U.S.A.I.D./O.M.V.S.
INTEGRATED DEVELOPMENT PROJECT
NO. 625-0621

# VOLUME II

# PROJECT PAPER

USAID/RBDO
December 1982
Dakar, Senegal

O.M.V.S./U.S.A.I.D. INTEGRATED DEVELOPMENT PROJECT No. 625-0621

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PROJECT PAPER

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AGENCY FOR INTERNATIONAL DEVELOPMENT

# PROJECT DATA SHEET

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

COUNTRY/ENTITY: O. M. V. S.

3. PROJECT NUMBER: 625-0621

4. BUREAU/OFFICE: AFR | 06

5. PROJECT TITLE (maximum 40 characters): OMVS INTEGRATED DEVELOPMENT

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 90

7. ESTIMATED DATE OF OBLIGATION (Under "B." below, enter 1, 2, 3, or 4)
A. Initial FY 83 B. Quarter 4 C. Final FY 89

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

| A. FUNDING SOURCE | FIRST FY 83 B. FX | C. L/C | D. Total | LIFE OF PROJECT E. FX | F. L/C | G. Total |
|---|---|---|---|---|---|---|
| AID Appropriated Total | | | | | | |
| (Grant) | ( ) | ( ) | ( 9,500 ) | ( ) | ( ) | ( 63,000 ) |
| (Loan) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Other U.S. 1. | | | | | | |
| Other U.S. 2. | | | | | | |
| Host Country Senegal/Mauritania/Mali | | | | | | 2,500 |
| Other Donor(s) World Bank/Mauritania | | | | | | 11,000 |
| TOTALS | | | | | | |

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 | S200 | 230 | | 0 | | 63,000 | | 63,000 | |
| (2) | | | | | | | | | |
| (3) | | | | | | | | | |
| (4) | | | | | | | | | |
| TOTALS | | | | | | | | | |

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 070 | 050 | 030 | 040 | 060 | 540

11. SECONDARY PURPOSE CODE: S 280

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

| A. Code | BS | INTR | PART | TNG | TECH | | |
|---|---|---|---|---|---|---|---|
| B. Amount | | | | | | | |

13. PROJECT PURPOSE (maximum 480 characters)

1. To increase food production in the SRB to keep pace with population growth;
2. To promote policy reforms that remove constraints to agricultural production; and,
3. To improve the capability of private and public institutions in the SRB to manage the transition from traditional to irrigated agriculture.

14. SCHEDULED EVALUATIONS
Interim MM 02 YY 87 | Final MM 02 YY 90

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

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

17. APPROVED BY
Signature: David Shear
Title: Director, USAID/Senegal
Date Signed: MM 11 DD 16 YY 93

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

AID 1350-4 (8-79)

## 2.0. DRAFT PROJECT AUTHORIZATION

Name of Country/Entity: OMVS, Senegal, Mauritania, Mali.
Name of Project: OMVS Integrated Development Project.
Number of Project: 625-0621

1. Pursuant to Section 121 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the OMVS Integrated Development Project for the Organisation pour la Mise en Valeur du Fleuve Senegal (OMVS), and the Governments of Senegal, Mauritania, and Mali, involving planned obligations of not to exceed $63,000,000 in grant funds over a seven 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. The planned life of the project is seven years from the data of initial obligation.

2. The Project consists of the provision of technical assistance, construction services, training, commodities, credit, and financial support to the Organisation pour la Mise en Valeur du Fleuve Senegal (OMVS), the Republics of Senegal, Mauritania and Mali, and private and public entities therein. The project has both a regional component, which will be implemented by and funded through the OMVS, and national components which will be implemented by entities of the three Member States of the OMVS ("Member States"), the Republic of Senegal, the Islamic Republic of Mauritania, and the Republic of Mali, and funded through separate but coordinated project agreements.

a. The regional component will consist of the provision of technical assistance, training, commodities, and operating support to develop the capacity of the OMVS to coordinate development activities in the Senegal River Basin and thereby assist the Member States in increasing food production in the Basin. The regional component of the project will finance the preparation of a long-range development plan for the Upper Senegal River Valley; prepare feasibility studies for the development of 15,000 ha. of irrigated agriculture in the Basin; examine the impact of existing national agricultural and trade policies on the future development of the Basin; undertake development studies concerning land tenure, women, pastoralists, fishermen and fisheries, and telecommunications in the Basin; establish a regional management information system for monitoring and evaluating project activities; and, provide training and technical support to national project activities. Each of the studies will be undertaken in close collaboration with and the participation of technical and managerial representatives designated by the Member States.

b. The national project components (one each for Mali, Mauritania and Senegal) will provide for technical assistance, training, commodities, construction services, credit, and operating support in five project zones (Kayes in Mali, Kaédi and Gouraye in Mauritania, and Bakel and Podor in Senegal) in order to increase food production, to promote policies that remove constraints to agricultural production, and to strengthen the capability of farmers and private and public institutions in the Basin to manage the transition from traditional to irrigated agriculture. The national programs will provide for the upgrading of approximately 700 ha. of existing irrigated agriculture; the construction of approximately 4,900 ha. of new

irrigation; the improvement of agricultural extension, rural credit and production input systems; the construction of 136 kms. of feeder roads; and increasing the capabilities of national health services to monitor the incidence of diseases in the five project zones of Kayes, Kaédi, Gouraye, Bakel, and Podor. In addition, a pilot telecommunications system will be installed and tested on the left bank of the River for possible later expansion throughout the Basin.

3. The Project Agreements which may be negotiated and executed by the officers to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

a. Source and Origin of Commodities, Nationality of Services

Commodities financed by A.I.D. under the project shall have their source and origin in Mali, Mauritania, or Senegal or in the United States except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have Mali, Mauritania, Senegal or the United States as their place of nationality, except as A.I.D. may otherwise agree in writing. For procurements made with any funds granted directly to Mali, commodities may also have their source and origin in countries included in AID Geographic Code 941 and suppliers of such commodities or service may have countries included in AID Geographic Code 941 as their place of nationality, 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, for destinations to Senegal and Mauritania. For commodities shipped to Mali, Code 941 flag registry is authorized.

b. Conditions Precedent to be included in Project Grant Agreement with OMVS

(1) Conditions Precedent to First Disbursement

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement with OMVS, OMVS shall furnish in form and substance satisfactory to AID:

(a) An opinion of counsel for OMVS that the Agreement has been duly authorized and/or ratified by and executed on behalf of the OMVS and that it constitutes a valid and legally binding obligation of the OMVS and its Member-States in accordance with all of its terms;

(b) A statement of the name of the person holding or acting in the office of the OMVS representative for this Agreement and any additional representatives, together with a specimen signature of each person specified in such statement;

(c) Evidence that a Project Manager acceptable to AID has been appointed in the OMVS Directorate of Development and Coordination, and has been invested with the rank and authorities necessary to assure coordination and direction of divisional level staff;

(d) Evidence that a Project Management Unit has been established under the direction of the Project Manager to direct and coordinate Project activities.

(2) Conditions Precedent to Additional Disbursements

(a) During the initial years of project implementation local currencies will be disbursed directly by AID or by a U.S. technical assistance contractor. OMVS will gradually assume responsibility for local disbursement. Prior to disbursement under the Grant of local currencies to be controlled by the OMVS, or to the issuance by AID of any documentation pursuant to which such disbursements will be made, the OMVS will furnish to AID, in form and substance satisfactory to AID, evidence that independent project-specific financial management and administrative systems have been set up under the direction of the Project Management Unit and such systems shall have been certified by AID as providing adequate identification of and control over the receipt and expenditure of AID funds under the requirements of Section 121 (d) of the Foreign Assistance Act of 1961, as amended.

(b) Prior to disbursement under the Grant or to the issuance by AID of any commitment documents under the Project Agreement for the provision of goods or services under contract with OMVS, the OMVS will, except as the OMVS and AID many otherwise agree in writing, furnish in form and substance satisfactory to AID:

(i) invitations for bids or requests for proposals for procurement of services or commodities estimated to exceed $100,000 including any local currency portion, prior to their issuance; and,

(ii) contracts financed under the Grant in excess of $100,000 including any local currency/portion, prior to their execution by the OMVS.

c. Conditions Precedent to be included in the Project Grant Agreements with Mali, Mauritania, and Senegal (the Member States)

(1) Conditions Precedent to First Disbursement

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreements, the Member States shall provide in form and substance satisfactory to AID:

(a) Evidence that a national program with yearly targets through the PACD, has been established to reduce and eventually eliminate subsidies on credit, fertilizer, seeds and other agricultural production inputs;

(b) An opinion of counsel for the Member State and all implementing agencies of the Member-State, that the Project Agreement has been duly authorized and/or ratified by, and executed on behalf of the Member State and that it constitutes a valid and legally binding obligation of the Member State in accordance with all of its terms;

(c) A statement of the name of the person holding or acting in the office of the Member State representative for the Project Agreement, and of any additional representatives, together with a specimen signature of each person specified in such statements; and,

(d) Evidence that a project manager has been appointed within each national entity responsible for project execution and has been accorded sufficient authority to direct the activities of his agency for project implementation.

