated by Mauritania and Senegal for long-term participant training and by all three countries for special third country training. PIO/P's prepared.

Month 19 - 20 - Construction at Fanaye completed.

- Equipment for buildings in place.
- Long-term technical assistants arrive for Fanaye, Kaedi, and S
- Senegal and Mauritanian candidates for long-term participant training start language training.
- Vehicles for Fanaye contractor arrive.
- Participants leave for special third country training.

Month 23 - 24 - Construction completed at Kaédi and Samé.

- Equipment for buildings in place.
- Participants leave for U.S. long-term training.
- Vehicles and equipment for contractor arrive.
- Expand on-farm research program for Kaédi and Samé.
- Short-term participants depart for U.S. training.

Year 3 - Annual research program executed at each station.

- Third country and short-term training program for researchers and technicians implemented at each station by contractor.
- All commodities in place.
- Annual workplan and budget developed and approved by OMVS for the following year.
- New contracts negotiated or replacements found for country Project Officers (if necessary) and OMVS Research Management Specialist.
- Special project evaluation by outside consultant after 2 1/2 years of project.

Year 4 - Continuation of annual cycle of national research workplan, approval by OMVS, and national execution.

- Continue third-country and short-term training.
- Malian long-term participants return end of year.
- Order replacement vehicles and equipment.

Year 5 - Continuation of annual cycle of national research workplan, approved by OMVS and national execution.

Year 5 (continued)

- Continue third-country and short-term training.
- Receive replacement vehicles and equipment.
- Second evaluation and PID for project continuation.
- Senegalese and Mauritanian long-term participants return end of year.

Year 6 - Continuation of annual cycle of national research workplan, approved by OMVS and national execution.

- Completion of training.
- Design PP for project continuation.
- Completion of project contracts.

2. Plans for Technical Assistance Contracting

Technical Assistance Contracting under the project for both regional and country-specific contracts will be direct procurement by AID.

a) Regional Contracts

USAID/RBDO will be contracting for the following types of assistance :

(1) A Regional Financial Management Specialist to be assigned to the OMVS. The scope of work for this individual is provided in Annex F.

(2) A Deputy Project Officer will be assigned to the USAID/RBDO in Dakar. The scope of work for this individual is provided in Annex F.

(3) Special short-term assistance directly to the OMVS for project implementation and evaluation. Fifteen (15) person months of assistance will include financial systems development, research exchange development, research management, statistical and data analysis, special project evaluations, and integrated pest management.

(b) Country Specific Contracts

(1) Deputy Project Officers. Each USAID will contract for a national Deputy Project Officer. This person will be based in the respective USAID and will be responsible for providing national level project management and administration capabilities to support implementation of this project by USAID's Senegal, Mauritania and Mali. The scope of work for the Deputy Project Officer is provided in Annex F.

(2) Long Term Technical Assistance - Under the bilateral project agreements to be executed between the USAID and the respective Member State, each USAID will contract separately for the Technical Assistance required under each national component of the project.

(3) Title XII versus Open Competition - A review of this issue by the three USAIDs has concluded that the Title XII universities are the most appropriate and best suited institutions to provide technical assistance to this project. However, as noted in the paragraph above, the Missions have decided that each USAID will contract separately for the technical assistance required under each national component of the Project.

For Senegal, a contractor will provide two long-term researchers (a farming systems economist and an agronomist/extension specialist) and short-term specialists to activate the farming systems research team for Fanaye. For Mauritania, a contractor will provide an agricultural research planner/agricultural economist and an administrative assistant and short-term specialists to strengthen the research program at Kaedi. Considering the critical nature of irrigated land use, land distribution issues in Mauritania which could effect the progress of research dissemination and adoption, arrangements will be made with the GIRM to utilize the services of returning AID trainees funded under the Land Tenure AIP. For Mali, a contractor will provide two long-term researchers (an agronomist/extension specialist and an agricultural engineer) and short-term specialists to develop an applied research program at Same. Short-term social science expertise will be recruited locally and/or from the U.S., as the need arises. The contractors will also be requested to coordinate the long and short-term training program for each station. The contractor for each station will be a U.S. university. In any case, advertising and selection will be competitive to permit the best possible selection of a contractor suited to the national and regional research needs of each station. In the event of non-responsiveness on the part of the Title XII universities, competition for the technical assistance contract(s) will be opened to private firms and international organizations.

3. Training Plan

A separate training plan has been developed for each research program based on station needs and current training programs. These training plans are for this six-year project phase only. They will be continued and expanded in later phases as part of the long-term institutional development process for agricultural research in the Senegal River Basin.

While the implementation of the training plan will rest primarily with the research station and the technical assistance contractor, certain training actions, particularly for Same and Kaedi, will need to be taken before the arrival of the long term technical assistance personnel. The first long-term participants for Mali and Mauritania will be sent to the U.S. before the technical assistance contractor arrives. This will be handled by the project staff and USAID's Mali and Mauritania working through the AID/Washington International Training Office and the U.S. Department of Agriculture. Later long and short-term training will come under the technical assistance contracts, except for some regional short-term training that will be coordinated directly by the OMVS.

4. Construction Plans

Because of the magnitude and the importance of the construction of facilities to the research program, considerable time was given during the project design to construction planning. The presentation of the construction program for each station is given in the Technical Analysis, Section VII A.

The construction program for Fanaye, Senegal should move ahead more rapidly than that for Kaédi and Samé. The architectural design for all the buildings to be financed by AID under this project has already been done as part of the World Bank Agricultural Research Project for Senegal. These plans have been reviewed by the USAID/Senegal engineer and certain modifications requested. Following the modification of the plans according to USAID requests and the approval of this Project Paper, ISRA will issue the Invitation for Bids for the construction at Fanaye. Architectural and engineering supervision for the construction will also be financed by the World Bank Project. The monitoring of the construction will be handled by the USAID/Senegal Engineering Officer and his Senegalese Assistant.

For the construction program at Kaédi and Samé, the final design of the buildings will be done by a local architectural and engineering firm. The design contracting will be handled as a regional project component by the OMVS with the assistance of USAID/RBDO and the USAID/Senegal Engineer. The construction will be done by national firms or by international firms resident in the area. A separate contract will be negotiated for each station following AID and national bidding and contract award procedures. The contracting will be undertaken by the national agencies with the assistance of project staff and the respective USAID's. Construction monitoring will be the responsibility of the respective USAID's, with assistance from REDSO/WA or USAID/Senegal as requested.

In accordance with Section 2.2.5.2.e. of Handbook 11 (as revised 5/15/82) when the host country is an authorized source for services, and the estimated cost of the contract for construction services is $ 5 million or less, a corporation or partnership which is determined by AID to be an integral part of the local economy is eligible. However, such a determination is contingent on first ascertaining that no US construction company with the required capability is currently operating in the host country or, if there is such a company, that it is not interested in bidding for the proposed contract. In the latter case, inquiries on a company's interest should be addressed to its headquarters. A corporation of partnership is an integral part of the local economy provided:

(1) It has done business in the host country on a continuing basis for not less than three years prior to the issuance date of invitations for bids or requests for proposals.

Under the Agricultural Research Project each of the three Member States are authorized sources for services, the estimated cost of the contracts for construction services is less than $ 5 million, and there are no US construction companies with the required capability currently operating in each of the host countries.

5. Commodity Procurement

Offshore procurement for this project will be conducted by the respective USAIDs on behalf of the Host Countries. When practical, purchase orders may be issued directly to manufacturers and suppliers in the United States. Alternatively, the services of a PSA (Procurement Service Agent) may be required , in which case, PIO/Cs will be issued to responsible experienced agents jointly agreed upon by the Host Country and the USAID. in each country.

Local procurement will be the responsibility of each national research center in Senegal, Mali and Mauritania, in accordance with the local costs component of each of the individual country project agreements and annual workplans. As noted on p. 47 above, the USAID/RBDO intends to establish a disbursing mechanism within the project to handle all requirements for local currency disbursements. This system would be organized around the Financial Management Technician being funded by the project and would likely include three or four Foreign National assistants-one for each accounting station (Research Centers) and one or two at OMVS or RBDO Headquarters. These individuals will be employed by the primary Technical Assistance Contractor under this project but will provide disbursing/accounting services for all USAID-funded OMVS activities. Each of these assistants, working under the technical supervision of the US Financial Manager, will be charged with the accounting, reporting and control of a local currency bank account. They will also be responsible to the requirements of the Project Officer located in each country.

The OMVS Project Manager (The Director of the OMVS Integrated Research Division) will be responsible for coordinating procurement planning, which will be finalized during the annual work plan cycle.

(c) Commodity List*

The items listed below are those financed by AID for the life of the project. The budget for these items is presented in Section IV Project Budget. More exact specifications will be furnished in the purchasing documents that will be issued to enact procurement.

(1) Fanaye, Senegal

- 1 motor cultivator (walking tractor), approx. 10 HP with attachements.
- 4 pick up trucks (for use of contract team -- two are replacements in yr. 4).
- 8 small motorbikes (4 are replacements in year 4).
- 2 diesel-powered electric generators 50 KW.
- Miscellaneous hand tools -
- Laboratory equipment, including ovens, scales, glassware and supplies.
- Office equipment, including typewriters and a small copy machine.
- Housing and Office furnishings.

(2) Kaédi, Mauritania

- 1 motor cultivator (walking tractor), approx. 10 HP with attachments.
- 4 all-terrain, 4 wheel drive vehicles (for contract team - two are replacement in year 4).
- 8 small motorbikes (4 are replacements in year 4).
- 2 diesel-powered electric generators 50 KW.
- Miscellaneous hand tools.
- Office equipment including typewriters and a small copy machine.
- Housing and office furnishings.

(3) Samé, Mali

- 1 tractor, approx. 60-70 HP with attachments and 25% spare parts.
- 4 all-terrain, 4-wheel drive vehicles (for contract team - 2 are replacements in year 4).
- 8 small motorbikes (4 are replacement in year 4).
- 2 diesel-powered electric generators 50 KW.
- Miscellaneous hand tools.
- Laboratory equipment, including ovens, scales, glassware, and supplies.
- Office equipment, including typewriters and small copy machine.
- Housing and Office furnishings.

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* 25% spare parts, based upon manufacturers' recommendations, will be ordered for the motorcultivators, trucks, vehicles, motorbikes, and generators.

d) Source of Procurement

The authorized source of procurement for this project is AID Geographic Code 000 (United States) and the respective cooperating countries. In addition, the authorized code for Mali is 941 (Selected Free World) and the cooperating country itself. Procurement of commodities from Geographic Code 935 (Special Free World) to include vehicles and other equipment, are covered by waivers, in Annex I.

e) Waivers

A source and origin procurement waiver will be requested from Code 000 (United States) to Code 935 (Special Free World) to permit the purchase of 24 small motorbikes ($ 30,000), 16 four-wheel drive vehicles ($ 430,000), and 6 diesel-powered electric generators ($ 150,000). The total amount of these waivers is $ 610,000

(1) Small Motorbikes

For the small motorbikes to be purchased for the project, a waiver will be requested since there are no US manufacturers of this type of vehicle. They are available from only Code 935 manufacturers.

(2) Vehicles

US manufactured vehicles have very limited utility in the rugged desert terrain encountered in the Senegal River Basin. Although there are distributors of US manufactured vehicles in Senegal, the density of such vehicles throughout has not reached the point to justify investment of substantial spare parts inventories with the result that spare parts support is still very poor in Senegal as well as in the other countries. In Senegal, the distributors confine their support activity to the main city which results in lack of service in the countryside. Throughout all of the countries local mechanics with some degree of know-how are unable to cope with the English system of measurement on which American vehicles are based.

(3) Diesel-powered Electric Generators

American manufactured electric generators and pumpsets have not been used in the Senegal River Basin. The major problem is after-sales service including warranty work, spare parts, and maintenance servicing. It would take several years for a US manufacturer to establish a similar local dealer organization and capability in the area, and no manufacturer has expressed interest in doing so because of the current low volume of business.

(f) Method of Procurement

All procurement will be accomplished in accordance with AID regulations and good commercial practices. As a matter of procedure the following will be observed:

- PIO/Cs will be issued by the respective countries as early as possible to initiate procurement flow in line with the project schedule. This will include local purchases by the USAID on behalf of each cooperating country of major items such as vehicles, generators, etc. as authorized by waivers of source/origin.

- For shelf item procurement from the local costs portion of the project agreement, the OMVS or the national research agencies may undertake local purchases on the basis of annual budgets.* For this shelf item procurement, shelf items having their origin in Code 935 countries are eligible for financing if the unit cost does not exceed $ 5,000 and the total of such financing does not exceed 10% of the total local costs financed by AID for each cooperating country. Commodities mined, produced or assembled in Senegal, Mauritania and Mali are eligible for financing without restriction, except for the limitation on the total amount available for local procurement. However, the statutory restrictions on certain commodities are also applicable to locally procured commodities, e.g., pharmaceuticals, fertilizers, motor vehicles (including motorcycles), etc. Shelf items produced or imported from countries not included in Geographic 935 are not eligible for AID financing. Procurement of shelf items for the project must be consistent with local laws and practices.

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* As already indicated, all such local purchases will be subject to prior authorization by the Project Officer or his Deputy in each country.

(g) Delivery

All imported goods will be shipped on the basis of CIF (Cost, Insurance, and Freight) to the port of entry — Dakar/Abidjan. All imported goods will be insured at 120% of the CIF cost to include air shipments. For surface shipments all-risk marine insurance will be used for coverage of the ocean voyage.

C. Constraints and special Concerns

1. Implementation Agreements

The project agreement between the respective USAID and each Member State will establish the project contributions of each country and the terms of project implementation.

2. Financial Management

As discussed on p. 47, of this Project Paper, a review of AID's Audit Files relating to a prior OMVS Project (625-0605), Agronomic Research) leads the Mission to conclude that OMVS's accounting system cannot be certified at the present time. It will be necessary to establish a system for local currency disbursements under this project outside of the normal OMVS system.

The USAID/RBDO will therefore establish a disbursing mechanism within the project to handle all requirements for local currency disbursements.

(See p. 47 for details).

VI. EVALUATION PLAN

A. Description of the Overall Plan

Two evaluations are planned during the six-year life of this project. The first evaluation will occur after two and a half years and the second after four and a half years. Both evaluation will focus on the implementation of the major project components: (1) technical assistance, (2) training, (3) construction, (4) commodities, and (5) operating support. Evaluation recommendations will concentrate on (1) the responsiveness of the project to needs of target groups, (2) the conformance of the project to AID and OMVS policy and development strategy, and (3) progress of the project toward specified targets. These evaluations will be undertaken by AID on a collaborative basis with the OMVS and use the Project Logical Framework, the Project Implementation Plan and the annual project workplans as the planned target indicators.

B. First Evaluation (30th month)

The first evaluation will be conducted after two-and-one-half years of implementation of the six-year project. A four-person evaluation team will consist of an AID evaluation officer, an OMVS representative, an agronomist, and an agricultural economist. The agronomist and the agricultural economist will be contracted for six weeks each using short-term technical assistance funds provided under the project. The AID evaluation officer will direct the evaluation in collaboration with the OMVS evaluation unit.

By the time of this first evaluation (1) regional technical assistance will have been in place for two years; (2) contracts will have been executed for technical assistance at each station and the long-term researchers will have been in place for six months to a year; (3) all long-term training will have begun; (4) the first research assistant training will have occured; and (5) all original commodities procured. With these accomplishments, considerable institution-building will have occured and the process of research program building well underway. However, there will be few measurable research results. This first evaluation will, therefore, look closely at project input delivery and at financial and program management. Of particularly importance will be:

(a) the operation of the annual workplan development and approval process involving the national agencies, CIERDA and the OMVS Division of Integrated Research;

(b) national agency project implementation under the USAID/Member State Project Agreements and under the annual workplans reviewed by CIERDA and approved by the OMVS Council of Ministers;

(c) Implementation of the farming systems and/or field tria research under research-extension protocol agreements between the resear stations and the national development agencies in each geographic area.

(d) regional and national financial management.

(e) regional and national implementation administration and the coordination and implementation assistance provided by the three USAID's.

(f) establishment of extension linkages to small farmers, including feedback from the farm level to researchers.

C. Second Evaluation (54th month)

The second evaluation will be conducted at the end of four and half years of implementation. The four member team for the second evaluation would preferably consist of the same individuals who were on the first evaluation mission. In addition to evaluating all the element considered during the first evaluation, the team will look closely at th established research programs and the research outputs from each station By the time of the second evaluation long-term researchers will have bee in the field a minimum of two-and-one-half years so that the research output should be apparent.

A major output of the second evaluation will be recommendations on the continuation of the project into another phase. Based on the recommendations of the evaluation team, AID will organize follow-up missions for developing a Project Identification Document (PID) and Project Paper (PP) to continue the project.

VII. FEASIBILITY ANALYSES

A. Technical Analysis

1. The Project Strategy

Under the Agricultural Research II Project for the Senegal River Valley the OMVS will receive a grant of $13.5 million from AID for a six-year program of agricultural research and institutional development. This project is the second phase of an ongoing effort to establish an integrated network of research stations and programs to support intensification of agricultural enterprises in the Senegal River Basin. This second phase of work will include field trials of improved technology, training and infrastructure investment for basic institution building. The institution-building process is expected to require fifteen years or more. A next five-year phase will focus primarily on the establishment of the needed indigenous programs of basic research, while the remaining five to ten years will mainly support refinement of research techniques and adaptation of broader program of work.

Based upon the development policy for the Senegal River Basin established by the OMVS Council of Ministers and upon the recommendations of the Interstate Committee for Agricultural Research and Development (CIERDA), the OMVS will establish priorities for research support. Within this framework, the project assistance to the research stations will provide comprehensive, research and institutional support. As the stations and the OMVS develop, the basic sequence of establishing program priorities will be revised to support specific lines of investigations and adapted to include allocation of funds from multiple donors during the fourth and fifth years of the project. The basic system is highly adaptable and should be a means of priority planning and support that will be of continuing value, even beyond the time frame of this project.

The OMVS staff (Integrated Research Division) shall periodically convene researchers, development agencies, farmers' groups and others in review of research programs, farm problems, and related questions. From these reviews and consultations the OMVS will set program goals and objectives of high priority.

The OMVS staff, station director and principal investigators will discuss proposals during their incorporation to the annual workplan so that certain details of the research programs may be negotiated to ensure the best match of research resources and objectives. The OMVS is not the only source of support for the research stations in the Basin, although during the life of this project it is expected to be a major research support source. As a major funding agency it will play an important role in setting the priorities and program approach for research in the Basin.

The OMVS will convene research review conferences of the cooperating station staff at approximately six-month intervals to review results, consider progress toward research objectives, establish future plans and revise budgets or allotments. The March/April review conference will include principal investigators, and eminent scientists outside of the OMVS supported stations will be invited to participate. The November meeting will be the annual program review by CIERDA. The Integrated Research Division of the OMVS will be responsible for preparing issues papers and for acting as the secretariat for these meetings. Donors will be invited to participate in these discussions and to make pledges. The OMVS will also compile research progress and expenditure reports for all accounts and grants.

The current FAO regional project is ending and will soon be evaluated. Nonetheless, it seems likely that there will be a continuing provision for personnel in the headquarters staff. However, since FAO support is dispersed within the OMVS High Commission and not provided to the Integrated Research Division, the Agricultural Research II Project will provide some managerial and administrative assistance to this Division. During the course of the project the OMVS will be expected to strengthen central staff or establish a mechanism whereby needed technical staff can be assigned on a rotational basis by the Member States.

The three primary research stations to be supported by this project are Richard-Toll/Fanaye in Senegal, Kaédi in Mauritania, and Samé in Mali. These stations will continue to be administered as national research stations within the research organizations of their respective countries. Consequently the personnel management, accounting procedures and a number of other administrative matters will not come under OMVS control. The stations will continue certain lines of research with national funding or other donor funding concurrently with OMVS supported research. The individual governments and research administrators will establish the program priorities and provide resources according to national interests. Nonetheless, the strong commitment of the Member States to the OMVS ensures that it carries the major responsibility for establishing the program priorities and ensuring research accomplishment.

During the life of this project the OMVS supported research at the three stations will strengthen the core program of these stations. Each nationa component will support the full range of research station building including participant training, technical assistance, commodity procurement, research support and station development. The project attention will be focused on extensive field trials and basic station development. However, as research programs become established and field trial results are available the focus of attention will shift to applied research investigation. Under the USAID/Member State Project Agreements, AID will contract for technical assistance which will provide the necessary

professional and institutional resources for each research station. U.S. universities and private firms will be invited to submit contract proposals for an individual station grant or for combinations of two or more stations, as may be in their interest.

It will be the policy of this project to encourage working linkages among the three major stations and between these stations and international agricultural research programs. For example, collaboration with SAFGRAD, WARDA, CIMMYT, ICRISAT, and other programs which are all established in the area will be encouraged and expanded wherever possible. Similarly, working linkages between this regional program and the other components of the ISRA (Senegal), CNRADA (Mauritania), and IER (Mali) programs will be strengthened, when useful, to expedite the research program in the Basin. These linkages are expected to reduce the cost and accelerate the pace of research in the Basin and each station's annual workplan and research proposals will be carefully scrutinized to ensure that all useful linkages are fully described and established.

How these linkages are expected to facilitate the research program can be illustrated with the following examples. Wheat research at Guédé using CIMMYT varieties has identified several wheat varieties or lines that are ready for field trial. Work at Bakl with promising material from the ISRA/WARDA station at Fanaye has indicated that more extensive field trials could identify additional well-adapted rice varieties, and the SAFGRAD and ICRISAT work in Mali has identified sorghum and millet varieties and practices of sound merit for farm use. While these activities have identified existing technology which is improved in comparison with traditional practices, there are good reasons to believe that more basic research will be needed to exploit the full agricultural potential of the valley. Therefore, the project can (1) produce significant short-term benefits by screening and adapting existing technologies and (2) develop feedback mechanisms that describe the unsolved problems and establish viable long-term research guidelines.

Up to 15 person-months of short term consultancies will be provided in integrated pest management to complement the work of the entomologist at Kaedi and at Fanaye and to provide a regional orientation to research on pest management in all the stations and their associated trials. It is proposed to use the mechanism of the Consortium for International Crop Protection for the needed experts. In addition to advising on research design and interpretation of results the experts could screen and review proposed pesticides as per Regulation 216. Water management considerations are central to the project. They must be addressed directly in research and research-extension linkages. Water management needs, in general, will be addressed through consultants. These may be with international and agricultural research organizations for specific areas such as IRRI for rice, ICRISAT and the soils CRSP for rainfed agriculture, or through centrally funded S&T Bureau projects.

This project will build upon the institutional base and research programs established at the three major stations (as described in Section III B). The adapted technology from these stations will be freely transfered to all suitable areas of the Basin.

The extension linkages will be from the regional development agencies in each country to the individual and combined network of research centers in order to gain the full range of technologies required for development of the Basin. The Researchers must also maintain close collaboration with their counterparts at other stations in order to acquire and transfer the required farming systems technologies rather than duplicating basic studies for the vicinity of each station.

From these principles the program of work as it will be undertaken by the various stations cooperating in this project will be decentralized and specialized.

2. Summary of Research Results

Section III B.3. presented a brief background of agricultural research undertaken in the Senegal River Basin. This section builds on that background and presents research results that are immediately applicable for field testing and further development by the Agricultural Research II Project. A brief summary is provided below of the many years of accumulated research results. For further details one should refer to the original reports and papers cited. Figure VI. A. summaries the available field crop results.

a. Senegal: Richard-Toll, Guédé, Fanaye

(1) Rice

Considerable rice research has been undertaken by WARDA at Richard-Toll and Fanaye and field testing of promising rice varieties has been an important element of the UNDP/FAO support to the CUMA pilot cooperatives. A summary of the field tests was given in Section III. B.3. The most promising varieties include IR 2071-625, IR 2071-636, Taichung Native No.1 (TN1), I Kong Pao, Thiou Thon Way, and Jaya with stations yields as high as 8-10 tons per hectare and on-farm yields of 6-8 t/ha with the best farmers. Since work with rice is the most developed and the most promising for widespread farmer adaptation under irrigated conditions in the Basin further field trials and adaptive research will receive high priority under the project.

(2) Wheat

FAO-supported variety research began in 1969. By 1977-78, Mexipak had been selected as the best bread wheat (Moscal 1979, 1980 b). Over 950 cultivars were tested, including 368 from CIMMYT. Work with other cultivars was conducted independently at Guédé. Since 1975 there has also been extensive work on cultivation practices.

The selection process was first conducted in 0.4 to 1.2 m^2 plots, was later continued on 10-100 m^2 randomized blocks, and then moved into 1.2 ha field plots for the most promising cultivars. Some cultivars were tested in pre-extension plots with SAED and other agricultural development agencies. Furthermore, Mexipak was produced under controlled conditions on 50 ha in the Guédé region and 24 ha in Mali (Timbuktou) by farmers in small plots and yielded 2.5 T/ha. in both locations (Moscal 1980 b).

Despite these good results under controlled conditions, farmers have not accepted wheat since the return under existing irrigation with small farmer plots is not competitive with that of rice. Further research involving on-farm trials and farming systems in needed.

(3) Sorghum

Eighty introduced composite and hybrid cultivars, as well as 22 local cultivars, were tested over a six-year period at Guédé and Fanaye by UNDP/FAO scientists with the help of ICRISAT (Moscal 1979, 1980a, 1980b). The trials covered the three seasons of the Basin.

The highest yielding cultivars were found to be P-8416 BT x P-7822 (5.12 T/ha), P-830T x 5915 (5.10 T/ha), and P-8325T x P7812 (5.05 T/ha). Due to the absence of seed production services, farmers use their own production of seed and the composite cultivars, although lower yielding, are more practical than hybrids and remain good for six or seven growing seasons. The yields of the dry-hot season were much lower than those of the dry-cold season.

ISRA (1980) tested 17 cultivars from the Basin along with others from different areas of Senegal. The best yielded from 0.69 to 1.31 T/ha. In another series 34 hybrids were tested. The yields were from 1.2 T to 1.6 T/ha in the dry-hot season. Like FAO, ISRA recommended that sorghum not be grown in the dry-hot season in the Basin. Sorghum trials conducted in the dry-cold season yielded an average of 5.14 T/ha with an 8.5% coefficient of variation and significant differences in favor of the "2450" cultivar among the six best cultivars of the 34 tested (ISRA 1980). Other newly recommended cultivars are 75-14 (5.68 T/ha), 612 x 75-14, and Sombassoki (a local cultivar). These results are ready to be field tested under the project.

(4) Corn

Over 140 cultivars of different origins have been tested since 1974 in all three seasons of the Senegal River Basin. The most promising cultivars were found to be: Penjalinan (yield = 5T/ha), Diana (4.3 T/ha in rainy and dry-cold season), and Early Thai (5.4 T/ha and 4.7 T/ha and 5.0T/ha). It can be inferred from these results that the best seasons for growing corn are the dry-cold and rainy seasons.

These results are applicable to project supported adaptive research. More work on cultivation practices within existing farming systems needs to be done.

(5) Millet

Very little work has been done on millet in the Senegal River region. ISRA prepared some standard cultivation practices for experimentation in all regions of Senegal concerning early (Souna) and late (Sonia) millet (Poethier 1980). The suggested cultivars are Souna III (early) and "Sanio de Sefa" (late).

Under rainfed conditions, a spacing of 90 x 90 cm is recommended. Under irrigation, solid seeding (60 x 15 cm) might be ideal. Most of the work was done in Bambey and the Casamance Region (Poethier 1980).

FIGURE VII A. Summary of Field Crop Research

Crop	Fanye/Guédé	Kaédi	Samé
Wheat	950 cultivars tested Mexipak tested on wide scale	3 cultivars selected	identified promising cultivars
Sorghum	153 cultivars tested 6 selected	(not much attention) 2 cultivars selected, 2 others being tested	4 cultivars identified
Corn	140 cultivars tested 3 selected	4 cultivars being tested	4 promising cultivars identified
Millet	(little work in SRB) standard cultivation practices, "early" and "late" cultivars selected	2 cultivars under rainfed conditions	5 cultivars are best adapted
Soybeans	(some work done) 5 promising cultivars	limited work	--
Cowpeans	(little work) 2 cultivars selected in other areas	limited work	--

Some applied research on the experimental stations to adapt these results to the Basin is needed before testing the results with field trials.

(6) Soybeans

ISRA gives cultural practices for soybeans under rainfed conditions (Poethier 1980). FAO has conducted several trials under rainfed and irrigated conditions for the last few years in cooperation with INTSOY and ISRA (Moscal 1978c, 1980a).

The best seeding date for soybeans has been found to be 5 to 15 of July. The most promising local cultivar was found to be ISRA 19/74. Other local possible cultivars are: ISRA 26/72, ISRA 31/73, ISRA 188/74, and ISRA 20/74.

Innoculation with Rhizobem Japonicum has significantly increased the yield. Moreover, the application of 46 kg/ha of nitrogen did not increase soyben seed production except for the July 15th seeding. In some cases it reduced the yield.

More work needs to be done, especially on irrigated soybean production and cultivar selection for the Basin before introduction can be contemplated.

(7) Cowpeas

Little work has been done on this crop in the Basin. Storage of cowpea seeds is hampered by the "Brucus" bug, which attachs the cotyledons. This reduces germination to about 50 per cent.

The most promising cultivars seem to be KVX 1841-CE (2.76 T/ha) and TVX 1576 x OIE (2.36 T/ha) (Moscal 1979).

b. Mauritania, Kaédi

(1) Rice

Supported primarily by the UNDP/FAO, the station at Kaédi has undertaken short and medium cycle variety testing, fertilizer and azolla africana tests, spacing and planting date tests, and cold tolerance tests. The most promising varieties with yields of 8-10 t/ha are TN1; IKP, IR 1561-228-3, IR 2071-625, and BG 34-8. Field testing and technological package development for the most promising varieties is needed.

(2) Wheat

In the dry-cold season, the cultivars Mexipak (4t/ha), Chenab 70 (3 T/ha), and SA-42 (3.5 T/ha) have given satisfactory yields in research plots and are recommended for field testing.

(3) Sorghum

This crop has not received much attention, and the present cultivars under local conditions yield 0.8 T/ha (Samé 600) and 0.6 to 0.8 T/ha (M'DABIRI). Newly introduced cultivars RT 13 (1.0 T/a) and SD-10 (0.6 - 0.8 T/ha) need further study. These cultivars were suggested for growing in the dry-cold season. Aphid attacks tend to limit the growth of RT-13.

(4) Corn

Limited work has been done at Kaédi. The cultivars currently tested are CPJ de Bouaké (1T/ha). Early Thai (1T/ha), and Diana (3T/ha). The locally grown cultivar is Maka with 0.6 to 0.8 T/ha yield. More applied research is needed in this area, with emphasis on composites which are more easily adopted by farmers.

(5) Millet

The cultivars BJ-104 and INCH-105 of ICRISAT yielded from 1 to 1.5 T/ha in research plots. The trials were conducted during the rainy season, which is recommended for millet production.

(6) Cowpeans and Soybeans

Very limited research has been done with these crops.

(7) Vegetable production

Extensive work has been done in the area of species introduction and adaptation, vegetable production scheduling, and plant protection by CNRADA in cooperation with IRAT, IFAC, IFRA, and GERDAT. Some work has also been done in adapted cultival selection (see Figure VI.B.)

A production schedule has been established and is ready for field testing. Plant protection problems have been identified, but not yet solved except for insects and spiders.

Also tested: pepper (14 cultivars), okra (6 cultivars), melon and tomatoes, during dry-hot and dry-cold seasons with limited results (DeBoss 1980).

(8) Fruits

The fruit station at the Rindiao section of the Kaédi station was started in 1970 by IRAC and continued by IRFA until 1975, at which time CNRADA took over. The results obtained are summarized in Figure VI. C.

A nursery has been established at Rindiao,where fruit species and cultivars which have proven successful in research are being distributed to farmers.

Figure VII B. Summary of Results of Vegetable Production Research, CNRADA (Mauritania).

Crop	Cultivars	Growing Season	Yields	Remarks
Eggplant	Baily, Profic F_1 Black Beauty Baron F_1	dry hot season	120 T/ha 140 T/ha 90 T/ha	Disease problems in this season
Tomatoes	Homac VF Small Fry VFN	15 Jan-30April	64 T/ha	Disease problems
Melons	Cantaloupe C. Ido Planter Jumbo Charentais	15 Jan-30 April	20.8 T/ha 17.0 T/ha 12.6 T/ha	Local market Prefers "meaty" cantaloupes
Watermelon	Benpe Sugar Ball Sugar Baby Sugar Belle		34 T/ha 27 T/ha 25.5 T/ha 20.4 T/ha	Local market prefers dark red, sweet watermelons
Cabbage (of China)	Miscellaneous	Oct. (dry cold)	25-17 T/ha	Harvest cannot be extended beyond April
Onions	Crystal white Wax Yellow Crowns White Crowns	Rainy or dry-hot season	38 T/ha 16.4 T/ha	Low humidity dries bulbs

Figure VII C. Summary of Research Results on Fruit at Rindiao (Mauritania)
Source: CNRADA 1980.

Crop	Cultivars	Yield (T/ha)	Remarks
Citrus	Miscellaneous		Collection, adaptation, seed trials
Lemon	Gallet	9.25	Phytophtera attacks serious problem
Orange	"Pineapple"	9.5	Long juice fruit
Orange	Valencia	2.0	
Pomelo	Marsh	32.5	Good quality
Tangerine	Cleopatre	1.5	Serious phytophera problem
Tangerine	Troyer	8.0	
Citure Maclophyllae		31.8	
Citrange	Carizo	4.5	
Lemon	Rouge	19	
Bitter Orange		20	Multipurpose stock and rootstock
Banana	LePoya Petit nain	25-30 25-30	Cultivar response and adaptation trials
Mango	Amalie	3	Adaptation response and cultivar trial
Mango	Early Passy Irwin	2 1.5	
Guava	Supreme Ruby Supreme White Supreme Ruby White Elizabeth	0.72 0.9 2.6	1972 response trials and 1973 cultivar trials initiated

c. Mali, Samé

(1) Wheat

Cultivar introduction and selection trials have been conducted in the last few years by FAO/UNDP and the government of Mali (through IER) in cooperation with CIMMYT. Some promising cultivars have been identified and are ready for field testing.

(2) Sorghum

Cultivar selection trials revealed that the best local variety is "Gabiaba de Nara" (PNUD/OMVS 1967). Among the introduced cultivars the most promising were CE 90, 137-62 (Niger), and 96-1217 A (Upper Volta). The yield average was 3.5 T/ha in a cycle of 120 days. Currently more trials are being conducted for sorghum as well as millet with ICRISAT providing design and data analysis.

(3) Millet

Selection among the local and introduced cultivars revealed the best adapted ones to be M2D2, NKK, MG (Mali), Souna II (Senegal), and P3 Kolo (Niger). They all yield about 1.5 T/ha. More recent trials conducted in cooperation with ICRISAT identified new higher yielding cultivars that can be used for field testing.

(4) Corn

The cultivars Segola ND1 and Maïs de Doro were selected from the local corn cultivars grown in the area. BDS and JDE are the two most promising cultivars introduced from Bambey (Senegal).

d. Research from other areas

There are many examples of research in other arid and semi-arid areas which may be applicable to the SRB.

Work done in southwestern U.S. on water requirements for crops and identification of heat-resistant cultivars may be useful under Senegal River Basin ecological conditions.

Farming system and animal traction work done in pilot farms in Morocco and in outreach stations or experimental stations as well as with local farmers in other West African countries (Togo, Nigeria, and Ghana) appears to be successful and feasible in those locations. Some of the acquired techniques and methods may be adaptable to local conditions.

Small agricultural equipment developed or tested by IRRI, ICRISAT, CIAT, and other organizations or countries (India, Philippines, Thailand), as well as other appropriate technology, can be tested.

Crop rotation may be further tested. The various components of a rotation could be: cereals (sorghum, millet, wheat, corn), vegetables, legumes (cowpeas, soybeans), forage (alfalfa, Stylosanhes grassilis, Desmodium spp.), cash or industrial crops, other crops specific to the area and food habits of the local population.

3. Research Programs

a. Senegal

The research program for Senegal will concentrate on setting up a farming systems (or production systems) research program at Fanaye as planned under the multidonor Senegal Agricultural Research Project coordinated by the World Bank. The farming systems team planned for Fanaye consists of six researchers including a general agronomist, agronomist for weed control, agricultural engineer, agricultural economist, rural sociologist, and extension specialist. This farming systems research team will:

(1) identify and quantify technical, economic and social contraints on existing production systems;

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

(3) assist in diffusing the improved technological packages.

The project will provide the technical assistance, training, equipment, and operating support needed to establish this farming systems team. This assistance will fit within and be coordinated by ISRA which has established a national farming systems program and methodology that is first being implemented in the Casamance under bilateral projects[1/] with Michigan State University and SECID. The long-term technical assistants needed to start this farming systems research are an agronomist/extension specialist and a micro-economist to be provided under a contract financed by the project. The contract will also provide for short-term assistance in other disciplines as identified during project implementation. A scope of work for this contract assistance is presented in Annex F.

b. Mauritania

It was originally envisioned that the Mauritanian component of this agricultural research program would begin with an on-the-ground adaptive crops research effort. A joint GIRM/USAID review and further design work indicated that development of an adaptive crops research program at CNRADA was premature at the present time, and consequently, that a good foundation of human resources development, the development of a research strategy as well as the development of financial, commodity and research systems was the appropriate first step to take during the initial phases of the project. A transition to Farming Systems Research will be made in the latter stages of the project, after the basic research systems are in place.