(e) Evidence that the Member-State has accepted the authorization of OMVS to bind the Member-State to the regional component of the Project.

(2) Conditions Precedent to Additional Disbursements

(a) During the initial years of project implementation local currencies will be disbursed directly by AID or a U.S. contractor and Member State implementing agency project managers will be trained in project and financial management. Prior to turning over disbursement responsibilities to the control of the Member State implementing agencies, or to the issuance by AID of any documentation pursuant to which such disbursements will be made, the Member State will furnish to AID in form and substance satisfactory to AID evidence that independent project-specific financial management and administrative systems have been set up under the direction of the Project Manager in each national entity and that such systems shall have been certified by AID as providing adequate identification of and control over the receipt and expenditure of AID funds under the requirements of Section 121 (d) of the Foreign Assistance Act of 1961, as amended.

(b) Prior to the disbursement of funds under the Grant, or the issuance by AID of documentation pursuant to which disbursement will be made for the construction of irrigated perimeters or other irrigation works, the Parties shall, except as the parties may otherwise agree in wriging, prepare or have prepared for such irrigation work a site plan in accordance with the Environmental Guidelines for Irrigation Projects of AID, and such site plan shall have been approved by the Project Officer and AID environmental officer in the relevant AID mission.

(c) Prior to the disbursement of funds under the Grant, or to the issuance by AID of documentation pursuant to which disbursement will be made for the construction of feeder roads or the procurement of pesticides already not identified and approved by AID, the Parties shall prepare or have prepared an Initial Environmental Examination (IEE), or other appropriate documentation in accordance with AID environmental procedures.

(d) Prior to disbursement under the Grant, or to the issuance by AID of documentation pursuant to which disbursement would be made

for the procurement of goods and services under contract with the Member State, except as the parties may otherwise agree in writing, the Member States shall furnish to AID, in form and substance satisfactory to AID:

(i) invitations for bid or requests for proposals for the procurement of services or commodities estimated to exceed $100,000 including any local currency portion, for approval by AID, prior to their issuance; and,

(ii) contracts financed under the Grant in excess of $100,000 including any local currency portion for approval by AID prior to their execution by the Member State.

d. Covenants

(1) Project Evaluation

The Parties agree to establish an information management system and an evaluation program as part of the project. Except as the Parties otherwise agree in writing, the program will include, during the implementation of the Project and at one or more points threafter:

(a) monitoring on a national and regional basis of project inputs and outputs, of management objectives, and of socioeconomic data generated by the project implementation systems;

(b) evaluation of progress toward attainment of the objectives of the Project;

(c) identification and evaluation of problem areas or constraints which may inhibit such attainment;

(d) assessment of how such information may be used to help overcome such problems; and

(e) evaluation, to the degree feasible, of the overall development impact of the Project.

(2) Secretariat for the OMVS Consultative Committee

The OMVS agrees to designate a secretariat for the Consultative Committee, and to delegate to it responsibility for preparation of reports, studies, evaluations related to the socioeconomic development of the River Basin.

(3) National Project Coordination

Each Member State agrees to establish a national interministerial mechanism mandated to assure policy and management coordination of project activities, and of other socioeconomic development activities in the Senegal River Basin. It is further agreed that strong linkages will be established between national technical services and the OMVS Development and Coordination Directorate.

(4) Market Liberalization

The Member States agree not to restrict marketing in the Senegal River Basin and to collaborate with the OMVS Policy Making Structure to study and develop programs for liberalizing agricultural and related markets and trade and for harmonizing pertinent national policies to the extent that they impact upon the Senegal River Basin. As part of this program, the Member States also agree: (1) to actively encourage through policy and administrative actions the participation of the private sector in the development of the River Basin and particularly in the areas of agricultural input supply and produce marketing; and (2) to permit farmer and farmers associations to control the purchasing of agricultural inputs and marketing of their produce.

(5) Tax-Free Importation of Project Commodities

The Member States agree to assure tax-free importation, and expedited entry to the project zones by the shortest route, of all commodities funded by AID under the Project, destined for activities in any of the Member States. Shelf items and other commodities procured locally as provided by waivers will be exempt form local taxes and import duties.

(6) Participant Training

The Member States agree to assign personnel who have receive training under the Project, to positions within the implementing agencies, suitable to the type and level to training that they have received.

e. Waivers

The following waivers to AID regulations are hereby approved:

(1) a source/origin waiver and a waiver of the requirements of Section 636(i) of the Foreign Assistance Act of 1961, as amended to permit the procurement of 22 motor vehicles for Mauritania and 52 small motorbikes (mobylettes) for Mauritania, Senegal, and Mali of Code 935 source and origin of an approximate value of $680,000;

(2) a conditional waiver of nationality of supplier from Code 000 to Code 935 to permit local advertising and contracting for construction of the Podor perimeter in the event that no responses are received from U.S. source and origin firms, or that the lowest responsive U.S. bid is more than 50 percent higher than the lowest responsive Code 935 bid. Approximate value of this contract is estimated at $6.4 million.

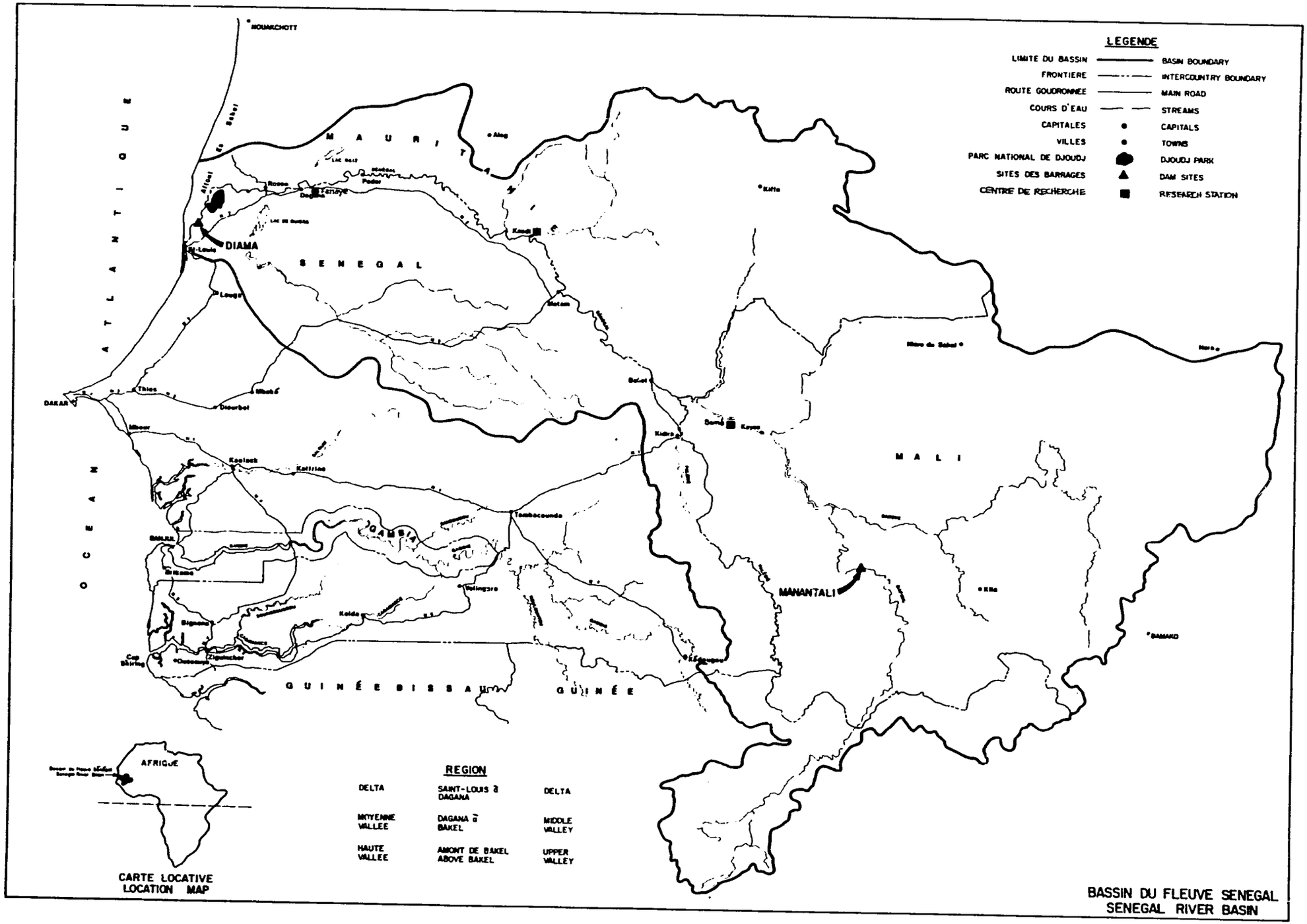
(3) a waiver to raise the shelf-item procurement authority of the project to a unit value of $12,000 and total amount from 10 percent to 15 percent of local currency costs, in order to assure the success of the credit system and of the private sector program of the project.

(4) a source/origin waiver from Code 000 to Code 935 to permit the local procurement of medicines for the health surveillance and control programs in Mauritania, Senegal and Mali of an approximate value of $300,000.

Signature: _____

W. Peter McPherson
Administrator, AID

Date: _____


LEGENDE
LIMITE DU BASSIN
BASIN BOUNDARY
FRONTIERE
INTERCOUNTRY BOUNDARY
ROUTE GOUDRONNEE
MAIN ROAD
COURS D'EAU
STREAMS
CAPITALES
CAPITALS
VILLES
TOWNS
PARC NATIONAL DE DJOUDJ
DJOUDJ PARK
SITES DES BARRAGES
DAM SITES
CENTRE DE RECHERCHE
RESEARCH STATION
MAURITANIE
SENEGAL
MALI
DIAMA
MANANTALI
GAMBIE
GUINÉE BISSAU
GUINÉE
OCEAN ATLANTIQUE
NOUAKCHOTT
DAKAR
Saint-Louis
Podor
Matam
Kayes
Kita
Bamako
Tambacounda
Kolda
Ziguinchor
REGION
DELTA
SAINT-LOUIS à DAGANA
DELTA
MOYENNE VALLEE
DAGANA à BAKEL
MIDDLE VALLEY
HAUTE VALLEE
AMONT DE BAKEL
ABOVE BAKEL
UPPER VALLEY
AFRIQUE
CARTE LOCATIVE
LOCATION MAP
BASSIN DU FLEUVE SENEGAL
SENEGAL RIVER BASIN

## 3.0. PROJECT DESCRIPTION

### 3.1. Summary and Recommendations

| | | |
|---|---|---|
| 1. | Organization | : OMVS (Organisation pour le Mise en Valeur du Fleuve Sénégal) |
| 2. | Project | : OMVS Integrated Development (625-0621) |
| 3. | Funding | : $63 million * |
| 4. | Life of Project | : 7 years |

The OMVS Integrated Development Project (IDP) is a comprehensive regional project for the development of the Senegal River Basin (SRB) in the states of Mauritania, Senegal and Mali. The project consists of immediate action programs for irrigated agriculture, health monitoring, and road construction in Mauritania, Senegal and Mali; and of regional planning, policy and feasibility studies for additional projects and for harmonizing and accelerating development in the basin. The project has been designed to integrate production, policy and planning activities in order to increase food production, to promote policy reforms, to remove production constraints, and to improve the capability of private and public institutions in the SRB to manage the transition from traditional to irrigated agriculture.

The project fully conforms to the AID development strategy for the region as presented by the regional strategy statement, U.S. Development Objectives in the Senegal River Basin, USAID/Senegal, River Basin Development Office, June 1982. That document provides a general analysis of the Senegal River Basin, food production, donor involvement, U.S. interests, and basin institutions, and it outlines AID's planning and programming strategy for development assistance to the region. This project document presents the specific activities, management systems and resources that will be used to achieve U.S. development objectives in the region.

The OMVS Integrated Development Project is a regional project to be implemented by the OMVS and by specialized agencies of its three member states, and managed jointly by the USAID River Basin Development Office (RBDO) and the three USAID's in Mauritania, Senegal, and Mali. Programming and fiscal procedures for the project will be set-up to maintain clear distinctions and lines of authority for implementation. These procedures will be established by the project agreements through the process described in detail in Section 5, Implementation Plan.

A series of formal negotiations with the OMVS and its three member states has led to an agreed draft of the overall protocol accord which is in Volume III, Section 8. This protocol will be refined and put into final form when the project is authorized. The protocol agreement sets forth the responsibilities and obligations of the parties--AID, the OMVS, and the member states--for all activities and for the entire cost of the project. Thus, it represents a life of project commitment by all parties for the overall development program. The protocol presents the general understanding that all parties have reached regarding this regional project. It contains the elements of and the instructions for the execution of the four separate project

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* The approved (PID) level for project funding is $62 million. An additional $1 million is being requested for the telecommunications component.

agreements--with the OMVS and each member state--that will be the obligating documents for the project. The protocol will stipulate the major conditions precedent and covenants that are required for each of the project agreements, to assure that the regional objectives of the project are achieved.

Project implementation in each of the three participating countries will be the responsibility of national implementing agencies with guidance and management support of the respective USAID's in Mauritania, Senegal and Mali. The OMVS, with guidence and support from the RBDO, will be responsible for the implementation of the regional activities of the project and for policy and programmatic coordination of the entire project. In order to facilitate this decentralized project's structure, this paper presents project activities, implementation plans, and management systems, by regional and individual country component. However, they all share the common program strategy ard objectives, and will have interlocking, complementary effects on development in the basin. The OMVS and the RBDO will assure unified development, and coordinated execution of activities among the regional and national programs.

The overall protocol accord will stipulate the major conditions precedent and covenants and these will be included in each of the project agreements to assure that the regional objectives of the project are achieved. These include as conditions precedent (1) the establishment of national programs for the reduction and eventual elimination of input and credit subsidies, (2) the appointment of a project manager within each implementing agency for project execution, and (3) the establishment of an independent project--specific financial management and administrative system. The covenants are that each government (1) establish an interministerial coordinating committee for policy level project coordination, (2) agree to the liberalization of agricultural and related marketing within and across national borders, and (3) agree to actively encourage participation of the private sector in input supply and produce marketing in the basin. The national project agreements will contain several additional conditions precedent and covenants as required by AID regulations concerning irrigation systems and feeder roads construction, local currency disbursement, and customs and tax exemptions. These are specific to the national prog ms and will not be included in the overall protocol accord.

Total project costs are estimated to be $63 million for AID and $2.5 million for the OMVS and member states. Farmers in the five project zones will contribute labor and goods and services calculated at roughly $60 million. AID funding will be for grants of $21.7 million for project activities in Mauritania, $21 million in Senegal, $11 million in Mali, and $9.3 regional with the OMVS. The participation of the OMVS and member states will be in the form of counterpart funds and in-kind contributions. The OMVS and member states will pay for the salaries of national project personnel in the implementing agencies, for the costs of zone-level administrative support by the ministries concerned, and for any input or price subsidies that are still in existence when the project begins.

Procurement of goods and services for the project will be from the United States (Code 000) and the host country for Mauritania, Senegal and the OMVS, and from the Selected Free World (Code 941) and the host country for Mali, except for three procurement waivers that are requested for the

project. These are for a waiver of source and origin from Code 000 to Code 935 (Special Free World) to permit the purchase of 22 vehicles ($625,000) for Mauritania; 52 small motorbikes ($52,000) for Mauritania, Senegal and Mali; and medicines for health surveillance ($300,000) in the three countries. The waivers are included in Volume III, Section 7.

A conditional waiver of nationality of supplier from Code 000 to Code 935 is also requested to permit local advertising and contracting for construction of the Podor perimeter ($6.4 million), in the event that no responses are received from U.S. source and origin firms.

In addition, because of the special procurement needs of the project credit program, a waiver is requested to raise the shelf-item procurement unit value to $12,000 and the total amount available for shelf-item procurement from 10 percent to 15 percent of local currency costs in the project. This will permit all items under the credit program (including pumpsets with a unit value of $11,000 and rice hullers with a unit value of $7,000) to be purchased as shelf items and thus, help assure the success of the credit system and private sector program objectives. Details are provided in the Procurement Plan, Section 5.3, and the Private Sector Analysis, Volume III, Section 3.10.

## 3.2. Goal, Purpose and Outputs

### 3.2.1. Project Goal

The goal to which the OMVS Integrated Development Project will contribute is to increase and secure agricultural production in the Senegal River Basin through multi-donor financed integrated agricultural development. The project will contribute to this goal by increasing agricultural production and productivity, by refining irrigation development techniques as models for additional projects, by producing project proposals for donor financing, and by encouraging policy reforms favorable to development in the basin. Progress toward this goal will be measured in the medium and long term by changes in macro-indicators for food production, rural income and health status, and by changes in donor project financing and direct foreign investment in the basin.

### 3.2.2. Project Purpose

The project has as its purpose the three main objectives for U.S. development assistance in the Senegal river basin as presented by the regional strategy statement. These objectives are:

(1) to increase food production in the SRB to keep pace with population growth:

(2) to promote policy reforms that remove constraints to agricultural production; and,

(3) to improve the capability of private and public institutions in the SRB to manage the transition from traditional to irrigated agriculture.

Progress toward the achievement of this purpose will be indicated in agricultural production and productivity increases; member state policy changes concerning subsidies, prices, regional trade, land tenure,

fishing and grazing rights, transportation, and telecommunications; input supply and produce marketing channels and changes in private and public support systems. These changes will be identified and measured through the project implementation and impact monitoring systems and by routine and special project evaluations.