1/ See Senegal Agricultural Research and Planning Project (685-0223) for further information on the farming systems program and methodology.

Specifically, the project in Mauritania will finance one long-term technical advisor and an administrative assistant at the Kaedi research station. The Research Planner/Agricultural Economist will be the counterpart of the Director of CNRADA and as the Chief of Party (COP) will be responsible for the implementation of the project. Together with the staff of CNRADA, the Planner will design the long range research strategy for CNRADA. The plan will match resource availability with the research priorities of Mauritania. The plan will focus on the River Basin but must, of necessity, incorporate CNRADA's national, non-River Basin responsibilities.

The research strategy and implementation plan will be used as the guidelines for developing the specific systems necessary for implementation. In the preparation of the strategy it will also be necessary to make an inventory of research resources and farmer needs. Thus, its preparation may take as long as one year.

The Research Planner will be assisted by a project-financed Administrative Assistant, also based in Kaëdi, who will be responsible for establishing systems to handle all administrative, logistics, and procurement activities. In addition, a project-financed USAID Country Project Officer, based in USAID/Nouakchott, will be responsible for liaison with the Ministry of Rural Development in Nouakchott and other relevant national agencies, for the processing of all documentation needed for the project (initiation, contracting and implementation), for organizing project evaluations, for coordinating mission agricultural research activities and for liaison with the project contractor, CNRADA, OMVS and USAID/RBDO. (The Country Project Officer will also monitor and provide liaison of the OMVS Groundwater Monitoring Project.) Short-term technical assistance in financial management will be provided by the OMVS regional Financial Management Specialist.

During year two of the Chief of Party's tenure he will monitor the beginnings of implementation and address concerns attendant upon a functioning research station: organization/procedures of research committes; research proposal justification and approval; release of improved genetic material and establishment of a documentation center.

Trained research staff is a major component of the CNRADA development program. The project will therefore provide four M.S. and two B.S. scholarships. In addition to the planned academic program, a number of short-term training activities are also planned.

The COP will also be responsible for the integration of returning trainees into the activities of the research center, especially in the development of the Farming Systems Research program. This program will be a long-term effort to work with a high priority, economically viable production system and cooperating farmers. It is hypothesized that an applied or "downstream" Farming Systems Research program will be developed with SONADER and cooperating farmers involved in growing irrigated rice.

The expected outputs of this program will be as follows:

— a medium to long-term strategy for agricultural research activities in the Mauritanian portion of the Senegal River Basin;

— academically trained personnel, including 4 participants with Master's Degrees (Agricultural Economics, Research Administra tion, Agronomy-Soils, Plant Breeding); two participants with Bachelor's Degrees (Agricultural Engineer with emphasis in la and water development and Agronomy-Crops).

— Short-term training at international training centers.

— U.S. observation tours for two participants.

— Third Country Tour.

— Incountry training and seminars.

— Infrastructure development.

c. Mali

The research program for Mali will concentrate on dryland crops -- sorghum, millet, and certain fruits and vegetables. Five to ten varieties will be included in the field trial program. Field plots will be established at about ten sites. The number of sites may be expanded if site specific factors are detected in the analysis of trial results. Because of the limited existing research program and institutional capac at Samé, project technical assistance will be more diffuse, focusing on field trial component, but also helping to strengthen the research stati program. The long-term technical assistance will consist of an agronomi (4 years) and an agricultural engineer (4 years). Short-term assistance will be provided as identified during implementation. A scope of work i provided in Annex F.

The field trials in Mali will be conducted on farmers' fields. Under the research-extension protocol agreements between the research agencies and the regional development agencies (e.g., OVSTM) the development agencies will identify sites and organize cooperating farmers while the research agencies will establish the research design and provide technical support. A draft research-extension protocol agreement is provided in Annex G.

The pursuit of the project's research strategy will progressively establish a farming systems research methodology. As the researchers gain familiarity with farm conditions, more time will be given to field trials and then to the diagnostic aspects of farming systems research. Experience in field trials will also rapidly establish and/or revise the basis for on-station testing and evaluation of technology which is being studied. Thirdly, the increased numbers of field trials and demonstrations will accelerate the rate of flow of technology from the laboratory to farmers' fields. The improvement of these three steps in the farming systems approach will apply to all disciplines of the research institutions and are expected to shift the character of the research work to more applied rather than basic investigation, and in the medium term, to increase the return on the research investment.

d. Regional

The regional program role will be, as described earlier, to establish regional research priorities, to coordinate regional and external contributions to the national programs at each station, and to coordinate the dissemination of research results. To help the OMVS fulfill these responsibilities, the project will provide a long-term technical assistant in management and 15-person-months of consultants to the OMVS Division of Integrated Research.

4. Training Programs

Training will be provided for various individuals or groups associated with the project. The training approach includes the following elements:

(a) Provide training opportunities for all local personnel.
(b) Use combination of academic (U.S.) and on-the-job training to prepare counterparts for professional role.
(c) Send research assistants to third countries, francophone countries when possible, for practical training.
(d) Use full local training capabilities for support personnel.
(e) Conduct seminars, workshops, and field days and use them as appropriate for training purposes.

A summary of training is given in Figure VII D.

a. Management Training

Phase I of the Agronomic Research II Project included on-the-job experiences (for the three national research directors, the Director of Planning and Coordination and the Coordinator of Agricultural Research of OMVS, and the three agricultural station directors) and a technical and administrative orientation in the western United States.

Under the Agricultural Research II there will be considerable on-the-job experience in administration that will be reinforced by close collaborative working relationships between the OMVS and national research administrators and the project technical assistants. Regular conferences and briefings will also be held, so that by the end of the project a good administrative system with strong regional and national management will have been established.

The process of collaborative decision-making was started during the final design of the project by a joint OMVS/USAID team which discussed thoroughly all project elements with each national station director. This process will continue in final implementation planning through the negotiation of the Project Agreement and the individual Country Project Agreements, then in the development of final specifications and implementation contracts, and finally in the preparation of the annual research programs and budgets for each station. With each of these steps, the station directors will be the prime actors, working with the assistance of OMVS and USAID project managers and later, with contract technical assistants.

FIGURE VII D - Training Summary

Target Group	Subject	Description	
		Formal	Informal
1. Administrators	Management/ Administration	---	Study/Observation tour On-the-job experience
2. Accountants	Accounting/ Administration	Special in country training	On-the-job by regional management expert
3. Professional Counterparts	Research, Technical Production, extension methods	MS in U.S., short courses	On-the-job, Seminars Field days, Seminars
4. Research Assistants	Research methods	Special practical courses (3rd country) Short courses	On-the-job
5. Support personnel Field Assistants Mechanics	Field procedures Pump, tractor and equipment maintenance and repair Buildings, utilities and infrastructure maintenance	Workshops Workshops	On-the-job On-the-job

b. Accounting Training

As a preliminary step to local disbursement each research station will be required to name a project director and accountant and to establish an adequate financial management system. The station accountants and the OMVS accountant will all receive short-term training in the creation and maintenance of the project accounting system. A project technical assistant for financial management will be recruited to work within the OMVS Integrated Research Division. This individual will be responsible for following up on financial management and accounting training and for providing continuous supervision and on-the-job training to assure the proper and timely operation of the project financial system.

c. Research Training

In order to establish an on-going national capacity to carry out agricultural research, the project will provide academic training for researchers from each of the three countries. National researchers will be assigned to work with each long-term expatriate researcher. The on-the-job work and academic training of these national researchers will be staggered so that one will receive practical experience working with the expatriate researcher while the other is in academic training and vice-versa. This research training program will involve the national researchers in all phases of research from planning through analysis of results and report preparation and give them a solid academic background with the opportunity to do this research within the project.

The project will finance 12 long-term participants for approximately 36 months of training each. Training to the Masters and Bachelors level is planned, although this may have to be adjusted, depending on the background and academic level of available candidates. Samé, Mali will have four long-term participants and Senegal will have two. In view of its limited research capacity, Mauritania will send six (6) participants for long-term training in the United States. Senegalese and Mauritanian participants already in long-term training will be named counterpart researchers when they return to the Fanaye and Kaédi stations.

During the first year of the project Mali will nominate two candidates and Mauritania will nominate three for training. (See Training Schedule below.) These nominees will already have a relatively high level of academic and research experience. They will receive special intensive in-country English language training and then depart for a two-year Masters program. The AID/W International Training Division will handle their placement through the USAID/OICO/ITO.

The remaining eight candidates will be nominated during the first year, but will be assigned to the research stations to work as researcher counterparts following the arrival of the long-term technical assistants. The contractor will collaborate with

FIGURE VII E

Training Schedule

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Malian -------- → --------- →				
	Malian -------- → --------- →				
	Mauritanian ---- → --------- →				
	Mauritanian ---- → --------- →				
	Mauritanian ---- → --------- →				
		Malian --------- → --------- →			
		Malian --------- → --------- →			
		Mauritanian ----- → --------- →			
		Mauritanian ----- → --------- →			
		Mauritanian ----- → --------- →			
		Senegalese ----- → --------- →			
		Senegalese ----- → --------- →			

NOTE: Long-term academic training in the U.S. will be provided for 12 participants (4 from Mali, 2 from Senegal, and 6 from Mauritania) at approximately 36 months each.

with the national research agency in defining an academic program for each of these later participants, and then the contractor will coordinate their placement in U.S. universities and provide administrative backstopping for the training.

d. Research Assistant Training

The project will provide for special non-academic third-country training for research assistants. This program will include 3 or 4 research assistants from each station. The training program will be combined with experience and work on the station and will be managed by the technical assistance contractor. The selection of candidates and the establishment of the training program will occur after the arrival of the long-term technical assistants. The training envisioned includes: research methodology, survey and field trial design, technical crop production training, and multi-disciplinary or farming systems research training.

e. Other training

Other aspects of the training program intended to improve research capability and strengthen the research-development link include:

(1) Local seminars and workshops at each station including researchers, research assistants and field assistants. Several sessions will be devoted to each crop and/or farming system. These workshops will be organized and given by the technical assistance contractor with the help of consultants and other external resources. Examples of the training are:

- Land preparation	- Agricultural Engineer
- Seed bed preparation	- Agronomist
- Fertilizers and fertilizer application	- Agronomist, Agricultural Engineer
- Irrigation principles	- Agronomist, Soil Specialist
- Specific practices (including water measurement and control)	- Agricultural Engineer
- Land leveling and layout for irrigation	- Agricultural Engineer
- Seed quality and types, selection and improvement	- Agronomist
- Choice of cultivars and adaptation	- Agronomist
- Seeding	- Agronomist
- Simple seeders and their adjustment and use	- Agricultural Engineer
- Weeds	- Agronomist
- Weed control	- Weed Control Specialist
- Herbicide applicators, setting and calibration	- Agricultural Engineer

- Pests and parasites of cereals	- Plant Protection Specialist
- Plant protection	- " " "
- Economics of cereal production	- Agricultural Economist
- Maintenance and use of farm machinery	- Agricultural Engineer
- Appropriate cereal production technology	- Contractor team
- Harvesting and threshing methods (small, intermediate and large machinery)	
- Storage of crops (cereals), various seed and staple cereal treatments	- Agronomist, Agricultural Engineer
- Nutrition and diets	- Contractor team

(2) Local seminars and workshops for support and maintenance personnel covering equipment and infrastructure maintenance will also be given by the technical assistance contractor.

(3) Frequent visits to field trial sites and other stations by the researchers and assistants to exchange information and coordinate work.

(4) Annual regional seminars will be organized by the OMVS Division of Integrated Research. Personnel from each of the stations and from other research projects and research institutions will be invited to participate.

(5) Printed pamphlets or "extension" material (pictures and pictorial sketches of simple recommended implements and techniques) will be developed by the stations with assistance of the contractor.

(6) International and regional symposia and meeting will be attended as appropriate.

5. Construction Programs

To attract and retain qualified expatriate and national researchers, an attractive and comfortable environment must be created at the three research stations. At the same time laboratory, shop, storage, and field facilities must be adequate for the research program. These would include as a minimum: good housing, ample office and laboratory space, well prepared field plots, efficient irrigation and drainage systems, basic recreational facilities, easy access to a medical clinic, and safe and reliable domestic water supply, waste disposal, and electric power systems. Facilities are sited so as to integrate the contractor team and local scientists with the surrounding communities.

The investment in a good physical infrastructure, however, is in itself not sufficient for the success of the project. Inadequate maintenance is a chronic problem. Sufficient spare parts for buildings, equipment, and machinery will be supplied from the beginning of operations. Training will be provided to local staff at each station to maintain all physical facilities, equipment, and machinery and to operate a spare parts inventory and ordering system based on reliability principles. At the same time a maintenance budget for the physical facilities and equipment is provided in the operating budget.

Tight financial control of the construction process is important, and it will be essential to process quickly the purchase, importation, and clearance of tax- and customs-free items. This is particularly true during the construction phase, because any delay in clearing and delivering tax-and duty-free material from customs will give the contractor cause for increasing the contract price.

a. Research Stations

The three research stations where project activities will be concentrated are described in brief below.

(1) Fanaye, Senegal

The Fanaye station is being established (a) as a replacement for the station at Richard Toll which is being displaced by the expansion of a sugar mill, and (b) as a supplement to the station at Guédé, which is unsuitable for expansion. It consists of a gross area of approximately 700 ha., with about seven different types of soil ranging from heavy clay soils to light sandy soils. The current plans of the Senegalese government call for the development of about 60 ha. of the easterly 100 ha. for research purposes. The remainder of the area is proposed to be used for other activities such as demonstration or pilot farms, farmer training, and seed production. Currently about 20 ha. are leveled and have irrigation facilities. Approximately 40 ha. of the planned research area remains to be completed. At present, only 1,500 m. of a needed 4,600 m. flood protection dike have been completed.

There are only three buildings at the station. Housing, storage facilities, and water and power facilities need to be constructed.

(2) Kaédi, Mauritania

The Kaédi center is also in the process of development. Previous research in the area has been done at Wandama and Rindiao. The Wandama station is comprised of about 9 ha. and located some 2 km south of Kaédi; the Rindiao station consists of about 14 ha. located roughly 7 km west of Kaédi. These two areas are inadequate for the planned research program and were established under a temporary short-term agreement with local land holders. Housing will have to be constructed at the headquarters in Kaédi.

(3) Samé, Mali

The Samé research center is actually made up of two stations: the Kamenkolé station, located about 5 km west of Kayes, and the main station located about 3 km west of the village of Samé and about 20 km west of Kayes. The Kamenkole station consists of about 6 ha., two hectares of which are presently in rice trials. The Samé station fields are about 60 ha., the bulk of which has been used for rainfed crops. Eleven hectares have been leveled and developed for irrigated agriculture, with more of the area being planned for development. The plan of the Malian government is to expand the research area to about 200 has. of leveled land.

Three houses are available at the Samé center. They are in need of repairs and maintenance. There is also a repair shop and maintenance area with one storage room.

b. Buildings to be constructed

The final design of the buildings will be done regionally under a contract with a local architectural engineering firm. The construction will be done by national and/or international contractors. Construction recommendations and costs have given due consideration to climatic factors and the need for double roofs, insulation, and cross-ventilation in all buildings to minimize the artificial cooling requirements. The interiors of the office and laboratory buildings should have movable partitioning to achieve flexibility in space use with changing requirements. Although laboratories are designated for a specific purpose, they will be sufficiently large to contain room for general laboratory analysis. If possible, construction should be in modular units and phased in such a way to allow the early initiation of the research activity. Construction

should preferably begin after the rainy season to prevent difficulties in transportation of materials to the sites in Mali and Mauritania, and to allow site preparation, site development, and enclosure of buildings before the next rainy season.

The number of housing units, research laboratories, and other facilities is designed to meet the specific requirements of this project as set forth by the agricultural research program. However, since the future participation of the other donor agencies cannot be predicted at this time, it is reasonnable to suggest that complete financing of the Samé station in Mali by this project is justified. The Fanaye station in Senegal is one of the agricultural research centers which the World Bank and other donors are financing under the Senegal Agricultural Research Project. There will be coordination of effort and sharing of costs for this station. The Kaédi station in Mauritania is receiving financial aid from FAC for the construction of residential, laboratory, and office buildings. Efforts are being coordinated for design and construction of facilities at this station.

Land at all three stations is provided by the national governments. Preliminary site plans were made for each research station in accordance with the anticipated needs of the project, and in response to the general conditions of the sites, particularly the climate. Actual site planning will require field work to locate exactly the structures vis-a-vis configuration of the terrain, local flooding and water table, soil conditions, as well as existing structures and vegetation.

It is important to propose appropriate technologies for the buildings required to carry out the research program. Buildings designed to ventilate and cool themselves naturally will require much less energy than will buildings designed without the effects of the climate in mind (Clark and Paylore, 1980). Based on a combination of indigenous building design in West Africa and research that has been done at the University of Arizona, the proposed site layouts and prototype building designs could be models for future development along the Senegal River.

Climate is a very important factor in building design, particularly in areas that experience both hot arid and hot humid atmospheric conditions. All three research center sites experience similar weather patterns: relatively mild and dry winters, a hot dry spring season, and a hot humid season that extends from July through October when the majority of the rainfall occurs. They experience approximately 8 months of dry weather with occasional Harmattan winds off the Sahara desert and 4 months in which hot moist air blows from the southwest quadrant.

The effect of the sun on buildings in the lower latitudes is somewhat different than its effect in latitudes farther north. Located at 14.5° (Samé) and 16.5° (Fanaye and Kaédi) north latitude, even the northern facades of buildings will receive significant amounts of insolation, especially during the hot wet months. Yearly temperature extremes fall between 16°C and 42°C, meaning that keeping the building interiors cool is the more urgent problem.

Although various approaches to passive cooling may be defined separately, they work best when combined. The optimal passive cooling system is one which minimizes the need for cooling in the first place. Responsive building designs with proper orientation, optimal window area, good shading and insulation, minimal air infiltration, and appropriate construction materials should be considered before specific passive or active cooling system are proposed.

c. Cost Estimating Procedures

The cost figures have been developed from the best available information on past constructions at the sites and adjusted to October, 1982. The estimated construction costs have been checked with USAID engineering staff in Dakar, Bamako, and Nouakchott.

No detailed enumeration of office and house furnishings has been attempted. Furnishings for residential buildings, office furniture and equipment, and furniture and scientific equipment for laboratories, were estimated based on experience at the three USAID's.

The cost of renovating existing facilities is taken as 25 per cent of the cost of similar new construction. Construction site development and landscaping costs are assumed to be 10 percent of the cost of civil works.

The architect-engineering fees for building design are taken as 10 per cent of construction cost, because they include topographic survey of the construction site, subsoil investigations and the cost of obtaining the necessary building permits and/or certification of insurance, as well as supervision of construction.

In the Fanaye-Richard Toll station area, the World Bank will fund all architectural and engineering fees for OMVS research buildings and houses under its loan to Senegal.

Construction contracts in Senegal, Mali and Mauritania carry a clause allowing the contract price to be adjusted according to a formula incorporating proportional increases in labor rates; the price of cement, steel, and other construction materials; and fuel for: (a) price and cost increases during the period between the date of submission of bids and the

date of the order to begin construction; (b) official governmental increases in labor rates, the price of cement and other construction materials, and fuel. These cost adjustments are applicable even after the signing of the lump sum contract.

The estimates of project costs are exclusive of all taxes and custom duties, and assume that construction will start by December 1982 for Fanaye and December 1983 for Kaédi and Samé. The preparation of design and bid documents for Kaédi and Samé will take 7 months under the best of circumstances. If construction does not begin by the planned dates, delay will cause a cost increase at the rate of 1 to 2 per cent per month.

It should be pointed out that these estimates will be refined after construction drawings are completed. The final cost will only be known after construction bids are received.

d. Construction Contract

The tender documents should make absolutely clear that all bids are to be submitted with all cost items calculated tax and duty-free; the tax on profit will be the contractor's responsibility. It is accepted practice—if requested by the contractor—to advance to the contractor 15 percent of the total contract. It is also acceptable to advance to the contractor up to 50 per cent of the cost of construction materials. The total of such sums should be approved only upon presentation of appropriate bank guarantees. Monthly payments are made later upon presentation and approval of construction progress reports and accompanying bills. Within 15 days of acceptance of the contract, the contractor deposits a surety bond equal to 5 per cent of the total contract cost, and from subsequent monthly account settlements 10 per cent is deducted as guarantee deposits.

f. Specific Construction Requirements at Research Stations

(1) Fanaye, Senegal

The civil works requirements at Fanaye are:

Four 3-bedroom housing units each about 135 m^2 floor area
Four 1-bedroom houses for research assistants
One office building for researchers
One office building for assistants and a library.

The general arrangement of the Fanaye station is shown in Figure VII F. The preliminary site layout is given in Figure VII G.

Topographical maps of Fanaye exist and may be adequate for agricultural land development. Local architects will have to develop their own site maps for the exact location of the buildings based on local site conditions. The building site is on a firm sand dune, and no foundation difficulties are foreseen.

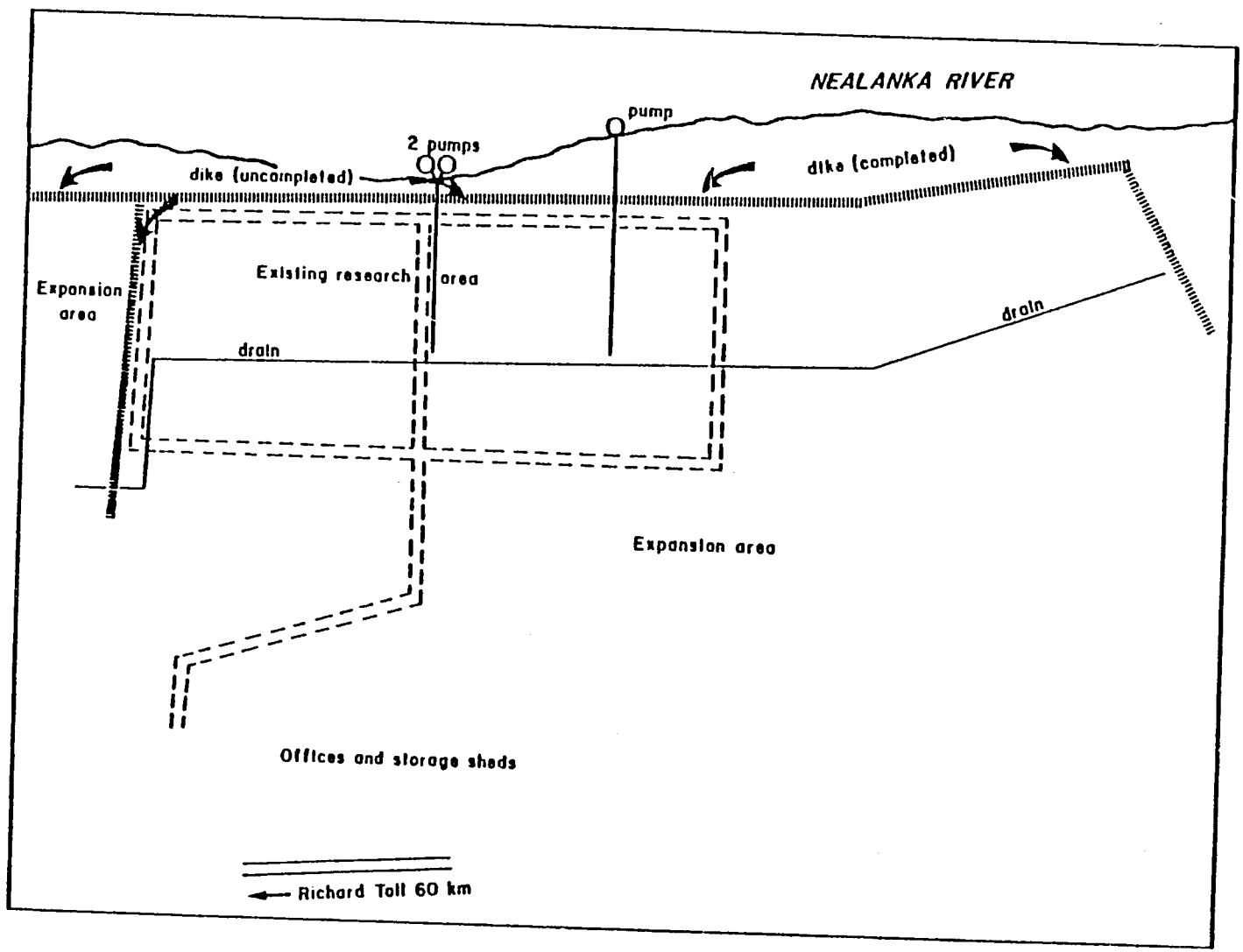


Figure VII F General Arrangement of Fanaye Research Center

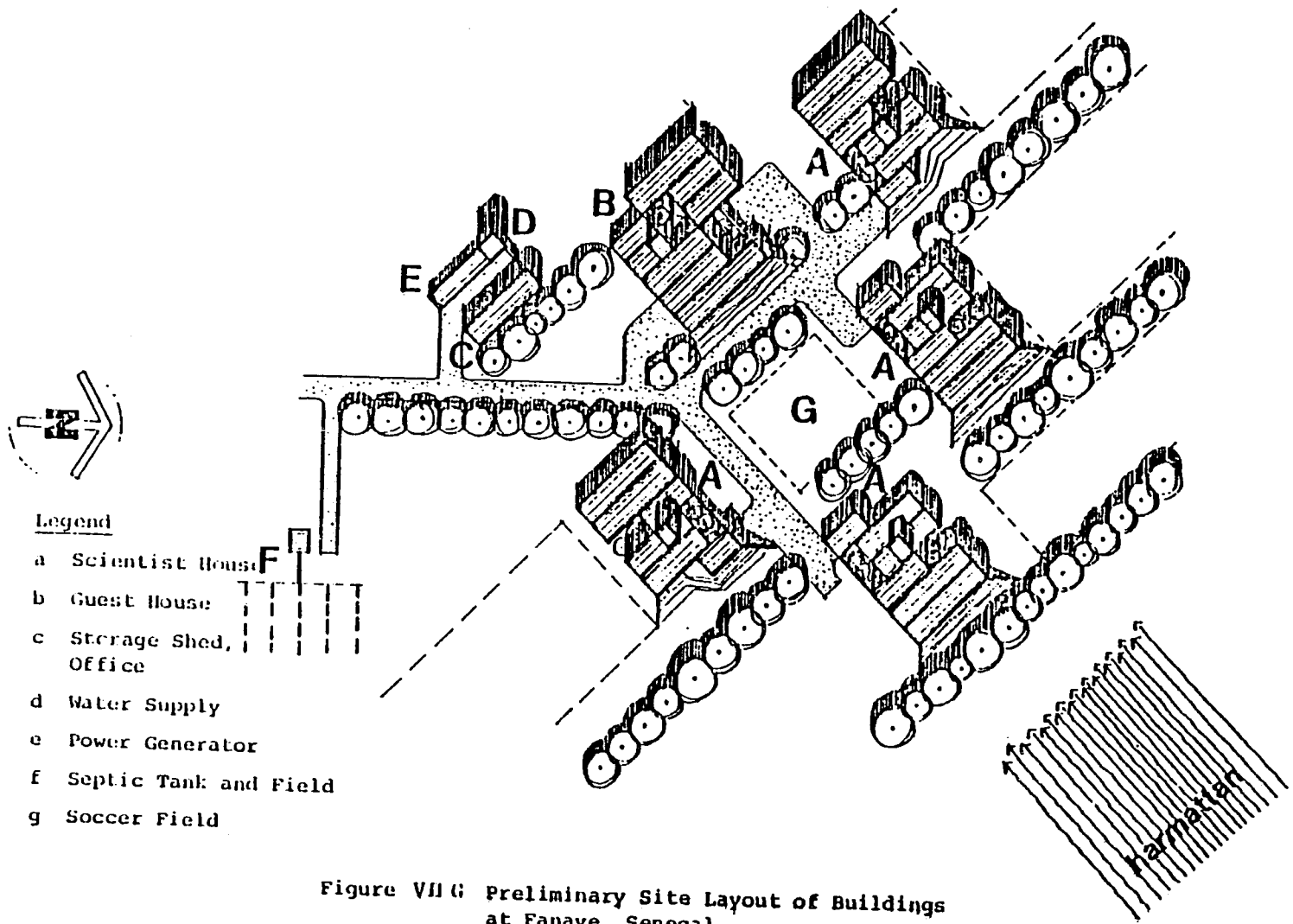


Figure VII G Preliminary Site Layout of Buildings at Fanaye, Senegal

Ground water of good quality is available from a shallow aquifer in ample quantities for domestic use with a modicum of treatment. Water from the irrigation system can be used for other purposes such as watering lawns, trees, and vegetable gardens. Investigations by World Bank engineers have led to the same conclusions. Water demand for the well system of 25,000 l/day is based on a population projection of 50 permanent and 100 transient people. An elevated storage tank of 75 m^3 should supply the full demand for 3 days as well as sufficient emergency fire demand flow.

The waste disposal system for about 17,000 l/day could most effectively and economically be accomplished by a septic tank system.

The electrical power system would consist of two, 50-KW diesel generators, one of which would be a stand-by unit.

The Fanaye, Senegal, station will benefit from the proposed construction of housing, laboratories, and infrastructure by the World Bank. A small grouping of scientists' houses and a guest house in a universal setting is proposed, with a definite orientation to prevailing winds and sun angles (see Figure VII G). The major site organizer is the response to the dessicating winds from the northeast which occur during a majority of the year. Although the houses are detached from each other, they need to be carefully arranged to avoid the brunt of the Harmattan by mutual wind shading while preserving their individual privacy. The use of earth berms and windbreaks will aid in this sheltering. As a side benefit, closely placed houses can protect exterior play or garden areas. To further reduce the effects of the northeast winds, the houses are slightly cut into the earth and sheltered by overhead barrel vaults placed normal to the prevailing winds. Other facilities at Fanaye include a storage shed, sewage treatment/storage, power generation and a soccer (football) field.

(2) Kaédi, Mauritania

The site designated for the housing at Kaédi is close to the FAO facilities and guest house, but contains no existing structures. Water line and electric power lines come close to the boundary of the site, so that an independent water supply system and electric power system will not be necessary. Nevertheless, it is recommended that a 50 KW unit be made available at the site as a backup unit for emergencies. FAC is planning the construction of housing, office, and laboratory buildings at Kaédi, and the design of facilities will be coordinated with the design team from FAC.

On the basis of the proposed research program and staff requirements, four 3-bedroom housing units each with about 100 m^2 floor area will be constructed at Kaédi.

Kaedi is a somewhat isolated station. There are two flights a week from Dakar and Richard Toll (Air Senegal), but most of the transportation between Dakar-Fanaye and Kaédi goes over RN2 to Tilogne and from there over a 20 km bush road (piste) to Kaedi. The Senegal River can not constitute a major obstacle. However, during the rainy season and/or the flood season of the Senegal River, the "piste" is impassable because of water in the marigots. Improvement of the "piste" to an all-weather road is planned within the framework of a transportation network development in the Senegal River Basin with funding from West Germany.

As shown in Figure VIIJ, the two researcher houses and 2 smaller houses will be constructed at Kaédi, in concert with a development proposed by FAC architects. Again, the houses are sited according to the prevailing winds, using earth berms, windbreaks, earth integration, and the barrel vaulted roof for protection. Exterior activities such as children's play areas, recreational areas, and irrigated gardens all occur in the protected areas between the structures.

(3) Samé, Mali

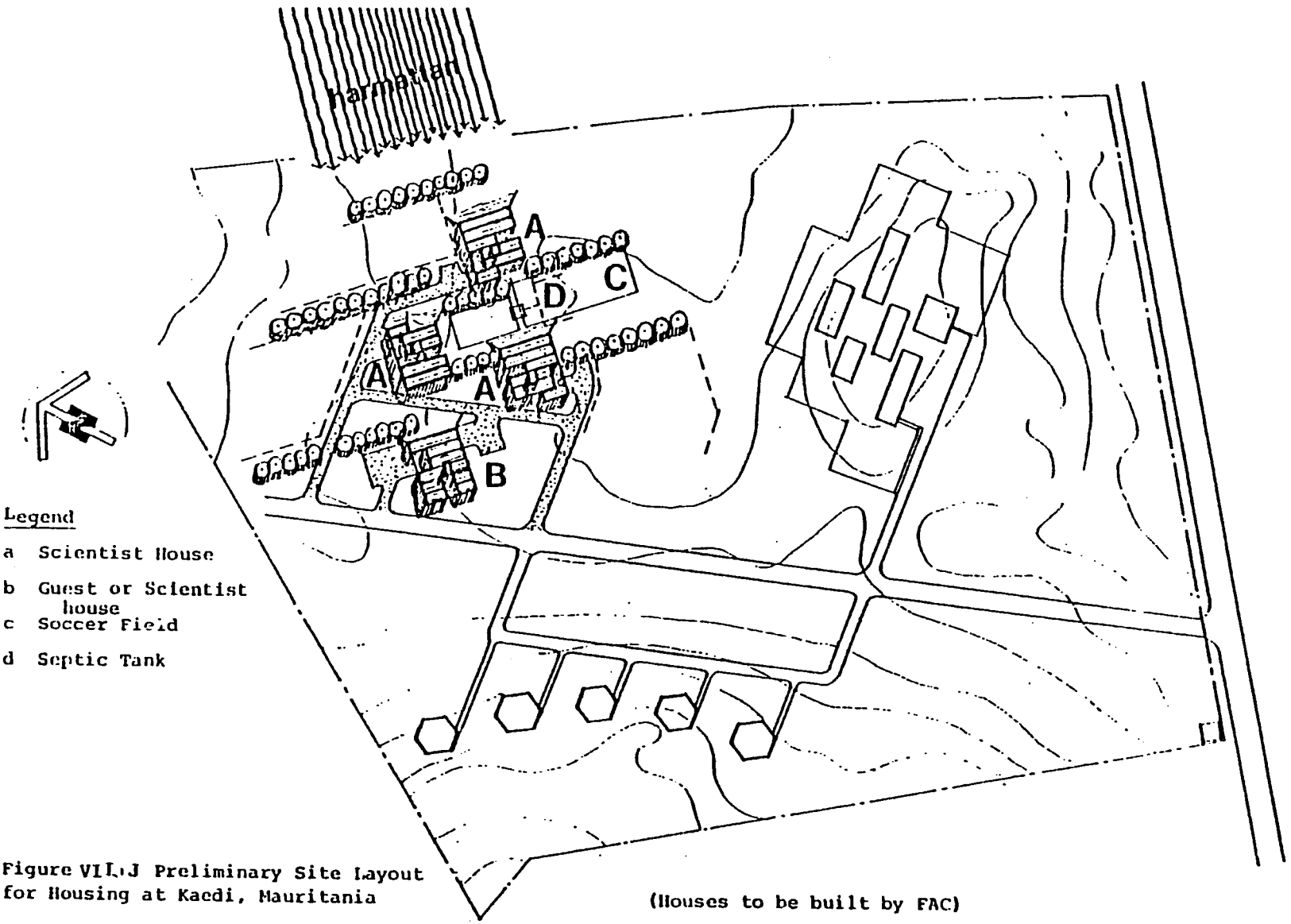
At Samé there are two houses, a 4-roo[illegible] building used as storage bins, a repair shop and maintenance area, and a large storage room adjoining the repair shop which is being used to store agricultural products. These buildings are in need of repair; the two houses will be transformed into guest houses. The ex-office building will continue to be used as storage area. The repair shop will be renovated, and the sotre converted into a spare parts storage room.

The new building requirements are:

Housing, 5 units each, 135 m^2 floor area,
Office, 1 unit, 250 m^2 floor area,
Laboratory , 1 unit, 60 m^2 floor area.

Space will be allocated for future expansion needs.

Equipment storage, 1 unit, 100 m^2 floor area,
General hangar, 1 unit, 50 m^2 floor area.