3.2.3. Project Outputs

At the regional level the project outputs will be:

(1) a regional system of financial management, programmatic coordination and training and technical support for agricultural development in the SRB;

(2) policy, planning and feasibility studies including a long-range regional development plan for the upper valley (for the regions of Gouraye, Bakel and Kayes); feasibility studies for up to 15,000 hectares of irrigated agriculture; and policy recommendations concerning women, pastoralists, fishermen, land tenure, regional trade, and telecommunications;

(3) a model project management information system that provides reliable data to monitor project impact and evaluate results;

(4) a business promotion program and information packages for potential investors in the SRB;

(5) an effective donor financing and coordination mechanism for agricultural development in the SRB.

At the national level in the five project zones the project outputs will be:

(6) approximately 160 village associations effectively constructing and managing irrigated perimeters, obtaining and managing production inputs as well as marketing outputs;

(7) approximately 1,500 villagers trained as perimeter technicians for pump operations, water distribution, maintenance of civil works, management of village associations, animal traction, and functional literacy;

(8) improved agricultural extension involving animal traction, alternative water use technology, selected agricultural equipment, improved crop storage and processing techniques plus effective use a joint research/extension program for field demonstration;

(9) rehabilitation of 32 existing perimeters with a total of 703 hectares in the Bakel, Kayes and Gouraye project zones;

(10) construction of 2,120 hectares of new small village perimeters, 1,907 hectares of medium-sized perimeters, and 933 hectares of cuvette* gravity-fed irrigation;

(11) improved technical support for and continuous monitoring and evaluation of irrigated agriculture by the Regional Development Agencies (RDA's);

(12) improved rural credit and production input supply systems;

(13) construction of 136 kilometers of feeder roads, and a feasibility study for the Kayes-Diboli road;

(14) strengthened health surveillance capabilities of local health services, and baseline and follow-up epidemiological surveys in the five project zones.

Progress toward the achievement of these outputs will be measured by the project implementation and impact monitoring systems that will be established by the RDA's in each project zone under the coordination of the Project Management Unit in the OMVS. The operation of the monitoring system is presented in Section 6, and detailed verifiable output indicators are provided in the "Project Logical Framework", Section 10.2.

### 3.3. Project Activities

The Integrated Development Project will promote an agricultural development policy framework for the OMVS member states and donor orgainzations. The three primary aims of this framework are as follows:

1. To modify policies that constrain optimal agricultural production;

2. To mobilize capital and resources to accelerate development of the SRB and to share the risks inherent in policy reform measures;

3. To remove technological and organizational constraints to agricultural development.

This section describes the role and responsibility of the OMVS in pursuit of the policy framework described above as well as the management responsibilities of the OMVS High Commission in implementing the Project.

#### 1. Policy Reform

As the Economic Analysis (Volume III, Section 2) demonstrates, current agricultural policies in the Senegal River Basin provide insufficient incentives to farmers to expand food production beyond local needs. Principal

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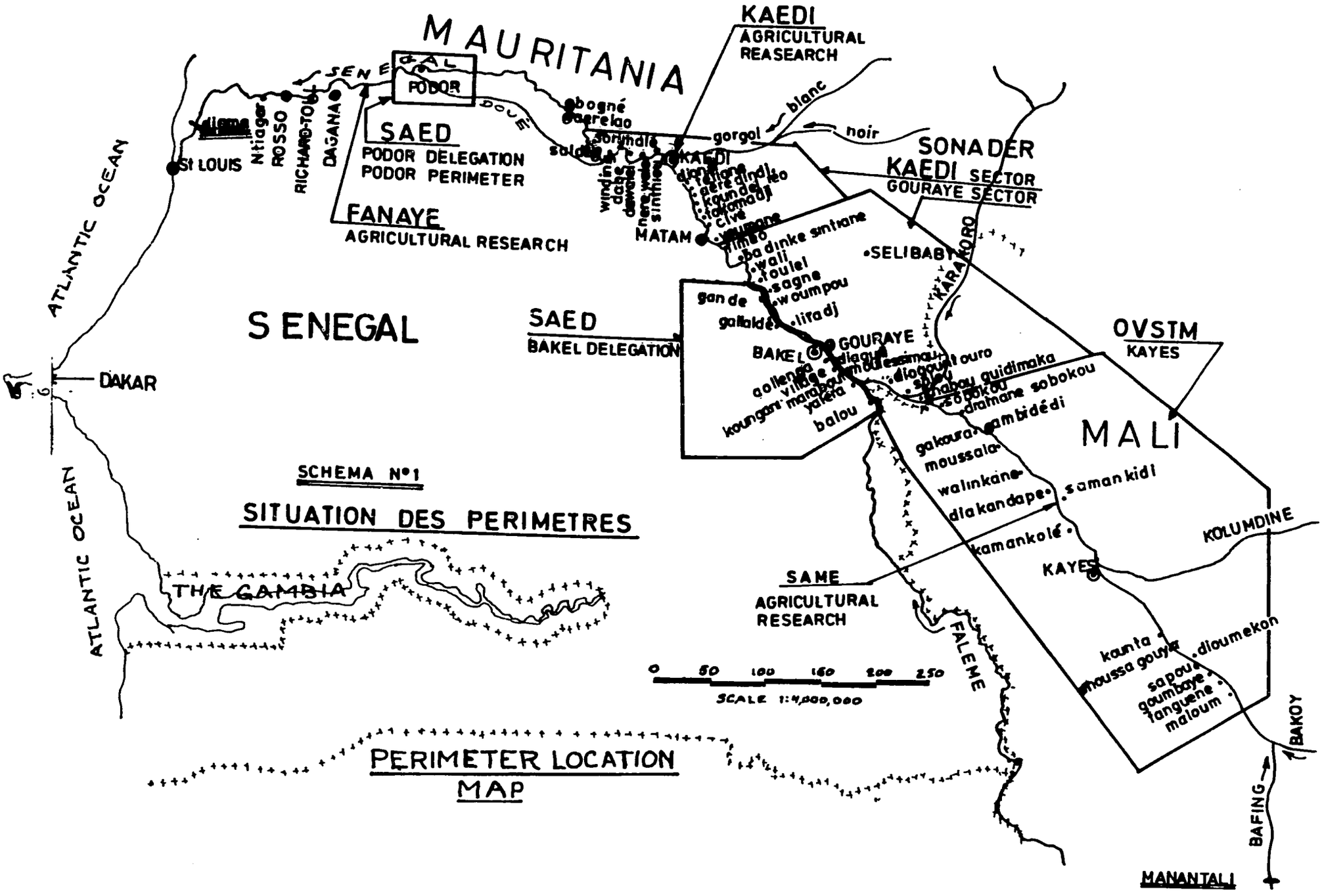
* Cuvettes are former riverbeds or depressions lying parallel to the river. They are alluvial areas with heavy loam soils.


MAURITANIA
KAEDI
AGRICULTURAL
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blanc
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PODOR PERIMETER
FANAYE
AGRICULTURAL RESEARCH
SONADER
KAEDI SECTOR
GOURAYE SECTOR
ATLANTIC OCEAN
St LOUIS
Ndiaga Ndiaye
ROSSO
RICHARD-TOLL
DAGANA
MATAM
SELIBABY
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responsibility for adjusting these policies rests with the OMVS member states. The OMVS is responsible for analyzing the impact of national policies across national borders, as specified in its mandate.

The IDP will provide resources to strengthen the institutional capacity of the OMVS to analyze policy options, evaluate agricultural production systems from a regional perspective, and make recommendations to the member states for corrective action. The region-wide Management Information System (MIS) to be designed and installed by the IDP under the direction of the OMVS will generate continuous and reliable data to serve as the basis for measuring progress and determining the impact of policy adjustments.

During project implementation, the OMVS will have the opportunity to strengthen its planning and coordination capacities, particularly in supervising the upper valley development plan. This plan, further described below, is intended to coherently integrate the master plans for the development of the Gouraye (Mauritania), Bakel (Senegal), and Kayes (Mali) subregions, with due regard to cross-border implications. Inter-state collaboration will be essential for the successful completion of the sub-regional and upper valley plans.

2. Mobilization of Capital

The most effective mechanism for resource mobilization in the SRB is the OMVS Consultative Committee (CC). The CC, chaired by the president of the OMVS Council of Ministers, is comprised of representatives of major donors committed to SRB infrastructure and downstream development, as well as delegates from the three OMVS member states. The committee has successfully mobilized the nearly $800 million required to construct the two major dams.

The IDP will strengthen the OMVS capacity to support program and project-specific deliberations of the Consultative Committee through two related project initiatives. The first initiative will be to assist the OMVS in establishing a staff secretariat capable of providing to the CC data, analyses, and recommendations on production and policy issues of agricultural development in the SRB. Second, the project will finance the completion of feasibility studies for up to 15,000 hectares of irrigated farms in the SRB. These studies will be carried out under the supervision of the OMVS but in close collaboration with specialized agencies of its three member states. These studies will be prepared in the form of project dossiers ready for donor consideration and financing, and will be presented to the CC upon completion.