Legend

a Scientist House

b Guest or Scientist house

c Soccer Field

d Septic Tank

Figure VII.J Preliminary Site Layout for Housing at Kaedi, Mauritania

(Houses to be built by FAC)

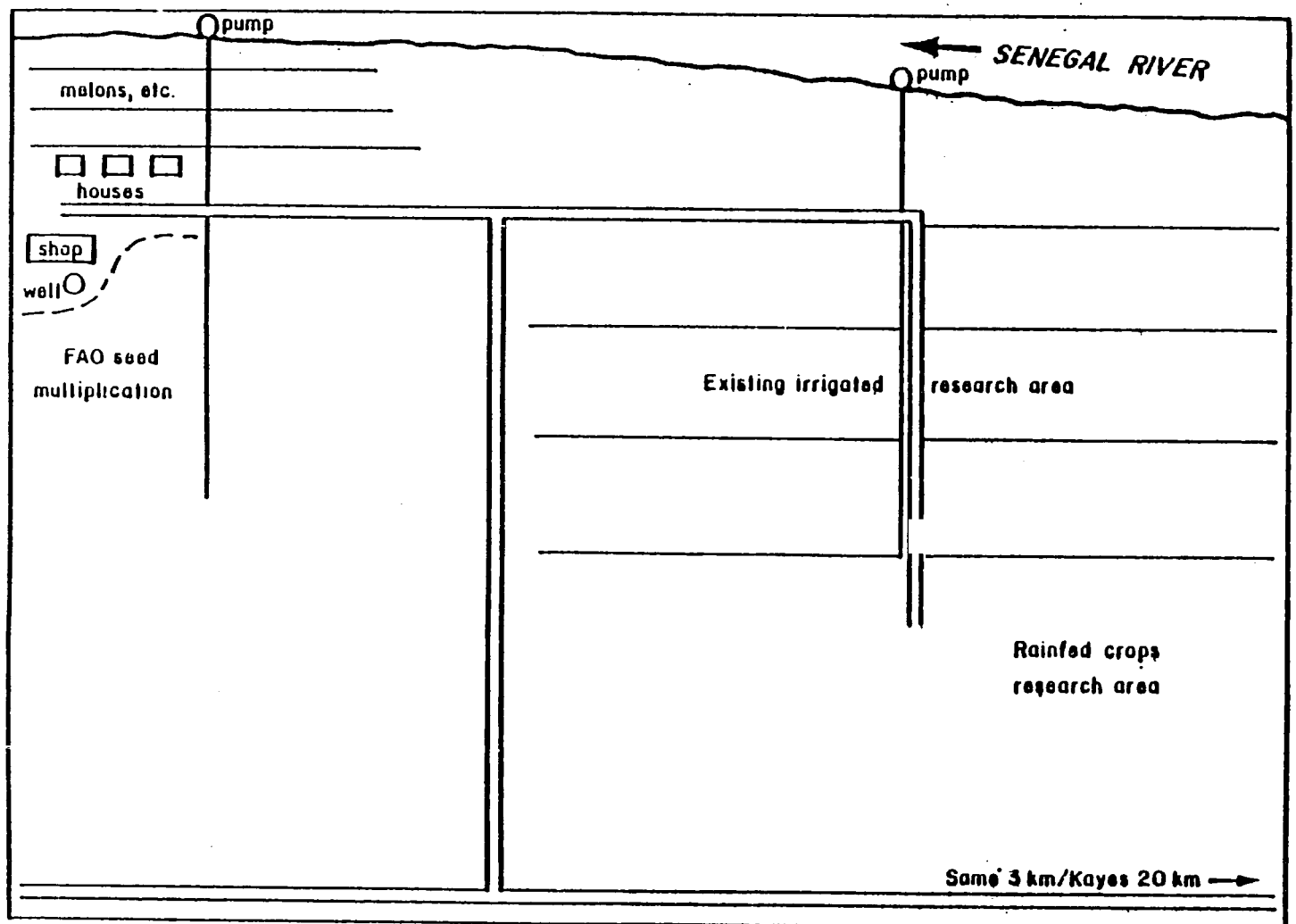


Figure VIIK. General Arrangement of Samé Research Station

The general arrangement of the Samé research center is shown in Figure VIIK. The preliminary site layout of buildings is given in Figure VIIL.

Based on a projected population of 65 permanent residents and 100 transients, a domestic water supply with a capacity of 30,000 l/day needs to be developed using river water which should pass through a simple treatment system. A 100,000 liter storage tank would be required as reserve and for fire protection.

The ground water is reported to be highly corrosive and will be tested further to determine its suitability for domestic (and irrigation) purposes. The electric power needs of this station are two, 100 KW units, one of which will be used as a standby unit. The waste disposal system will consist of septic tanks. A volleyball field and a tennis court are needed as recreational facilities. USAID has already supplied a soccer field, a volleyball field, and a basketball court in connection with the construction of the Agricultural Apprenticeship Center - Mali Agricultural Officers Training Project (688-0207).

Samé is at present a doubly-isolated station. Its main access is by a dirt road from Kayes, which in the rainy season is negotiable at low lying stretches only by a 4-wheel drive vehicle with an experienced driver. Two single lane bridges on this road have the nominal load capacity of 10 tons, but are in constant need of repair. A bush trail connects Kidira at the Senegal border with Kayes, passing through Samé, but in the rainy season and during the flood stage of the Senegal River it is absolutely impassable for any kind of ground vehicle except the train. The main—but not the only—obstacle is the Falémé River. The Dakar-Bamako train can negotiate the same stretch in any season because of bridges and an elevated track bed. At present, however, this is not a recommended train trip. Other access to Kayes is by train or by air from Bamako. Under the best circumstances the train takes 10 hours and is extremely crowded; the plane schedule can be very unreliable.

Improvement of the road between Kayes and Samé will therefore only partially relieve the isolation of Samé. The only justification for improving this stretch without improvement of the general transportation system in the region would be in case of medical emergencies in the rainy season.

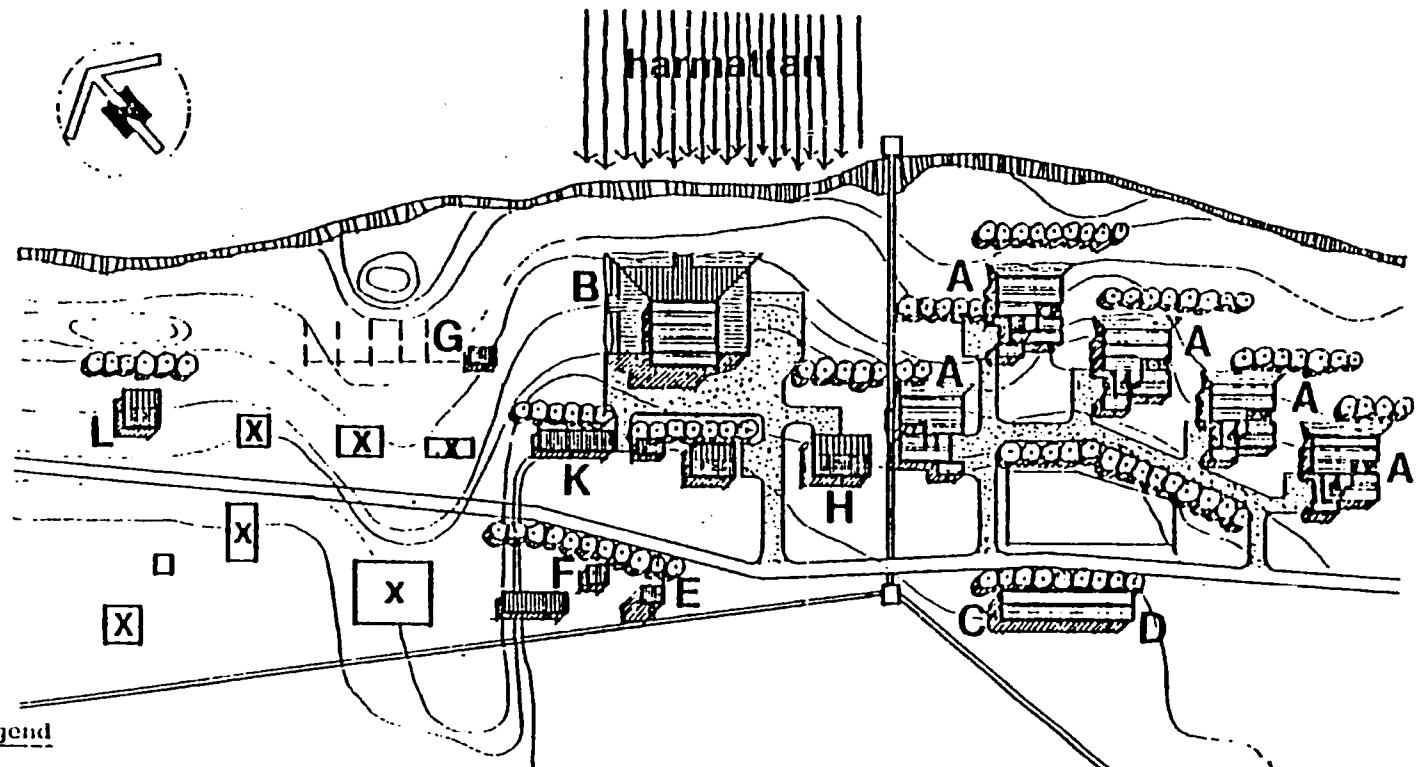
The cost of rebuilding all of the 20-km stretch will vary with the width of the road and the type of surface. The cheapest construction is a 6 m. wide roadbed with a 4 m. wide traffic lane consisting of a 20 cm laterite layer. It can support loads up to 13 tons at speeds of up to 60 km/hr. In terms of June, 1980, prices this road would cost 200,000,000 F. CFA or approximately US $1,000,000. Once built, the road will certainly be used by heavy trucks making the Kidira-Kayes run; they would most likely not honor the load and speed limit, causing the early deterioration of the road.

In connection with the construction of the Manantali Dam and the overall improvement of the transportation network, the Tambacounda to Kayes section of the road to Diamou is being designed by DFW. It is expected that West German financing will be available for its construction. The Faleme River crossing near Kidira, and the Bafing River crossing near Mahina will have to be bridged. If German financing is made available for the Tambacounda to Kayes section, the Faleme bridge will be included and an all-weather paved road connecting Kayes to Dakar will pass through Samé. Information obtained in August, 1981, in Bamako indicated that the design was completed and that there was a high probability that construction would begin in 1982.

It is therefore recommended that road construction between Kayes and Samé not be included in this project at this time. OMVS should make requests to the Public Works agency in Kayes to have the road repaired sufficiently in the interim for safe passage during the rainy season. It could be accomplished by filling the low spots with laterite and providing proper grading and drainage. Occasional passes with a bulldozer would eliminate ruts and rough spots.

At Samé, Mali, several existing structures are available, although in need of remodeling and/or renovation. These structures will be remodeled as temporary housing, a guest house, and storage shed (see Figure VIIL). Other existing structures on the site will be used by various governmental agencies. In addition to the existing buildings, it is proposed to add offices, a laboratory, 5 scientists' houses, as well as other support facilities. This should be done in concert with the existing structures, especially those being refurbished for use by the project.

In the Samé site layout the detached houses are buffered from the northeast winds by bermed earth and windbreaks of trees that protect places of outdoor activities. The office/laboratory building is separated from the housing and uses a combination of hip roof and barrel vaults to create a ventilating wind shield. Earth berms on the northeast facade deflect the prevailing winds off the river upward and over the buildings. Access to the office/laboratory building is directly off the main road.



Legend

a Scientist Houses

b Office/Laboratory

c Equipment Storage

d General Hangar

e Water Supply

f Power Generator

g Septic Tank and Field

h Remodeled Guest House

k Existing Storage Bins

l Remodeled Temporary Housing

x Existing structures to be used by other governmental and international agencies

Figure VII L. Preliminary Site Layout for Buildings at Samé, Mali

g. Assumptions

The following assumptions were made concerning construction and facilities development:

- other donors will cooperate in construction activities;
- construction will be carried out on schedule;
- an effective maintenance program can be implemented;
- personnel will be satisfied with living arrangements.

h. Justification

The proposed construction and facilities development activities are justified because they:

- provide minimum cost method of getting what is needed in place in a timely way;
- avoid problems of "absentee" researchers by providing comfortable work and living conditions on site;
- use minimum of scarce energy resources for climate control while maintaining comfort of occupants;
- take advantage of resources of other donors in the SRB;
- have flexibility to adapt to changing total program needs.

i. Feasibility

The proposed construction and facilities development activities are feasible within the framework of the overall project because:

- The OMVS and USAID's are prepared to initiate design and construction activities immediately after project approval;
- The construction plan emphasizes use of locally available materials and techniques;
- Discussions have been held with other donors to initiate coordination of construction activities;
- Local and expatriate (non-American) contracting firms with necessary skills and experience are available (and working) in the Senegal River Basin.

B. ECONOMIC ANALYSIS

1. Parameters of the Project and the target area

The project will contribute $13.5 million between 1982 and 1987 to improve the research capability of the OMVS through three national research stations in the river basin and the OMVS regional coordinating secretariat.

The project is targeted on an area of some 300 thousand square kilometers with a population of about 1.6 million, essentially all engaged in agriculture and husbandry. Most of the agricultural population is engaged in rainfed farming, but yields are extremely low, averaging some 0.5 tons per hectare except in the Upper Valley where rainfall exceeds 1,000 mm per year. Higher yields are obtained on some 10 to 100 thousand hectares (depending on year) cultivated in recessional agriculture. This activity will decline as river flow is artificially stabilized at 300 m3/second following completion of the Manantali dam.

Irrigated perimeters under full water control currently amount to about 29,000 hectares, the bulk of which is located on large-scale perimeters in the delta area. The central agricultural objective of the OMVS is to increase the land under irrigation to a total of 255 thousand hectares by the year 2026, or an average of about 5,000 hectares per year. Associated with this objective are the aims to increase multi-cropping from the current rate (about 1.26 in 1980/81) to over 2.0; and to increase yields. Yields providing very high rates of internal return have been achieved on small perimeters such as the USAID/Bakel area, but yields on large scale perimeters have averaged disappointingly low in recent years.

2. Principal Types of Economic Benefits

Agricultural research supported by this project may be expected to yield substantial economic benefits through progress in some of the following areas, among others:

a. Improved yields, through (a) development of improved cultivars with higher gross yield and resistance to parasites; (b) more effective input packages; (c) better crop mixes.

b. Increased multi-cropping, through identification of optimal off-season crops and crop cycles.

c. Reduced input costs, through more economical input mixes, development of biological soil regenerants, improved farm systems technology, and improved distribution techniques.

d. Rationalization of labor, through identification of multi-crop patterns and labor/animal traction/mechanization mixes which attenuate peak labor requirements and free women from lower-yield labor intensive activities.

e. Increased unit value of production, through development of crops with higher marketable value, techniques for improved control of post-harvest losses, more efficient storage and marketing, and higher value-added through quality control, grading and marketing.

f. Improved agronomic planning information, which will optimize the future selection of irrigated perimeter sites in relation to alternative land uses for rainfed agriculture and livestock grazing and fodder.

3. Quantitative Measures of Economic Impact and Rate of Return

Since the OMVS Agricultural Research II project is not revenue producing in nature, it is difficult to analyze from a strictly economic viewpoint. Therefore, no attempt has been made to quantify the ex-ante economic rate of return for this project. While the costs of the project have been estimated and clearly presented, it is much more difficult to estimate the benefits because of the following:

a. Outcomes from research activities are uncertain and any attempt to impute values to expected results would be subjective and speculative;

b. The benefits that will arise during the project will result in intermediate products (e.g. improvement in human capital, such as trained national researchers; redirected research priorities; and improvement in crop varieties; 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;

c. 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 researchers to a farming systems team in Senegal, but the success of this team will be contingent upon the inputs from other members of the team and general research management by ISRA. Likewise, the adoption of improved technical packages will be contingent upon the availability of credit, extension assistance, etc.

4. Alternative Indicators of Economic Feasibility

Several alternative approaches can be shown consistent with the expectation that this project will generate an acceptably high economic yield.

a. Results of previous studies

Numerous previous studies in both high and low-income countries have demonstrated the high pay-off to public investment in agricultural research (see Figure VII.B.2). In virtually all cases, the estimated internal rates of return have been higher (typically two to three times higher) than the opportunity cost of capital and higher than the rates of return which have been estimated for most other development projects in those countries.1/ Despite the fact that conditions in OMVS countries are probably not as favorable as in the countries listed in Figure VII 3.2, it is nonetheless possible that positive IRR's can be achieved.

b. Marginal return expectations

Production function analyses indicate that an average one dollar invested in good research is likely to produce at least five dollars in additional agricultural output annually when that research effort matures. A study for the CGIAR suggests that returns to research investment would remain higher than the opportunity cost of capital even if such investment was increased five-fold.

The World Bank suggests that the optimum level of expenditure on agricultural research in large agriculturally-oriented countries would be some 2 percent of agriculture GDP 2/.

1/ For a summary of the methodological techniques and difficulties associated with such studies, see World Bank, Costs and Benefits of Agricultural Research: The State of the Art (World Bank Staff Working Paper No. 360, October 1979).

2/ World Bank, Agricultural Research Sector Policy Paper (June 1981).

In 1975, the ratio of such research expenditures to agricultural GDP in OMVS member states averaged 0.86 percent (see Figure 1). The best performance was by Mali at 1.31 percent, and the weakest was by Senegal at 0.70 percent 1/.

Based on trend projections for agricultural production 1982-88 (figure A) and estimated research expenditures (Figure 2), the ratio for the OMVS as a whole would average between 0.8 and 1.1 percent without the project.

With the project, the ratio would average between 0.8 and 1.2 percent.

Since the ratio will remain well below the recommended ceiling in the base (without project) case, and since the project represents only a very marginal increase in total research resources, it may be assumed with considerable confidence that the marginal return on this increment will be substantially above the opportunity cost of capital.

FIGURE VII B.1

Estimated ratios of Agricultural Research Expenditures to Agricultural Production, 1982-1988, for OMVS Total

	Without Project	With Project
Research	163.7	177.2
Production		
- Low	14985	14985
- High	21286	21286
Percent Ratio		
- Low	1.09	1.18
- High	0.77	0.83

Source: Figures 2 and A

1/ Senegal's performance may have been understated by exclusion of foreign technical assistance. See World Bank "Senegal Agricultural Research Project Staff Appraisal", Report No. 3073-SE (December 1980), Table VIII.

FIGURE VII B.2

AGRICULTURAL RESEARCH PROJECT

(xv) Estimated Internal Rates of Return to Agricultural Research Expenditures

Commodity	Country	Study	Time Period	Internal Rate of return (%)
Maize	U.S.A.	Grilliches (1958)	1940-55	35-40
Sorghum	U.S.A.	Grilliches (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 O Evenson (1970)	1953-71	40
Crops	Mexico	Ardito-Barletta (1970)	-	45-93
	International	Kislev and Evenson (1973)	1955-1968	
Applied Research	LDC[s]			42
	DC[s]			21
Agriculture Scientific Research	LDC[s]			60
	DC[s]			35

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

FIGURE VII B.3

OMVS Agricultural Research Project 625-0957

Alternative Projections of

Agricultural Output 1982-88

($ Million)

	Senegal	Mali	Mauritania	Total
A. Current Dollars				
1960	146.4	140.5	NA	NA
1979	719.2	512.4	126.9	1,358.5
Growth Rate	8.7	6.7	5[1/]	NA
Projected				
1982	924.7	622.4	146.9	1,694.0
1988	1,528.7	918.5	196.9	2,644.1
Cumulative 82-88	8,439.8	5,348.8	1,196.2	14,984.8
B. Real growth-rate 1970-79	3.6	4.2	(-1.4)	NA
1979 Actual	719	512	127	1,358
Projected real				
1982	799	579	122	1,500
1988	988	741	112	1,841
At 10% inflation Projected current				
1982	1,063	770	163	1,996
1988	2,329	1,747	264	4,340
Cumulative 82-88	11,394	8,399	1,493	21,286

Source: World Bank, Accelerated Development in Sub-Saharan Africa (1981), Annex tables 2 and 3.

c. Indicative target approach

The World Bank recommends a series of indicative targets for expansion of agricultural research expenditures depending on the structure of production and the current level of expenditures in each country 1/.

Based on their criteria, the target rate of growth for OMVS member states should be in the range of 10 to 12 percent per annum in real terms.

While data are not available for past trend analysis of the individual countries, the World Bank estimates that the average progression in West Africa was well below that target in 1958-64 (7.6%) and declined by over 67 percent on the following decade (to only 2.5% per annum).

It is unlikely that recent performance in OMVS countries has shown much deviation from these average trends for West Africa. The underlying constraints cited by the Bank with respect to West African performance have proved even more binding in the three OMVS member countries: scarce skilled manpower, unfavorable external trade trends and budgetary imbalance. Given these constraints, it is unlikely that domestic resources for agricultural research will even approach the recommended growth path between now and 1988 2/.

Meeting the World Bank indicative targets would require growth in annual OMVS research expenditures from the estimated $24.3 million in 1981 to as much as $47 million in real (1981) terms or $92 million in current-dollar terms by 1988. By contrast, the present analysis foresees an unchanged real value of domestic resources, and an actual decline in total resources in the latter part of this period (assuming no other external assistance commitments than those currently planned).

In conclusion, this project will help make up the gap between actual and recommended growth in agricultural research at least in the initial high-disbursing years. However, it will not produce any overages, and in fact the gap will tend to widen again in the later years of the project.

d. Potential Benefits Approach

Given the complex methodological problems associated with applications of standard cost-benefit analysis to research projects, an indirect approach followed in some studies has been to assess potential benefits, either at a fixed point on an extended time horizon or as an annuity factor

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1/ World Bank, Agricultural Research Sector Policy Paper (June, 1981), Annex 10.

2/ For example, the World Bank projects zero real growth in GOS contributions to agricultural research in 1981-86 (see Report 3073-SE, "Senegal Agricultural Research Project; Staff Appraisal", Annex 4). A similar zero real growth assumption underlies the projections in the present analysis for Mali and Mauritania.

associated with a stream of benefits into the future. 1/ In such analysis, if benefits of the necessary magnitude appear reasonably likely, then it is presumed that the cost-benefit conditions are satisfied.

The existing technology mix in the valley includes at least four main components: practices associated with (a) large-scale perimeters, (b) small-scale perimeters, (c) recessional (walo) farming, and (d) traditional rainfed agriculture.

As shown in Figure 7, performance under these different farming systems is highly differentiated, with net profit per man-day averaging far higher in small-scale irrigated perimeters than under any of the other three systems.

To avoid biases in pricing factors at this analytical stage (obviously prices are key policy and performance variables in later sensitivity analysis) these yield and factor cost data are then converted into cereal equivalents at the baseline price level. Labor is broken out as a production cost, shadow-priced at CFA 250 (six kilos of rice equivalent at farm-gate valuation) per day. The data for rainfed agriculture are reworked to show zero net profit (stable auto-consumption).

Using these parameters, the performance of agriculture can be projected over the full duration of the OMVS development period, and estimates of the potential impact of technology changes can be obtained.

Metric Tons of Paddy Per Hectare by Factor of Production

	Irrigated Perimeters		Traditional Systems	
	Large	Small	Recessional	Rainfed
Hectare Yield	3.77	4.75	1.00	.50
Inputs	2.65	1.40	.55	.08
Labor	1.37	1.99	.42	.42
Profit/Loss	-.25	1.36	.03	0

1/ For a typical application of this approach, see OAU/SAFGRAD, "Semi-Arid Foodgrains Research and Development Project" (undated draft), pages 69 ff.

As a base for such projections, the following additional assumptions are made:

(1) Reference year: 2026.

(2) Area under controlled irrigation: 255 thousand hectares, of which;
- two thirds, or 170 thousand hectares, are in large-scale perimeters; and
- one third; or 85 thousand hectares, are in small perimeters.

(3) Recessional agriculture is reduced by 75 percent to 10,000 hectares.

(4) Rainfed agriculture remains constant at the level required to maintain 1.5 million persons.

With these assumptions, the basic horizon 2026 scenario becomes:

Agricultural Output and Factor Payments
Horizon 2026
(Thousand Metric Tons)

	Total	Irrigated Perimeters		Traditional Systems	
		Large	Small	Recessional	Rainfed
Area (000 Hectares)	1015	170	85	10	750
Output (000 Tons)	1430	641	404	10	375
Inputs	635	450	119	5.5	60
Labor	720	232	169	4.2	315
Profit	75	(-41)	116	0.3	0

In the base case, which is simply an extrapolation of existing technology to the year 2026, the net yield of the entire system is only about $10.4 million at 1980 prices, or 1.0 percent of gross output. What net yield there is remains entirely due to gains on small perimeters which offset the large losses on large-scale perimeters.

From this base scenario, the sensitivity of production to changes in the underlying parameters, as might be associated with improved technology, can then be demonstrated. For example:

(1) A twelve percent increase in yield or an equivalent reduction in input costs would suffice to make large perimeter production profitable.

(2) A ten percent improvement in small scale perimeter area would increase the total investible surplus in the basin by 15.5 percent.

(3) An equivalent 15.5 percent increase in the total surplus (profit) could be achieved by a 3 percent increase in yields in rainfed agriculture.

All the foregoing gains potentially could be realized through better applied agricultural research and extension. Some of the scope for such improvements is suggested by the following:

(1) The wide gap between average and maximum yields under current agricultural practices. For rice, the range is from a 3.7 average on large scale perimeters to as much as 10 tons per hectare on a few exceptional small scale perimeters.

(2) Input cost analysis, which shows that total non-labor costs could be reduced by as much as 25 percent on large-scale perimeters, and by as much as 10 percent on small scale perimeters.

(3) The substantial potential for improving yields in rainfed agriculture, at least in the better-rainfall areas of the Upper Valley. Studies of other similar areas in the Sahel have suggested that improvements of 30 to 40 percent or more in traditional rainfed yields are possible with improved technological packages: better seed, animal traction, introduction of fertilizer, and adequate extension.

The economic value of such technological improvements is evident from the magnitude of agricultural investment and output to be developed in the Basin during the next 40 years. If research succeeded in contributing no more than a 1 percent increase in output by the year 2026, that alone would amount to over $6.6 million dollars of net social profit per year; while in the absence of such improvement, major portions of the physical investment would remain unable to yield an acceptable return.

FIGURE VII B.4

ONVS AGRICULTURAL RESEARCH PROJECT 625-0957

COMPARATIVE INDICATORS OF AGRICULTURAL RESEARCH EFFORT IN LOW-INCOME COUNTRIES, 1975

	Agricultural Research Expenditures (US $'000)	Number of Research Scientists	Research Expenditures/ Scientist/yr. (US $'000)	Research Scientists Per Million Agricultural Population	Research Expenditures/ Capita Agricultural Population	Research Expenditures As % of Agricultural G.D.P.	Agricultural G.D.P. % of Total G.D.P.
Project Countries: Total	7,176	187	38.37	19	0.749	0.86	32
Mali	2,630	37	71.09	7	0.518	1.31	38
Mauritania	597	4	149.25	4	0.546	0.88	16
Senegal	3,949	146	27.05	43	1.159	0.70	34
Other West Africa							
Benin	1,215	17	71.47	12	0.826	1.04	31
Cameroun	1,947	96	20.28	18	0.366	0.27	32
Chad	649	30	21.64	9	0.188	0.06	50
Gambia	53	10	5.32	24	0.130	0.11	48
Niger	819	16	51.21	4	0.196	0.31	45
Nigeria	66,376	2,534	26.19	70	1.824	0.78	34
Sierra Leone	325	36	9.02	18	0.159	0.15	33
Togo	497	19	26.16	12	0.313	0.30	29
Upper-Volta	226	11	20.54	2	0.044	0.08	42
Total West Africa	79,283	2,956	27	42	1.141	0.65	35
Asia	89,500	8,950	10	14	0.14	0.15	39
N. Africa/Middle East	19,400	970	20	20	0.39	0.29	35
East Africa	25,300	790	32	8	0.26	0.38	35
Latin America	400	90	4	14	0.06	0.04	24
Total Low Income	206,000	13,750	15	16	0.26	0.26	37

Source: World Bank, adapted from Peter Oram, "Current and Projected Agricultural Research Expenditures and Staff in Developing Countries", International Food Policy Research Institute (IFPRI) Working Paper 30 (November, 1978)

Low Income countries defined as those with per capita income not exceeding 1975 $250.

Figure VII B.5

OMVS Agricultural Research Project 625-0957
Impact of Project on total Resource
Availabilities for Agricultural Research
1982-1988 ($ Millions)

	Without Project 1/	Project	With Project	Percent Increase
A. Senegal-ISRA	133.1	3.454	136.5	2.6
B. Mauritania-CNRADA	6.57	3.417	9.99	52.1
C. Mali-IER	21.31	4.809	26.12	22.6
D. Bilateral Total	161.0	11.680	172.7	7.3
E. Regional (OMVS) 2/	2.8	1.82	4.6	65.0
F. Project Total	163.8	13.50	177.3	7.6

Notes: 1/ Cumulative expenditures 1982 through 1988.
Individual country data extrapolated to 1988 as follows

- Senegal: 1986 level continued unchanged to 1988;
- Mauritania and Mali: 10% p.a. growth continued through 1988;

2/ It is assumed that OMVS research funded from its general budget is constant at $400 thousand per year. Although this level of support is considered part of the project (see PP face sheet), it is assumed independent from the project for the purposes of this analysis.

Remark: Project impact would be somewhat higher if calculated only through 1987, since only the last 3.5% of project funds are expended in 1988.

Figure VII B.6

OMVS - Agricultural Research Project 625-0957

Participating Country Budgetary Summary:

1. Senegal - I.S.R.A.

($ Millions)

Fiscal Year	81	82	83	84	85	86	Total
1. Baseline Budget	11.0	12.1	13.3	14.6	15.9	17.4	84.4
a. GOS	5.3	5.9	6.4	7.1	7.8	8.6	41.0
b. France	5.7	6.2	6.9	7.5	8.1	8.8	43.4
2. IBRD Project	13.3	17.6	7.2	4.3	2.4	(0.1)	44.6
a. GOS	1.1	0.3	(-0.9)	-	0.4	0.6	1.5
b. IDA, Belgium, etc. 1/	8.8	12.8	5.4	1.8	0.9	(-1.6)	28.1
c. USAID 2/	3.4	4.5	2.7	2.5	1.1	0.9	15.1
3. Total with IBRD Project	24.3	29.7	20.5	18.9	18.3	17.3	129.0
4. Less: OMVS-ARP 3/	-	1.6	0.5	0.7	0.8	0.9	4.2
5. Net without OMVS-ARP	24.3	28.1	20.0	18.2	17.5	16.4	124.8

1/ LOP estimates for other donors are: IDA (15.0); Belgium (3.4); FAO/CILSS (4.2); France incremental (0.4); Other (including ICRISAT and WARDA and Shortfall) (3.4).

2/ USAID total ($15.1) is decomposed as: OMVS-ARP (4.2); Casamance IDP (2.7); Senegal-ARP (5.0); PL 480/III (3.2). AID's contribution through CILSS is shown under "other donors" (see note (1) above).

3/ Estimate based on $4.2 total (see note (2)) and time phasing of expenditures for Senegal in FY 81 - FY 86 (from PP financial table 6). It must be assumed that the IBRD estimate of $4.2 million from OMVS-ARP also includes some pro-ratio of OMVS regional costs.

Source: IBRD, Report No. 3073-SE: "Senegal Agricultural Research Project Staff Appraisal" (12/9/80).

OMVS - Agricultural Research Project 625-0957
Participating Country Budgetary Summary:
2. Mauritania - CNRADA
($ Millions)

Fiscal Year	81	82	83	84	85	86
1. GIRM Budget	.140	.154	.169	.186	.205	.225
2. Donor Support	.310	.541	.595	.655	.720	.790
3. Total	.450	.695	.764	.841	.925	1.015

(1) GIRM budgetary support for CNRADA was $140,000 in 1981. It is assumed to increase at 10% per annum through 1986 to compensate inflation (no real growth).

(2) Identified donor support in 1981 was five expatriate scientists (one from FAC, two from GERDAT, one from SAFGRAD, and one from UNDP/FAO), plus $91,000 in operating costs (FED, SAFGRAD, and UNDP/FAO). Assumed cost per scientist in 1982 is $50,000. In 1982, FAC is assumed to begin first of five annual tranches of an $1 million construction project. No other real growth is assumed in donor support. Inflation is assumed at 10% per annum.

(3) The identified total of $450,000 in 1980 may be compared with the $597,000 in 1975 estimated by IFPRI (see "comparative Indicators" table). Differences in accounting and scope of coverage presumably explain the seemingly negative growth 1975-80

OMVS Agronomic Research Project 625-0957
Participating Country Budgetary Summary
3. Mali - I.E.R.
($ Millions) 1/

Year	81	82	83	84	85	86
A. Sources						
1. GRM Budget	1.21	1.33	1.46	1.61	1.77	1.95
2. Sales (seed)	.16	.18	.20	.22	.24	.27
3. Total Domestic	1.37	1.51	1.66	1.83	2.01	2.22
4. Donor assistance - of which:	1.88	2.06	2.30	2.49	2.75	3.03
a. Cereal/oil research	1.20	1.32	1.45	1.60	1.75	1.93
5. Total Resources	3.25	3.57	3.96	4.32	4.76	5.25
B. Applications						
1. Agronomic Research	2.05	2.25	2.48	2.71	2.99	3.29
2. Other	1.20	1.32	1.48	1.61	1.77	1.96
3. Total applications	3.25	3.57	3.96	4.32	2.99	3.29

1/ At 210 CFA = 420 FM = $1.00 (standard basis for Senegal and Mali analyses).

Projections are based on data for 1980 (PP page 29) and assumed 10 percent growth rate equal to assumed rate of inflation (no real growth).

Figure VII B.9

OMVS Agricultural Research Project 625-0957

Baseline Production Parameters

A. Land Use Patterns circa 1981 in OMVS Basin

	Irrigated Perimeters		Traditional Systems	
	Large	Small	Recessional	Rainfed
Area (Hectares)	28,000	2,000 1/	125,000 2/	750.000 3/
Use pattern (%)				
1. Developed	100	100	100	NA
2. Unexploited	25.7	18.9	60	
3. Cultivated (1-2)	74.3	81.1	40 2/	
4. Abandoned	10.5	4.0	NA	
5. Harvested (3-4)	63.8	77.1	(40)	NA

Source: OMVS, "Etude Socio-Economique du Bassin du Fleuve Senegal" (April, 1980), Part C, Annex 6.

1/ op. cit., chapter C-III. 9. Table 12c estimates total small-scale perimeter area in 1978/79 at 2,193 hectares.

2/ op. cit., part A , chapter 4.1 (page 53). Total useful area is estimated at 125 thousand hectares. Average area cultivated or harvested between 1970/71 and 1978/79 was 50,000 hectares.

3/ Based on an assumed population of 1.5 million persons dependent on rainfed agriculture, and a per capita requirement (cash and subsistence, including provision for seed and losses) equivalent to 0.5 hectares yield.

Figure VII B.10

OMVS Agricultural Research Project 625-0957

Baseline Production Parameters

B. Agricultural Performance Indicators circa 1980

	Irrigated Perimeter		Traditional Systems	
	Large	Small	Recessional 1/	Rainfed 2/
Average yield (T/ha)	3.7	4.75	1.0	0.5
Unit value (CFA/kg)	41.5	41.5	41.5	41.5
Extended value (000 CFA)	156.5	197.2	41.5	20.7
Input costs (000 CFA)	110.0	58.1	22.8	8.7
Net profit (000 CFA)	46.5	139.1	18.7	-12.0
Labor days (per ha)	227	330	70	70
Net profit/day (CFA)	205	422	268	171

Source: OMVS, "Etude Socioeconomique du Bassin du Fleuve Senegal" (April 1980), part C, chapter C.V.5.

1/ Op. Cit., part E, chapter E. IV. 2.1. - Net profit in recessional agriculture is 200-500 kilos/hectare for 70 days labor. Assume the average is 450 kilos (CFA 18.700) after paying same inputs as Foyré rainy season Model (op. cit. chapter C. V. 4.1.) except irrigation (seed, fertilizer and overhead, 22.800 CFA), to obtain required gross yield of 1.0 tons/hectare.

2/ Based on PP yield estimate, assuming input costs same as in recessional agriculture except zero fertilizer.

5. Recurrent Cost Analysis

Continuing the OMVS- Agricultural Research II effort after project funding ends will involve several issues beyond the purely technical question of perceived effectiveness. Will the participating governments be financially able to support this continous research effort ? Has the project been designed in a manner which will minimize budgetary costs relative to effectiveness ? Will the project's continuation burden the supply of scarce national resources such as high-skilled manpower and will it mortage donor resources ? And will the net impact of research on production, incomes and taxes offset the budgetary cost ?

a. Magnitude - The cost of operating the three research stations and OMVS coordinating unit is estimated at $ 340,000 year. This includes salaries, fringes, travel, supplies, utilities and maintenance totalling $ 110 thousand per station (see financial table 5).

b. Relative to Budgets - Relative to the total tax revenues of the three countries (excluding non-tax and foreign-source receipts), this recurrent cost would amount to only 0.25 percents of national resources. (FY79/80 tax revenues were Dols millions : Mali (140), Mauritania (99), Senegal (478), total Dols.717 million. (Source : IMF, Government Financial Statistics. Dol. 1 equals 500 FM, 50 UM, 250 FCFA). Compared to the individual budgets of the three national research agencies, absorbing these recurrent costs would have the following impact (annual station cost percent of item):

	Total Agric. Research Budget	Domestic Financed Research Budget	Memo: Research As percent of National Taxes
Mali (IER)	3	8	1.0
Mauritania (CNRADA)	24	80	0.1
Senegal (ISRA)	0.5	2	1.4
Total	1.2	4.2	1.1

Therefore, host Government financing of recurrent costs would be only a marginal additional burden for Senegal (ISRA) and only a moderate burden for Mali (IER). In contrast, it would be an unmanageable burden for Mauritania (CNRADA) without a quantum jump in CNRADA budgetary allocations. Since CNRADA domestic financing currently is very low compared to Mauritania's tax base, such a major budgetary increase would certainly be desirable.

c. Current financing intentions -

All host governments have indicated that, assuming adequate budgetary resources and satisfactory progress on achieving research objectives, they could be willing to bear the recurrent costs at the end of the project. However, as noted in the discussion of evaluation scheduling, the possibility that these expenditures might be financed by a further phase of project assistance has not been excluded.