The CC will thus have access to (1) planning and policy studies which will establish the policy framework necessary for the integrated development of the SRB, and (2) project-specific studies guiding agricultural investments within the previously established policy framework.

This strategy draws upon existing institutions to strengthen both inter-state and inter-donor investment management.

The Consultative Committee is a unique mechanism for assuring a coordinated planning and implementation of development assistance in the SRB, unlike piecemeal approaches in the past. It has no counterpart on a bilateral or national level.

3. Technical and Structural Constraints

Specialized institutions of the OMVS member states are primarily responsible for addressing these issues. Initiatives proposed by the IDP for the reform of agricultural research and production institutions are discussed in detail in other sections of this paper. The OMVS role in technology evaluation, information dissemination, and inter-state collaboration is described below. The Management Information System will generate data which, once aggregated and analyzed, will demonstrate whether the innovative technical and structural reforms introduced by IDP are effective. The OMVS' analytical role will be essential in determining the comparative advantages of IDP innovations and of disseminating the results to its member states.

Strengthening of OMVS capabilities to foster private sector participation in SRB development is another important IDP objective which is described in greater detail below.

3.3.1. OMVS Regional Program Activities

In line with the objectives and strategy presented above, the IDP Regional Program will support the following activities:

1. A long-range regional development plan for the upper valley;

2. Feasibility studies for irrigation development and for a fishing estuary in the Delta;

3. Policy development studies concerning land tenure, women, pastoralists, fishermen, and telecommunications;

4. Financial and programmatic coordination for all project activities;

5. A Management Information System (MIS) supported by improved baseline studies, continuous monitoring, and periodic evaluation;

6. Private sector development through a regionally coordinated business promotion program;

7. Training, conferences, and technical support for IDP national program activities;

8. Donor coordination to improve project planning and to increase capital investments for agricultural development in the SRB.

(1) Long-Range Development Plan for the Upper Valley

The 1980's and 1990's will be decades of dramatic change in the upper valley. Construction of the Manantali Dam is already bringing new sources of income and employment into the region. Once the reservoir is filled and used for seasonal water storage, the pace of agricultural change will accelerate and the importance of river transport will grow. With the installation of

hydroelectric generators in the mid-1990's, possibilities for rural electrification in the region will multiply. Finally, the linking of the upper valley to Saint Louis and Bamako by a paved road will have an important influence on opening up the region.

As a result of these changes, the potential for agricultural production and marketing in the region is increasing quite markedly. This new potential, in turn, will generate higher income, greater employment, and new opportunities for investment in processing and other industries as well as various service activities.

Increased incomes will lead to changing patterns of consumption and marketing opportunities within the region. Improvements in transportation will permit increased trade flows between the upper valley and other areas of the OMVS countries, the rest of West Africa, and elsewhere.

It is inevitable in such a period that a number of critical constraints to development will arise. These may be technical, economic, social, institutional, or policy related. Surveys must be conducted within the region, for example, to identify potential sites for irrigated perimeters. Marketing of vegetable crops is already a constraint in some areas and land tenure problems prevail. Variations in agricultural price policies between countries lead to serious distortions in the distribution of resources.

A series of feasibility studies must be conducted to identify these constraints and to recommend activities or policy changes necessary to overcome them. These studies should be regional in nature because of the numerous linkages between the three countries. The studies will be used to aid in the preparation of a long-term development plan for the upper valley, which will include national development plans for the Bakel, Gouraye, and Kayes regions. The overall plan will consist of the following components:

a. a definition of the area studied;

b. an inventory of physical and human resources;

c. a description of the existing technological, economic, social, institutional, and policy situation;

d. an analysis and assessment of possibilities for developing the area;

e. a series of scenarios outlining alternative ways in which development might proceed;

f. the identification of major constraints to development;

g. a plan of action with recommendations for ways in which projects or policy changes intended to overcome these constraints can be implemented, including terms of reference for appropriate feasibility studies.

The plan will be prepared by a contract team working under the joint supervision of OMVS and the RBDO. The development plans for the Gouraye, Bakel, and Kayes regions will be prepared first in collaboration with the appropriate technical services of the member states. Management and programmatic supervision by the OMVS is required in order to assure that the regional development plans are constructed in a complementary and consistent manner. This is especially important in view of the fact that the long-term macro-economic viability of a region in one country may very well depend upon development actions taken in the neighboring country.

In year two of the project, a specially contracted staff as well as other national and expatriate IDP personnel will develop the component plans. The regional and subregional plans are expected to provide the OMVS and member states baseline data and recommendations for program initiatives. The plans will assist donor and recipient organizations in structuring development interventions in a rational manner, avoiding duplication of effort, and assigning appropriate weight to policy reform considerations.

(2) Feasibility Studies

Several reconnaissance and pre-feasibility studies undertaken in the middle valley have identified potential sites for further irrigation development. The IDP will fund appropriate feasibility studies based on the earlier studies, for up to 15,000 hectares of new irrigation development. The studies will present detailed information on the following topics:

a. land - area maps, topographic maps, soil maps, description of geomorphology, soil survey data, and drainage characteristics;

b. climate - variations in rainfall patterns from middle to upper basin;

c. water - surface water maps, project watershed and present land use, ground water maps, location of potential impoundment sites, and water quality data;

d. agriculture - present agriculture, proposed crops for irrigation, proposed irrigation methods, potential fertilizer and pesticide requirements, and principal crop pests;

e. public health - major diseases, population size and characteristics, available health services, water supply, and sanitation;

f. vegetables and wildlife - inventory of natural vegetation in the area, potential endangered plants or wildlife, forest areas, forest and wildlife legislation in area;

g. social and economic factors - plans for community participation, land use and demographic history, land tenure, local economy and commerce, local government, transportation network, migrations, inventory of nonagricultural resources; and,

h. energy - current and projected sources of energy, comparative analysis of generating costs, projected agricultural sector requirements of energy in the SRB.

i. engineering planning and design - site layout, system plan, dikes, irrigation network, pumping system, implementation and maintenance plans.

These feasibility studies will be prepared by a contract team working under the joint supervision of OMVS and RBDO. In year four of the project, following completion of the upper valley development plan, the staff specifically contracted for the feasibility studies as well as other national and expatriate IDP personnel will develop the studies in the designated zones. These feasibility studies will serve as project dossiers for the OMVS and member states to present to donors for funding through the OMVS Consultative Committee.

The second type of feasibility study will explore the possibility of constructing an artificial estuary in the Diaouling-Tianbrank area of the Delta by building a canal from the Senegal River at Debi to the Tianbrank. This estuary was recommended by the OMVS Environmental Study (USAID Project No. 625-0617) as a possible mitigating measure for the adverse effects that the Diama Dam will have on certain species of aquatic life in the Delta.

The Fishing Estuary Study, a preliminary engineering and feasibility study, is expected to provide the OMVS with the means of recreating conditions for an adequate habitat (replacing to some degree the one destroyed by the Diama Dam) thereby ensuring the survival of certain aquatic species in the Delta. The study's objectives are as follows:

a. To establish the biological feasibility of creating an artificial estuary in the Tianbrank-Diaouling complex, taking into consideration the requirement of major fish and shellfish species as well as the preservation of a representative sample of the ecosystem currently existing in the Delta;

b. To establish the technical feasibility of creating the artificial estuary with regard to hydraulic and civil works and to prepare preliminary engineering designs for all proposed hydraulic structures; and,

c. To establish the economic feasibility of the artificial estuary, through an analysis of the benefits to be derived from fishing harvests, employment, and food considerations against the costs associated with the transfer of water from the Diama reservoir to the Tianbrank-Diaouling estuary.

Completion of the study will require about six months of work by a consultant team consisting of a fisheries biologist, a hydraulic engineer, a civil engineer, an economist, plus support staff. RBDO will contract for this expertise for the OMVS.

(3) Policy Development Studies

The preparation of the long-term development plan for the upper valley, presented above, will involve policy studies and recommendations as well as project specific feasibility studies. In addition to these, the IDP proposes

several studies aimed at systematically examining the actual and potential impact of SRB development upon certain groups, such as women, fishermen, pastoralists, and landless farmers. These studies will be concerned with two principal issues:

a. immediate and long-range effects; and,

b. strategies to minimize the negative consequences and maximize benefits to these groups.

The detailed planning and supervision of these studies will be done by the IDP senior applied anthropologist, who will serve as part of the OMVS project management unit. He/she will collaborate closely with the USAID social scientists, the project and RDA social scientists, and consultants in each national program. Much of the fieldwork will be executed by fulltime OMVS and IDP staff, supplemented by field research assistants and consultants working on a specific problem. To make maximum use of project resources, including the professional staff and fulltime field personnel, these studies will be closely coordinated with the long-range development plan for the upper valley, and with the monitoring/evaluation system and baseline surveys. The studies will be conducted during the first few years of the project. The results will include specific recommendations for mitigating negative effects and increasing opportunities for these groups. As recommendations are incorporated into project activities, they will be monitored and their results evaluated by the OMVS management unit. Detailed terms of reference and workplans for the implementation of each study will be prepared by the OMVS and IDP Regional Contractor and submitted to RBDO for approval prior to the disbursement of funds for these studies.