Finally, a number of other donor will continue to be active in support of OMVS Agronomic Research.

d. Program Mortage - This project does not explicitly enter into a commitment of AID resources beyond the indicated LOP. Therefore, and for the reasons set forth in paragraph (c) above, it does not mortage the AID program beyond FY/88.

e. Design Considerations to Minimize Direct and Indirect Recurrent Costs.

In keeping with Club/CILSS guidelines on recurrent costs of development projects in the countries of the Sahel, and the Acts of the Ouagadougou Symposium 11-15 January 1982 on recurrent costs), the design for this project has paid careful attention to minimizing recurrent costs relative to project effectiveness.

e.1. Definition of Recurrent Costs - It should be noted that the research work under this project is itself a form of investment in agriculture, and not a recurrent expenditure in the sense of operation and maintenance of installed productive capacity. Therefore the term "Recurrent Costs" is to some extent inapplicable to the future research expenditures in question.

e.2. Recurrent Cost Minimization - The project is designed to hold down such costs by instituting accounting and management training, and by tightly defining project objectives, functions and requirements. Since as important factor inflating research costs is needless duplication and inadequate exchange of information, this project emphasizes regional coordination, and diffusion of results.

e.3. Impact on Factor Markets - This project will create additional demand for scarce scientific and managerial resources, which could indirectly raise recurrent costs of other development projects. For this reason, the project strongly emphasizes technical and managerial training to compensate its claim on these resources.

e.4. Indirect Cost Impact - The project may impose a marginal additional recurrent burden on participating government servicing the three research stations. The Same Station may require road construction or maintenance, for example.

e.5. Cost Recovery - This is not a revenue-producing project, and will not market its services. Sale of embodied technology (seed, etc.) is not planned. Unlike water control and some extension services, charging a user fee is not an option. Cost recovery can be achieved only indirectly, through expansion of taxable income.

e.6. Expansion of the Real Tax Base - This project will produce scientific knowledge needed to rationalize production and raise output. It should have a large indirect impact on taxable incomes in the OMVS area which should far more than compensate the $110 thousand annual recurrent cost of continuing the effort after PACD.

f. Project in Context of Regional Review of Recurrent Costs

All three participating countries face difficult immediate recurrent cost problems due to weak economic and tax performance and rapid acceleration in development programs. For this reason, all three are participating in Club/CILSS National Workshops in 1982-83 to obtain detailed diagnostics and remedial action programs to resolve the problem. This project will take full account of their conclusions.

6. Expected Tangible Outputs

The following section addresses specific economic issues raised in the PP guidance cable (para 3(f) of (81) State 314925) and the project review cable (para 3(J) of State 242891), concerning tangible outputs from this project.

(1) Numbers/level of degree training/areas of specialization envisioned for each of the research institutions (and/or the OMVS member countries).

The Training Programs Analysis (Section VII.A.4. of the PP) provides detailed information responsive to this question. To recapitulate, the project will provide an array of training programs (management, accounting, research, support specialties) involving personnel from each research station, the OMVS and the national research agencies.

(2) Number and type of counterpart staff to be provided by OMVS member countries.

The discussion of Program Factors (Section II of the PP) and the Administrative Analysis (Section VII.E of the PP) provide detailed information responsive to this question. To recapitulate, the OMVS member states fullystaff the OMVS regional office. The Fanaye station as of 1984 will include about 20 counterpart scientists. The CNRADA station currently includes 3 national scientists and seven national research assistants. Approximately ten others are in training. The Same station currently includes two national scientists and four national technicians. These will increase to a staff of fifteen professional, nationals at the start of the project.

(3) Types of research trials/studies ot be conducted

The discussion of Future Research Needs (Section II.E. of the PP) and ther Terminal Analyses : Research Programs (Section VII.A.3. of the PP) provide detailed information responsive to this question. To recapitulate, each station will design and implement annual research programs coordinated with the national research agency and the OMVS. In Senegal, the focus will be on farming systems research. In Mauritania, the focus will be on training personnel and developing a good research strategy, with transision to farming systems research in the latter stages of the project. In Mali, the program will concentrate on field trials of 5 to 10 varieties of sorghum, millet, fruits and vegetables at ten sites on farmers' fields. The Mali strategy will progressively establish a farming systems research methodology. The OMVS itself will concentrate on research prioritization, coordination and dissemination.

(4) Potential increases in production and yields, number of farmers to be reached and other such indicators of benefits than can be expected with the accomplishment of the project's research objectives such as to test improved varieties of rainfed crops in farmer's fields or to test levels/timing of fertilizers application on selected crops, etc.

The discussion earlier in this section of the PP has provided detail on the potential increases in yields (hence production) reductory in costs, and other performance factors which might be realized with adequate research. There are, of course, important logical gaps between research financed, techniques devèloped, practices adapted, and agriculture performance achieved. The flow from one step to the next is probabilistic, not mechanical. Research may have to be sustained for many years before a significant break-through is achieved. Farmer acceptance, even of very promising techniques cannot be taken for granted. And many other intervening factors (resources expended on extension and complementary inputs ; price policies and market behavior, and climate, to name just a few) can skew the final impact on performance. Quantifying final performance improvements has been set aside in this analysis for several other reasons as well : (a) there is no satisfactory methodology to allocate the impact of specific research among geographical zones : part of the improved performance from OMVS research will be realized in the OMVS area, but part will be diffused beyond OMVS to the other regions of Mali, Senegal and Mauritania. Likewise, part of the improved performance in the OMVS will be due to research funded from other sources both within and without the river basin. The geographical non-specificity of much agricultural research is precisely the reason why this project places a major design emphasis on diffusion and coordination of research as ends in themselves ; (b) the maturity of the research institutions financed by this project, and the specificity of their research plans to quantifiable goods, is variable. At one extreme, the Mauritanian research station must first organize itself and define a research strategy. At another extreme, the Mali station has set very narrow and specificimmediate objectives but it contemplates broadening them later in implementation. The need for (and inevitably of) flexibility in setting research is underserved by the recent discussion as to whether the project should not be much more heavily focused on irrigated rather than rainfed agriculture. Although research is by nature a long-term process, this project

addresses only a five year program. Against the planning horizon for basin development (to 2026), this is only 1.25th of the period during which intensive research will be required. It makes for better sense to use these first years to establish a sound foundation for research then to seek immediate and therefore probably ephemeral results.

With these important caveats, the following estimates of project achievement are mare.

Financial Impact

It may be guessed that some 15% of the tri-national research effort presently affects the Senegal Basin area. This would be higher than the Basin's share in total tri-national population (10-12%) but lower than the Basin's contribution to tri-national cereals output (around 20%).

The OMVS Ag Research PP will increase tri-national research capability by 7.6% in 1982-1988. The majority, but not all, of the product of this effort will be felt in the Basin, while some will be diffused across the rest of the tri-national area and (to some degree) abroad. It may arbitrarily be assumed that 75% of the product applies to the Basin.

From these assumptions, the project's impact on OMVS production can be scaled as follows:

	Without Project	Project	With Project	Percent Increase
Tri-national Research	$ 163.8	13.50	177.3	7.6%
Impact on OMVS area	$ 24.6	10.12	34.7	41.1%
Percent of total impact	15%	75%	19.6%	-

Physical inputs impact

The project will increase trained national researchers from 14 to 26 in the Basin.

The project will increase the total number of researchers (national and expatriate) in the Basin from 19 to 31 during the life of the project.

Assuming the Malian program is typical of the level of effort at all three stations, the project will develop and test 100 new cultivars during 1982-1988.

The project will provide physical structures and equipment to support research during and after the project valued at $ 3.9 million.

Impacts on production

In projecting these impacts, the following assumptions are made : (a) Physical development of the OMVS (land use patterns) as presented in the text table on page 99 ; (b) Technical improvement possibilities as outlined on page 100 :

- Yields : From 3.7 (large scale) or 4.7 (small scale) to a maximum of 10 MT/ha in irrigation,
  From 0.5 to 0.7 MT/ha in rainfed agriculture.

- Input costs : From 110 to 82.5 thousand francs CFA in large scale; and from 58.1 to 52.3 thousand CFA per hectare on small scale perimeter.

(c) However, because the agricultural research-to-production ratio will (it is assumed) remain about 1/2 of the IRBD recommended ration, the actual improvement in yields and input costs will be half of the technically possible improvements. It is assumed that the rate of improvement will be steady from 1983 to 2026 when the full 50% improvement will have been achieved.

(d) Improvement in performance factors are assumed attributable to research as follows :

- Yields : 5% (the remainder being attributable to education, extension, physical infrastructure, agricultural inputs, and social/economic incentives such as price policy.

- Input Costs: 10% (the remainder being attributable to education, extension, management, and price policies).

To avoid blurring the distinction between costs and benefits, changes in labor costs are not considered improvements in this analysis. It should be noted that since technology is rarely available as a separate item, but usually "embodied" in a product (seed, equipment, extension service, etc.), this type of allocation is characteristically arbitrary.

(e) Improvements in performance can be attributed evenly to research taking place at any previous time i.e.,

Year Improvement occurs	Years since Project	Project Years completed	% Attributable to project period
1	0	1	100%
5	0	5	100%
10	5	5	50%
20	15	5	25%
40	35	5	12%

(f) The proportion of improvements attributable to project-years research which can be attributed to the OMVS Ag. Research PP is the same as the proportion estimated from the financial impact analysis: $ 10.12 million out of $ 34.7 million, or 29.2% (rounded to 30%).

Cost-Benefit Analysis

The assumptions underlying this analysis are:

(a) Total area, and, its allocation between farming systems, evolves as specified in the previous section (potential benefits);

(b) Yields improve moderately in all systems, with the largest gain in large-scale perimeters. No system approaches the technical limit for yields in this period;

(c) Input costs are reduced by half of their "potential" savings : by 12% in large scale irrigation, and by 5% in all other systems;

(d) No changes take place in per hectare labor costs.

Benefits are calculated independently for each farming system. The algebric notation is:

1. $B_t = R\ (at + bt^2)$
where R is the annual increase in yield and reduction in cost attributable to research, expressed in MT/ha,

a is the base-period area under cultivation,
b is the annual increase in area,
t is time.

Fifty percent of increases in yield and one hundred percent of reductions in input costs are considered attributable to research.

Benefits are attributed on a digressible basis across time to research activity funded during the project period, as distinct from subsequent research tranches to be funded later. For simplicity, it is assumed that all research to the need of the project period has been funded during that period; which is 5 years (1982-1987). Thereafter, the proportional contribution of project period research to performance improvements realized is calculated as :

2. $PBt = Bt \times \frac{5}{t}$

Finally, it is assumed that 30% of this benefit is attributable to the project itself, as distinct from other research activity inside or outside the basin also contributing to solution of the problems.

Benefits defined in this way are calculated as a 44-year stream (1982 to2026), and are deflated with the standard 10 percent factor to obtain current worth. Project costs scheduled 1982-1987 are deflated likewise.

It will be noted that no OEM or replacement costs are entered into this calculation distinct from investment costs. This follows from the assumption that the OMVS research program will be funded in distinct tranches, each of which begins and ends at a specific time, and each of which can be considered entirely investment in nature.

Project benefits, which are calculated in terms of MT of grain, are nverted to dollars at an assumed shadow price of $ 200/ton.

The results of the analysis can be summarized as follows:

(a) Over the period 1982-2026, the contribution of research to cumulative output of grain in the OMVS would be about 4140 thousand metric tons, or an average of close to 94 000 tons worth $ 19 million per year and $ 828 million cumulatively. The impact would be distributed among crop systems as follows:

	000 tons increase due to research
Large-scale perimeters	2050
Small-scale perimeters	707
Recessional practices	70
Rainfed agriculture	1312
	4140

(b) Only about one eighth of this increase, or some $ 100 million could be attributed to research carried out in the project period. In addition, since the gains loom larger at the end of the 44-year period (when irrigated area reaches its target 255 thousand hectares), the present worth of this stream of increased production is far less about $ 39 million.

(c) Finally, it is conservatively assumed that only about one-third of this amount, or $ 11.87 million, is due to research specifically funded under this project.

(d) Nonetheless, accepting the assumptions underlying this projection, the net present value of $ 11.87 million attributable to this project exceeds the net present value of project investment costs ($ 9.68 million) by a reasonable margin, and the cost-benefit ratio works out at 1.23.

Figure VII.B.11 COST BENEFIT ANALYSIS : PERFORMANCE ASSUMPTIONS

	Irrigated Systems				Technical Systems				OMVS	
	Large		Small		Recessional		Rainfed			
	1980	2026	1980	2026	1980	2026	1980	2026	1980	2026
1. Area (000 ha) In metric tons/hectare	28	170	2	85	50	10	750	750	830	1015
2. Yield	3.77	5.00	4.75	6.00	1.0	1.2	.50	.60	.65	1.80
3. Input costs	2.64	2.31	1.40	1.33	.55	.53	.08	.08	.20	.56
4. Labor costs	1.36	1.36	2.00	2.00	.42	.42	.42	.42	.45	.77
5. Profit	(-.23)	1.33	1.35	2.67	.03	.25	0	.20	0	.47

Figure VII.B.12 COST BENEFIT ANALYSIS SUMMARY

	Irrigated		Traditional		Total
	Large	Small	Recession	Rainfed	
1. Metric tons (000)					
Cumulative increase due to research	2050	707	70	1312	4140
Annual average	47	16	1.6	30	94
2. Dollars (million)					
Cross cumulative	410	141	14	262	828
Attributed to 1982-87 research	102	35	3.5	65	207
Present worth	19.6	6.7	.7	12.5	39.6
Attributable to project	5.9	2.0	.2	3.7	11.87
3. Project costs ($million)					
Current prices					13.5
Present worth					9.68
4. Benefit/Cost ratio	(11.87/9.68)				1.23

C. Social Analysis

1. Institution Building

This project is designed to help the Governments of Senegal, Mali and Mauritania strengthen their agricultural research institutions in the Senegal River Basin. The project has explicitly choosen the strategy of developing national research capabilities through a long-term, regionally coordinated activity since this process will avoid unnecessary duplication and wasted resources among national systems yet permit flexibility for national and local orientations. This institution building will be accomplished through technical assistance, training, construction and operating support. With this project an institutional environment will be created that provides good working conditions and a dynamic, applied research program so that researchers are at once content and secure in their professional status and also motivated to pursue applied research stressing broad themes of equity and encouraging the adoption, spread and continued use of new technologies. The research will use existing farm systems as a resource for research by starting at the farm level to address agricultural needs perceived by the farmers and local communities.

2. Socio-Cultural Feasibility

An analysis of elements of the Social Structure influencing the feasibility of this project was prepared by the Consortium for International Development (CID) is summarized below. The complete analysis is available in USAID/RBDO and AFR/DR/SWAP files.

The social structure of the Senegal River Basin is first of all shaped by the population structure and its dynamics. The two major demographic forces in Senegal River Basin today are rapid population growth and migration. A rapidly growing population without adequate rural economic opportunity has led to large emigration, which in turn has reduced productive potential in the Basin, although it has also increased the cash flow to the Basin through remittances. The growth of different ethnic groups at different rates has sometimes exacerbated tension between groups in close proximity, and the age and sex structure with a large number of children and middle age women has created a large group of consumers with limited production potential. The current growth pattern has created seasonal labor shortages and led to increased use of hired labor and the substitution of purchased for produced food.

A further complicating factor is health and nutrition. The high mortality rates represent great human suffering and demand a major contribution of scarce resources of time, food, and cash for health care. Malnutrition in adults, especially during the weeding season when demands on labor are highest, also leads to lower productivity. While the concentration of resources in this project will be on increasing production,

questions of diet and nutrition certainly merit further consideration and will be included in later phases of the project.

Migration has been an important demographic force in the Senegal River Basin for a long time. Herding peoples of the area developed a pattern of transhumance following the seasonal cycles of vegetation and water availability. Emigration to nearby cities, national capitals, or to France was a pattern established during the colonial period. Decreasing economic opportunity, accentuated by drought, has reinforced this pattern. This movement out of rural areas has affected the Senegalese and Mauritanian areas of the Basin the most. It is estimated that 25% or more of the Senegalese and Mauritanian riverine village population are absent as opposed to only 5% for Mali.

This migration has precipitated a variety of changes in the Basin. Because of the resulting labor scarcity, women have become more involved in the production of basic subsistence and commercial commodities, and migrant workers from outside the region seasonally contribute to agricultural production. The remittances from migrant laborers to the area are commonly controlled by the elder males of the village, increasing their authority and control over village affairs. These remittances have also encouraged the purchase of consumer items such as transistor radios, the investment by individuals in items such as cattle, and the development of community projects such as building new mosques. The money is also used to compensate for the migrants' lost labor by purchasing food and hiring labor.

The slowing or reversing of the rural labor exodus has been declared as national priorities in all three countries. However, even with successful agricultural development, migration may continue to be significant, as the increasing independence of young people and the continuing attraction of city life will continue even as the "push" factor of limited economic opportunity is reduced. Additional socio-economic research is needed to clarify the factors influencing migration in the area.

Among the six major ethnic groups in the Basin, subsistence food production is the primary economic activity, with 85% of the rural residents and many urban residents participating in subsistence agriculture. Most of the people of the Basin are sedentary, expecially in Mali and Senegal, and Mauritania has recently experienced a dramatic shift from transhumant herding to sedentary farming. The drought has played a critical role in destabilizing much of the traditional economic activity of the region, creating increased uncertainty of production. The three research stations included in this project are located from the lower to the upper areas of the river basin, so that the projected spread of research results is expected to apply to peoples throughout the river basin area.

The major etchnic groups in the Basin are traditionally characterized by a persuasive system of caste stratification. The normal characterization is of three caste strata: free people including rulers and cultivators; largely dependent artisans, including musicians; and slaves. Membership in a caste was fixed from birth and there was traditionally little or no mobility, although the castes complemented each other economically and there was probably little difference in living standards. Colonialism and subsequent Independence have led to modifications of the caste system. Members of the slave class are legally free, but their social stigma remains and some continue to pay tribute to their former masters. In addition, with the emergence of a money economy and greater links to the rest of the world, there have been increasing opportunities for lower castes to obtain new status and wealth through local jobs outside of the traditional economy and through emigration to Dakar and other parts of West African and Europe.

Closely tied to the ethnic structure and caste system is a complicated system of land tenure. The question of land tenure has important implications for the access to resources and destribution of benefits among the Basin residents. A complex system of rents and tithes has been developed for the rich flood recession lands. The system is characterized by many small plots which make up larger family holdings. In contrast, rules concerning the upland areas which are highly dependent on erratic rainfall, are generally more casual. Goal have been to increase rice, vegetable and poultry production, and research will be conducted to improve the quality as well as the yields of those crops traditionally produced by woman.

The household or the extended family is the basic unit of production and consumption in the Senegal River Basin. Clan members tracing lineage through male (or female) lines of descent form corporate units which perform political and economic functions. In larger villages, several lineages compose a clan. Each lineage is headed by the oldest male member who manages the lineage land. Within each lineage there are several households, each of which work land in common.

Throughout the region, men are traditionally responsible for production of the staple grains. Women work vegetable plots which provide an important addition to household nutrition, as well as a source trade and sale for other goods. Women also have their own fields where they traditionally produce such crops as cowpeas, rice, sorrel, cotton and indigo.

About one-half of the population in the Senegal River Basin is less than 15 years old, and these children make a significant contribution to agricultural production. A large portion of this contribution is devoted to guarding fields from birds and domestic animals. This is an important task, especially well-suited to their relative lack of strength and skill.

3. Spread Effects

The spread effects of the agricultural research program will depend largely on (1) the extent to which research is "bottom up" directed, based on farmers' perceived needs and interests, and (2) the ability of the development agencies to deliver diverse technology packages appropriate to the needs of rural households.

Project assistance will support the inclusion of socio-economic and multidisciplinaty research concepts into the research programs of all three countries. In Senegal, the reorganization of ISRA has adopted a farming systems (production systems) approach aud has structured complementary production systems and commodity research programs. The project will assist this effort of ISRA by directly supporting the production systems research program being established at Fanaye. In Mauritania and Mali, the research program is structured along more traditional disciplinary lines. The project will provide assistance and encourage applied research across normal disciplinary lines thus forming a basis for farming systems approaches at both the Kaedi and Samé strations.

In all three countries the project will work to increase the coordination and cooperation between research and extension by establishing agreements for joint fieldwork by the research station and the rural development agency in that area. The strengthening of this linkage should help to assure that the technology packages are appropriate and are extended in an effective manner.

4. Social Consequences

The welfare of the people in the Senegal River Basin is closely linked to food production. Since urban consumers in the region 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. The agricultural research activities of this project can contribute to this objective through a "bottom-up" applied research program which identifies and helps to solve site-specific production problems.

The project research emphasis on small-scale irrigation is based in part on Basin experience showing that small-scale perimeters permit farmers to maintain control over production. Small irrigation schemes in rural areas generally permit the local social systems to maintain control over the production system. The involvement of a development agency is generally needed to assure equal access and to permit formerly landless peasants to acquire this valuable resource. Inequities in access remain, but generally to a much lesser degree than in large scale schemes, or in traditional agriculture.

The role of women in development in the Senegal River Basin will be addressed in the training program for scientists and technicians, in the socio-economic and production systems research, and in special studies. A vigorous attempt will be made to identify female researchers for training under this project. Female researchers are currently working in Senegal and Mali, and ISRA has already proposed several women for long-term training by AID under its new decentralization program.

Data from irrigation projects in the Senegal River Basin show that when womens' traditional roles in food production are explicitly recognized in development projects, woman can make a large contribution to increased production. The involvement of women in agricultural development in the Basin is underway. Several projects have focused on guiding pre-cooperative village organizations as a basis for increased social and economic activities. Goals have been to increase rice, vegetable and poultry production.

The applied agricultural research program being introduced in the Basin will by its nature attempt to understand rural families and the local environment in which they operate. Because labor is the most important input in traditional farming, the research will give special attention to the present labor allocation of men, women, and children in crops, livestock, and off-farm enterprises. The research 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 grains. Since the ultimate goal of production is consumption, including leisure, it follows that the research should contribute to an improved understanding of how women can increase their productivity, their income and possibly their leisure. In addition, the project could fund special studies of high priority research topics facing women. These topics, which will be proposed by the national research agencies, include problems women face in gaining access to land and to inputs such as credit and problems of agricultural processing and of migration.

D. Environmental Analysis

1. Pesticides

This project supports an adaptive research program including farming systems research and field trials. Thus, pesticides (the principal environmental issue in this project) involved in the project will be used for research purposes, which would exclude the project from the Pesticides Procedures in Section 216. On the other hand, since the research to be undertaken is only one step away from recommendations to farmers (i.e. diffusion), pesticides used in the trials are essentially being tested with a view towards their possible widespread use. Because of this potential, the project's researchers must be mindful of the various ecological and human health impacts of the different pesticides to be tested. At the same time the pesticides must be handled and used in a safe manner during the trials. These two issues are addressed in the evaluation of the pesticides which is attached to the IEE. (See Annex E.)

Pesticides to be used in the adaptive research have not yet been proposed. Hence a compound-specific analysis was not possible. Pesticides acceptable for use, in compliance with Regulation 16 stipulation that they be registered and approved for use in the USA, are listed in Table 1, Annex E, the Initial Environmental Examination.

On a larger geographic scale, the consequences of pesticides for the Senegal River Basin's aquatic system and particularly the fishes, were treated in the Partial Report for Fisheries and the Partial Report for Water Quality of the Gannett, Fleming, Corddry & Carpenter environmental assessment for the Senegal River Basin. Both reports estimated a minimal pesticide impact based on the expectation of negligible erosion and run-off within the developed irrigated areas. It was established that only chlorinated hydrocarbons would pose a problem, because of their persistence and tendency to bioaccumulate. Except for aldrin used for termite control in construction, the project would not employ this group of pesticides in adaptive research.

Special precautions are needed to avert contamination of fish ponds sites near irrigated fields. Use of low toxicity pesticides for fish is an obvious preventive measure. The pesticides currently in use in the Basin include Thimul 35 (Endosulfan) which is highly toxic to fish. Adaptive research carried out through this project will use chemicals that will minimize the possible damage to fish culture.

Pest management is a specialized research area which USAID supports through the Integrated Pest Management. Research application has been the concern of the Regional Food Crop Protection Project. Both activities cover the OMVS member states. Both projects are being currently re-designed and the three USAID missions except the following staff configuration to emerge A Senegalese WARDA entomologist will be working on cereal crop insects at the Fanaye station beginning in June of 1983. Two FAO entomologists from the FAO/CILSS IPM research project work in the Basin. One currently at Richard Toll will be moved to Fanaye, the one currently in Nouakchott will be transfered to Kaedi. Although these researchers are not specifically attached to the USAID Agricultural Research Project, their activities can and will be closely coordinated by the USAIDs. The inclusion of pest management research expertise in the research project would duplicate these specialized efforts and overload the agenda of the agricultural research project. The monitoring of usage and storage of pesticides will be the responsibility of the respective National Project Officers. Reports will be directed to the research centers, to missions and to CIERDA for review. Local Food Crop Protection project personnel can be drawn upon for advice on this matter in Senegal and Mauritania.

2. Construction

Construction of houses and other buildings at the research stations represents an important investment of $ 2.4 million. Environmentally sensitive and energy conservative designs are to be used for the buildings, with special attention to windbreaks, berms and other features that ameliorate Harmattan wind.

These facilities are located on lands provided by the three governments and within the areas of existing research station sites. In other words, there are no alternatives to the chosen sites for construction in as much as the project aims to reinforce existing stations. Construction activities will of course generate environmental disturbance in the locale of the works. The total area affected is small, not exceeding several hectares at each station. The long term result will be a more habitable human environment. Septic tanks will be used to handle organic wastes. Agricultural chemicals containers will be disposed through separate arrangements, so as to avoid groundwater of surface water contamination, as described in Annex E.

E. Administrative Analysis

1. OMVS

The mechanisms for the implementation of this project already exist and are functioning within the OMVS. No legal or organizational changes are required. The project will only need to reinforce the existing system and expand administrative capacity to meet new objectives while assuring the application of existing procedures.

a. Organization

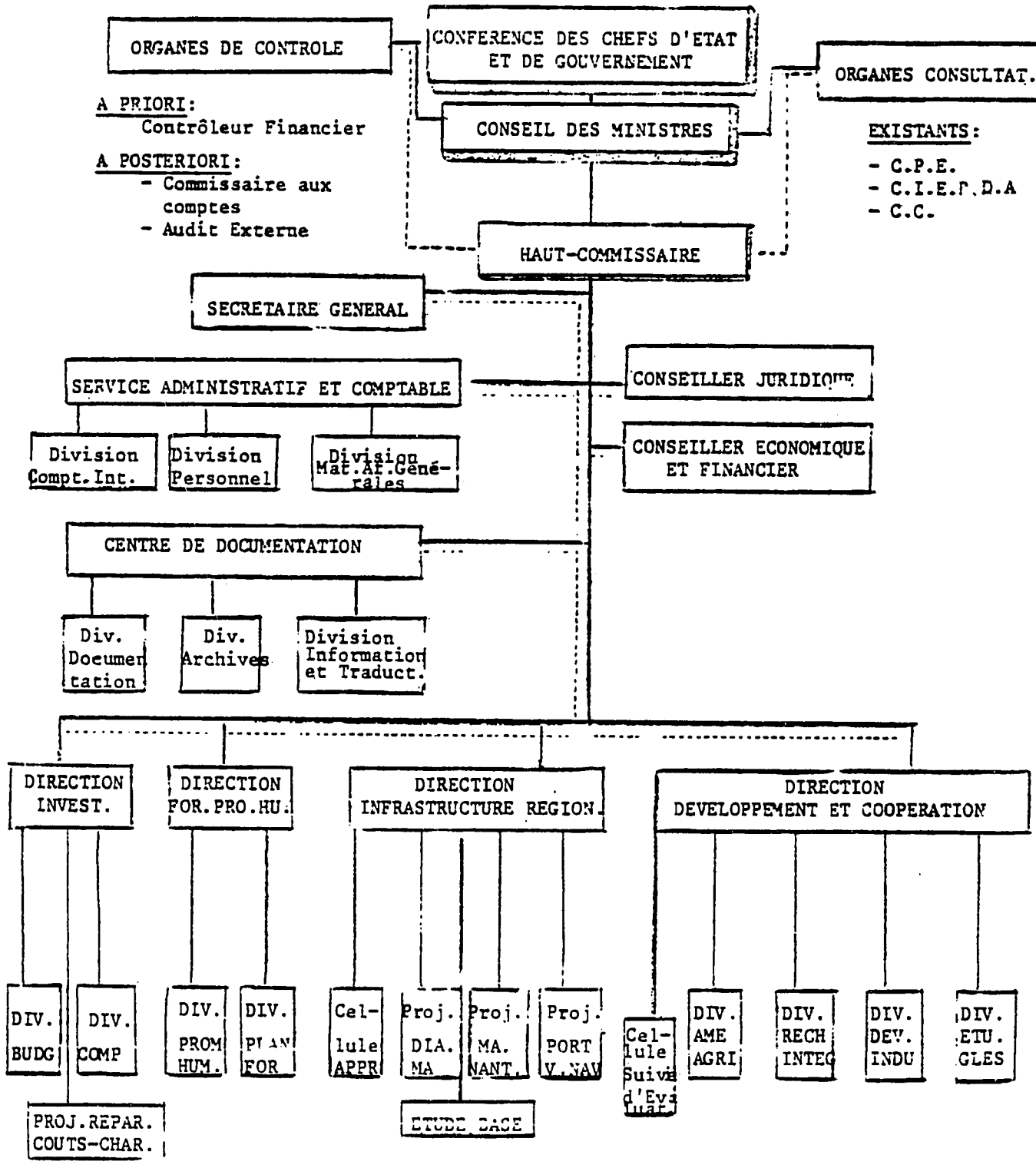
The four Senegal River countries of Senegal, Mauritania, Mali and Guinea joined together in 1963 to integrate river basin development by forming the Organization of Riparian States. With the withdrawal of Guinea in 1972, because of political differences, the name was changed to OMVS (Organisation pour la Mise en Valeur du Fleuve Sénégal) but development planning continued. The OMVS has four broad objectives which are: (a) to improve the income for the maximum number of inhabitants in the Basin and in neighboring regions; (b) to establish a more stable balance between man and his environment (c) to make the economies of the three States less vulnerable to climatic and external factors; and (d) to accelerate the economic development of the three States through inter-State cooperation. These objectvies are being promoted through a general development plan which includes construction of dams at Diama and Manantali, development of sea and river ports, improvement of river navigability, and development of various integrated development activities.

As shown by the OMVS Organization chart (Figure VI 4), the OMVS is governed by the Conference of Chiefs of States. This conference is the final decision-making body which rules on questions of general policy. Such decision must be unanimous and are binding obligations of the respective States. The Chair of the Conference is rotated annually among the Member States. The next level of organization is three-person Council of Ministers. The Council is comprised of one individual of ministerial rank appointed by each State, one of whom is designated as OMVS President. The Presidency is rotated every two years. The Council of Ministers directs the general operations of the OMVS by defining priorities for development projects, authorizing the acceptance of loans and grants, and apportioning payment obligations among the Member States.

In 1975, a High Commissioner's Office was created under the Council of Ministers and broad executive powers were delegated to it by the Council of Ministers. The High Commissioner is nominated by the Chiefs of State and serves for a four-year term. With the amendment

ORGANIGRAMME DE L'O.M.V.S. No.1

Figure VII- E-1



C.P.E. : Commission Permanente des Eaux
C.I.E.R.D.A. : Comité Inter Etats de la Recherche et du Développement Agricole.
C.C. : Comité Consultatif

———— Relations Hiérarchiques
- - - - - Relations Fonctionnelles

of the OMVS Charter in December 1979, the High Commissioner was given broad responsibilities over the execution of all studies, the management of irrigation development, and control of OMVS personnel and administration.

Within the Office of the High Commissioner there are four main Directorates. These are:

(1) Development and Cooperation. This Directorate is responsible for the long-range Master Plan for the integrated development of the entire Senegal River Basin for the harmonization of individual national development plans with the Master Plan, and for the planning, and evaluation of specific basin development actions.

(2) Training and Human Resources. This Directorate plans and addresses all manpower needs of the OMVS program including training of personnel for the High Commission and of personnel required for the management and operation of all infrastructure within the OMVS development program. The Directorate also coordinates training required within the Member States for realization of irrigated agricultural development projects in the Basin.

(3) Program and Finance. This Directorate plans and executes the overall OMVS budget, including the execution and monitoring of contracts and the management of all accounts. These activities are carried out according to the guidelines governing the relationships among the OMVS Member States and in close liaison with external sources of financing.

(4) Regional Infrastrucute. This Directorate handles all tasks associated with the studies, construction, management and operations of the Diama and Manantali dams, hydroelectric power, navigation and river port development.

In addition, there are three permanent consultative committees.

(1) The Interstate Commission for the Rules and Control of the Use of Water of the Senegal River rules on the equitable use of water among Member States by examining all projects which modify appreciably the characteristics of the river and all requests for the use of the water.

(2) The Interstate Committee for Agricultural Research and Development (CIREDA) studies and proposes programs of common interest in the areas of agricultural research and development conforming to the development objectives established by the Member States of the OMVS.

(3) The Consultative Committee is composed of the OMVS and major donors and assists the High Commissioner in mobilizing necessary financial resources, promoting better coordination of activities, and providing systematic exchange of information.

b. Management

Responsibility for the implementation of the OMVS Agricultural Research Project will rest primarily within the Division for Integrated Research, one of the four divisions within the Directorate for Planning and Coordination. This division is responsible for reviewing and coordinating all agricultural research and health surveillance activities in the Basin. Its specific responsibilities include:

(1) The coordination and monitoring of activities undertaken by the research centers at Fanaye, Kaédi, and Samé;

(2) The development, in liaison with CIERDA, of OMVS research strategies and priorities;

(3) The testing of new models of agricutlrual/livestock integration, in cooperation with the Agriculture Division;

(4) The design and monitoring of health surveillance programs;

(5) And the use and application of agricultural research results, in collaboration with the Agriculture and Training Division of OMVS. The Integrated Research Division also serves as the Secretariat of CIERDA.

The research programs of the Member States are harmonized and activities of common interest are developed by the OMVS Interstate Committee for Agricultural Research and Development (CIERDA). The responsibilities of CIERDA are:

(1) to periodically examine the results of existing programs and to propose new programs after having evaluated the costs and implementation plans;

(2) to recommend promising technologies to the rural development agencies based on the agricultural research results and development experience;

(3) to study and propose the best means of supporting the national research structures and of encouraging extension through the concept of research/extension liaison at national level.

CIERDA is composed of two members from each country -- one representative of agricultural research and one representative of the rural development services, and of one representative of the OMVS High Commission, Additional participants are included on request by OMVS or a Member State as required for the business at hand. CIERDA is required to hold one annual meeting, normally in October/November, and can hold additional meetings when requested by either a Member State or the High Commission. CIERDA, through its Secretariat, which is the OMVS Division of Integrated Research, overseas the implementation of programs for research and agricultural development undertaken by the Member States in the Senegal River Basin. CIERDA prepares reports for the Council of Ministers noting particularly any problems or constraints in the execution of the programs.

The OMVS Integrated Research Division and CIERDA have already had considerable experience in implementing and monitoring the type of activities called for under this project. The OMVS is currently providing substantial funding (approximately $400,000 per year) for the research operations of Fanaye, Kaédi and Samé. The programming and monitoring of these activities are handled through a process that will be used to implement this project. This process involves the following steps:

(1) the annual research program and budget are developed by each station;

(2) this program is reviewed by the national system and sent to the OMVS;

(3) CIERDA reviews the proposals and makes recommendations to the OMVS Council of Ministers;

(4) the Council of Ministers approves the programs;

(5) the research program is implemented by the research centers under their Project Agreements with the OMVS;

(6) The stations submit regular reports to the OMVS.

c. Staffing

The Chief of the Division of Integrated Research is the only permanent fulltime employee of his division. He also serves as the Secretariat for CIERDA and has no additional staff to help with these functions, although he is supported administratively by the secretary pool within the Development and Cooperation Directorate, and by an accountant and procurement specialists in the Administrative Service. At the present level of activity within the Division, the

Director is able to carry out his responsibilities which are primarily related to the agricultural research program. Nonetheless, increased project responsibilities and the development of previously inactive program areas under his jurisdiction (such as health surveillance) could easily overreach the managerial capacity of this individual.

To assure the proper operation of this Division, the project will finance the addition of a management specialist to work under the supervision of the Division Chief. During the first two years of the project this specialist will be a financial management expert who will be responsible for setting up and implementing a project financial management system within the OMVS and the three national research stations. In year three, the financial management specialist will be replaced by a research management specialist who will concentrate on strengthening the OMVS research coordination and dissemination activities. (A scope of work for these positions is provided in Annex G).

The project design team feels that this combination of long-term technical assistance, supplemented by short-term assistance in financial management, research programming, documentation, and evaluation, will resolve the problems OMVS encountered with the Agronomic Research I Project, the most serious of which was financial management.

2. National Agencies

Under the agreements to be signed by each country with the USAID for this project, the national research stations at Fanaye, Kaédi, and Samé will be assigned the responsibility for project implementation within their respective countries. As the project implementing agency, each station will be responsible for the development of annual work plans and budgets for research activities. These will be transmitted through the national systems to the OMVS for review by CIERDA and final approval by the OMVS Council of Ministers. Once the annual program is approved, separate allotments will be requested by each USAID and funds will be advanced by treasury check to the special local accounts established by each research station. The station will disburse these advances according to the agreed upon budget and replenish the account regularly by preparing vouchers to be sent to the respective USAID. Each station will have an accountant responsible for maintaining adequate records and local control. The work of the accountant and the proper functioning of the financial system will be supervised by the OMVS contract official manangement specialist. The Country Project Officers in each USAID will monitor the operation of the financial process.

The provision of other project inputs for technical assistance, training, construction, and commodities will be coordinated by the USAID's and the OMVS as described above in the procurement plan.

a. Fanaye, Senegal

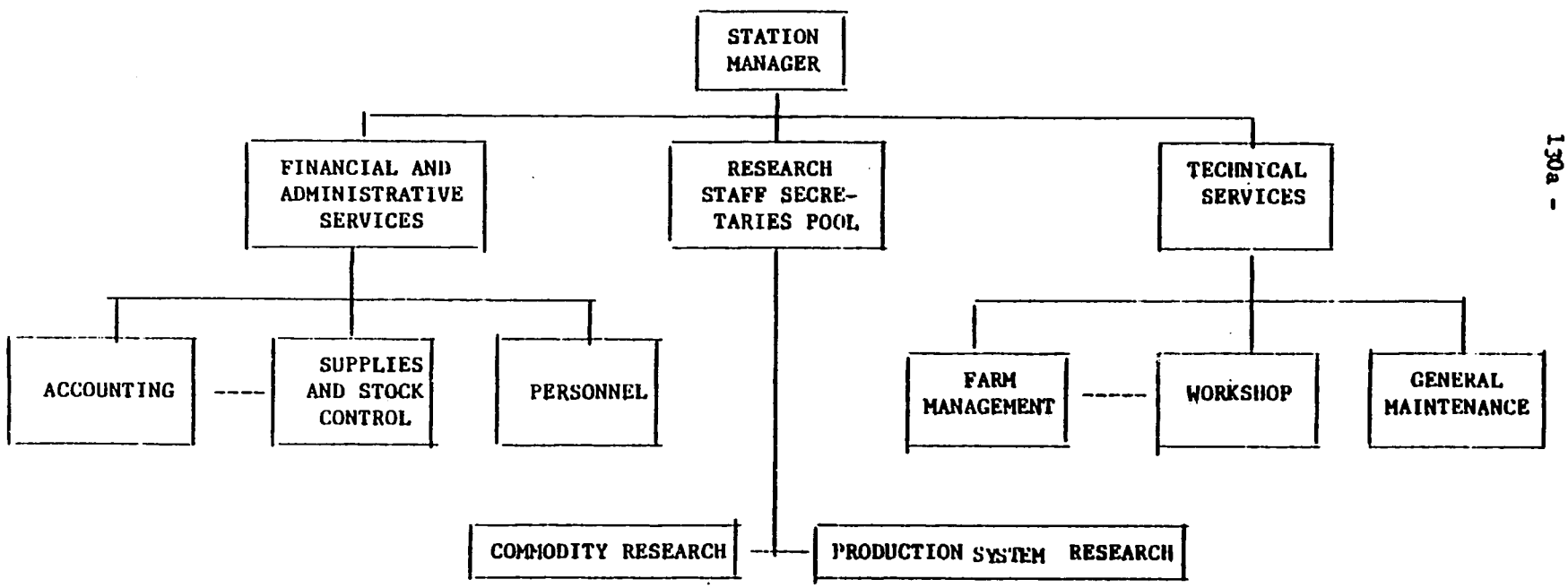
(1) Organization

The agricultural research structure for the Senegal River Region of Senegal consists of administrative headquarters and limited fields at Richard Toll, an older area of about 15 has. at Guédé and a new area of about 60 has. being developed at Fanaye. Research is presently going on at all three locations, although future activities will be concentrated at Fanaye as the station is developed.

With the initiation of the reorganization being established by the agricultural research decentralization program coordinated by the World Bank, the organization of ISRA/Fanaye will be consolidated as shown in Figure VII.E2. This new structure will support a seven member farming systems research team and a four member commodity research team primarily for rice, although some millet and sorghum work will be included. Some other activities will be continued under supporting research, financed by other donors (as with the wheat research of OMVS at Guédé), or by development projects (like current farm testing for vegetable production and mixed cropping techniques).

FIGURE VII - E.2

SENEGAL
AGRICULTURAL RESEARCH PROJECT
RESEARCH STATION ORGANIZATION CHART
(Fanaye, Bambey, Nioro du Rip, Djibelor)



---- Liaison

(2) Management

The present research activities are primarily project oriented, meaning that they are directed by a project management structure and administratively coordinated by the Station Director. The rice program is generally operated and coordinated by WARDA, which has a team of four scientists stationed at Richard Toll. Work on wheat is being supported by the OMVS and implemented by two British scientists working primarily at Guédé in coordination with CYMMIT. CILSS has provided an entomologist for crop protection research, and France has provided three scientists to direct ISRA programs in cultural techniques and vegetable research.

With the introduction of the new station organization under the Senegal Agricultural Research Project, management of station operations will be improved by the strengthening of the Financial and Administrative Service to include accounting, supply and stock control, and personnel activities and of the Technical Services to include farm management, the workshop, and general maintenance activities. These services will be supervised by the Station Manager. The Station Manager will also coordinate the commodity research and production systems research programs with technical direction being provided from the central support groups in the Production Systems Department and Commodity Research Department within ISRA Headquarters. This management structure corresponds to the structural and functional changes being made throughout the ISRA system under the World Bank coordinated Senegal Agricultural Research Project, as was described in the Background, Section IIIB, Research in Senegal.

(3) Staffing

Of the 11 scientists working in the area (this excludes the Station Director who is mainly occupied with administrative duties) only two are Senegalese and only one is funded by ISRA. These 11 scientists are supported by 5 senior technicians and 12 junior technicians.

Three Senegalese are now in the U.S. receiving training to the Masters level. They will return to work in Fanaye in late 83 or early 84 as researchers on the farming systems team. Their return will correspond with the arrival of technical assistants under this project and change the staffing pattern to the following:

Farming System Team:

- General Agronomist	: France
- Agronomist (Weed control)	: Senegal (financed by WARDA)
- Animal Production Scientist	: Senegal
- Agricultural Economist	: USAID/OMVS (Senegalese counterpart)
- Rural Sociologist	: Senegal
- Agricultural Engineer	: Senegal
- Extension Specialist	: USAID/OMVS (Senegalese counterpart)
- 7 Senior Technicians	: Senegal
- 7 Junior Technicians	: Senegal

Commodity Research:

- Sorghum and Maize Breeder	: France
- Rice Breeder	: WARDA (Senegalese counterpart)
- Rice Breeder	: Senegal (financed by WARDA)
- Pathologist	: Undetermined
- Entomologist	: Senegal (CILSS financed)

ISRA/Fanaye will have a broad range of qualified researchers so that no problems are foreseen in the implementation of the technical aspects of the research program. On the administrative side, the conclusions are equally positive. ISRA has had considerable experience in the execution of AID projects at the national level and is currently working closely with a U.S. contractor in setting up the production systems research department. The ISRA administrative structure should be able to handle the administrative needs of this project. The project will train the research station accountant so that he can properly maintain project accounts. ISRA/Fanaye has already had experience with the management of externally financed research activities, so that no particular administrative problems are anticipated.

b. Kaedi, Mauritania

(1) Organization

The agricultural research center at Kaédi (Centre National de Recherche Agronomique et de Développement Agricole - CNRADA) is in the process of being developed.

The administrative offices are located in leased buildings in Kaédi, until the new facilities being financed by FAC are completed. Previous research has been done at Wandama and Rindiao. The Wandama station consists of 9 has., located some 2 kms. south of Kaédi and the Rindiao Station includes about 14 has. located roughly 7 kms, west of Kaédi. Since these two areas are inadequate for the planned research program a new station of about 100 has. is being developed at Belinabé, adjacent to the Rindiao Station, about 6 kms. west of Kaedi.

Since the Kaédi station is the national research center for Mauritania, it has established a wide based research program to cover all areas considered important to the national program. The organization chart for CNRADA is shown in Figure VI F. In general, the various divisions are thinly staffed and poorly supported by the national budget. Most research underway at CNRADA is directly financed and generally administered by outside donors and expatriate technical assistance. Currently CNRADA is directly administering the national budget and CILSS financed research (a total annual budget of about $180,000).

(2) Management

To date, CNRADA has not effectively managed the technical nor the administrative aspects of its research program. All but a very small portion of externally financed research has been directly managed and controlled by expatriate researchers. The Agronomic Research I Project gave some management responsibilities to the station and encountered financial control problems.

The disbursement of project funds will be tightly structured by a financial management system to be set up under the project and be tightly controlled by the financial management specialist and a double signature system for disbursing funds from the local project account.

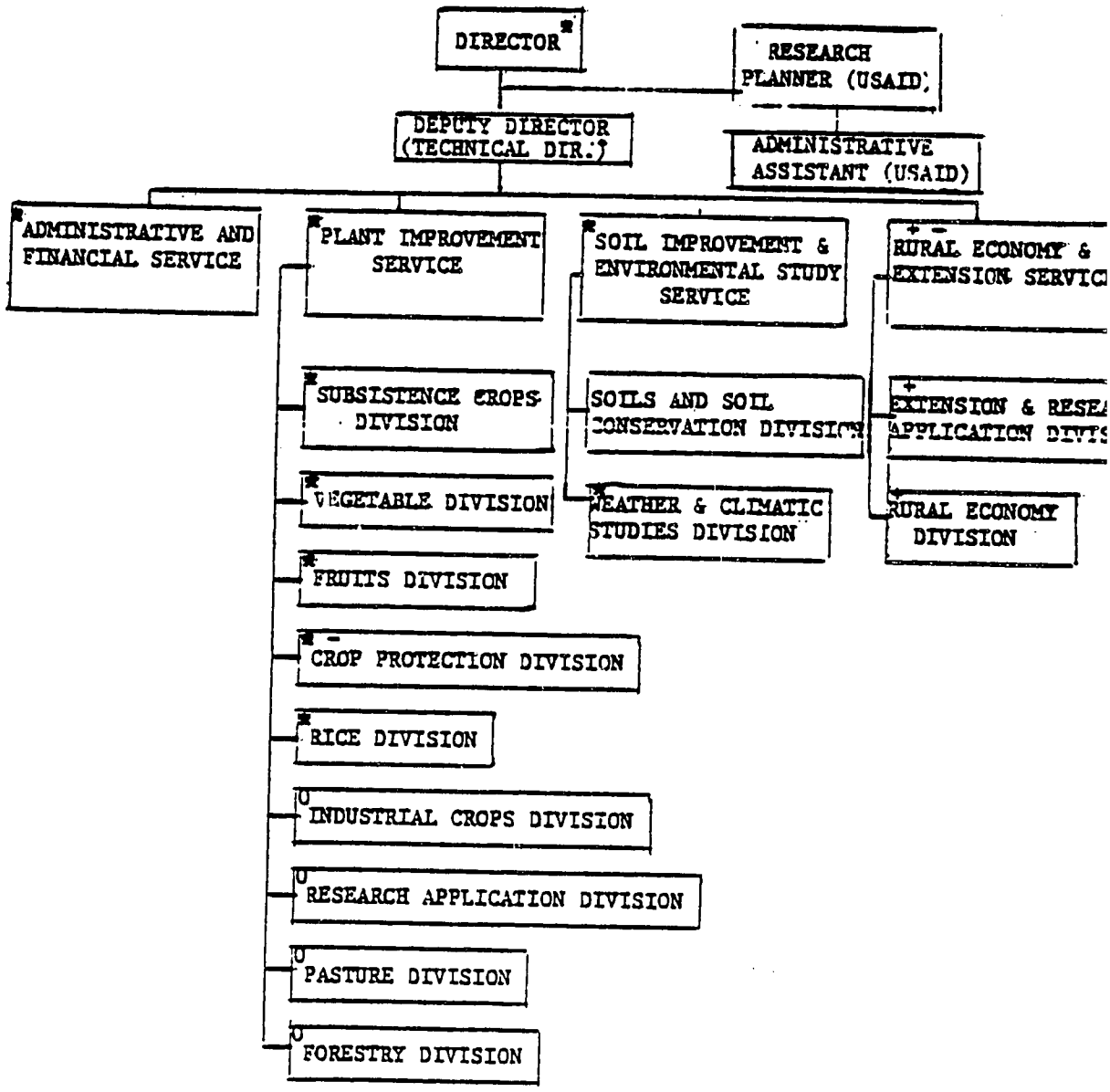
(3) Staffing

CNRADA staffing currently consists of 3 Mauritanian researchers (one of whom is the Director), 3 expatriate researchers, 7 research assistants, 7 research technicians and a support staff of about 77. The FAO finances one researcher (for rice) and GERDAT and FAC have each provided one researcher (for cereals and vegetables). CNRADA has been able to develop a sound research program in several areas but the continuity and quality of this program have been hampered by low national funding and by diverse and uncertain international donor support.

Because of the availability of several scholarship programs, Mauritania now has a foreign training program underway to build up its national research personnel. Three students left in 1977 under FAC financing

FIGURE VII. E-3

CENTRE NATIONAL DE RECHERCHE AGRONOMIQUE ET DE DEVELOPPEMENT AGRICOLE - KAEDI, MAURITANIE
RESEARCH CENTER ORGANIZATION CHART.



Key:

* position occupied
\- staff in training or to be trained
0 vacant
\+ planned but not approved

to study cereal, vegetable, and fruit production in France and will return to CNRADA in September 1982. In addition, five more scholarships were provided by FAC in 1981 for training through GERDAT. Three students left in September 1981 and should return in 1984. The two remaining scholarhips have not yet been awarded. SAFCRAD has also provided a scholarship for graduate training in crop protection. This candidate has been nominated and is scheduled to leave for a two-year program starting in September 1982.
The design team has concluded that CNRADA (1) has adequate organizational authority and structure for the project, (2) will have adequate national technical staff by the time the project starts, and (3) can manage project activities, if those activities are well defined and tightly controlled by a new project financial management system. Regional and national technical assistance will have to be closely involved in project and research management to assure that the project is properly executed.

c. Samé, Mali

(1) Organization

The Samé research center consists of two separate areas, about 20 has. at Samé and 6 has. at Kamenkolé which is located about 5 kms. west of Samé. The plan of the Malian government is to expand the research areas to about 200 has. of leveled land.

The Samé Station is the least developed of the three stations in terms of research program and administrative structure. The current research program is run by the director and one researcher, supported by four technicians. This program is limited to varietal trials and some specialized activities. There is no administrative service; the supervision of financial, administrative and farm operations depends directly on the Station Director.

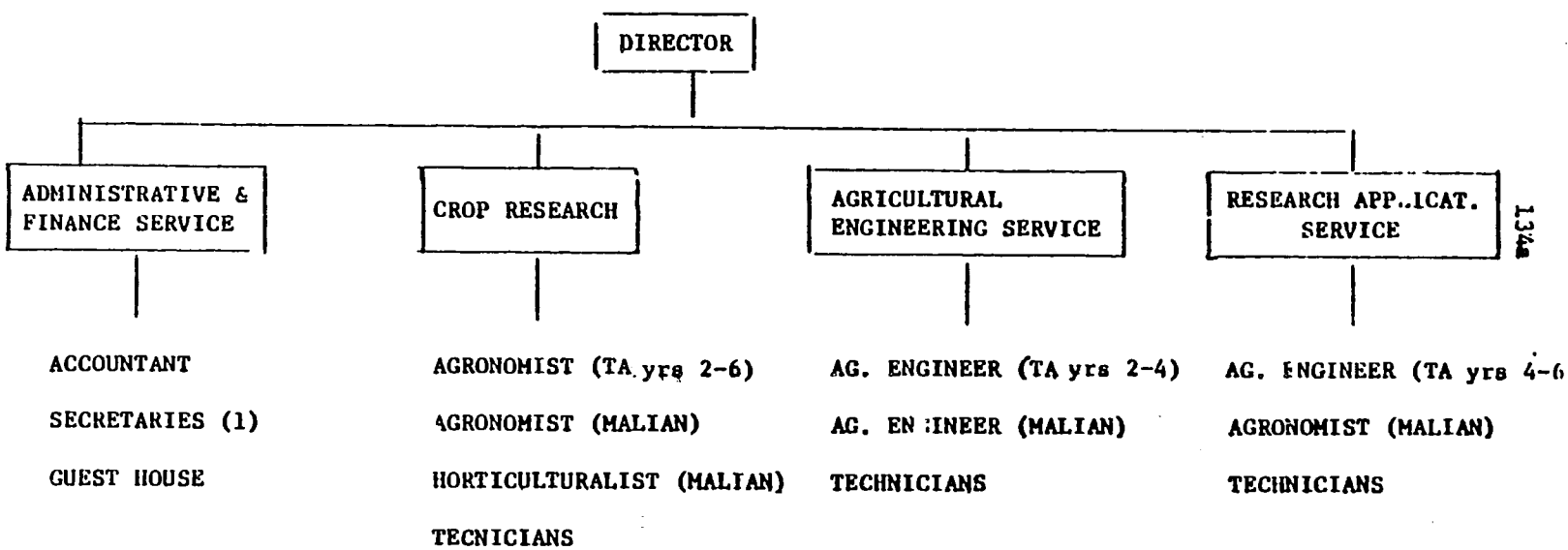
With the start of this project an administrative structure will be established at Samé as shown in Figure VI Q. Besides the strengthening of research capabilities through technical assistance and additional counterpart researchers, the major change will be the establishment of an Administrative/Financial Section to coordinate station operations and provide project financial management.

(2) Management

The Samé station is managed by the Station Director. He is energetic and capable, and has done a good job directing the station given the difficult circumstances under which he has worked. Because of the small size of the current research program and the lack of institutional mechanisms and delegated authority at the station, it is hard to assess management capabilities for this project, except to say that additional management capability will be needed.

FIGURE VII- E.4

ORGANIZATION CHART FOR THE
AGRICULTURAL RESEARCH STATION
AT SAME, MALI.



The project will provide for a station accountant and for continuing follow up by the regional financial management specialist. Project technical assistants for research will also need to carry certain administrative and management responsibilities.

(3) Staffing

Current staffing at the Samé Station includes only two professional researchers (the Station Director and his assistant), 4 technicians, and about 15 labors, drivers, etc. This skeletal research operation is currently financed completely by the OMVS (approximately $210,000 in 1981). For the start of the project, planned station staffing is the following:

- Director (Malian)
- Chief of Administration and Finance (Malian)
- Crop Research:
  - Agronomist (Expatriate)
  - Agronomist (Malian)
  - Horticulturalist (Malian)
- Engineering:
  - Agricultural Engineer (Expatriate)
  - Agricultural Engineer (Malian).
- Research technicians:
  - 5 Senior
  - 5 Junior

Within the new organization and staffing to be established at Samé the design team feels that project activities can be successfully implemented provided that those activities are well defined and tightly controlled. The Station, with project technical assistance, will only be managing a small budget for operating support. All other project inputs will be contracted and supplied by USAID/Mali or the OMVS.

ANNEX A

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project :
From FY 83 to FY 88
Total US Funding $13.5 million
Date Prepared March 1982

Project Title & Number: OMVS Agricultural Research II (625-0957)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal : The broader objective to which this project contributes :	Measures of effectiveness:		Assumptions for Achieving goal targets :
Senegal, Mali and Mauritania will more effectively plan and implement agricultural development activities in the Senegal River Basin (SRB).	Greater use of improved technologies which will provide higher yields.	Project evaluations Economic indicators	The Member States will provide recurrent and capital budget allocations, and human resources to support agricultural research in the Senegal River Basi .
	Improved design of agricultural research activities by the OMVS and by each national research component.	Evaluations	
	Farmers actively participating in the research program.	Evaluations	Research results will be readily accepted and used by development agencies and farmers.

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PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

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Life of Project:
From FY 83 to FY 88
Total US Funding $13.5 million
Date prepared March 1982

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose:	Conditions that will indicate purpose has been achieved: End of project status:		Assumptions for achieving purpose:
1. To develop and strengthen OMVS agricultural research capacities in the Senegal River Basin. 2. To improve the combined effectiveness of national agricultural research programs in Senegal, Mauritania and Mali through regional coordination and prioritizing within the OMVS.	Quality research is being carried out on critical technical and socio economic agricultural problems. Research recommendations are being implemented by national development agencies and adopted by farmers. Research programs are implemented cooperatively among the three countries and results are disseminated by the OMVS throughout the SRB. Research staffed by nationals of the countries.	Research reports by national research agencies and the OMVS. Reports by national development agencies. Project evaluation.	OMVS and the Member States wil provide adequate policy direction, coordination and sup ort CIERDA and national scientific and technical review committee will function effectively. Donors will collaborate and provide continuing inputs in a timely manner.

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title & Number OMVS Agricultural Research II (625-0957)

Life of Project :
From FY 83 to FY 88
Total US Funding $13.5 million
Date Prepared March 1982

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs :	Magnitude of Outputs		Assumptions for achieving Outputs :
1. Improved crop varieties, and technical packages developed and field tested	1. 3 or 4 promising cultivars and improved technical packages have been developed and field tested and are ready for farm use for each major cereal crop in each major ecological area of the Basin.	1. Reports of the national research agencies and by researchers.	1. Positive agronomic and social options will emerge. Farmers will be able to put into practice the improved agricultural technologies.
2. Upgraded technical and professional skills for agricultural researchers.	2. a. 12 researchers trained to BS & MS level b. Research assistants given special academic third country & US training and short courses c. Station accountant/administrative assistants, and mechanic and maintenance personnel given special short courses.	2. Training records for U.S. and 3rd country participants.	2. Relevant and effective training programs are found and well qualified candidates are proposed.
3. Upgraded agricultural research facilities at three locations in the SRB.	3. a. Fanaye, Senegal: 4 houses for researchers 4 houses for research assistants 1 office for researchers 1 office for assistants & library b. Mauritania Kaédi : 2 houses	3. Inspection Project Reports.	3. Bidding and evaluation procedures are efficiently undertaken so that work starts promptly. Facilities development is coordinated with other donors.

ANNEX A

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title & Number OMVS Agricultural Research II - (625-0957)

Life of Project :
From FY 83 to FY 88
Total US Funding $13.5 million
Date Prepared March 1982

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs :	Magnitude of Outputs c. Samé, Mali: 5 houses for researchers 1 office building for 6 offices and support 1 soils and plant laboratory electric power station water supply and waste disposal systems Renovation of guest house, and warehouse.		Assumptions for achieving Outputs :
4. Strengthened regional research system integrating national research agencies and involving national development agencies.	4. a. Regional research system with effective research/extension liaison assured by protocol arrangements. b. Field trials executed jointly by national research station and appropriate national development agency in each geographic area. c. Improved regional coordination among research stations for regional research priorities and dissemination of technical information by OMVS.	4. Protocol agreements. Reports and records of research agencies and development agencies	4. Continuing support for agricultural research and rural development from Member States and donors.

ANNEX A

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number OMVS Agricultural Research II (625-0957)

Life of Project :
From FY 83 to FY 88
Total US Funding $13.5 million
Date Prepared : March 1982

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs :	Implementation Target (Type and Quantity) :		Assumptions providing inputs
AID			
1. Technical Assistance: 6 research scientists 60 person/months consultants 1 management specialist 1 Deputy project officer (regional) 3 Deputy project officers (national)	1. $6.4 million for technical assistance	Project records and disbursement accounts	Funds are available and all inputs are provided on a timely basis. Construction and technical assistance contracts are signed without excessive delays.
2. Training: U.S. and 3rd country participant training short courses and seminars.	2. $1.7 million for training		
3. Construction: Construction for national research centers at Fanaye, Kaédi and Samé.	3. $2.5 million for construction		
4. Commodities: Vehicles, housing and office furnishings, electric generators, farm equipment and research supplies.	4. $1.5 million for commodities		
5. Operating Support: Support for research station operations	5. $1.6 million for operating support		

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)?	This project is being presented to Congress through the advice of program change process, to show the new total life of project funding of $13.5 million and the research program and implementation changes included in this PP amendment.
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?	The Project Committee determined that FAA Section 611(a) was satisfied, in that adequate engineering, financial and other plans, and reasonably firm cost estimates have been provided.
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?	No legislative action required.
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?	YES
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?	YES. See Annex H
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.	YES, OMVS is a regional organization.

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B-2

A.

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.	The project purpose is to undertake research to improve the technical efficiency of agricultural production in the Senegal River Basin.
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).	This is a research project for which technical assistance will be provided by U.S. private firms and/or universities.
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.	OMVS is contributing to extent possibl to cover certain local costs.
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?	U.S. does not own any excess foreign currency.
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, competitive selection will be used.
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?	No such commodities are involved.

B. 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	Participation in research trials and use of research results will involve rural farmers in the economic development process. Farmer committees will be organized to facilitate their involvement.

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B.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. 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.) N/A

(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;

(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.

(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;

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

(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 problems, 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?

Project research will help develop all best appropriate technologies.

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 is a multi-donor project to a regional organization under Section 121 and thus the 25% requirement is not applicable.

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"?

N/A

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.

This project will provide essential cereals research results which will assist the OMVS Member States in meeting their food needs.

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?

OMVS will provide African manpower to complement the U.S. researchers.

2. Development Assistance Project Criteria (Loans Only)

N/A

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

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?

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B. B-5

3. Project Criteria Solely for Economic Support Fund N/A

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?

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

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B-6

5C(1) - 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, the USAID/Senegal Project Support Office will see that U.S. small businesses are considered as procurement sources.
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
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?	N/A
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, this will be assured by the USAID/Senegal Project Support Office.
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
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	YES, sources for technical assistance will be selected on a competitive basis from U.S. firms and universities.

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?

B. Construction

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? — YES

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? — YES

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? — N/A

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? — N/A

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? — N/A

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign 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, AID procurement regulations will be applied for purchase of some non-U.S. source origin vehicles.

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C. B-8

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? YES

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

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

d. FAA Sec. 662. For CIA activities? YES

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

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

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.) YES

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? YES

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

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ORGANISATION POUR LA MISE EN VALEUR DU FLEUVE SENEGAL

N° ..OMVS HC

ANNEX C

Dakar, le

Le Haut Commissaire

Objet : Demande d'aide - Projet de Recherche Agricole (OMVS-FAO).

Monsieur le Directeur,

ACTION
PDO
INFO
DIR
DDIR
MO
FRM
OMVS
Reg Com
RPM
PML
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FHP
PDO
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Comme vous le savez déjà, le Haut-Commissariat de l'OMVS et ses Etats membres ont financé pendant de nombreuses années un programme régional de recherche agricole dans le bassin du fleuve Sénégal. Les agences internationales telles que le Programme des Nations Unies pour le Développement et l'Organisation pour l'Alimentation et l'Agriculture (PNUD/FAO) y ont participé depuis les années 60. De 1970 à 1976, la FAO a pris une part très active dans direction de ce programme de recherche agricole effectué dans les centres de Fanaye au Sénégal, Kamé au Mali et Kaédi en Mauritanie.

A la demande de l'OMVS, appuyée en cela par le PNUD/FAO, l'USAID a fourni aux trois centres, l'outillage, l'assistance technique et a pris en charge les frais de fonctionnement de 1975 à 1978. Cette assistance de l'AID a permis aux centres de continuer à fonctionner et à poursuivre les essais sur le terrain bien que l'assistance de la FAO/PNUD ait pris fin.

Les Etats membres de l'OMVS soucieux de rentabiliser le programme d'infrastructure régionale dont l'une des principales justifications reste le développement du secteur agricole avaient demandé au Haut-Commissariat de l'OMVS de mettre sur pied un programme de recherche Agricole. Ce programme devait permettre de développer les possibilités d'une recherche continue dans le bassin du fleuve Sénégal tout en accroissant la production et en améliorant le revenu des paysans. Ce programme fut présenté et adopté lors de la réunion du Club du Sahel à Ottawa, Canada en Mai 1977. Par la suite, l'USAID a été sollicité pour une assistance dans l'élaboration de ce programme de recherche. Un programme de recherche a donc été étudié et a fait l'objet d'analyse et de recommandations lors des rencontres avec les Etats membres, l'OMVS, la SAED, l'ISRA et les membres du CIERDA.

Monsieur David SHEAR
Directeur de l'USAID/Sénégal
D A K A R

USAID SENEGAL
Date received AUG 25 1981
Number 1712
Date Action Taken 8/27/81
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ANNEX C

Afin de mettre en place cet important programme de recherche agricole, je vous serais reconnaissant de bien vouloir appuyer auprès de l'AID/Washington l'octroi de son financement.

Ce programme constitue pour l'OMVS un élément essentiel dans la stratégie d'ensemble du programme de développement dont le but est d'atteind l'autosuffisance alimentaire de la sous-région.

Veuillez agréer, Monsieur le Directeur, l'expression de ma considération distinguée.

Mokhtar Ould HAIBA

ORGANISATION POUR LA MISE EN VALEUR DU FLEUVE SENEGAL

ANNEX C

OMVS/HC

DAKAR, le

JAN 11 1982

0007

OMVS 8916 R.O

Haut Commissaire

à Monsieur le Directeur
de l'USAID

DAKAR

Monsieur le Directeur

Au cours de la 15è Session Ordinaire tenue à Bamako du 17 au 20 Décembre 1981, le Conseil des Ministres de l'OMVS m'a demandé de vous transmettre quelques observations contenues dans le document ci-joint relatives au rapport de factibilité du projet OMVS/USAID de Recherche Agronomique phase II, rapport que vous aviez soumis à son approbation par le biais du Haut - Commissariat.

Ces observations ont été émises par le Comité Inter-Etat de la Recherche Agricole (CIERDA) qui s'était également réuni à Bamako à la même période en vue de discuter le rapport.

Il importe que vous les preniez en considération dans la reformulation du projet que vous comptez semble t-il entreprendre à la suite de commentaires formulés par l'USAID/Washington.

En espérant que ce travail sera conduit avec diligence pour permettre le démarrage effectif du projet dans des délais raisonnables, je vous prie, Monsieur le Directeur Général, d'agréer l'expression de ma considération distinguée.

Mokhtar Ould HATBA

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ANNEX C

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COMMUNICATION DE LA SESSION EXTRAORDINAIRE DU CIERDA

A la suite de sa Session Ordinaire tenue à Dakar du 17 au 26 novembre 1981, le CIERDA avait envisagé la tenue d'une Session Extraordinaire les 5, 6 et 7 Décembre 1981, aux fins d'examiner :

le Rapport de faisabilité du projet de recherche agricole phase II US AID/OMVS ,

procéder à un échange de vues sur la gestion des Centres de Recherche.

I. - A la lecture du Rapport de faisabilité, certains membres du CIERDA ont fait état de propos officieux tenus par les Responsables US AID à DAKAR, selon lesquels, le rapport soumis à l'OMVS serait susceptible de subir de profondes modifications à la suite d'observations de fond émises par l'US AID WASHINGTON. Ces observations seraient en cours de traduction à l'AID/DAKAR en vue d'être soumises au Haut Commissariat de l'OMVS.

Tenant compte de ces informations, qui ont été de leur caractère officieux, le CIERDA a jugé opportun de se limiter à des observations de fond qui seront transmises au Haut Commissariat de l'OMVS pour être transmises à l'AID/Washington et servir éventuellement à la reformulation du projet.

Ces observations qui ne pourraient donc pas à l'échelon du Conseil des Ministres se présentent comme suit :

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ANNEX C

1°/ - Philosophie du Projet

L'unanimité s'est faite sur l'approche [illegible] visant à cerner au préalable les réalités socio-économiques rurales. Toutefois des réservations ont été émises sur la multiplicité des types de recherche. Des regroupements pourraient sans doute être opérés entre certains types de recherche en vue d'une économie de ressources.

Le CILSS a, par ailleurs exprimé des réserves sur la fiabilité de certaines hypothèses de recherche, par exemple l'irrigation d'appoint des cultures pluviales sur le District de la vallée du Sénégal à partir de forages.

2°/ - Gestion du Projet

S'agissant de la gestion, l'unanimité s'est faite sur la nécessité d'une gestion conjointe à tous les niveaux, avec toutefois au niveau des centres une prééminence des Chefs de Centres nationaux qui délèguent des pouvoirs aux responsables des centres pour la gestion des équipements et matériels du projet. En ce qui concerne le processus décisionnel, le CILSS sera l'instance souveraine qui examine et approuve tous les programmes de recherche établis à partir des centres. Le CILSS aura par ailleurs à examiner la qualification des chercheurs expatriés à travers leurs curriculum vitae qui lui seront fournis par l'USAID. Des fois opérations, les programmes de recherche seront exécutés sous la supervision du Coordonnateur de la Recherche et du Chef de section du Centre qui sont par ailleurs responsables à titre égal de la mobilisation des moyens de direction des centres. Les centres rendus "actifs" se partagent l'exécution des programmes [illegible]

ANNEX C

La représentation des agriculteurs au sein du CILRDA n'a pas été jugée utile du fait qu'ils sont actionnaires des organismes nationaux de développement qui sont Membres de cette Institution.

Quant au Consultant, il ne peut participer au CILRDA que conformément aux Statuts de ce dernier qui stipulent que le CILRDA peut faire appel à toute personne pour ses compétences personnelles.

3°/ Qualification et formation des Chercheurs nationaux.

Le CILRDA a reconnu l'intérêt du projet, comme moyen de formation de chercheurs nationaux aux différentes disciplines de la recherche agricole.

Toutefois, afin de garantir l'efficacité de cette formation et prévenir toute forme d'aliénation des chercheurs nationaux, le CILRDA préconise que le recrutement de ces derniers se fasse à deux niveaux différents chercheurs juniors nouvellement diplômés, sans expérience, et chercheurs seniors ayant déjà pratiqué la recherche pendant 3 à 5 ans.

Les dispositions relatives à la sanction de cette formation sont été jugées adéquates par le CILRDA dans la mesure où elles permettent de maintenir les chercheurs une fois formés auprès de leurs Centres.

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RUTABO/AMEMBASSY BAMAKO PRIORITY 3867
RUFROC/AMEMBASSY NOUAKCHOTT PRIORITY 6569
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SUBJECT: OMVS AGRICULTURAL RESEARCH PROJECT

1. A PROJECT COMMITTEE (PC) MEETING TO CONSIDER [illegible] FOR SUBJECT PROJECT WAS HELD IN AID/W ON OCTOBER [illegible]. IN ADDITION TO THE PC MEMBERS, MIKE MAU AND BEN STOLZ FROM USAID/SENEGAL AND DR. MATLOCK FROM UNIVERSITY OF ARIZONA WERE IN ATTENDANCE.

2. THE PC DISCUSSED SEVERAL ISSUES WHICH WERE OUTLINED IN THE 6 SEPARATE ISSUES PAPERS THAT WERE PREPARED PRIOR TO THE MEETING. THE PC CONCLUDED THAT THE MISSION SHOULD UNDERTAKE TO REVISE THE PP TAKING INTO ACCOUNT THE POSITIONS SET FORTH IN THE ISSUES PAPERS. COPIES OF THE ISSUES PAPERS WERE HANDCARRIED TO DAKAR BY MIKE MAU ON NOVEMBER 1. A SECOND SET OF COPIES WILL BE POUCHED TO EACH OMVS MISSION. AS A VERY HELPFUL MEETING PARTICIPANT, MAU WILL BE ABLE TO AMPLIFY THE ISSUES PAPERS WITH COMMENTS AND KNOWLEDGE OF HIS OWN. THE PC WILL REVIEW THE PP AGAIN FOLLOWING ITS REVISION AND SUBMISSION.

ACTION
OMVS
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3. IN ADDITION TO THE ISSUES PAPERS THEMSELVES, THE PC WOULD LIKE THE PP REVISIONS TO TAKE INTO ACCOUNT THE FOLLOWING SUGGESTIONS:

EXTENSION ORGANIZATIONS IN EACH COUNTRY NEEDS TO BE CLEARLY AND CONCISELY DESCRIBED. IN PARTICULAR, THE PP SHOULD ELABORATE ON THE KINDS OF MECHANISMS OR ARRANGEMENTS WHICH WILL BE ESTABLISHED TO ENSURE THAT THE TWO DISCIPLINES FUNCTION AS PARTNERS.

--B. THE PP SHOULD DESCRIBE IN MORE DETAIL THE RELATIONSHIP OF THE OMVS RESEARCH STAFF TO NATIONAL RESEARCH ORGANIZATIONS INCLUDING LINES OF RESPONSIBILITY AND AUTHORITY AT RESEARCH STATIONS AND AT ALL LEVELS OF ADMINISTRATION.

--C. WHILE NUTRITION CONSUMPTION AND MEASUREMENT IS NOT A PRIMARY FOCUS OF THE RESEARCH EFFORT, IT SHOULD BE NOTED AS AN AREA OF SECONDARY INTEREST WHICH WILL BE MON-

ITORED BY THE SOCIAL SCIENTIST WITH SUPPORT OF SHORT-TERM CONSULTANTS.

--D. THE PP WILL NEED AN IEE. DUE TO THE LARGE AMOUNTS OF CONSTRUCTION, A CATEGORICAL EXCLUSION IS INSUFFICIENT. FURTHER, THE IEE SHOULD PERFORM A RISK/BENEFIT ANALYSIS OF ANY POSSIBLE CHEMICALS THAT MAY BE EMPLOYED AS PART OF THE RESEARCH/EXTENSION EFFORT.