One particularly important policy study will concern land tenure policy. Three kinds of land transactions are required to introduce irrigation into the Senegal River Basin:

a. acquisition;

b. redistribution to user group or groups, and

c. a continuing system of local land administration that secures farmers' interests in the land while permitting transfers as the need arises. The current land law and administration systems of each of the member states are inadequate in all three areas, particularly in the matter of continuing local administration.

For implementation of the land tenure policy studies under the IDP, a Commission on Land Law and Administration will be established by the Ministry of Plan or of Rural Development in each country. This commission will be responsible for studying and testing, in years one through four of the IDP, local and administration procedures and records systems suitable for irrigated lands. The model system of land inventories and distribution records to be used on the perimeters financed by AID will provide case studies. Technical assistants (legal, economic, agronomic and sociological), contracted by the commissions, will study policy and legal options. Funding will also be provided for training and orientation sessions for local administrative personnel (of the Ministries of Interior, of Rural Development, the RDA's and IDP personnel) on modes of implementation and/or models to be tested.

Upon completion of the studies and formulation of proposals (projets de loi), Senegal and Mali (in project year five or six) will hold national colloquia on land tenure in irrigated agriculture at which the reports of the studies will be thoroughly discussed. Mauritania has already scheduled a national colloquium on land tenure, with separate funding. Participants in the seminars will include personnel of all ministries concerned with rural development, AID project personnel, and OMVS representatives.

In the final year of the project, the OMVS will sponsor a colloquium for the three countries, including the same participants as above, in which their deliberations and experiences can be compared. A detailed analysis of land tenure in the basin is presented as part of the "Social Analysis", Volume III, Section 2.

Another subject of policy studies will be the telecommunications policy in the Senegal River Basin. The lack or inadequacy of a basic telecommunications infrastructure in the Senegal River Basin is a serious impediment to the long-term economic and social development of the area. This policy study will identify requirements that must be met in the next decade for the effective administration of certain development outputs (management information systems, project implementation and supervision, provision of inputs and marketing, monitoring of environmental and other conditions, support services to research and extension work, support services for primary and public health care, health surveillance, support to primary education, etc.), and present potential economic and social development benefits to river basin development resulting from telecommunications. The study will make as complete an inventory as possible of the existing and planned telecommunications systems in the river basin, including those of the public telephone carriers and of private systems in place or planned. It will identify the performance, problems, and potential of these systems and attempt to identify their total capital and operation and maintenance costs. In addition, demographic and geographic data will be arranged in a suitable format for the analysis.

On the basis of the above needs assessment, the study will project the amount of telephone traffic and its flow between the key sites for the short and long-term. It will determine if telephone, facsimile, telex, and data services are required and, if deemed desirable, radio and television services. The best mix of satellite and terrestrial systems to satisfy these needs will be modeled using the existing (INTELSAT and Telecom - 1), planned (ARABSAT), and potential (AFSAT, AFRISAT, etc.) space segment capacity.

The study will relate closely to the pilot satellite communications project being funded under the IDP program for Senegal. This pilot project will provide a satellite telecommunications link from Saint Louis to Bakel and provide concrete data on the construction and operation of such a system in the basin.

The study will result in a set of recommendations regarding the design of a regional telecommunications system and steps for establishing and operating such a system. The study is also expected to strengthen member state cooperation in terms of telecommunication policy and assess donor willingness to contribute to construction of the recommended system. The Telecommunications Technical Analysis appears in Volume III, Section 3.7.

Table 1

## INTEGRATED DEVELOPMENT PROJECT

## STAFFING PLAN

| Management Units | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Total Number of Years of Staff Assignments |
|---|---|---|---|---|---|---|---|---|---|
| OMVS | | | | | | | | | |
| 1. OMVS General Manager | PRE-IMPLEMENTATION | | | | | | | | 7.5 years |
| 2. OMVS Director of Integrated Development Division (IDD) | | | | | | | | | 7.0 years |
| 3. USAID Deputy Director of IDD/Management Specialist | | | | | | | | | 4.0 years |
| 4. USAID Anthropologist | | | | | | | | | 4.0 years |
| 5. USAID Epidemiologist | | | | | | | | | 5.0 years |
| 6. OMVS Epidemiologist | | | | | | | | | 6.5 years |
| 7. USAID Health Planner | | | | | | | | | 2.0 years |
| 8. USAID Enterprise Development Specialist | | | | | | | | | 2.0 years |
| 9. OMVS Accountant | | | | | | | | | 7.0 years |
| 10. USAID - MIS. Specialist | | | | | | | | | 2.0 years |

SUMMARY:

OMVS - Financed Staff: 2 Managerial; 2 Technical
USAID - Financed Staff: 1 Managerial; 5 Technical

(4) Financial and Program Coordination

As is fully described in Section 5 below, the authority for project implementation will be established by the Overall Protocol Agreement between the OMVS and USAID/RBDO and the country and regional project agreements between each member state and the respective USAID. The OMVS and RBDO will have the dual role of implementing regional activities for which they will have direct authority, and of supporting the implementation of national project activities by the member states. In order to accomplish these functions, a Project Management Unit will be established in the Directorate for Development and Coordination (DDC). The unit which is the DDC's Integrated Development Division, will be responsible for the supervision and management of regional project activities within the OMVS, for the financial and programmatic coordination of the entire project, for technical and training support to the national programs, and for overall project monitoring and evaluation.

Financial and programmatic coordination procedures for the project will be established by the project agreements and by subsequent implementation letters issued for the project by the OMVS and RBDO. The principal means of effecting the project management and coordination function will be through the annual project workplans and budgets that each national implementing agency will be required to prepare to obtain implementation authority and budget allotments for the upcoming year. The workplans and budgets will be discussed and agreed upon in an annual implementation review and workplan development seminar that will be organized by the OMVS and RBDO project managers. These seminars will include the project management personnel in the national implementing agencies and the respective USAID's. The agreed upon workplans and budgets will be used to request the annual allotment of funds from AID/Washington directly to the various project components. Implementation of these workplans will be monitored regularly by the USAID's, and monitored and reviewed semi-annually by the OMVS and RBDO through the project management information system. The USAID's and national project management staff will be responsible for making minor changes and corrections during implementation of the workplans. Major changes in program strategy, policy, or objectives that would require a modification of the workplans and budget will require the approval of the USAID management committee which is described in the project implementation section of this paper.

(5) Management Information System (MIS)

A project management information system (MIS) will be established and supervised by the Project Management Unit. Its two principal components will be (a) the monitoring of project input and output performance in relation to workplan and budget targets; and (b) monitoring the impact of changes in agricultural production and in economic, social, and health indicators in the project zones.

a. Implementation Monitoring

The OMVS Project Management Unit will be responsible for setting up and supervising this component of the IDP. In accordance with the approved annual workplans and budgets for the regional and each of the national programs, the project management unit will establish a uniform reporting

system for use by project staff at every level. This system will include project monitoring forms specifying each expected output, and give a schedule for implementation performance. The zone level management unit (Podor, Bakel, Kaédi, Gouraye, and Kayes) will be responsible for providing the project monitoring data for the sector. The data will be compiled and provided to the respective USAID and national level implementing agency (Ministry of Health, Ministry of Equipment, etc.) on a quarterly basis and to the OMVS and RBDO on a semi-annual basis. This information will form the basis for the periodic review of implementation progress at the national level and the annual workplan and budget development seminars and six-month reviews at the regional level. The MIS is more fully described in Section 6 and in Volume III, Section 3.9., Project Monitoring.

b. Impact Monitoring

The OMVS Unit for Permanent Evaluation and Planning will be responsible for the supervision and operation of this component of the MIS. The OMVS Project Management Unit will assure that this component is compatible and integrated with the implementation monitoring component of the MIS. The unit for Permanent Evaluation and Planning has already established a good system for impact monitoring that will be further strengthened by support from the United Nations Development Program (UNDP) and the German Government. The program planned for the unit includes:

- follow-up and evaluation of development performance in the SRB;
- analysis of demographic census data;
- annual updating of a map showing all irrigated perimeters;
- collection of data on the results of each agricultural season;
- collection and aggregation of data on principal socioeconomic indicators;
- entry of irrigated perimeter data onto microcomputers to be installed at the OMVS;
- analysis of the effects of interannual flood variations;
- studies of costs of irrigation and irrigated cultivation.

There remain several areas in which the current monitoring program is deficient. First, it concentrates heavily on irrigated cultivation and ignores rainfed agriculture, livestock, and fishing. Secondly, the program does not include any disease or nutrition surveillance. Finally, it focuses on technical and economic considerations at the micro level and does not address concerns like marketing and economic policy.

A number of additional efforts will be carried out by the Unit to remedy these deficiencies, especially in the five project zones. These include the following measures:

- a series of farm/houshold surveys providing data for farm systems research and an evaluation of the impact of the project on the welfare of farmers;

- continuous impact monitoring to be coordinated with the implementation monitoring by the IDP Management Unit;

- health monitoring through a series of disease and nutrition surveillance surveys to be carried out by national health services in each of the project zones;

- coordination of the impact monitoring activities with data developed by the planning, policy, and feasibility studies of IDP.

(6) Private Sector Development

Private sector promotion activities of the IDP will be directed by a business development specialist serving as part of the IDP management unit and working with the Industrial Development Division of the DDC.

The business promotion activities of the IDP will include an orientation program for potential investors, a more detailed investment information package, and studies to better identify the constraints on private investment in the basin. The orientation program for potential investors will provide information on the infrastructural, economic, technical, and social aspects of SRB planning and emphasize potential areas for investor participation. The investment information package will cover the regulations of foreign and local investment in each of the member states and give step-by-step guidance on how to go about investing in the basin. The studies on business constraints will be closely coordinated with the planning, policy, and feasibility studies, particularly those for the upper valley development plan. The objective of these studies is to identify areas for which more detailed feasibility studies are justified.

The national components of the IDP are designed to strengthen private business and markets in each of the five project zones by supporting a pilot rural credit and artisan assistance program. The long-term goal of this program is to develop private sector and free market alternatives to the present RDA monopoly of input supply and produce marketing. The national components will provide technical assistance, training and administrative support to the rural credit, and artisan development programs in each zone. This support will go directly to the banks, artisan development centers, and RDA's participating in the program in each zone and will be integrated into the agricultural and irrigation development program of the IDP. The business development specialist will not be involved in these activities except to monitor them at the regional level and to assure that the experiences of this program are integrated into the other OMVS activities for business promotion and industrial development.

(7) Training, Conferences, and Technical Support

The OMVS Project Management Unit will be responsible for organizing participant training, technical conferences, and specialized technical support to assure effective implementation of the national development programs of IDP.

During project design, needs for short-term specialized participant training were identified. These include agricultural production, rural credit, fish ponds, research demonstrations, extension techniques, social science methodologies, and health surveillance. The OMVS Project Management Unit will assist national agencies with candidate selection, specific course identification, and enrollment of participants for these and other short-term training needs during project implementation.

Similarly, the Project Management Unit will organize the annual implementation review and workplan development seminars as well as a series of technical workshops and conferences during the life of the project. These will cover land tenure policy, economic policy, extension and research/extension techniques, sociological studies, irrigation engineering, health surveillance, and other areas involving issues important to project implementation.

For technical support to national program implementation, the OMVS Project Management Unit will coordinate the provision of direct assistance or the contracting of some services as presented above for the feasibility studies, sociological studies, monitoring systems, financial management, and training.

(8) Donor Coordination

The IDP will strive to improve donor coordination within the Senegal River Basin, acting through the OMVS Consultative Committee (CC) and the High Commission. Effective donor coordination was achieved by the OMVS in conjunction with the design and financing of the Diama and Manantali Dams. Representatives of donor organizations participated actively--both in an advisory and concurrence role--in all major aspects of the design of and contracting for dam construction. The High Commission Infrastructure Directorate served as the Consultative Committee Staff Secretariat, and committee members had and continue to have direct access to the two consulting engineering firms charged with supervising dams construction.

A majority of the donor organizations that are participating in the financing of the dams also participate--on a bilateral basis--in the funding of agricultural and rural development projects in the three OMVS member states. The Consultative Committee is interested in coordinating both donor and host government actions in basin development primarily because its members feel that in the short and medium term the value of the infrastructure lies in its contribution to agriculture.

In order to begin the process of regional integrated development planning, the Consultative Committee ordered and received in 1979 the first OMVS-produced indicative plan for SRB agricultural development. The middle and upper valley development plans to be completed under the IDP are a continuation, albeit more comprehensive, of the steps taken by the Consultative Committee in 1979.

The IDP will use the Consultative Committee as a forum for presentating and debating IDP project activities and outputs, particularly in the areas of policy reform and development studies. In both these areas, coordinated donor action and support is essential if the OMVS and member states are to receive the backing necessary to effect change.

In order for the Committee to act on the basis of rigorously developed analytical information, the OMVS, with U.S. assistance will establish and a staff Secretariat. This Secretariat will not be a separate organizational unit within OMVS. Rather, the IDP Project Management Unit will carry out the tasks required.

### 3.3.2. Mauritanian Program Activities

The national program for Mauritania will focus geographically on the upstream sectors of the river starting at the Mali border and going downstream some 320 kilometers to approximately 50 kilometers below Kaédi. This portion of the river, known as the Gouraye and Kaédi Sectors, contains a population of approximately 50,000 persons of which over 20,000 are in the regional capital of Kaédi. The strategy for working in this area is to develop a region that has previously been cut off from the rest of the economy and to improve the security of food supplied. This will involve constructing feeder roads, and developing irrigated and other agricultural activities to a level sufficient to create a substantial demand in these regions for equipment, spare parts, fertilizers, rice hullers, small-scale mills, repair services, and other inputs, as well as small surplus output for local marketing. The expansion of agriculture will thus be linked as closely as possible to the development of the local economy and to increased income and food security for local farmers.

#### A. The Agricultural Program

The agricultural program will involve 19 villages in the Kaédi sector and 14 villages in the Gouraye sector. These villages presently have 639 hectares of irrigated agriculture lands in small villages perimeters. They are farmed within a mixed farming system that also includes upland and rainfed crops of millet, sorghum, vegetables, and herding. The small irrigated perimeters generally consist of a diesel pump, network of canals, surface drains, some small flood protection dikes, and partially leveled plots that range in size from 10 to 40 hectares. Table 2 provides a summary of existing and planned perimeters in the project zone.

The Project provides for the development of 2,250 hectares of new irrigated perimeters in the Kaédi and Gouraye Sectors during its seven-year life. These perimeters will be developed through the combined efforts of AID and the World Bank via two distinct but closely coordinated interventions. It should be noted that an additional 300 hectares are being put under production in the Kaédi Sector, through a FED project that will continue through 1984. USAID interventions have been designed with due consideration to the timing, nature, and size of the FED project.

The construction of the 2,250 hectares of new perimeters will involve two phases. The first phase covers three years (1984-86) and will involve only small perimeters. During this phase, the World Bank will finance limited technical assistance, equipment, construction and operating costs required to develop 75 small perimeters covering 1,570 hectares. AID will provide complementary assistance during this period to upgrade SONADER extension services, strengthen farmer associations, and improve agricultural

Table 2

Existing and Planned Perimeters in the Kaedi Sector

| Kaedi Sector | Existing Ha | FED Project | USAID/World Bank Project | |
|---|---|---|---|---|
| | | | Phase 1 | Phase 2 |
| Youmane Yire | 15 | 20 | 50 | - |
| Cive | 40 | 20 | 60 | - |
| Tokomadji | 11 | - | 40 | - |
| Koundel Reo | 15 | 20 | 80 | - |
| Guusel Gubi | - | 20 | - | - |
| Aere Dindi | 13 | - | 30 | - |
| Tetiane Patoukone | - | - | 20 | - |
| Pjawo | 89 | 40 | 100 | - |
| Palel Guiraye | - | - | 20 | - |
| Sintiou | 15 | - | 40 | - |
| Nere Walo | 15 | 40 | 160 | - |
| Roufi Aoudi | - | 40 | - | - |
| Dirol | - | - | - | 300 |
| Dawalel | - | - | 40 | - |
| Dabbe | - | - | 40 | - |
| Winding | 32 | - | 20 | 300 |
| Sori Male | 36 | - | 80 | - |
| Abdehah | - | 40 | - | - |
| Kaedi Gattoya | - | 60 | - | - |
| TOTAL | 281 | 300 | 780 | 600 |

Table 2 (Contd)

Existing and Planned Perimeters in the Gouraye Sector

| Gouraye Sector | Existing HA | USAID/World Bank Project | |
|---|---|---|---|
| | | Phase 1 | Phase 2 |
| Khabou Guidimaka | 35 | 140 | - |
| Soulou | 30 | 75 | 80 |
| Diagountourou | 70 | 100 | - |
| Moulessimou/Diaguili | 62 | 140 | - |
| Liradji-El Salam (Mercel) | - | 20 | - |
| Woumpou | 35 | 50 | - |
| Sagne | 9 | 45 | - |
| Toulel | 33 | 60 | - |
| Wali | 53 | 80 | - |
| Benenki | 19 | 20 | - |
| Synthiane | 12 | 20 | - |
| Pimbo Paliba-Toulel | 15 | 40 | - |
| TOTAL | 373 | 790 | 80 |

Phase 2 will also include the upgrading of 190 hectares of existing perimeters. These will be selected jointly by SONADER and USAID/Mauritania.

credit and input supply systems. AID will also finance the preparation of a development plan for the Gouraye Sector and feasibility studies for medium-term irrigated agriculture development.