--E. BOTH TITLE XII AND PRIVATE INSTITUTIONS OFFER ADVANTAGES FOR CARRYING OUT THE TECHNICAL ASSISTANCE PORTIONS OF THE PROJECT. THEREFORE, COMPETITION SHOULD NOT BE LIMITED AND AN RFP FOR OPEN BIDDING EVENTUALLY PREPARED.

--F. GIVEN THE NATURE OF THIS PROJECT, COMPUTATION OF ECONOMIC INTERNAL RATES OF RETURN WILL NOT BE REQUIRED. HOWEVER, ADDITIONAL SPECIFIC INFORMATION WILL BE NEEDED TO PROVIDE THE BASIS FOR DETERMINING THE ECONOMIC SOUNDNESS OF A DOLS 13 MILLION AID INVESTMENT. IN THIS CONNECTION, REASONABLE ESTIMATES OF TANGIBLE OUTPUTS THAT CAN BE EXPECTED WITHIN THE 6-YEAR LOP WILL BE NECESSARY. EXAMPLES OF WHAT SUCH TANGIBLE OUTPUTS MIGHT BE ARE. (1) NUMBERS/LEVEL OF DEGREE TRAINING/AREAS OF SPECIALIZATION ENVISIONED FOR EACH OF THE RESEARCH INSTITUTIONS (AND/OR THE OMVS MEMBER COUNTRIES); (2) NUMBER AND TYPE OF COUNTERPART STAFF TO BE PROVIDED BY OMVS MEMBER COUNTRIES; (3) TYPES OF RESEARCH TRIALS/STUDIES TO BE CONDUCTED, AND (4) POTENTIAL INCREASES IN PRODUCTION AND YIELDS, NUMBER OF FARMERS TO BE REACHED AND OTHER SUCH

INDICATORS OF BENEFITS THAT CAN BE EXPECTED WITH THE ACCOMPLISHMENT OF THE PROJECT'S RESEARCH OBJECTIVES SUCH AS TO TEST IMPROVED VARIETIES OF RAINFED CROPS IN FARMERS' FIELDS, OR TO TEST LEVELS/TIMING OF FERTILIZER APPLICATION ON SELECTED CROPS, ETC. ADDRESSING ITEM F.3 ABOVE WILL REQUIRE A CLEARER DEFINITION OF SPECIFIC RESEARCH OBJECTIVES THAN IS EVIDENT IN THE PP AMENDMENT. IT WILL BE DIFFICULT TO ADDRESS ITEM F.4 ABOVE WITHOUT A CLEAR DEFINITION OF SPECIFIC RESEARCH OBJECTIVES, WHICH APPEARS TO BE LACKING IN THE PP AMENDMENT. NEVERTHELESS, TO ILLUSTRATE WHAT IS EXPECTED IN ITEM F.4, LET US ASSUME THAT ONE OF THE RESEARCH OBJECTIVES IS TO IDENTIFY VARIETIES OF MILLET WHICH, WITH MINIMUM RISK, COULD INCREASE CURRENT YIELDS ON FARMERS' FIELDS BY, SAY 62 PERCENT. THE TANGIBLE OUTPUT CAN THEN BE CALCULATED BY DETERMINING THE EXPECTED INCREASE IN THE TOTAL PRODUCTION ON FARMERS' FIELDS, TIMES A GIVEN NUMBER OF SUITABLE HECTARES OF LAND. THE PROJECT COULD THEN BE SAID TO BE EXPECTED TO CONTRIBUTE TO QUOTE INCREASED OUTPUT OF X THOUSAND TONS OF MILLET UNQUOTE OR TO QUOTE IN-

C BASED MILLET YIELD POTENTIAL BY X PERCENT FOR Y NUMBER OF FARM FAMILIES UNQUOTE. THESE TERMS CAN BE TRANSLATED (IF APPLICABLE), INTO POTENTIAL MONETARY OUTPUT, WHICH IN TURN CAN BE RELATED TO INVESTMENTS IN RESEARCH. IT IS UNDERSTOOD THAT THESE BENEFITS MAY NOT BE REALIZED DURING THE LIFE OF THE PROJECT. FINALLY, AS MANY INDICATORS AS POSSIBLE ON THE LOG FRAME MUST BE QUANTIFIED AND TARGETED. OTHERWISE, THERE WILL BE LITTLE BASIS ON WHICH TO JUDGE SUCCESS OR FAILURE OF THE PROJECT.

--C. DISCUSSION OF OTHER DONOR AND HOST COUNTRY FUNDING IN THE AREA WILL LIKEWISE BE NECESSARY TO PROVIDE A BASIS FOR DETERMINING THE ADEQUACY OR INADEQUACY OF SUPPORT BEING PROVIDED TO ACHIEVE THE PROJECT'S GOAL OF INTEGRATED DEVELOPMENT IN THE SENEGAL RIVER BASIN.

--D. A LONG-TERM RESEARCH PLAN ACCOMPANIED BY A MORE REALISTIC ANALYSIS OF THE ABSORPTIVE CAPACITY FOR RECURRENT COSTS, WOULD BE VERY USEFUL IN PUTTING EXPECTATIONS IN THE PROPER PERSPECTIVE. AS INDICATED IN THE AFR/DR/ARD ISSUES PAPER, THE PURPOSE OF THE LONG-TERM RESEARCH PLAN IS TO PROVIDE AN EARLY INDICATION OF FUTURE INVESTMENTS AND RECURRENT COSTS NECESSARY TO FULLY OPERATIONALIZE AND INSTITUTIONALIZE AGRICULTURE RESEARCH/EXTENSION EFFORTS IN THE RIVER BASIN AREA. A 20-YEAR TIME HORIZON IS SUGGESTED, ALTHOUGH THIS MAY BE VARIED DEPENDING UPON THE MISSION'S DETERMINATION OF

WHEN QUOTE USEFUL UNQUOTE RESULTS CAN BE EXPECTED TO BE AVAILABLE FOR DISSEMINATION TO THE MAJORITY, IF NOT ALL, OF THE TARGET BENEFICIARIES. IT IS ENVISIONED THAT THIS PLAN WILL MITIGATE AGAINST FUTURE FRAGMENTATION AND DISCONTINUITY OF DONOR ASSISTANCE AND OMVS MEMBER COUNTRY EFFORTS, AS HAVE OCCURRED IN THE PAST.

4. IN ADDITION TO THE ISSUES PAPERS AND THE ABOVE SUGGESTIONS, THE MISSION MAY WISH TO ADDRESS THE FOLLOWING QUESTIONS IN A SEPARATE SECTION:

--A. HOW DOES THIS PROJECT FIT INTO THE USAID STRATEGY FOR OMVS DEVELOPMENT? DOES IT FALL WITHIN CURRENT AFRICA BUREAU RIVER BASIN DEVELOPMENT PRIORITIES?

--B. IS IT PLAUSIBLE THAT PROJECT ACTIVITIES COULD BE MORE EFFECTIVELY IMPLEMENTED AS SEPARATE BI-LATERAL PROJECTS?

5. A. GC/AFR DOES NOT FORESEE ANY PROBLEMS AT THIS TIME WITH THE AUTHORIZATION OF THIS PROJECT THOUGH IT DEPENDS, IN PART, ON FUNDING CONTAINED IN AN AS YET UNAPPROVED PROJECT (TITLE III).

--B. ANNEX G WAIVER IS INCORRECT. THE VEHICLE AND EQUIPMENT PROCUREMENTS HAVE DIFFERENT JUSTIFICATIONS AND MUST BE THE SUBJECT OF SEPARATE WAIVERS. FURTHER, WAIVER FORMAT REQUIRES APPROPRIATE HANDBOOK CITATION OF JUSTIFICATION AND REASONS FOR WAIVING CODE 941 PRO-

[illegible]

[illegible]

--C. 611(A) JUSTIFICATION IS FULFILLED BY PROPOSED-
[illegible] OF PROJECT. ANNEX I MAY BE REMOVED.

6. THE GIF ISSUES PAPERS WERE PREPARED BY:

--A. ANN MCDONALD, AFR/DR/SWAP
--B. STAFF FROM AFR/DR/ARP
--C. DAVID SMITH, AFR/DE/ENGR
--D. GEORGIA FULLER, SER/CCM/ALI
--E. EMMY SIMMONS, PPC/PDPR/RD
--F. DAYTON MAXWELL, AFR/SWA

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ANNEX E

INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Senegal River Basin Development Organization (OMVS): Senegal, Mauritania, and Mali.

Project Title: OMVS Agricultural Research II, Phase II (625-095

Funding: $13.5 million

Period of funding: FY 82 - FY 87

IEE Prepared by: Peter H. Freeman

Action Recommended: Negative Determination. No further environmental examination needed, except for risk/benefit analysis of pesticides to be used during the project, other than those appearing in Table 1 of this IEE

Determining Officer: David Shear, Mission Director.

David Shear

Date: 7/21/82

Bureau Environmental Officer:

Concur: MAR 1 1983

[illegible] IDENTIFICATION AND EVALUATION FORM 1/

1/ This evaluation refers only to the project's construction and land development component. The risk/benefit analysis for pesticides is appears in the IEE report.

	Impact Identification and Evaluation 2/
Impact Areas and Subareas 1/	
A. LAND USE	
1. Changing the character of the land through :	
a. Increasing the population	L
b. Exhausting natural resources	N
c. Land clearing	L
d. Changing soil character	L
2. Altering natural defenses	N
3. Foreclosing important uses	N
4. Jeopardizing man or his works	N
5. Other factors	
B. WATER QUALITY	
1. Physical state of water	N
2. Chemical and biological states	N
3. Ecological balance	N
4. Other factors	

1/ See Explanatory Notes for this form.

2/ Use the following symbols : N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

[illegible] IDENTIFICATION AND EVALUATION [illegible]

[illegible] CHEMICAL

1. Air emissions ---------- N
2. Air pollution ---------- N
3. Noise pollution ---------- N
4. Other factors

_____ _____
_____ _____

[illegible] NATURAL RESOURCES

1. Diversion, altered use of water ---------- L
2. Irreversible, inefficient commitments ---------- N
3. Other factors

_____ _____
_____ _____

[illegible] CULTURAL

1. Altering physical symbols ---------- N
2. Dilution of cultural traditions ---------- N
3. Other factors

_____ _____
_____ _____

[illegible] SOCIOECONOMIC

1. Changes in economic/employment patterns ---------- N
2. Changes in population ---------- N
3. Changes in cultural patterns ---------- N
4. Other factors

_____ _____
_____ _____

IMPACT CONSIDERATIONS AND IN QUESTION FORM

G. HEALTH

1. Changing a natural environment _____
2. Eliminating an ecosystem element _____ L
3. Other factors _____ N

_____

_____

H. GENERAL

1. International impacts _____
2. Controversial impacts _____ N
3. Larger program impacts _____ N
4. Other factors _____ N

_____

_____

I. OTHER POSSIBLE IMPACTS (not listed above)

_____

_____

_____

See attached discussion of impacts.

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INITIAL ENVIRONMENTAL EXAMINATION

This IEE served as a project design aid perhaps more so than as an evaluation of a project to ascertain whether or not it should be subjected to an environmental examination. The review cable (Annex D) specified that construction activities in the project and the risks and benefits of pesticides to be used in research should be examined. The risks/benefit analysis benefitted greatly from the advice of Pat Matteson of the Consortium for International Crop Protection and from materials she prepared for the risks/benefit analysis in the November, 1981, Environmental Assessment of the Semi-Arid Tropics Crops Research (Phase II) Project (Mali 688-0226). Bill Settle, USDA entomologist with the Regional Crop Protection Project, 625-0928, prepared the risks/benefit analysis for this IEE. Peter H. Freeman, AID/Senegal's Environmental Affairs Officer, coordinated the preparation of the IEE.

I - Nature, Scope and Magnitude of Environmental Impacts

A. Project Description

The purposes of this 6-year OMVS Agricultural Research II Project are:

1. To develop Senegalese, Mauritanian and Malian agricultural research capacities in the Senegal River Basin, and

2. To improve the combined effectiveness of national agricultural resear in the Senegal River Basin through regional coordination and prioritization.

1/ This IEE incorporates technical commentary by the Office of Agriculture, Bureau for Science and Technology (State 126157).

Research that would be undertaken in pursuit of the first purpose will seek to adapt existing research knowledge as well as farmers knowledge so as to achieve improvements in existing production systems. During the project's 6-year life, adaptive research will be centered at existing research stations, at Fanaye, Senegal; Kaedi, Mauritania; and Same, Mali; in the Middle, Upper Middle and Upper Valley portions of the basin, respectively. Farming systems research would emphasize irrigated production in Fanaye, irrigated and rainfed farming in Kaedi, and rainfed farming in Same.

Project outputs will include improved "technical packages for recommendation domains", in major ecological areas of the Basin; upgraded technical and professional skills for researchers and associated professionals; upgraded agricultural facilities for stations at Fanaye, Kaedi and Same, and strengthened regional research coordination. Practices and techniques will be researched in joint field trials with existing research and development agencies and would take place in farmers' fields.

The program would eventually establish links with agro-industrial enterprises in the region, i.e. the seed and agricultural chemical suppliers, food processors, etc., through periodic seminars and other forms of consultancies that would assist to implement results of adaptive research.

Prior to extension to the farmer of technology packages which include pesticides, the cost effectiveness of such uses will be determined, as well as relevant economic thresholds, as discussed on page 16 of this IEE. Short-term technical assistance to be provided to the project will include 15 person-months of consulting services in integrated pest management (IPM).

Existing research facilities will be improved through the following building and land development:

Fanaye, Senegal:

- eight houses
- two office buildings

Kaedi, Mauritania:

- four houses

Samé, Mali:

- five houses
- office building
- laboratory
- storage sheds
- repair of existing buildings

B. Examination of Environmental Impacts

The environmental impacts that will be generated by this project originate from two different categories of actions: (1) construction and land development, and (2) research on-station and in farmers' fields. The total geographic extent of the affected environments is very small.

As stated in the environmental analysis, the prospect of wide diffusion of the results of adaptive research puts special importance on the selection of pesticides and pest management techniques that will be studied. Thus a closer look was taken at the pesticides issue.

Pesticides to be used in the research have not yet been specified. Pesticides currently used in fields and in research were surveyed (Table 2) and an inquiry was made to assess the adequacy of pesticides handling in terms of environmental and human safety. Since pesticides have not yet been proposed for the research program, the information generated in the 12 questions used for the risks/benefit analysis responds normatively to future project work. It is proposed that the information from this review and analysis be used to guide use of pesticides in the integrated pest management research component of this project.

Specifically, project implementation plans and research extension agreements (See Annex G) between the research stations and collaborating regional development authorities will contain sections specific to the safe and ecologically sound use of pesticides, as set forth in Section II below. Short term consultancies in integrated

pest management, planned within the project's technical assistance component, will be used to guide these measures.

Construction and land development impacts at the three stations are assessed on the IEE check list, attached. Total surface affected at each station would not exceed 17 or 18 hectares.

Temporary disturbance of the physical environment during construction is to be expected, and unavoidable. Tree plantings and building layout are designed to buffer environmental extremes. It is expected that the design of irrigated fields and the irrigation schedules will be such that mosquito breeding in irrigation ditches and associated impoundments will be negligible.

II. Risk/Benefit Analysis of Pesticides

This analysis follows closely a similar analysis done for Project 688-0226 Semi-Arid Tropics Crop Research, Phase II, whose activities incidentally, would be undertaken, in part, at the Samé station in Mali. The present project was not planned with the same specificity as the Malian research project. Actual pesticides that will be used have not been identified. Consequently a list of pesticides presently in use was obtained, (Tables 3 and 4) and a list was developed of pesticides that would be acceptable to use in the future, based on present EPA status of pesticides (Tables 1 and 2).

Regulation 16 requires that all pesticides to be financed by AID be reviewed in the light of their EPA regulatory status, and that preference be given to pesticides which are currently registered by the U.S. Environmental Protection Agency (USEPA) for the same or similar use with restriction. If any pesticide for which a notice of Rebuttable Presumption Against Registration has been issued is selected for project use, an environmental assessment concerning the specific use must be prepared. As a matter of policy, AID actively discourages the use of pesticides which fall into the restricted category because of hazard to humans.

TABLE 1

PESTICIDES RECOMMENDED FOR USE IN THE OMVS AGRICULTURAL RESEARCH PROGRAM

Pesticide	Acute Oral LD50 MG/KG	EPA Registration Status	Crops to be treated 1/
Acephate	945	Reg. without Restriction (RR)	all
Bacillus Thuringiensis	Non toxic	RR	all
Carbofuran	8-14 (Technical) 490 (formulated)	Restricted 2/ (See table 2)	R,W.M.V.
Diazinon	300-850	RR	all
Dimethoate	320-380	RR	R,W,MS
Fenitrothion	250-500	RR (See Table 2)	all
Glyphosate	4,320	RR	R,W.MS
Malathion	2,800	RR	all
Oxadiazon	3,500	RR	R,W,MS
Thiram	780	RR	MS, M

1/ R: rice

M: maize

MS: millet/sorghum

W: wheat

V: vegetables

all: acceptable on any of the above.

2/ all liquid formulations are restricted because of their hazard to human health; granular formulations up to 10% active ingredient are not restricted.

The principal reason for pesticides being used in the project is to examine their potential for eventual farmer level use. Widespread use in the environment based upon project recommendations is only one step removed. Therefore care must be taken to observe Regulation 16 during the course of research activities conducted by this project. This implies compliance with para 216.3 (b) in every case, by means of project amendment.

A. Environmental Examination

Paragraph 216.3 (b) (I) (i) of Environmental Procedures established the procedures used here for evaluating the risks and benefits of pesticides. In the following, twelve points are addressed in accordance with the procedures

1. The USEPA Registration Status of the Requested Pesticides.

Specific pesticides have not been requested as yet. Table 1 lists the pesticides recommended for use in the OMVS Agricultural Research Project Only pesticides registered by the USEPA for the same or similar uses (without active or proposed regulatory action) are included for initial use in the Project.

2. The Basis for Selection of the Pesticides

Detail of the recommended pesticides are presented in Table 1. No restricted formulations are proposed for use. Prior to entering the extension phase, any uses for which no U.S. tolerances or FAO/WHO M.R.L.S. have been established will be covered by adequate crop residue data. The recommended pesticides represent a range of different actions useful for potential use against any anticipated problem. Carbofuran, for instance, is a very effective systemic insecticide useful against a wide range of

insects that feed in or on the plant Because it is incorporated into the soil and taken up into the plant tissues, its effect on target organisms is reduced. Carbofuran hydrolyses fairly rapidly in water. Acephate, carbaryl dimethoate, fenitrothion, and malathion are formulated as liquid or dusts fc use against foliar insects. All have moderate to low toxicity to warm blooc animals and do not bio-accumulate. They all biodegrade fairly rapidly in th environment.

Bacillus thuringiensis is a bacterial insecticide widely used in the U.S. with proven efficacy against Lepidopterous pests, (moth and butterfly larvae). The two herbicides, Oxadiazon and Glyphosate, are virtually nontox and have proven efficient in post-emergence treatment of broad-leafed perenn weeds. Thiram is a fungicidal seed treatment that may prove very valuable i controlling early plant mortality caused by Downey mildew in sorghum and mil

Table 2. Detailed Description of the Requested Chemicals

ACEPHATE

Type: An organophosphate compount used as a contact and systemic insecti

Toxicity: LD_{50} acute oral: male rats 945 mg/kg; acute dermal; rabbits greater than 2,000 mg/kg.

Formulations: 75% soluble powder, 50% WP, 2% dust.

Uses: Vegetable crops; cereal grains.

Dosage: 0.5 - 1-0 kg a.c. /ha.

Precautions: Do not graze treated areas; toxic to bees.

Additional information: Moderate persistence with residual activity of 6-9 days. Relatively non-toxic to fish. May be combined with other insecticides.

CARBARYL

Type: A Carbamate insecticide, having contact and stomach poison action with long residual effects.

Toxicity: LD_{50} acute oral: male rats 800 mg/kg;

acute dermal: rabbits greater than 2000 mg/Kg.

Formulations: 5 and 10% dusts, 5 and 10% granules, 4lb/gal flowable, 50% and 80% WP.

Uses: Vegetable crops, cereal crops, rangeland, commercial buildings. Very good in bait against grasshoppers.

Dosage: (see appropriate guidelines for specific rates)

Precautions: Not compatible with alkaline materials. Does not control spider mites. Highly toxic to bees.

Additional information: Compatible with other insecticides and fungicides. Some systemic action has been shown Controls the eggs of some insect species. Toxicity increases as temperature increases.

CARBOFURAN

Type: A carbamate compound used as a systemic and contact stomach poison insecticide - nematicide.

Toxicity: LD_{50} Acute oral rats: 8-14 mg/kg (technical); acute dermal rabbits 3,400 mg 75% wp/kg. Little or no cumulative toxicity. Granular formulation carbofuran have an acute oral LD_{50} of 490 mg/KG.

Formulations: 2, 3, 5 and 10% granules.

Uses: Principle use will be for rice although can be used on cereal grains and peanuts.

Dosage: 0.25 - 1-0 kg a.i./ha. Granular formulation encorporated into soil before flooding or broadcast no later than 30 days after flooding.

Precautions: Do not mix with alkaline compounds. Will support combusti if ignited. Toxic to bees.

Additional information: Half-life in soil 30-60 days. Although Carbofur has a high acute oral toxicity, granular formulations are considered saf to use if the granules are not applied directly by the bare hands but instead with an applicator device. Although the dermal toxicity is normally quite low, intoxication can occur under hot tropical conditions if improperly handled. Incorporation into the soil before flooding mean that its distribution in the environment is limited. Furthermore it is fairly rapidaly hydrolised in water, especially in elevated temperatures.

DIAZINON

Type: An organo-phosphate insecticide-acaricide with contact and stomac poison activity.

Toxicity: LD_{50} acute or

of product; acute dermal; rats greater than 2,150 mg/kg.

Formulations: 40%, 50% WP, 60% EC, dusts, 14% granules also sold mixed w/fertilizers.

Uses: A wide variety of crops including rice, other cereal grains, vegetables, and fruit trees.

Dosage: 0,25 - 2.0 kg a.i./ha.

Precautions: Certain wild birds are highly susceptible to this compound Do not mix with copper compounds. Toxic to bees.

FENITROTHION:

Type : An organo-phosphate insecticide acting by contact and as a stomach poison.

Toxicity : LD50 acute oral; rats 250-500 mg/kg; acute dermal: mice greater than 3,000m

Formulations : 10,50,60 and 80% EC, 2-3% dusts, 40% WP 3% granules, 1000 g/l EC (ULV).

Uses : Cereal and vegetable crops.

Dosage : 0.50 - 1.5 kg a.i./ha.

Precautions : Toxic to bees, moderately toxic to fish.

Additional information : Somewhat effective against mites. Good penetrative action. Expressed ovicidal activity.

MALATHION

Type : An organo-phosphate insecticide acaricide.

Toxicity : LD50 acute oral: rats 2,800 mg/kg; acute dermal: rabbits 4,100 mg/kg.

Formulation : 25 and 50% WP, 4,5,7 and 9.7 EC 4 and 5% dusts, 4% granules, 5 and 10% baits.

Uses : General insecticide

Dosage : 0,5- 2.0 Kg a.i./ha.

Precautions : Toxic to bees. Somewhat toxic to fish.

OXADIAZON

Type : An oxadiazole compound used as a selective pre-emergence herbic

Toxicity : LD_{50} acute oral - 3500 mg/kg. Irritating to the eyes.

Formulation : 2 EC, 75% WP, 2% granules, 4%6 Flowable.

Dosage : 1 - 4 kg a.i./ha.

Precautions: : Perennial weeds, with the exception of bind weeds are not controlled.

Additional information : More active on broadleaves than grasses. Very low solubility in water. Non-volati persistant in soil giving season long control (half life 3-6 months). The che mical is absorbed by the young weeds as they grow upward through the treated soil. More active in moist than in dry soil. Also kills by contact post emergence. Rainfall or irrigation is requi to activate this material. Has little or no effect on the weed's root system. Compatible with other herbicides

GLYPHOSATE

Type : A broad spectrum, post emergence, translocated herbicide.

Toxicity : LD_{50} acute oral: rats 4320 mg/kg. May cause eye irritation.

Formulation : 36% soluble solution.

Dosage : 0.5 - 4.0 kg/ha.

Precautions : Do not store in galvanized or unlined steel spray equipment as it will react with the metal causing a highly combustible gas. Very low crop selectivity.

DIMETHOATE

Type : An organo-phosphate insecticide - acaricide with contact, residual and systemic activities.

Toxicity : LD_{50} acute oral: rats 320-380 mg/kg; acute dermal: 610 mg/kg.

Formulation : 2% EC 4, 5, 25 and 50% W.P. 5 and 10% granules.

Dosage : 0.25 - 0.50 Kg a.i./ha.

Additional information : Effective against many insect larvae. Moves throughout the plant rapidly. Half-life in soi 2 - 4 days. When using, impermeable gloves sho always be worn during mixing and both long legg trousers and long sleeved shirts should be worn when applying, in conformity with current labeling (May, 1982).

THIRAM:

Type	: An organic compound used as a protective foliar fungicide, a seed treatment and an animal repellent.
Toxicity	: LD_{50} acute oral: rats 780 mg/kg. Irritating to the skin.
Formulations	: 60% dust seed protectant.
Uses	: Seed treatment, vegetables and cereal grains.
Precautions	: Treated seeds should not be used for food or feed. Do not handle treated seeds with bare hands.
Additional information	: When sold as a seed treatment it contains a red dye.

3. The Extent to which the Proposed Pesticide Use of an Integrated Pest Management Program.

Currently, nothing exists in the form of an integrated pest management program. Although several HCN researchers may be familiar with the theory of I.P.M., this would not be sufficient to ensure orientation of research in this direction. No full time entomologist or I.P.M. person has been budgeted; however, 15 person-months of I.P.M. consultancy is being provid This works out to one person-month per station per year over th six-year input period.

The bulk of the I.P.M. input will therefore have to come from the FAO experts attached to the CILSS I.P.M. program. There will be one stationed at Fanaye, and one in Mauritania.

The role of pesticides in the long-term research goals would be as a secondary integrated pest management component (1). In keeping with this viewpoint the various pesticides would be investigated for effectiveness in controlling specific key pests and occasional pests when these pests surpass specified population threshold levels. These economic thresholds will be determined and each pesticide will be evaluated economically. Minimum dosage levels will be determined, as well as effects on non-target organisms, (beneficial insects)

The West African Rice Development Association (WARDA) is an essential contact to be initiated and maintained. WARDA has an expressed interest in IPM for rice and should be consulted for research data on specific problems. WARDA maintains a research station at Richard Toll. WARDA has previously conducted a three week training course on IPM in Monrovia. The possibility exis of conducting a similar course for research and extension personnel.

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(1) IPM strategy defines three primary management components (mechanical cont biological control, use of resistant varieties), and one secondary management component (pesticides). No single management component is solely employed, rather, management of specific pest populations is undertaken with all three primary components if possible. Pesticides are held as a secondary tactic to be employed in those instances where pest populations have surpassed economic injury levels.

Integrated pest management (IPM) is the reduction of a pest species or gr of such species to a level at which they constitute no significant restraint a crop or other resource, through an understanding of their ecology and the u of a variety of methods and techniques. IPM seeks maximum use of naturally occuring pest controls, including the weather, disease agents, predators and parasites, use of crop varieties possessing pest resistant characteristics an cultural or environmental management techniques (such farming practices as cr rotation, planting and harvesting schedules, and destruction of post-harvest pest residues are emphasized as primary management components. Artificial co trol measures notably chemical pesticides are employed as secondary managemen components and are used only as required to reduce and maintain pests at tole able levels based on entire criteria developed to identify when and where cor trol is truly justified. The ultimate objective of IPM is to control pests i an economically efficient and environmentally sound manner.

IPM input will therefore have to come from the already existing expertise in the area. Specifically, there are two FAO/CILSS IPM entomologists, one at Fanaye, and the second at Nouakchott. (The Nouachott position is to be moved to Kaédi.) Additionally, as of June 1983, there will be a Senegalese research entomologist working for WARDA attached to the Fanaye station.

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Other institutions to maintain contacts with: IITA, CIMMYT, and ICRISAT especially (in Mali) Semi-arid Tropics Crops Research Phase ~~II~~ (ICRISAT/USAID 688-0226)

4. The proposed method or methods of application, including availability of appropriate application and safety equipment.

The following methods are proposed:

Applications will take place on research plots only by properly trained and equipped research personnel, or cooperating pilot farmers. The materials will be applied at rates and intervals associated with an experimental design that aims to find the minimum effective dosage, and minimize effects on non-target organisms.

Field application will take into account the type of application most likely to be encountered in farmer-field situations, i.e. most probably hand-pump knap sack sprayers and hand dusters. ULV "wand" sprayers might also be considered. Sprayers will be safely stored on the research station. Two sets of safety apparel (goggles, masks, aprons, gloves, boots, will be available for each sprayer).

National Project Officers will ensure the use of protective apparel, proper storage of pesticides and maintenance of application and protective equipment, and the proper disposal of used pesticides containers and left-over pesticides. The National Project Officers will ensure that instructions and precautions concerning time of re-entry into the field after pesticide application and number of days between application and crop harvest, as specified on the product label, are enforced.

The frequency rate and number of applications will not exceed that stat on labels as appearing on U.S. containers. In the absence of such labeling information, the frequency rate and number of applications will be geared to the treatment regime(s) upon which the relevant FAO/WHO maximum residue leve have been established. If applications in excess of above are needed, residu data must be obtained showing that established tolerances will not be exceedi Procedures for sampling are given in the FAO Plant Protection Bulletin: 1981, Vol. 29,No. 1/2, pages 12-27.

5. Any acute and long-term toxicological hazards, either human or environmental, associated with the proposed use, and measures available to minimize such hazards

All pesticides are potentially hazardous to humans and the environment and should be treated with great care, regardless of their relative toxicity.

Acephate, Bacillus thuringienis, Carbaryl, Diazinon, Malathion, Glyphosate, Oxadiazon, and Thiram are all recommended and available without restriction according to EPA regulations. Each is relatively acutely non-toxic to warm-blooded animals, based on its acute oral toxicity value (LD_{50}), and is considered relatively safe for use if used according to the label instructions.

A major concern with irrigated perimeters is the possible effects of pesticides residues on aquatic life. For this reason pesticides with high toxicity to fish are not being recommended for future investigation. For the compounds that are moderately toxic to fish such as Diazinon, Malathion, and Fenitrothion, care should be taken in the handling, transport and application in riverine areas. A future pesticide analysis laboratory is being planned for Dakar. The trained personnel are already in place. When this is functional, a sampling program should be initiated for analysis of pesticide residues in water downstream from irrigated perimeters. Meanwhile, great care should be taken in relation to the proposed placement of artificial fish ponds. Farmers should be made aware through extension efforts (most effectively radio programs) about the danger to fish populations associated with the use of pesticide

In conformity with current labeling for the pesticide Dimethoate, long-sleeved shirt and full length trousers will be worn during actual application of the pesticide. Likewise impermeable gloves will always be worn when handling Dimethoate.

Carbofuran has a restricted USEPA status due to toxicity to birds. The main basis for the proposed restriction is Carbofuran's stated potential for bird kill when the birds eat granular material. Carbofuran use for rice would not pose any similar problem as it would be incorporated into the soil prior to flooding.

Fenitrothion is not covered by either an FAO/WHO maximum residue level (MRL)[1/] or a U.S. tolerance. The use of Fenitrothion would be contingent upon gathering of crop residue data in support of an FAO/WHO approved MRL. Until such time that these residues have been established for a particular crop, all grain coming from harvest of test plots using Fenitrothion will be used for seed, and not for human or animal consumption.

6. The effectiveness of the requested pesticides for the proposed use.

The pesticides[2/] were chosen based upon USEPA registration for same or similar use. The requested pesticides will be applied according to instructions on their manufacturers labels. Therefore, it is assumed that their use will adequately control pests unless pesticide-resistant strains are present in the populations. No such resistant strains have been reported thus far. "Effectiveness" must take into account the number of treatments required and the cost to the farmer. Economic thresholds must therefore be a planned research goal.

1/ MRL = Maximum Residue Level.

2/ Tables 1 and 2.

7. Compatibilty of the proposed pesticides with target and non-target ecosystems.

See paragraph 5 above.

8. The conditions under which the pesticide is to be used, including climate, flora, fauna, geography, hydrology and soils.

See project area description.

9. The availability and effectiveness of other pesticides or non-chemical control methods.

Within Mali and Mauritania, no protections exist for the importation and use of pesticides. In Senegal a Pesticide Registration Committee met on 1981 to adopt legislation on the use of pesticides. The list, however, is more a description of what is currently available rather than a regulatory document based on human and environmental concerns. Ten out of the thirty-nine chemicals are not registered for use, or cancelled in the U.S. (Table 3).

Table 3. Pesticides registered for use in Senegal, 1981

ORGANO-PHOSPHATE GROUP

Acephate
Azinphos (Ethyl, Methyl)
Bromophos
Chlorvinphos
Chlorpyriphos (Ethyl, Methyl)
Diazinon
Dichlorvos
Dimethoate
Fenthion
Fenitrothion
Fonophos (experimental)
Lodofenphos
Malathion
Mevinphos
Monocrotophos
Naled
Phosphamidon
Phoxime
Temephos
Tetrachlorvinphos
Trichlorfon (Dipterex)
Vamidothion (x)

ORGANO-CHLORIDE GROUP

HCH (x)
Lindane (x)
DDT (x)
Aldrin (1) (x)
Heptachlore (x)
Chlordane (x)
Dieldrin (x)

CARBAMATES

Carbofuran
Dioxacarbe (x)
Methiocarbe
Methomyl
Pirimicarbe
Propoxur

PYRETHROIDS

Decamethrin* (Deltamethrin)
Cypermethrine
Fenvalerate

(x) not registered for use or cancelled in the U.S.

(1) Aldrin is registered for use in termite control in the U.S.

Table 4. Pesticides recommended by the Mauritanian Government in 1981 for use in Mauritania.

ORGANO-CHLORIDES

Chlorobenzilate
Dichlorovos
Dicofol
Lindane
Endosulfan
Toxaphene
Pyrimiphos-Methyl

ORGANO-PHOSPHATES

Acephate
Chloropyriphos
Dimethoate
Fenthion
Malathion
Phasulone

CARBAMATE

Binapacryl
Carbaryl
Carbofuran

ORGANIC-TIN COMPOUNDS

Cyhexatin

SYNTHETIC PYRETHROIDS

Cypermethrine
Decamethrine
Fanvelerate

10. The requesting country's ability to regulate or control the distribution storage, use and disposal of the requested pesticides.

All three of the participating countries have fledgling crop protection services. Senegal has the largest crop protection service consisting of 15 permanent staff in Dakar and about 40 seasonal laborers who conduct the field operations. All three countries depend on field agents from their respective departments of agriculture for regional storage and distribution of pesticides. More often than not pesticides are improperly stored. Pesticides and equipment are most often given out to farmers with no instructions for use. In Senegal the field operators are poorly trained having no capabilities to calibrate spray equipment and following few guidelines for safe use. There are no guidelines followed for disposal of pesticides and containers.

With this in mind, the project must take care to describe and follow its own proper guidelines for distribution, storage, disposal and use of pesticides, and not depend on any outside agencies to do a proper job in this domain.

11. The provisions made for training of users and applicators.

The National Project Officers will familiarize themselves with the appropriate safety measures for project pesticide use and make sure that these guidelines extended by pilot project farmers. The IPM consultants together with the extension/training expert will be responsible for providing specific curtila for use in the associated RDA's once it is decided that a particular pesticide is to be recommended to the farmer.

12. The evaluation of the use and effectiveness of the pesticides

The evaluation of the use of the pesticides will be the responsibility of the National Project Officer. By "use" is meant the conditions for use in the field : calibration, dosage, protection, cleaning, and disposal — as well as the conditions for storage. The N.P.O. will be able to obtain advice from the short-term IPM consultants on these matters.

B. Recommendations

1. Eventual use of pesticides not specified in this document

The pesticides discussed for use in this project (Table 1) represent an acceptable starting point when used with the guidelines set forth in this document. During the course of this project, however, researchers may wish to examine other pesticides for problems not amenable to control by either the primary management components or any of the approved pesticides. If this should occur the following procedures must be followed to receive approval for testing additional pesticides.

a) The researcher must prepare a request detailing:

i) the desired compount

ii) the specific pest problem to be addressed and the extent of the problem in farmers' fields

iii) why this problem cannot be addressed by either biological control, mechanical control, resistant varieties or any of the accepted pesticides.

b) The project manager, upon receipt of this request, must use the information from the researcher plus current published literature on pesticides to answer the 12 questions set forth in Regulation 16 paragraph 216.3(b)(I)(i). This document, termed an amendment I.E.E., would be presented to the AID/Washington Africa Bureau Environmental Officer for review and consultation with the Bureau of Science and Technology's Agricultural Office, for final action.

2. Additional Recommendations

Project conformity to the spirit of AID Regulation 16 and to the guidelines set forth in this I.E.E. should be checked during the normal project evaluation. IPM consultancy time is detailed in Table 5 for each of the first six years of the project. Staff of the ST/AGR centrally-funded Consortium for International Crop Protection or other experienced IMP consultants will be brought over to initially help with project design for IPM, and eventually evaluate the progress being made in this direction.

WARDA should be contacted soon after the beginning of the project and a training seminar in IPM organized for researchers and field technicians associated with the project. WARDA has had experience in this type of seminar

The monitoring of the effectiveness of the pesticides will require the observations of a biologist. The observations and research data from the entomologists with WARDA and FAO/CILSS will be drawn upon to answer this question.

For both the questions of use and effectiveness of pesticides, reports should be submitted to both CIERDA and the respective mission Project Officers and environmental officers on whatever schedule is deemed sufficient by the Chief of Party for CIERDA.

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Table 5. Proposed Schedule Short-term IPM Consultants

Project year	Person/months	Activity
1	4	Design & Programming
2	2	Field trials
3	2	Field trials
4	2	Supervision/follow-up
5	1	Follow-up
6	4	Evaluation
	15	

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WARDA should be contacted soon after the beginning of the project and a training seminar in IPM organized for researchers and field technicians associated with the project. WARDA has had experience in this type of seminar .

(Fendall, Liberia, January, 19 2). CICP[1/] should be contacted for details.

A special concern for project design should be the coordination of IPM research among the three research facilities as well as the various extension agents. IPM research cannot exist as separate from extension. Feed-back from farmers and extension agents should be sought as essential input into research.

Pesticides should be stored in well ventilated rooms. Pesticides containers and left-over pesticides will be disposed of in areas designated for that purpose and properly interred assuring there is no danger of run-off or contamination of nearby water sources.

III. Recommendation for Environmental Action

This project will not have a significant effect on the environment, and a Negative Determination is recommended for the following reasons:

1. Construction at the three stations will only produce minor and temporar impacts, and the net result will an improved human environment.
2. Land development to create the irrigated fields to be used in on-static research affects only 15 has. at each site, the net effect of which is a more productive site for crops.
3. Pesticides will be used in accordance with Regulation 16, and will be one element in an Integrated Pest Management approach to be pursued by the project.
4. Pesticides storage and container disposal will be accomplished followin guidance as set forth in "Report and Guidelines for the Packaging and Storage of Pesticides" [2/].

1/ Consortium for International Crop Protection
2288 Fulton Street Suite 310, Berkely, Calif. 94703

2/ Reynolds, Richard P. 1982. Report and Guidelines for the Packaging and Storage of Pesticides (Report to FAO prepared under sponsorship of USAID). 23 ps. + appendices. Four copies of this report were delivere to the AID River Basin Development Office, Dakar, in June, 1982.

ANNEX F

SCOPE OF WORK FOR TECHNICAL ASSISTANCE

I. COUNTRY CONTRACTS

A. Senegal

1. Objective

The objective of this contract is to provide long- and short-term technical assistance to ISRA for implementation of the Senegal portion of the OMVS Agricultural Research II Project (625-0957).

2. Composition of Contract Team and Location

The contractor will supply an initial team of two long-term researchers who will be assigned to ISRA/Fanaye. They will live in housing provided by the project in Richard Toll and work out of the Fanaye Research Station. These long-term researchers will be supported by up to 15 person-months of consultants as needed during implementation of the project.

The two long-term researchers will be assigned to and will form the technical core of a farming systems team being established for the Senegal River Region. One researcher will be an agronomist with an extension background and the other will be a farming systems economist. They will work in a farming systems team that will also include a general agronomist, weed control specialist, animal production specialist, rural sociologist, and agricultural engineer. This team will be supported by a senior and junior Senegalese technician for each scientist.

3. Relationship of Contractor to Cooperating Country and AID

The contract team will work under the day-to-day supervision of the Station Director ISRA/Fanaye and under the technical direction of the head of the farming systems team for Fanaye and under the Production Systems Department of ISRA. The contractor will be working under a Direct-AID contract with USAID/Senegal. One of the long-term researchers shall be designated the contractor chief of party and will be responsible for handling administrative matters with USAID/Senegal.

4. Job Descriptions

The contractor will make available long-term technical assistance and consultants to assist in the planning and implementation of the farming research program of ISRA for the Senegal River Valley. The contractor will provide personnel for the following positions:

Agronomic/Extension Specialist

(1) Under the policy guidance of the Production Systems Department Head and the supervision of the Research Station Director, the Agronomist/Extension Specialist will:

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

- direct research of the production systems team concerning improvements in technological packages to upgrade and accelerate extension to farmers;

- screen and undertake risks/benefits analyses (as per Regulation 216) for all pesticides to be used in research carried out by the project, or delegate this work to a consultant or research associate with pest control expertise;

- work closely with the regional development agencies and assist in the provision of information and interpretation of results for extensive farm dissemination by the regional development agencies;

  assist in training Senegalese counterparts.

(2) The qualifications and experience of the Agronomist Extension Specialist are:

- MS or Ph.D in Agronomy with emphasis on crop production;

- three to five years experience in extension preferably with experience as member of a multi-disciplinary research team undertaking farm-level surveys in the Third World;

- fluency in French at FSI 3 level.

b. Farming Systems Economist

(1) Under the policy guidance of the Production Systems Department Head and the supervision of the Research Station Director, the Farming Systems Economist will:

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 evaluations of improved technologies for site specific locations;

- assist in the timely data collection, processing, and analysis of the results of farm level surveys and on-farm trials with the micro computer at the research station;

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

- assist in the training of Senegalese counterparts.

(2) The qualifications and experience of the Farming Systems Economist are:

- MS or Ph.D. in Agricultural Economics with specialization in farming system economics;

- three to five years of experience including participation in farming systems research and work in the Third World;

- fluency in French to the FSI-3 level.

c. Consultants

Consultants will be provided in farming systems, econometrics, computer programing, documentation and information services, marketing, equipment maintenance and rural sociology, as required during project implementation.

5. Level of Effort

a. Agronomist/Extension Specialist	4	years
b. Farming Systems Economist	4	years
c. Consultants	15	months

6. Reports Required

a. Quarterly report: the contractor chief of party will provide a quarterly report covering the following:

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

b. An annual work plan with clearly defined objectives, time-frame, budget, and designation of persons responsible.

c. Semi-annual project reports.

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

B. Mauritania

1. Objective

The objective of this contract is to provide long- and short-term technical assistance to CNRADA for implementation of the Mauritanian portion of the OMVS Agricultural Research II Project (625-0957).

2. Composition of Contract Team and Location

The contractor will supply an initial team of two long-term persons who will be assigned to CNRADA at Kaedi. They will live in housing provided by the project at Kaedi and work in the surrounding regions of Mauritania along the Senegal River. These two long-term persons will be supported by up to 15 person-months of consultants as needed during implementation of the project.

The two long-term researcher/administrative assistant team will form the technical core for a program of adaptive research that will include numerous on-farm variety and technological package trials. The researcher will be a research planner with an advanced degree in agricultural economics, the other member of the team will be an administrative assistant who will be responsible for routine administrative and financial management functions related to project implementation.

3. Relationship of Contractor to Cooperating Country and AID

The contract team will work under the day-to-day supervision of the Director of CNRADA and under the guidance of the Plant Improvement Service Chief within CNRADA. The contractor will be working under a Direct-AID contract with USAID/Nouakchott. One of the long-term researchers shall be designated the contractor chief of party and will be responsible for handling administrative matters with USAID/Nouakchott.

4. Job Descriptions

The contractor will make available long-term technical assistance and consultants to assist in the planning, and implementation of an adaptive research program for CNRADA in the Senegal River Valley. The contractor will provide personnel for the following positions:

a. Agricultural Planner/Agricultural Economist

(1) Under the policy supervision of the Director of CNRADA and the technical guidance of the Chief of the Plant Improvement Service of CNRADA the agricultural planner/agricultural economist will:

- participate with other researchers in developing and implementing a long term research strategy for the CNRADA program including assistance in project design, research resources management (including the development of methodology to predict cost effectiveness of research activities) and project reporting and evaluation;

- the agricultural planner/economist will develop and implement a Farming Systems Research program on irrigated river basin agriculture;

- work closely with the regional development agencies in setting up and implementing the on-farm trials and assist in the provision of information and interpretation of results for extensive farm dissemination by regional development agencies;

- assist in training Mauritanian counterparts.

(2) The qualifications and experience of the Agronomist are:

- MS in Agronomy with specialization in cereals production — rice wheat, sorghum, corn;

- three to five years experience in agronomic research involving extensive on-farm trials and field work in the Third World;

- fluency in French at FSI-3 level.

b. Administrative Assistant

(1) Under the day to day supervision of the Director of CNRADA and the guidance of the agricultural planner, the Administrative Assistant will:

- assist CNRADA and the project in its routine functions of administrative and logistical support, including commodity procurement, travel and housing arrangements for research station staff and TDY personnel;

- the Administrative Assistant will work closely with CNRADA staff and the OMVS management specialist on project implementation

- will be responsible for establishing liaison with the AID Project Officer based in USAID/Nouakchott regarding project implementation.

(2) The qualifications and experience of Administrative Assistant are:

- BS in management and accounting;

- three to five years experience as an Administrative Officer in either the private or public sector. At least two years in a responsible position in administrative work in a developing country;

- fluency in French at the FSI-3 Level.

c. Consultants

Consultants will be provided in irrigation engineering, horticulture statistics, marketing, equipment maintenance, integrated pest management, and documentation and information services, as required during project implementation.

5. Level of Effort

a. Agricultural Research Planner/Agricultural Economist	4 1/2 years
b. Administrative Assistant	4 1/2 years
c. Consultants	15 person-months

6. Reports Required

a. Quarterly reports: the contractor chief of party will provide a quarterly report covering the following:

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

b. An annual work plan with clearly defined objectives, time-frame, budget and designation of persons responsible.

c. Semi-annual project reports.

d. Research reports (jointly with CNRADA) on results of the research activities.

C. Mali

1. Objective

The objective of this contract is to provide long- and short-term technical assistance to IER at Samé for implementation of the Mali portion of the OMVS Agricultural Research II Project (625-0957).

2. Composition of Contract Team and Location

The contractor will supply a team of two long-term researchers who will be assigned to the Malian research station at Samé (near Kayes). They will live in housing provided by the project at Samé. These long-term researchers will be supported by up to 15 person-months of consultants as needed during implementation of the project.

The two long-term researchers will form the technical core for a program of adaptive cereals research that will include numerous on-farm variety and technological package trials. One researcher will be an agronomist and the other will be an agricultural engineer. They will work with Malian counterparts and other researchers at the Station to plan, organize and implement a program of adaptive cereals research and on-farm trials.

3. Relationship of Contractor to Cooperating Country and AID

The Contractor team will work under the day-to-day supervision of the Director of the Agricultural Research Station at Samé. The contractor will be working under a Direct-AID contract with USAID/Bamako. One of the long-term researchers shall be designated the contractor chief of party and will be responsible for handling administrative matters with USAID/Mali.

4. Job Description

The contractor will make available long-term technical assistance and consultants to assit in the planning and implementation of adaptive cereals research and on-farm research trials for the Malian Research station at Samé. The contractor will provide personnel for the following positions:

a. Agronomist

(1) Under the supervision of the Station Director/Samé the Agronomist will:

- provide technical direction for the on-station adaptive testing of promising cereal varieties and the development of technical packages for these varieties;

- plan, organize and supervise the implementation of an on-farm testing program for the most promising cereal varieties and technological packages;

- screen and undertake risks/benefits analyses (as per Regulation 216) of all pesticides to be used in research carried out by the project, or delegate this work to a consultant on research associate with pest control expertise.

- work closely with the regional development agencies in setting up and implementing the on-farm trials and assist in the provision of information and interpretation of results for extensive farm dissemination by the regional development agencies;

- assist in training Malian counterparts.

(2) The qualifications and experience of the Agronomist are:

- MS in Agronomy with specialization in cereals production - rice, wheat, sorghum, corn, millet;

- three to five years experience in agronomic research, including farm trials and fieldwork overseas in the Third World;

- fluency in French at the FSI-3 level.

b. Agricultural Engineer

(1) Under the supervision of the Samé Research Station Director the Agricultural Engineer will:

provide technical direction for the creation of a maintenance program for equipment and facilities at the Research Station;

- assist in the planning and supervision of the on-farm testing program, particularly the water management aspects;

- work closely with the regional development agencies in setting up and implementing on-farm trials and assist in the provision of information and interpretation of results for their use;

- assist in training Malian counterparts.

(2) The qualifications and experience of the Agricultural Engineer are:

- MS in Agricultural Engineering majoring in farm equipment or irrigated engineering;

- three to five years of experience, including participation in multi-disciplinary research and fieldwork overseas in a developing country;

- fluency in French to the FSI-3 level.

c. Consultants

Consultants will be provided in economics, marketing, statistics, soils science, and documentation and information services, as required during project implementation.

5. Level of Effort

a.	Agronomist	4 years
b.	Agricultural Engineer	4 years
c.	Consultants	15 person-months

6. Reports Required

a. Quarterly report: the contractor chief of party will provide a quarterly report covering the following:

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

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

c. Semi-Annual reports by the contractor.

d. Research reports on results of research activities.

D. Deputy Project Officer

1. Objective

The objective of these contracts will be to provide national level project management and administration capabilities to support implementation of the OMVS Agricultural Research II Project (625-0957) by USAID's Senegal, Mauritania, and Mali.

2. Contractor Relationships

One Deputy Project Officer will work in each of the three countries under the supervision of the respective USAID Project Officer assigned responsibility for the national components of the project. The Deputy Project Officers will work directly with the national project director and involved national agencies to facilitate all project activities in the country and serve as major liaison between AID and the national implementing agency.

3. Job Description

(a) The Deputy Project Officer will

- be responsible for the execution of all project backstopping tasks required for the implementation of the national program. This will include: preparation of implementation orders and letters and of other

project documentation; monitoring of contracts, procurement activities and operating funds; handling local administrative support including commodity exonerations and transport;

- serve as the principal liaison for routine contacts between national agencies, contractors, USAID and the OMVS;

- develop and install monitoring and control mechanisms to track project implementation;

- report to the national USAID and the USAID/RBDO on project implementation.

(b) The qualifications and experience of the Project Assistants are:

- BA degree;

- two or three years experience in development, preferably working in the Senegal River Basin;

- fluency in French at the FSI-3 level and preferably also fluent in a local language used in the project zone.

4. Level of Effort

5 1/2 years each (two year contracts with probable replacements during life of project).

5. Reports Required

(a) Annual workplan with clearly defined objectives and timeframe.

(b) Quarterly reports covering:

- progress measured against planned objectives;
- problems encountered;
- major activities during period;
- actions planned next period;
- recommendations.

II. REGIONAL CONTRACTS

A. Financial Management Specialist

1. Objective

The objective of this contract is to provide technical assistance to the OMVS to establish a reliable and effective financial management system for the OMVS Agricultural Research II Project (625-0957).

2. Contractor Relationships

The Financial Management Specialist will work within the OMVS Division of Integrated Research under the day-to-day supervision of the Division Head. This person will be hired under a Direct-AID contract with USAID/Senegal and will be based in Dakar, but travel 50% of time within project area.

3. Job Description

(a) The Financial Management Specialist will:

- assist in determining the characteristics needed for a project accounting system with the OMVS and the three research stations and in setting up a bookkeeping system compatible with existing systems;

- supervise the project accountant at each research station to assure proper maintenance of ledgers and accounting records for classification, and the preparation of vouchers and fiscal reports;

- assist in setting up and administering overall OMVS project record and reporting system, and work with relevant OMVS offices concerning procurement and other administrative matters.

(b) The qualifications and experience of the Financial Management Specialist are:

- BA or BS, preferable in accounting or administration;
- two to three years experience in administration, preferably overseas within the project area;
- fluency in French at FSI-3 level

4. Level of Effort

2 years (first two years of project).

5. Reports Required

(a) Annual workplan with clearly defined objectives and timeframe.

(b) Quarterly report covering:

- progress measured against planned objectives;
- problems encountered;
- major activities during period;
- actions planned next quarter;
- recommendations.

B. Research Management Specialist

1. Objective

The objective of this contract is to provide technical assistance to the OMVS Division of Integrated Research for strengthening regional research coordination within the OMVS Agricultural Research Project (625-0957).

2. Contractor Relationships

The Research Management Specialist will work under the day-to-day supervision of the Head of the OMVS Division of Integrated Research. This person will be contracted by USAID/Senegal.

3. Job Description

(a) The Research Management Specialist will:

- assist the head of the OMVS Division of Integrated Reseach in planning and executing the project research program as recommended by CIERDA and approved by the OMVS Council of Ministers;

- assist in the development and dissemination of relevant research documentation among the national research agencies;

- assist in the organization of research seminars and workshops among regional researchers and including outside participants;

- keep abreast of all agricultural research activities in the Basin and serve as liaison between the contract teams at each research station, the OMVS and USAID/RBDO:

- determine with the Head of the OMVS Integrated Research Division, the need for short regional technical assistance, prepare scopes of work and other documentation for such consultants, and coordinate their visits;

- participate in project monitoring and evaluation and prepare project reports as required by the OMVS.

(b) The qualifications and experience of the Research Management Specialist are:

- MS in agricultural discipline or in management;
- three to five years of experience in development assistance programs, preferable with research administration and West African experience;
- ability to work closely and cooperatively with African counterparts;
- fluency in French to the FSI-3 level.

4. Level of Effort

3 years (to start in the third year of the project).

5. Reports Required

(a) Annual workplan with clearly defined objectives, workplan budget and persons responsible for actions;

(b) Quarterly reports covering:

- progress measured against planned objectives;
- problems encountered;
- major activities during period;
- actions planned next reporting period;
- recommendations.

C. Deputy Project Officer

1. Objective

The objective of this contract is to provide technical assistance to USAID/RBDO in managing the regional component of this project.

2. Contractor Relationship

The Deputy Project Manager will work in the USAID/RBDO in Dakar under the day-to-day supervision of the Project Officer This person will be contracted by USAID/RBDO.

3. Job Description

(a) The Deputy Project Officer will:

- assist the PO in preparing regional project documentation including project agreements, project implementation orders and project reports;

- assist in the supervision and monitoring of overall project implementation;

- Work in collaboration with the PO to monitor procurement, tax exoneration, construction contracting and execution;

- Serve as field-level liaison with project contractors, national services and USAID's Senegal, Mali, and Mauritania.

- Participate in project monitoring and evaluation activities as needed.

(b) The qualifications and experience of the Deputy Project Officer are:

- a Master's level degree or higher;
- 5-10 years experience in development project management;
- fluency in French at FSI-4 plus level.

4. Level of Effort

5 1/2 years (Renewal or replacement after 3 years)

5. Reports Required

(a) Annual workplan with clearly defined objectives, workplan, budget and persons responsible for actions;

(b) Quarterly reports covering Regional aspects of project, including:

- progress measurements agains planned objectives;
- problems encountered;
- major activities during period;
- actions planned next reporting period;
- recommendations.

ANNEX G

MODEL RESEARCH/EXTENSION AGREEMENT BETWEEN REGIONAL DEVELOPMENT AGENCIES OF EACH MEMBER STATE OF THE OMVS AND ORGANIZATIONS RESPONSIBLE THE RESEARCH STATIONS OF SAME, KAEDI AND FANAYE

(Model Completed for Senegal)

FOR THE IMPLEMENTATION OF RESEARCH/EXTENSION ACTIVITIES OF THE AGRICULTURAL RESEARCH II PROJECT FINANCED BY USAID (No. 625-095.)

The Institut Sénégalais de Recherche Agricole hereafter referred to as "ISRA" represented by its General Manager_____

and

La Société d'Aménagement et d'Exploitation du Delta hereafter referred to as "SAED" represented by its General Manager_____

have agreed to the following:

ARTICLE I.: OBJECTIVE

This agreement is to establish the guidelines for collaboration between ISRA and SAED to implement the Agricultural Research II Project financed by USAID (No. 625-0957) in accordance with the Grant Agreement between the OMVS and the Agency for International Development signed on:_____

_____

This project will be implemented at the Fanaye Research Station of the Senegalese side of the River Bassin and will be effective from_____ to_____

ARTICLE II. DEFINITION OF WORK TO BE UNDERTAKEN

The work to be undertaken under this agreement is defined in the Project Paper, Chapter V.

ARTICLE III. ESTABLISHMENT OF AN ACTION PLAN FOR PROJECT OPERATIONS

Research to be undertaken under this project will be reviewed in accordance with the following description:

The research program for Senegal will concentrate on setting up a farming systems (or production systems) research program at Fanaye as planned under the multidonor Senegal Agricultural Research Project coordinated by the World Bank. The farming systems team planned for Fanaye consists of six researchers including a general agronomist, agronomist for weed control, agricultural engineer, agricultural economist, rural sociologist, and extension specialist. This farming systems research team will:

(1) identify and quantify technical, economic and social contraints on existing production systems;

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

(3) assist in diffusing the improved technological packages.

The project will provide the technical assistance, training, equipment, and operating support needed to establish this farming systems team. This assistance will fit within and be coordinated by ISRA which has established a national farming systems program and methodology that is first being implemented in the Casamance under bilateral projects with Michigan State University and SECID. The long-term technical assistants needed to start this farming systems research are an agronomist/extension specialist and a micro-economist to be provided under a contract financed by the project. The contract will also provide for short-term assistance in other disciplines as identified during project implementation. A scope of work for this contract assistance is presented in Annex F.

To this end, a working session between SAED and ISRA will be held during Month 3 of Project Implementation Schedule. For this meeting, researchers from Fanaye will prepare reports on past experiences in the project area and ISRA will present technical and development problems related to agricultural research.

The two agencies will jointly formulate a workplan for research activities to be undertaken during the project life.

ARTICLE IV. IMPLEMENTATION OF ANNUAL RESEARCH/EXTENSION WORKPLANS

Fanaye, Senegal

Organization

The agricultural research structure for the Senegal River Region of Senegal consists of administrative headquarters and limited fields at Richard Toll, an older area of about 15 has. at Guédé and a new area of about 60 has. being developed at Fanaye. Research is presently going on at all three locations, although future activities will be concentrated at Fanaye as the station is developed.

With the introduction of the new station organization under the Senegal Agricultural Research Project, management of station operations will be improved by the strengthening of the Financial and Administrative Service to include accounting, supply and stock control, and personnel activities and of the Technical Services to include farm management, the workshop, and general maintenance activities. These services will be supervised by the Station Manager. The Station Manager will also coordinate the commodity research and production systems research programs with technical direction being provided from the central support groups in the Production Systems Department and Commodity Research Department within ISRA Headquarters. This management structure corresponds to the structural and functional changes being made throughout the ISRA system under the World Bank coordinated Senegal Agricultural Research Project, as was described in the Background, Section IIIB, Research in Senegal.

Staffing

Of the 11 scientists working in the area (this excludes the Station Director who is mainly occupied with administrative duties) only two are Senegalese and only one is funded by ISRA. These 11 scientists are supported by 5 senior technicians and 12 junior technicians.

Three Senegalese are now in the U.S. receiving training to the Masters level. They will return to work in Fanaye in late 83 or early 84 as researchers on the farming systems team.

ARTICLE V. ANALYSIS AND USE OF PROJECT OUTPUTS

ISRA will be responsible for analysis and compiling research outputs. The following outputs will indicate progress towards achieving the purpose and goals of the project:

a. production systems studies, on-farm trials of improved technology, and improved technical packages for "recommendation domains" in ecological areas of the Senegal River Bassin;

b. upgraded technical and professional skills for agricultural researchers, research-assistants and research technicians;

c. upgraded agricultural facilities for the Fanaye Research Station;

d. strengthened regional research, coordination among national research agencies and involving national development agencies.

ARTICLE VI. TASKS ASSIGNMENTS

The OMVS and ISRA/GOS will designate the services and persons responsible for effectiveness of this Agreement. The OMVS and USAID/RBDO will be promptly advised of any personnel changes. These will be discussed at the Six Month Joint Review Meetings with USAID/RBDO.

ISRA/GOS will designate the Agricultural Economist and the Extension Specialist to be financed by USAID.. The specialists will be selected in accordance with the criteria described in the Project Paper.

ARTICLE VII. DISTRIBUTION OF FINANCING COSTS

The professional salaries of the Agricultural Economist and Extension Specialist assigned at Fanaye will be paid by the Project, The GOS and other donors will finance other costs and some operation expenses whereas the OMVS will finance_____% of the costs described in Financial Tables 1 to 5 of the Project Paper. It is agreed that the Member States and the OMVS will assume the recurrent costs of agricultural research activities after USAID financing is terminated.

ARTICLE VIII. LITIGATIONS

In case of litigations between the OMVS, ISRA/GOS and USAID/RBDO which could not be settled between the Project Manager RBDO and his Senegalese counterparts, the Secretary General of the OMVS and the Director General of ISRA will try to come to a friendly solution.

ARTICLE IX . MODIFICATIONS

The OMVS or the ISRA/GOS may request reviews and/or modifications for this agreement. However, these reviews and/or modifications should in no way affect normal implementation of the program.

ARTICLE X. APPROVAL

In accordance with the Regional Agreement between USAID/RBDO and the OMVS, this agreement will be submitted to USAID/RBDO approval.

Dakar_____

General Manager of ISRA

_____

General Manager of SAED

_____

USAID

_____

611(e) Certification of Capacity to Maintain and Utilize

I. Project Data:

A.	Country	:	OMVS - Senegal, Mauritania, Mali
B.	Project	:	OMVS Agricultural Research II (625-0957)
C.	Funding	:	$13.5 million
D.	Life of Project	:	6 years.

II. Description:

This project provides support to the OMVS and its Member States of Senegal, Mauritania and Mali for a program of comprehensive agricultural research activities focused on adaptive research for small-scale farming systems.

The research to be undertaken during this project will be mainly farm field trials intended to identify technology of increased yield potential for the localities to be developed in the Integrated Development Project of OMVS. The research staff of this project will operate from the three existing stations of the Senegal Valley and work jointly with extension workers assigned to the responsible regional development agencies. Promising varieties, farming practices and cropping systems will be carefully evaluated to establish their potential benefits and local problems. Improved varieties and farming practices available as output from the project will be an input for the development programs of the valley and in that program these technologies will be transferred to large numbers of farmers fields.

The project administrative, economic and financial analyses examined the financial and human resource capability of each country to maintain and utilize this project, and project inputs were designed with respect to these capabilities. Regionally, the OMVS will be required to continue its current level of support for agricultural research in each of the three countries. For Senegal, the agricultural research institute, ISRA, has had considerable experience with AID projects and has demonstrated that it has the human resource and financial capabilities needed for the project.
For Mauritania, the agricultural research center, CNRADA, has adequate organizational authority and structure and will have adequate technical staff by the time the project starts, and will be able to manage activities that will be well defined and tightly controlled by a new project financial management system.

For Mali, the agricultural research station at Samé will adopt a new organizational structure and obtain additional national technical staff to implement well-defined and tightly controlled project activities under a new financial management system and with expatriate technical assistance.

III. Certification

A. Regional and Senegal

As the principal officer of the Agency for International Development in Senegal and for the OMVS, I affirm that, in my judgement, Senegal and the OMVS have both the financial capability and the human resources to effectively maintain and utilize the goods and services being provided by the OMVS Agricultural Research II Project (625-0957).

David Shear
Director,
USAID/Senegal

Signature: [illegible]

Date: July 7, 1982

B. Mauritania

As the principal officer of the Agency for International Development in Mauritania, I affirm that, in my judgement, Mauritania has both the financial capability and the human resources to effectively maintain and utilize the goods and services being provided by the OMVS Agricultural Research II Project (625-0957).

Peter Benedict
Director,
USAID/Mauritania

Signature: _____

Date: _____

C. Mali

As the principal officer of the Agency for International Development in Mali, I affirm that, in my judgement, Mali has both the financial capability and human resources to effectively maintain and utilize the goods and services being provided by the OMVS Agricultural Research II Project (625-0957).

David Wilson
Director,
USAID/Mali

Signature: [illegible]

Date: 24 V 1982

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FOR USAID/REDSO

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E.O. 12356: N/A
SUBJECT: AG RES II (625-0957)-611E CERTIFICATION

REF: (A) DAKAR 06538; (B) NOUAKCHOTT 3274; (C) STATE 314925

CERTIFICATION 611-E SIGNED BY DIRECTOR BENEDICT ON 15 JULY 1982, DOCUMENT POUCHED TO REDSO/ABIDJAN SAME DATE.
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ANNEX J

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E.O. 12356:
TAGS:
SUBJECT: OMVS AGRICULTURAL RESEARCH (625-0957)

1. A PROJECT REVIEW (PR) MEETING TO REVIEW THE PP FOR SUBJECT PROJECT WAS HELD IN AID/W ON AUGUST 19, 1982.

2. THE PR REVIEWED THE PP AND CONCLUDED THAT IT CANNOT YET BE RECOMMENDED FOR CONSIDERATION BY THE EXECUTIVE COMMITTEE FOR PROJECT REVIEW (ECPR). THE PR RECOMMENDS THAT THE PP BE REVISED ALONG THE LINES INDICATED BELOW (PARA 3) AND THAT, UPON COMPLETION, THE PP BE RE-SUBMITTED TO AID/W.

3. ISSUES:

(A) PROJECT CONTEXT'S RELATIONSHIP TO OTHER PROJECTS - IT WOULD BE HIGHLY DESIRABLE TO STRENGTHEN THE PP DESCRIPTION OF SENEGAL RIVER BASIN DEVELOPMENT PLANS, AND THE RELATIONSHIP OF THIS PROJECT TO THAT DEVELOPMENT.- THE GENERAL RELATIONSHIP HAS BEEN ADEQUATELY-STATED, BUT A MORE COMPLETE SET OF PROJECT OUTPUTS SHOULD BE PROVIDED AS WELL AS A SPECIFIC DESCRIPTION OF HOW THESE OUTPUTS WILL BE DRAWN UPON OR EXPANDED BY OTHER PROJECTS TO ACHIEVE THE GAINS IN AGRICULTURE PRODUCTION ESTABLISHED AS GOALS IN THE BASIN PLANS. (WHERE THIS EXPLANATION APPEARS IN OTHER DOCUMENTS ALREADY SUBMITTED TO AID/W, THEY MAY BE REFERENCED). IT WILL ALSO BE IMPORTANT TO SHOW THE RELATIONSHIP OF AGRICULTURAL RESEARCH TO THE PROPOSED OMVS IDP PROJECT, AND INDICATE WHETHER AGRICULTURAL RESEARCH SHOULD BE FUNDED EVEN IF IDP IS, FOR ANY REASON, NOT APPROVED.

(B) CLARIFICATION OF FARMING SYSTEMS RESEARCH (FSR) - THE PROJECT PAPER INDICATES THAT THE RESEARCH UNDERTAKEN AT SOME, IF NOT ALL, OF THE STATIONS WILL BE BASED ON A FARMING SYSTEMS RESEARCH (FSR) APPROACH; HOWEVER, NO ELABORATION OR DEFINITION OF JUST WHAT THIS MEANS IS PROVIDED. THIS DEFICIENCY SHOULD BE CORRECTED BY A BRIEF DISCUSSION/EXPLANATION; HOWEVER, MORE IMPORTANTLY, THIS LACK OF CLARITY RAISES TWO IMPORTANT CONCERNS:

--(1) IS THIS MEANING CONSISTENT WITH THAT RECENTLY

ADOPTED BY THE AFRICA BUREAU AND CONTAINED IN THE PAPER QUOTE INSTITUTIONALIZING THE FARMING SYSTEMS APPROACH TO RESEARCH UNQUOTE, PRESENTED DURING THE ADO CONFERENCE IN IBADAN, NIGERIA BY DR. D.W. NORMAN?

--(2) IS THIS APPROACH, ALONE, ADEQUATE AND BEST-SUITED FOR RESEARCHING AGRICULTURAL PROBLEMS AND DEVELOPING IMPROVED VARIETIES, PRACTICES AND METHODS IN A TRANSITION SITUATION (TRANSITION FROM RAINFED TO IRRIGATED AGRICULTURE) THAT CHARACTERIZES THE CONDITIONS UPON WHICH THIS PROJECT WILL LARGELY FOCUS?

(C) NEED FOR STRONGER IRRIGATION FOCUS - UNDER QUOTE FUTURE RESEARCH NEEDS UNQUOTE (PAGE L2), THE PROJECT PAPER IDENTIFIES THE FOLLOWING PROBLEMS (OF FOUR CITED) WHICH MOST INHIBIT THE REALIZATION OF AGRICULTURAL DEVELOPMENT OBJECTIVES BY OMVS:

--(1) THE HIGH COST OF IRRIGATION DEVELOPMENT REQUIRED FOR ADEQUATE WATER CONTROL; AND,

--(2) THE HIGH COST OF AGRICULTURAL PRODUCTION IN THE IRRIGATED PERIMETERS BEING DEVELOPED.

HOWEVER, NEITHER OF THESE APPEARS TO BE DIRECTLY ADDRESSED BY THE RESEARCH THE PROJECT IS TO INITIATE, CARRY OUT OR ORGANIZE TO UNDERTAKE. IN FACT, DESPITE THE HEAVY FOCUS ON IRRIGATION AS A MEANS OF CARRYING OUT AGRICULTURAL DEVELOPMENT WITHIN THE SENEGAL RIVER BASIN, THIS PROJECT DOES NOT APPEAR TO EMPHASIZE IRRIGATION OR STRESS THE DIFFERENCES THAT SHOULD BE INCORPORATED INTO AN INSTITUTION-BUILDING/STRENGTHENING EFFORT RELATIVE TO IRRIGATED AGRICULTURAL RESEARCH AS OPPOSED TO RAINFED. THIS MAY BE PARTLY CORRECTED BY SOME RE-WRITING BUT A SUBSTANTIAL DEFICIENCY IN PROJECT DESIGN MAY BE INVOLVED AND NEEDS TO BE CAREFULLY ASSESSED AND CORRECTED, IF FOUND TO EXIST.

(D) WATER MANAGEMENT RESEARCH - RELATED TO THE NEED FOR A STRONGER IRRIGATION FOCUS IS THE PERCEIVED LACK OF ADEQUATE ATTENTION TO THE PROBLEMS OF (IRRIGATION) WATER MANAGEMENT. SOME RESEARCH IN THIS AREA SHOULD BE INCLUDED; HOWEVER, THE MAIN CONCERN RELATES MORE TO THE ADAPTATION AND ADOPTION OF SOUND AND IMPROVED WATER MANAGEMENT PRACTICES AND TECHNOLOGIES BY BOTH PRODUCERS (WATER USERS) AND BY THOSE RESPONSIBLE FOR OPERATING THE SYSTEMS BY WHICH IRRIGATION WATER WILL BE MADE AVAILABLE TO FARMERS.

- THE LATTER WILL PROBABLY (OR AT LEAST SHOULD) BE ADDRESSED MORE IN THE INTEGRATED DEVELOPMENT PROJECT (IDP)

FOR THE BASIN NOW BEING FORMULATED. IT IS SUGGESTED THAT A STRONGER LINKAGE AND JOINT DESIGN OF THIS AND THE ID PROJECT BE ESTABLISHED, AT LEAST WITH REGARD TO IRRIGATION OPERATION, WATER MANAGEMENT AND IRRIGATION RESEARCH.

- THE WATER MANAGEMENT SYNTHESIS II PROJECT (SAT/AGR) COULD PROVIDE ASSISTANCE IN THIS ENDEAVOR AS WELL AS PROVIDE ACTUAL TECHNICAL ASSISTANCE AND TRAINING AND THE UNDERTAKING OF SPECIAL STUDIES TO COMPLEMENT ACTIVITIES UNDER EITHER OF THESE OMVS PROJECTS. THE BUREAU AND MISSION ARE URGED TO INVESTIGATE THIS POSSIBILITY FURTHER.

(E) RESEARCH EXTENSION LINKAGES - ALTHOUGH THE LOGICAL FRAMEWORK STATES THAT QUOTE RESEARCH RESULTS WILL BE READILY ACCEPTED AND USED BY DEVELOPMENT AGENCIES AND FARMERS UNQUOTE,THE DESCRIPTION OF THE RESEARCH-EXTENSION LINKAGES IS WEAK AND DOES NOT SUPPORT THE ASSUMPTION. IN VIEW OF THEIR CRITICAL IMPORTANCE TO THE SUCCESSFUL ACHIEVEMENT OF PROJECT OBJECTIVES, THESE LINKAGES AND MECHANISMS SHOULD BE CONCISELY DESCRIBED AND THEIR CONNECTION TO IDP SHOULD BE CLEARLY ESTABLISHED. IN ADDITION, THE EVALUATION PLAN SHOULD PROVIDE FOR AN ASJASSMENT OF EXTENSION LINKAGES EARLY IN THE PROJECT IN ORDER TO DETERMINE WHETHER THE OBJECTIVES OF THE PROJECT AS THEY RELATE TO -EXTENSION EFFORTS ARE BEING MET. FINALLY, THE PROTOCOL RESEARCH-EXTENSION AGREEMENT SHOULD BUILD IN THE APPROPRIATE MEASURES WHICH STRENGTHEN THIS LINKAGE BASED ON THE RESULTS OF THIS ADDITIONAL WORK, AND A CONDITION PRECEDENT SHOULD BE INCLUDED IN THE PP TO THE EFFECT THAT NO FUNDS SHOULD BE DISBURSED TO A NATIONAL RESEARCH STATION UNTIL THE PROTOCOL IS SIGNED.

(F) TECHNICAL CAPABILITY TO ADDRESS SOCIAL ISSUES - THE PP RECOGNIZES CRITICAL SOCIAL ISSUES WHICH COULD PERDE OR AFFECT ADAPTATION BY FARMERS OF IMPROVED PRODUCTION TECHNOLOGIES (E.G. LABOR CONSTRAINTS, ORGANIZATION OF FARMERS, LAND TENURE, ACCESS TO AND AVAILABILITY OF PRODUCTIVE RESOURCES). SOCIO-ECONOMIC DIAGNOSTIC STUDIES AND THE FARMING SYSTEMS RESEARCH APPROACH TO TECHNOLOGY DEVELOPMENT AND DISSEMINATION ARE MENTIONED AS HIGHLIGHTS OF THE PROJECT. HOWEVER, THERE APPEARS TO BE NO CAPABILITY IN THE TA TEAMS TO ADDRESS SOCIAL CONCERNS.

- IT IS RECOMMENDED THAT CONSIDERATION BE GIVEN TO UTILIZING THE SERVICES OF A SOCIOLOGIST OR ANTHROPOLOGIST TO ADDRESS CRITICAL SOCIAL CONCERNS. IN ADDITION, IDENTIFICATION SHOULD BE MADE IN THE PP CONCERNING THOSE SOCIAL CONCERNS WHICH WILL BE ADDRESSED BY THE PROJECT AS COMPARED TO THOSE THAT WILL BE ADDRESSED IN THE IDP.

(G) ABILITY OF THE OMVS AND CIERDA TO ESTABLISH PRIORITIES AND STRATEGIES FOR REGIONAL RESEARCH ACTIVITIES - IT DOES NOT APPEAR THAT ADEQUATE ATTENTION AND INPUTS WILL BE GIVEN TO ENABLE OMVS AND CIERDA TO PERFORM COORDINATING FUNCTIONS EFFECTIVELY AND TO ESTABLISH PRIORITIES FOR REGIONAL RESEARCH ACTIVITIES WITHIN THE SENEGAL RIVER BASIN AREA. FOR THE OMVS TO ACCOMPLISH THIS FUNCTION,

IT IS CRITICAL TO PROVIDE IT WITH THE TECHNICAL EXPERTISE TO DO RESEARCH PLANNING. PROPOSED ASSISTANCE IN THIS AREA IS INADEQUATE. IN ADDITION, IT DOES NOT APPEAR THAT THE DIVISION OF INTEGRATED RESEARCH HAS ADEQUATE MANPOWER TO UNDERTAKE THE FUNCTIONS IT IS ENVISIONED TO DO. NO INCREASES IN MANPOWER OR TECHNICAL TRAINING OF EXISTING MANPOWER IS ENVISIONED. LASTLY, IT IS NOT CLEAR IN THE PP WHAT INSTITUTIONAL ARRANGEMENTS AND LINKAGES EXIST BETWEEN OMVS AND THE NATIONAL RESEARCH STATIONS TO ENABLE PROPER COORDINATION TO OCCUR, PARTICULARLY IN THE DEVELOPMENT OF A REGIONAL RESEARCH PLAN.

- IT IS, THEREFORE, RECOMMENDED THAT AN ANALYSIS OF INSTITUTIONAL LINKAGES BETWEEN OMVS AND CIERDA ON THE ONE HAND, AND THE NATIONAL RESEARCH CENTERS ON THE OTHER, BE UNDERTAKEN, TAKING INTO CONSIDERATION RESPECTIVE REGIONAL AND NATIONAL RESEARCH RESPONSIBILITIES AND PRIORITIES AND HOW THEY WILL BE COORDINATED. IN ADDITION, IN ORDER TO ENABLE OMVS IN GENERAL, AND THE CIERDA IN PARTICULAR, TO GAIN CREDIBILITY WITH THE NATIONAL RESEARCH INSTITUTIONS, MEASURES MUST BE UNDERTAKEN TO ENSURE THAT THESE ENTITIES HAVE SUFFICIENT NUMBER OF STAFF WHO ARE ADEQUATELY TRAINED TO CARRY OUT THE FUNCTION OF DRAWING UP A REGIONAL RESEARCH STRATEGY AND OF COORDINATING THE RESEARCH ACTIVITIES OF NATIONAL RESEARCH INSTITUTES.

(H) TITLE XII VERSUS OPEN COMPETITION. ALTHOUGH MISSION PREFERENCE IS FOR OPEN COMPETITION IN THE PROCUREMENT OF TECHNICAL ASSISTANCE, IT SHOULD CONSIDER THE STRONG ARGUMENTS FOR USING TITLE XII UNIVERSITIES--E.G. ACCESS TO A BROAD RANGE OF TRAINING RESOURCES AND FACILITIES, COMPREHENSIVE SUPPORT SERVICES, PARTICIPATION IN CRSPS, AND THEIR INSTITUTION-BUILDING CAPABILITIES. IN ORDER TO ASSIST MISSION IN REACHING A DECISION, BIFAD WILL EXPLORE ON INFORMAL BASIS LEVEL OF INTEREST AND AVAILABILITY OF

TA RESOURCES IN THE TITLE XII COMMUNITY FOR SUBJECT PROJECT AND WILL ADVISE ASAP.

(I) PEST MANAGEMENT. IN VIEW OF THE NEED TO MINIMIZE THE COSTLY INPUT OF PETROCHEMICALLY DERIVED PESTICIDES AND WORK WITHIN THE CONTEXT OF AN INTEGRATED PEST MANAGEMENT APPROACH, A MINIMUM OF ONE FULL-TIME ENTOMOLOGIST SHOULD BE ASSIGNED TO THE PROJECT AT A RESEARCH LOCATION WHERE CROPPING PRACTICES ARE CONSIDERED QUOTE TYPICAL UNQUOTE OF IRRIGATED PERIMETER AGRICULTURE. AS STATED IN THE INITIAL DRAFT OF THE IEE, AS PREPARED BY PETER FREEMAN AND WILLIAM SETTLE, QUOTE THE LONG TERM PLACEMENT OF AN ENTOMOLOGIST (IPM-ORIENTED EXPERT) AT KAEDI IS A KEY FACTOR IN THE ESTABLISHMENT OF IPM-ORIENTED RESEARCH GOALS UNQUOTE. THE PP SHOULD MAKE SURE THAT IPM ASPECT IS NOT DUPLICATIVE OF EXISTING IPM AND CROP PROTECTION RESOURCES. AT THE SAME TIME, USE OF EXISTING RESOURCES (AS,E.G.,FAO TECHNICIANS) SHOULD BE EXPLORED. SINCE IPM WILL INCLUDE MANY SEPARATE ASPECTS AND MUST BE MULTIDISCIPLINARY, CONSULTANTS MUST BE PROVIDED (MINIMUM OF 1; PERSON-MONTHS) COVERING WEED SCIENCE, PLANT PATHOLOGY AND ENTOMOLOGY.

(J) ECONOMIC ANALYSIS. THE FOUR APPROACHES TAKEN IN THE ECONOMIC ANALYSIS (PREVIOUS STUDIES, MARGINAL RETURN, INDICATIVE TARGETS, AND POTENTIAL BENEFITS) ELUCIDATE THE IMPORTANCE OF AGRICULTURAL RESEARCH IN THE OMVS AREA AND MAKE A STRONG CASE FOR FURTHER INVESTMENT IN AGRICULTURAL RESEARCH IN THE AREA. HOWEVER, THE ECONOMIC ANALYSIS FAILS TO JUSTIFY THE PARTICULAR INVESTMENT IN AGRICULTURAL RESEARCH PROPOSED IN THIS PP. SUCH JUSTIFICATION, REQUESTED IN LAST YEAR'S GUIDANCE CABLE, PARA F (ANNEX D OF PP) WOULD MAKE THE PP A MUCH STRONGER DOCUMENT. IT MUST BE NOTED THAT SUGGESTED ADDITIONS TO THE ECONOMIC ANALYSIS ARE ONLY QUOTE COSMETIC UNQUOTE IN THAT THEY WILL MAKE THE PP A STRONGER DOCUMENT, BUT THEY DO NOT REFLECT ANY CHANGES IN THE IMPLEMENTATION PLAN.

(K) RECURRENT COSTS AND MORTGAGE IMPLICATIONS. IN VIEW OF PROBABLE OMVS INABILITY TO SUPPORT THE NECESSARY 10-15 YEAR RESEARCH EFFORT TO SUCCESSFUL COMPLETION, IT IS NECESSARY TO CONSIDER REALISTIC RECURRENT COSTS IMPLICATIONS OF THE PROJECT AND WHAT, IF ANY, QUOTE MORTGAGE UNQUOTE ON FUTURE FUNDS CAN BE EXPECTED, AS A RESULT OF APPROVING THE SUBJECT PROJECT.

(L) AGRONOMIC EXPERTISE. IT WAS POINTED OUT THAT THE PROJECT IS SOMEWHAT SHORT ON AGRONOMIC EXPERTISE AND THAT ADDITIONAL RESOURCES AVAILABLE TO THE PROJECT SHOULD BE IDENTIFIED. IN AS MUCH AS THE LONG-TERM TECHNICAL ASSISTANCE IS GOING TO BE MINIMAL, CONSIDERATION SHOULD, THEREFORE, BE GIVEN TO ESTABLISHING LINKAGES WITH THREE OF THE CRSPS IN S&T/AGR, NAMELY, SORGHUM AND MILLET, BEANS AND COWPEAS AND PEANUTS. THESE LINKAGES WOULD PROVIDE ACCESS TO A VAST SOURCE OF RESEARCH ON THESE CROPS. FUNDS SHOULD BE MADE AVAILABLE FROM THOSE EARMARKED FOR CONSULTANTS TO PROVIDE FOR SHORT-TERM ASSISTANCE IN THE INITIAL STAGES OF PROJECT IMPLEMENTATION.

(M) TRAINING:

--(1) THE PP SHOULD PROVIDE A RATIONALE AND DESCRIPTION OF THE KINDS OF TRAINING PROGRAMS WHICH WILL BE REQUESTED FOR LONG-TERM TRAINEES.

--(2) AVAILABILITY OF CANDIDATES FOR LONG-TERM TRAINING. A QUESTION WAS RAISED AS TO WHETHER SUFFICIENT NUMBERS OF CANDIDATES WILL BE AVAILABLE FOR LONG-TERM TRAINING, PARTICULARLY IN MAURITANIA. THE SUGGESTION WAS MADE THAT A C.P. BE AWWED TO THE SECOND DISBURSEMENT OF FUNDS REQUIRING THAT EACH COUNTRY PROVIDE ASSURANCES THAT TRAINEES WILL BE MADE AVAILABLE.

--(3) THE PP SHOULD TAKE COGNIZANCE OF THE REPEATED USE OF THE SAME CANDIDATES FOR SHORT-TERM TRAINING (AS IN PREVIOUS PROJECTS) AND THAT PROJECT MANAGERS MAKE SPECIAL EFFORTS TO INCLUDE A BROAD SAMPLE OF PARTICIPANTS IN THE SHORT-TERM TRAINING PROGRAMS.

(N) BUDGET ITEMS:

--(1) EACH TECHNICIAN SHOULD HAVE AN UNCOMMITTED BUDGET OF DOLS 15,000 FOR THE PURCHASE OF LABORATORY/FIELD SUPPLIES.

--(2) AN ELECTRIC POWER SYSTEM IS PROVIDED FOR SAME BUT NOT FOR FANAYE OR KAEDI RESEARCH STATIONS. IF NECESSARY A LINE ITEM SHOULD BE INCLUDED IN THE BUDGET TO PERMIT THE ACQUISITION OF SIMILAR SYSTEMS FOR FANAYE AND KAEDI.

(O) PROCUREMENT. THE PROCUREMENT PLAN NEEDS TO BE CLARIFIED AND SOME OF THE WAIVERS RE-DRAFTED. SER/COM WILL PROVIDE REVISIONS.

(P) AUDIT AND 121D DETERMINATION. GC/AFR HAS EXPRESSED CONCERN THAT OUTSTANDING AUDIT RECOMMENDATION REQUIRING USAID/SENEGAL TO RECOVER OUTSTANDING AMOUNTS FROM OMVS EFFECTIVELY PROHIBITS ANY DISBURSEMENTS UNDER THE AGRICULTURAL RESEARCH II PROJECT, UNTIL OUTSTANDING AMOUNTS ARE COLLECTED FROM THE OMVS. THEREFORE, IT APPEARS INADVISABLE TO ASK AA/AFR TO AUTHORIZE THE PROJECT, UNTIL THE OMVS SETTLES ITS OUTSTANDING DEBT. GC/AFR HAS ALSO ADVISED THAT 121D CERTIFICATION AND AA/AFR DETERMINATION MUST BE BASED ON AN EXISTING, RATHER THAN AN QUOTE INTERIM UNQUOTE FINANCE/ACCOUNTING SYSTEM. AS THE 121D CERTIFICATION SHOULD BE APPROVED BY AA/AFR AS PART OF THE AUTHORIZATION PACKAGE, THE PP SHOULD NOT BE RE-SUBMITTED UNTIL SUCH AN ACCOUNTING SYSTEM IS IN PLACE IN THE OMVS.

(Q) MISSION MANAGEMENT. LEVEL OF DETAIL CONTAINED IN PROJECT OUTPUTS SECTION IS INSUFFICIENT TO BE OF ASSISTANCE TO MISSION IN DRAFTING SCOPE OF WORK FOR CONTRACTOR OR TO EFFECTIVELY MONITOR PROGRESS BY CONTRACTOR DURING IMPLEMENTATION. WE RECOMMEND THAT MISSION AVOID A LEVEL OF EFFORT TYPE CONTRACT, AND THAT A SCOPE OF WORK FOR CONTRACTORS WHICH REQUIRES COMPLETION OF SPECIFIED TASKS,BE INCLUDED IN PP. FOR EXAMPLE, FIRST IMPORTANT TASK MAY BE COMPLETION OF A RESEARCH PLAN WHICH INCLUDES INDICATIVE MEASURES OF RESEARCH GOALS TO BE ACHIEVED DURING PROJECT. OBJECTIVELY VERIFIABLE INDICATORS BUILT INTO CONTRACTOR SCOPE OF WORK WOULD FACILITATE PROJECT MANAGEMENT BY MISSION.

4. AID/W WISHES TO COMMEND USAID/RBDO AND PARTICIPATING MISSIONS FOR CONSIDERABLE WORK AND SUBSTANTIAL IMPROVEMENTS MADE IN THE OMVS AG RESEARCH PP SINCE THE PREVIOUS REVIEW. MOST OF THE PRECEDING SUGGESTIONS WILL, REGRETTABLY, MAKE ADDITIONAL WORK FOR ALL INVOLVED BUT WOULD NOT ENTAIL MAJOR REVISIONS IN THE STRUCTURE/EFFICIENCY OF THE PROJECT. WE LOOK FORWARD TO SEEING THE REVISED PP AS SOON AS IT IS READY FOR REVIEW AND AUTHORIZATION. STOESSEL
BT

PROGRAM:

AGENCY FOR INTERNATIONAL DEVELOPMENT
ACTIVITY DATA SHEET

CP 81-06 (8-79)

TITLE		FUNDING SOURCE	PROPOSED OBLIGATION (In thousands of dollars)		
OMVS Agricultural Research II		Sahel Development Program	FY 83 3,800		LIFE OF PROJECT (Auth.) 13,622
NUMBER 625-0957	NEW [X]	PRIOR REFERENCE	INITIAL OBLIGATION FY 83	ESTIMATED FINAL OBLIGATION FY 88	ESTIMATED COMPLETION DATE OF PROJECT FY 89
GRANT [X] LOAN [ ]	CONTINUING [ ]	None			

Purpose: To develop and strengthen OMVS agricultural research capacities in the Senegal River Basin and to improve the combined effectiveness of national agricultural research programs in Senegal, Mauritania and Mali through regional coordination and prioritizing within the OMVS.

Background: The Senegal River Basin is in a state of transition moving from traditional rainfed to irrigated agriculture. A solid base of agricultural research is needed to insure a successful transition. And institutional capacity must be developed to allow the nations of the Senegal River Basin to carry on agricultural research supporting Basin development in the future.

Project Description: The purpose of this project is to develop the research capacities of the three OMVS Member States through training; develop three existing research stations in the Senegal River Basin; promote participation in designing and implementation of adaptive research and farming systems research programs; and improve the combined effectiveness of national agricultural research in the Basin. Extensive field trial programs will be carried out by the three research stations in association with national extension agencies. National research activities will be under the jurisdiction of the respective countries, thus linking the project to the research information available in all three national research organizations. The OMVS development and coordination office will assure that technical and professional collaboration takes place among institutions and researchers working in this project. Functional relationships between researchers and extension agents will be formalized via protocol agreements between research organizations and Regional Development Agencies (RDA's). AID-financed inputs are listed elsewhere on this Activity Data Sheet.

Relationship of Project to A.I.D. Regional Strategy: The AID Regional Development Strategy Statement (RDSS) endorses the project approach, stating that AID will give high priority to the development of an irrigated agriculture and to river basin planning and feasibility studies necessary for future projects. The RDSS further emphasizes a regional approach to river basin development and expresses AID's desire to assist international organizations like the OMVS in formulating optimum strategies for river basin development. The formulation of optimum irrigation and basin development requires that data be gathered and analyzed on a wide range of factors affecting agricultural production in the Senegal River Basin. In addition, as an institution-building effort the present project will strengthen the capacity of the OMVS and Member States to plan and implement regional agricultural projects.

Beneficiaries: The direct beneficiaries of the project are the OMVS and Member State officials involved in agricultural research activities in the Senegal River Basin. The ultimate beneficiaries of this increased research capability will be the nearly 10,000 small farmers who will benefit from improved on-farm technologies, crop varieties, farming practices and cropping systems to be developed by this project.

Host Country and Other Donors: The OMVS contribution is estimated at $2.4 million over the life of the project. Other assistance is being provided by FAO which, since 1978, has contributed $1,129,556 to the OMVS to study farming and management systems being used in irrigated perimeters. Additional assistance to agricultural research in the Basin will be provided by the World Bank's $15.0 million Agricultural Research Project in Senegal.

Major Outputs:

	All Years
Improved crop varieties and technical packages developed	3
Agricultural researchers upgraded	12
Agricultural research facilities improved	3
Strengthened regional research system coordinated with national research agencies	X

AID-Financed Inputs	($ Thousands) Life-of-Project
Technical Assistance 11 long-term (54 pm) 12 short-term (60 pm)	6,400
Training 12 long-term (36 pm) 62 short-term (62 pm)	1,700
Commodities: Vehicles, office furnishings, electric generators, farm equipment and research supplies	1,500
Other Costs: Construction and operating expenses	4,022
TOTAL	13,622

U.S. FINANCING (In thousands of dollars)	Obligations	Expenditures	Unliquidated
Through September 30 1980	-	-	-
Estimated Fiscal Year 1981	-	-	
Estimated Through September 30, 1981	-	-	
		Future Year Obligations	Estimated Total Cost
Proposed Fiscal Year 1982	3,800	9,822	13,622

PRINCIPAL CONTRACTORS OR AGENCIES

Title XII Univerity

AGENCY FOR INTERNATIONAL DEVELOPMENT
Advice of Program Change

Date:

Country: Sahel Regional

Project Title: OMVS Agricultural Research II

Project Number: 625-0957

FY 1983 CP Reference: None

Appropriation Category: Sahel Development Program

Life of Project Funding: $13,622,000

Intended FY 1983 Obligation: $3,800,000 Grant

This is to advise that AID intends to obligate $3.8 million in FY 1983 for the OMVS Agricultural Research II project. This is a new project and was not included in the FY 1983 CP.

The project will assist the Senegal River Basin Development Authority (OMVS) and its three member states, Senegal, Mali and Mauritania, to create and strengthen their capacity to carry out agricultural research in support of river basin development.

Further details are provided in the attached Activity Data Sheet.

On , 1983, the AA/AFR approved the recommendation that the system of accounts proposed for project funds satisfies the requirements of Section 121(d) of the FAA.

Clearances:
AFR/SWA,FGilbert
AFR/SWA,JBierke
AFR/PD/SWAP,GSlocum
GC/LP,GLecce
AA/AFR,FSRuddy
AFR/DP:SSharp

AFR/SWA,DMaxwell (draft)
AFR/DP,HJohnson
AFR/PD,NCohen
DAA/AFR,ARLove
LEG/PPD,MO'Sullivan

Drafted by:AFR/PD/SWAP,AMcDonald:fn:1/14/83 ext 27886 0062M

PROJECT AUTHORIZATION

Name of Program: Sahel Regional

Name of Project:
OMVS Agricultural
Research II

Number of Project:
625-0957

1. Pursuant to Section 121 of the Foreign Assistance Act of 1961, as amended (the "FAA"), I hereby authorize the Agricultural Research II Project for the Organization pour la Mise en Valeur du Fleuve Senegal involving planned obligations not to exceed $13,622,000 in grant funds over a six-year period from date of authorization, subject to the availability of funds in accordance with the AID/OYB Allotment Process, to help in financing foreign exchange and local currency costs for the project.

2. The project will assist in developing the research capabilities of the three OMVS Member States through training; developing three existing research stations in the Senegal River Basin; promoting participation in the design and implementation of adaptive research and farming systems research programs; and in improving the combined effectiveness of national agricultural research in the Basin. Extensive field trials programs will be carried out by the three research stations in association with national extension agencies. National research activities will be under the jurisdiction of the respective countries, thus linking the project to the research information available in all three national research organizations. The OMVS Development and Coordination Office will assure that technical and professional collaboration takes place among institutions and researchers working in this project. Working relationships between researchers and extension agents will be formalized by means of protocol agreements between research organizations and Regional Development Agencies (RDAs).

3. The Project Agreements, which may be negotiated and executed by the Officers to whom such authority is delegated in accordance with AID regulations and Delegations of Authority, shall be subject to the following essential terms, covenants and major conditions, together with such other terms and conditions as AID may deem appropriate.

4.a. Source and Origin of Goods and Services

Goods and services, except for ocean shipping, financed by AID under the project shall have their source and origin in Senegal, Mali and Mauritania or in the United States except as AID may otherwise agree in writing. Ocean shipping financed by AID under the project shall, except as AID may otherwise agree in writing, be financed only on flag vessels of the United States.

b. Waiver

Notwithstanding paragraph a. above, the following waiver to A.I.D. regulations is hereby approved:

1) The requirement set forth in Handbook 1, Supplement B, Chapters 4 and 5, that commodities procured with grant funds have their source and origin in the U.S. is waived to permit the procurement of commodities and vehicles which have as their source and origin countries included in Geographic Code 935 (Special Free World). On the basis of these waivers, project funds may be used to procure 6 non-U.S. manufactured diesel-powered electric generators and spare parts at an approximate cost of $150,000. Up to $460,000 may be used to purchase 4 all-terrain pick-up trucks, 14 all-terrain vehicles and 24 light motorcycles of non-U.S. manufacture, including 25% of the dollar value for spare parts. It is hereby determined that exclusion of procurement from Free World countries other than the Cooperating Country and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program; and that special circumstances exist which justify a waiver of the requirements of Section 636(i) of the Foreign Assistance Act of 1961, as amended.

Francis S. Ruddy
Assistant Administrator
for Africa

Date

Clearances:

AFR/SWA:FGilbert (draft)
AFR/SWA:DMaxwell (draft)
AFR/PD/SWAP:GSlocum
AFR/PD:NCohen
GC/AFR:LDeSoto (draft - with corrections)
DAA/AFR:ARLove

Drafters: H.Smith, USAID/Dakar and A.MCDonald, AFR/PD/SWAP:02/04/83:fn

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

From: Carole H. Tyson, Acting Director, USAID/Senegal

Subject: OMVS - Source/Origin Procurement Waiver for Diesel-powered Electric Generators

Problem: The OMVS Agricultural Research II Project (625-0957) will require the procurement of non-U.S. manufactured diesel-powered electric generators and spare parts for which your authorization is required. You are hereby requested to authorize such procurement by granting the following:

(1) A source/origin waiver from Geographic Code 000 (United States) to Geographic Code 935 (Special Free World).

Facts:

(a) Cooperating Country: OMVS Member States of Senegal, Mali and Mauritania.

(b) Project: OMVS Agricultural Research II (625-0957).

(c) Nature of Funding: Grant

(d) Source of Funding: SH

(e) Description of Goods: Six (6) diesel-powered electric generators ($25,000 per unit, including spare parts).

(f) Approximate Value: $150,000.

(g) Probable Sources: Senegal.

(h) Probable Origin: United Kingdon.

Discussion:

A. Source/Origin Waiver

This waiver request is made to cover six (6) diesel-powered electric generators which are needed for carrying out the irrigation requirements related to agricultural research activities planned under this project. While there are distributors of U.S. manufactured electric generators in Senegal (although none in Mauritania or Mali) American manufactured electric generators have not been used in the Senegal River Basin. The major problem has been that American manufacturers are not represented in the SRB, and therefore after-sales service, including warranty work, provision of spare parts, and maintenance servicing are not available in the area. A related problem is the lack of trained personnel familiar with American manufactured electric generators. It would take several years for a U.S. manufacturer to establish a similar local dealer organization and capability in the area, and no manufacturer has expressed interest in doing so because of the current low volume of business. By comparison, distributors of electric generators from Geographic Code 935 countries are well-established in the SRB, spare parts are generally available and there are trained personnel familiar with this equipment throughout the area.

In accordance with Handbook I, Supplement B, procurement of commodities from Code 935 under a grant financed project requires a waiver. Under Handbook I, Supplement B, Chapter 5B4a(2) and (7), a waiver may be granted if "the commodity is not available from countries included in the authorized geographic code" and for "such other circumstances as are determined to be critical to the success of project objectives."

Recommendation: For the above reasons, it is recommended that you:

(1) Approve a procurement source/origin waiver for diesel-powered electric generators from AID Geographic Code 000 to Code 935.

(2) Certify that the exclusion of procurement from Free World countries other than the cooperating countries and countries in Code 941 would seriously impede the attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program.

Approved: _____

Disapproved: _____

Date: _____

Clearances:

SER/COM/ALI:PHagan (phone)
GC/AFR:LDeSoto _____

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM: Carole H. Tyson, Acting Director, USAID/Senegal

SUBJECT: OMVS - Source/Origin Procurement Waiver for Vehicles

Problem: The OMVS Agricultural Research II Project (625-0957)will require the procurement of non-US manufactured vehicles and spare parts for which your authorization is required. You are hereby requested to authorize such procurement by granting the following:

(1) A source/origin waiver from Geographic Code 000 (United States) to Geographic Code 935 (Special Free World).

(2) A waiver of the provision of Section 636 (i) of the FAA.

Facts:

(a) Cooperating Country : OMVS Member States of Senegal, Mali and Mauritania.

(b) Project: OMVS Agricultural Research II (625-0957).

(c) Nature of Funding : Grant

(d) Source of Funding : SH

(e) Description of Goods : 4 all-terrain pick up trucks ($ 16,000 per vehicle)

14 all-terrain vehicles ($ 20,000 per vehicle)

24 motorbikes ($ 1,000 per motorbike)

(f) Approximate Value : $ 460,000 (includes 25% for spare parts)

(g) Probable Sources : Senegal, Mali

(h) Probable Origin : Germany, France, Japan, United Kingdon, etc.

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Discussion:

A. Source/Origin Waiver

The Agricultural Research II project personnel will be required to travel extensively to project sites which are located in rural areas of the Senegal River Basin to supervise agricultural field trials and to coordinate other field research activities. For the most part, the road network in the Basin is poor. Most paved roads are poorly maintained and potholes are rampant. Unpaved, washboard-type roads are extensive throughout the region. During the rainy season the roads further deteriorate, many are impassable, and others require sturdy four-wheel vehicles. Adequate spare parts, maintenance and repair facilities are not available for U.S. vehicles in Mauritania, Mali and Senegal. While there are distributors of US manufactured vehicles in Senegal, although none in the other countries mentioned above, the density of such vehicles throughout Senegal has not reached the point to justify investment of substantial spare parts inventories with the result that spare parts support is still very poor in Senegal as well as in other countries. In Senegal, the distributors confine their support activity to the main city which results in lack of service in the country Throughout all of the countries, local mechanics with some degree of know-how are unable to cope with the English measurement system of nuts and bolts, even if they could understand the unfamiliar American vehicle.

In addition, this waiver request is to cover 24 light motorcycles are not manufactured in the US, and which are needed for monitoring agricultural research activities in the field.

In accordance with Handbook I, Supplement B, procurement of commodities from Code 935 under a grant financed project rquires a waiver. Under Handbook I, Supplement B, Chapter 5B4b(2) and (7) a waiver may be granted if "the commodity is not available from countries included in the authorized geographic code" and for "such other circumstances as are determined to be critical to the success of project objectives."

B. Waiver of Section 636(i)

In additional to the general source/origin limitations on the procurement of commodities, Section 636(i) of the FAA prohibits the procurement of non-US manufactured vehicles. However, the provisions of Section 636(i) may be waived when special circumstances permit it. Under Handbook 1B, Chapter 4C2d(1), special circumstances are deemed to exist if there is (a) "an inability of US manufacturers to provide a particular type of needed vehicle"; or (b) "present or projected lack of adequate service facilities and supply of spare parts for US manufactured vehicles." The authority to find such circumstances and grant a waiver has also been delegated to you by AID Delegation of Authority No. 40.

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Since, as discussed in the source/origin context, US-manufacturers are unable to provide for adequate spare parts support and service of their vehicles, the special circumstances criterion set forth above is satisfied.

Recommendation: For the above reasons, it is recommended that you:

(1) Approve a vehicle procurement source/origin waiver from AID Geographic Code 000 to Code 935.

(2) Conclude that special circumstances exist which merit a waiver of the provisions of Section 636(i) of the Foreign Assistance Act of 1961, as amended;

(3) Certify that the exclusion of procurement from Free World countries other than the cooperating countries and countries in Code 941 would seriously impede the attainment of US foreign policy objectives and the objectives of the foreign assistance program.

APPROVED _____

DISAPPROVED _____

DATE _____

Clearances:

SER/COM/ALI:PHagan (phone)
GC/AFR:LDeSoto (draft - with corrections)

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ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM : AFR/SWA, Frederick E. Gilbert Frederick E. Gilbert

SUBJECT: OMVS Agricultural Research II (625-0957)

RE: Delegation of Authority No. 144

Problem: Section 121(d) of the Foreign Assistance Act of 1961, as amended (the "FAA"), precludes any new obligation of the Sahel Development Program funds for disbursement by a foreign government until the Administrator has determined "that the foreign government will maintain a system of accounts with respect to those funds which will provide adequate identification of and control over the receipt and expenditure of those funds." On January 6, 1982 the Administrator delegated the authority to make this determination to you in Delegation of Authority No. 144.

Discusson: The Africa Bureau, at the beginning of FY 1982, initiated a process of "Certification Review" and "Certification" by Mission Directors and Office Heads. This review is designed to establish the adequacy of host country accounting systems. The Certfication requirements are spelled out in State 278344 dated October 20, 1981 and State 313799 dated November 25, 1981, both of which were forwarded to your office by previous memoranda with respect to Delegation of Authority No. 144. The latter was prepared by the Office of Financial Management and established for the Missions the minimum standards for host country accounting systems which must be met prior to certification.

In accordance with the above procedures, Dakar 331 of January 7, 1983 certified the adequacy of the Senegalese Institute for Agricultural Research (ISRA) in order to implement the Senegal component of the OMVS Agricultural Research II project (625-0957). ISRA will utilize a very simple USAID-designed system of accounting for AID funds. The system provides a cash receipts and disbursements journal which identifies each payment by project budget line item. This is an auditable system, and it satisfies Mission and Grantee needs. All funds will be maintained in a separate bank account. All bills, invoices, receipts, etc., will be separately filed. ISRA has used similar accounting systems for AID funds advanced in the past under other AID projects with no problem. USAID/Dakar Director certification of ISRA is based on the foregoing, and on a review of the institution's accounting system conducted by USAID's Controller staff.

The Project Paper indicates that accounting systems for the OMVS (regional), Mali and Mauritania institutions benefitting from 625-0957 project funds cannot yet be certified. The PP proposes to have all project funds for these components managed by the technical assistance contractor, a US university under Title XII. Part of the contractor's responsibility will be to help the OMVS and participating national institutions develop financial management and accountability systems which ultimately will be certifiable for AA/AFR determination.

As no funds will be managed by the OMVS or national implementing agencies of the Mali and Mauritanian governments, Section 121(d) does not require a determination as to acceptability or reliability of their accounting systems at this time.

Recommendation: That you make a determination, a) that the Senegalese Institute for Agricultural Research (ISRA) will maintain a system of accounts with respect to these funds which meets the requirements of Section 121(d) of the FAA, and (b) that the determination described in FAA Section 121(d) is not required at this time for the OMVS or the Malian and Mauritanian implementing agencies under project 625-0957, as all local costs will be controlled and disbursed directly by a US contractor.

Approved:_____

Disapproved:_____

Date:_____

Clearances:

DAA/AFR, ARLove_____
AFR/SWA, JBierke_____
AFR/SWA, JProcopis_____
AFR/SWA, FGilbert_____
GC/AFR, LDeSoto_____
AFR/DP, SSharp_____
AFR/PD/SWAP, GSlocum_____
AFR/PD, NCohen_____

Drafted by: AFR/PD/SWAP:AMcDonald:edb:01/17/83 EXT: 27886

OMVS Agricultural Research II (625-0957)

"Summary of Changes/Additions to the PP Resulting from December 14, 1982 Issues Meeting"

REF: State 242891 (Project Committee Guidance Cable)

Guidance Cable Ref.	Subject	PP Page(s)	Change or Addition
Para. 3-A	Relationship of of Ag.Research II to other projects	-	-
Para 3-B	Clarification of Farming Systems Research	-	-
Para. 3-C	Need for Stronger Irrigation Focus	-	-
Para. 3_D	Water Management Research	67	Add to para. 4 per S&T: "Water management considerations are central to the project. They must be addressed directly in research and research-extension linkages. Water management needs, in general, will be addressed through consultants. These may be with international agriculture research organizations for specific areas such as IRRA for rice, ICRISAT and the soils CRSP for rainfed agriculture, or through centrally funded S&T projects."

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Cable Ref.	Subject	Page(s)	Change or Addition
Para 3-E	Research-Extension Linkages	64	Per State 242891, add item (f) under first evaluation: (f) establishment of extension linkages to small farmers, including feedback from the farm level to researchers.
Para. 3-F	Technical Capability to Address Social Issues	55	Add after para 1, second sentence per: AFR/TR/ARD: "For Mauritania ... in Kaedi. Considering the critical nature of irrigated land use, land distribution issues in Mauritania which could effect the progress of research dissemination and adoption, arrangements will be made with the GIRM to utilize the services of returning AID trainees funded under the Land Tenure AIP." Add after para. 1, 3rd sentence, "For Mali, a contractor ...at Same. Short-term social science expertise will be recruited locally and/or from the U.S., as the need arises."
		38	At next to last para. (item (b) per AFR/TR/ARD, insert "...agricultural and social sciences (e.g. agricultural

Cable Ref.	Subject	Page(s)	Change or Addition
			economics, plant breeding, agronomy/ soils, anthropology) will be provided for 12 participants."
Para 3-G	Ability of OMVS and CIERDA Establish Priorities for Regional Research	127	Item b(2) per recommendation of the Project Committee, change word establishment to development.
Para 3-H	Title XII Versus Open Competition for Technical Assistance	55	First para. 5th sentence per recommendation of the Project Committee, correct sentence to read, "The contrtactor for each station will be a U.S. university." Add sentence to same para.: "In the event of non-responsiveness on the part of the Title XII universities, competition for the technical assistance contract(s) will be opened to private firms and international organizations."
Para 3-I	Integrated Pest Management	Annex E (IEE)	Page 3, add new first sentence Per S&T: "Prior to extension to the farmer of technology packages which include pesticides, the cost effectiveness of

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Cable Ref.	Subject	Page(s)	Change or Addition
			such uses will be determined, as well as relevant economic thresholds, as discussed on page 16 of this IEE."
Para. 3-J	Economic Analysis	-	
Para. 3-K	Recurrent Costs	-	Project Committee believes the PP provides as rigorous an analysis as practicable. However, question was raised as a discussion point for the ECPR.
Para. 3-L	Agronomic Expertise	-	-
Para. 3-M	Training		Per recommendation of the Project Committee, the respective Project Agreements will contain covenants to the effect that host governments will insure availability of qualified participants for project-financed training.
Para. 3-N	Budget Items	Annex B (Statutory Checklist)	Change item A-2 response to read: "The Project Committee determined that FAA Section 611(a) was satisfied, in that adequate engineering, financial and other other plans and reasonably firm cost estimates have been provided."

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Cable Ref.	Subject	Page(s)	Change or Addition
Para. 3-O	Procurement	-	
Para. 3-P	Audit and 121d Recommendation	-	A 121a certification will be prepared by USAID/Dakar, and a determination memo drafted by AFR/PD for AA/AFR approval. The ECPR Issues Paper will request a decision as to whether project should be authorized and/or funds obligated before OMVS has repaid monies owed to AID per an outstanding recommendation.
Para. 3-Q	Mission Management		