The second phase will cover four years (1987-90). This phase will involve the consolidation of the small perimeter program and the introduction of medium-sized perimeters. AID will finance the upgrading of existing perimeters in the Gouraye Sector and an 80 hectare extension of the village perimeter at Soulou. The upgrading of existing perimeters involves realigning some canals and releveling some plots to correct engineering design and supervision weaknesses in the original construction, and the installation of some water control and water measuring devices. The introduction of medium-sized perimeters will start with the development of two perimeters, each of approximately 300 hectares. Two sites have been proposed by the Mauritanian Government for these perimeters, at Winding and Dirol in the Kaédi Sector. Development of these perimeters involves the construction of small dams to establish seasonal reservoirs in low-lying basins from which water for irrigation can be pumped. By 1987, phase one project activities will have improved agricultural extension and introduced animal traction and other labor-saving and productivity-increasing technologies so that this larger-scale irrigation development will be possible. The medium perimeters will be organized along the same lines as the small perimeters with farmer associations directing the development and cultivation of their farms.

It should be noted that once the World Bank and FED-financed small perimeters are constructed, no further possibilities exist to develop in the Kaédi-Gouraye sectors what have been referred to as small village perimeters. This is so because all farmland exploitable through modest cost and simple management techniques will have been put under cultivation by 1986. The move to medium-sized farms is dictated both by physical constraints and by the need to evolve higher land-to-farmer ratios of cultivation and consequently of productivity.

Up until now, farmers in the project zones have looked to irrigation primarily to provide food security, and not as an important source of cash income. In part, this results from the small size of family plots-usually well under .5 hectares-which inhibits the production of much of a surplus for the market. But it also results from a cautionary approach by the farmer to a new technology and a new farming system. However, there is a growing demand for perimeter expansion and for new perimeters in villages which do not have them. Increased farmed areas and larger plot sizes are expected to lead to production of a surplus.

In order to improve productivity and expand irrigated agriculture production, the project proposes a strategy to:

- Increase the effectiveness of the regional development agency (SONADER) to provide higher quality technical direction and training in irrigation: both in increasing the productivity of old perimeters and in putting new ones under production;

- Maximize the participation of the rural populations in all phases of agricultural development and thereby encourage their commitment to irrigation;

- Establish more clearly defined, better understood, and accepted responsibilities between regional development agencies and farmer groups;

- Increase private sector involvement in the provision of inputs and the marketing and processing of farm produce, thereby increasing agricultural efficiency and reducing the recurrent costs burden of SONADER;

- Create a system of field data collection and performance monitoring that will permit evaluation of project efforts; that will produce baseline information reliable enough to guide the preparation of feasibility studies for new perimeters and aid development policy studies; and that will strengthen Mauritanian and OMVS capacities for integrated development planning.

In pursuit of this strategy the project will provide:

(1) support to national institutions in the project zone;

(2) support to farmer associations in the 33 villages reached by the project;

(3) training for farmers and agricultural technicians;

(4) improved agricultural extension;

(5) construction of 1,570 hectares of new small perimeters during phase one;

(6) upgrading approximately 190 hectares of existing perimeters and 80 hectares of new perimeters in the Gouraye Sector during phase two;

(7) construction of 600 hectares of medium-sized perimeters in the Kaédi Sector during phase two;

(8) improved rural credit and production input supply systems; and,

(9) a continuous monitoring and evaluation system.

A brief description of each of these nine project activities is provided below. The description of the inputs for the agricultural program is provided in Section 3.4.2; the budget is presented in Section 4; and the implementation plan in Section 5. The analyses supporting the choice of project activities and a more complete description of each activity are found in the corresponding technical analyses of Volume III.

(1) Support to National Institutions

The project strategy is to provide support to existing national institutions in order to strengthen administrative and technical capabilities to undertake agriculture projects within their jurisdiction. For the agricultural program in Mauritania, the only governmental agency effectively operating in the project zone is SONADER. SONADER will be the main implementing agency for the agricultural aspects of the project. It will also coordinate the participation of other governmental agencies responsible for other aspects of the project. It is anticipated that a functional literacy program to support village association activities will be introduced in the project zones by the Institut des Langues Nationales (ILN), and that the agricultural credit activities of SONADER can eventually be shifted to the Fonds Nationals pour le Developpement (FND), both of these institutions are being currently reorganized and neither is presently active in the project zones. The Institutional Analysis, Volume III, Section 4.2., persents SONADER administrative capabilities, and the Social Analysis, Volume III, Section 2.8. describes other national institutions relevant to project implementation.

The project will directly increase the technical and administrative capabilities of SONADER in the project zone by providing: (1) in-service training for SONADER staff, (2) technical assistance, (3) vehicles and equipment, and (4) operating support for temporary and nonprofessional project staff, vehicle operation and maintenance, office operations, and local travel and technical operations. The project will provide a technical assistance team to SONADER to assure proper management and technical oversight of project activities, and to train and upgrade SONADER staff in the Kaédi and Gouraye Sectors. The technical assistance team will include: (1) a project management and credit specialist who will be a deputy to and share project management responsibilities with the SONADER Regional Director in Kaédi; (2) two specialists in agronomy and extension assigned to Kaédi and Gouraye; (3) one irrigation engineer who will be based in Kaédi; and, (4) two Mauritanian sociologists in Kaédi and Gouraye. Two sector-level project managers, two senior agronomists/extension specialist; and one irrigation engineer, will be assigned by SONADER as counterparts to the U.S. staff. The project staffing plan for the agricultural program in Mauritania is presented in Table 3.

The technical assistance team will also provide on-the-job trechnical training to counterpart SONADER staff in project management, agronomy, extension, audio-visual techniques, irrigation engineering, contracting and contract supervision, and data collection and monitoring. The project will finance pre-service training of varying length and sophistication for virtually all SONADER staff assigned to participate in project implementation. The technical assistance team will organize regular in-service training programs for all sector staff of SONADER, and provide additional special training seminars in certain topics. In addition, several agricultural agents and mid-level technicians will be sent to special training programs to upgrade their skills in the areas of research application, agronomy, irrigation, extension techniques, and social science methodologies. The OMVS, at the regional level, will organize several seminars to cover various technical subjects relevant to project implementation, and to foster technical interchange among the institutions of the three riparian states.

Table 3

## INTEGRATED DEVELOPMENT PROJECT

## STAFFING PLAN

| Management Units | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Total Number of Years of Staff Assignments |
|---|---|---|---|---|---|---|---|---|---|
| MAURITANIA | | | | | | | | | |
| 1. SONADER Regional Director (Kaedi) | PRE-IMPLEMENTATION | | | | | | | | 7.0 years |
| 2. USAID Deputy Regional Director Specialist in Financial and Credit Management (Kaedi) | | | | | | | | | 5.0 years |
| 3. SONADER Senior Agronomists/ Extension Agents (Kaedi, Gouraye) | | | | | | | | | 14.0 years |
| 4. USAID Agronomist/Extension Specialist (Kaedi) | | | | | | | | | 3.0 years |
| 5. USAID Agronomist/Extension Specialist (Gouraye) | | | | | | | | | 3.0 years |
| 6. IBRD Irrigation Engineer (Kaedi) | | | | | | | | | 3.0 years |
| 7. IBRD Irrigation Engineer (Gouraye) | | | | | | | | | 3.0 years |
| 8. SONADER Irrigation Engineers | | | | | | | | | 14.0 years |
| 9. USAID - Financed Mauritanian Sociologist (Kaedi) | | | | | | | | | 2.0 years |
| 10. USAID - Financed Mauritanian Sociologist (Gouraye) | | | | | | | | | 2.0 years |
| 11. USAID Irrigation Engineer (Kaedi and Gouraye) | | | | | | | | | 2.0 years |
| 12. USAID - Financed Accountant (Kaedi) | | | | | | | | | 5.0 years |

SUMMARY:

A. SONADER - Financed Staff: 5 Senior Staff; 18 Support Field Staff
B. USAID - Financed Staff: 4 Expatriates; 3 Nationals
C. IBRD - Financed Staff: 2 Expatriates.

For the functional literacy program an agreement will be negotiated with ILN to begin local language programs in villages participating in the project. Since ILN has not previously worked in the project zones, this will be a small pilot effort that will start during the third year of project implementation. The training materials developed and used in the functional literacy program will relate to project activities: agricultural extension, irrigation development, animal traction, farmer association organization and management, rural credit, pump maintenance and repair, primary and preventive health, etc. A description of this program as well as the other training activities is provided in the Training Analysis, Volume III, Section 3.3.

For the rural credit program, the project will initially work with the existing credit and input program of SONADER's Credit and Marketing office (Bureau de Credit et de Commercialisation) in Kaédi. The project credit specialist assigned to Kaédi will help design a new system in cooperation with the Fonds National pour le Developpement (FND). He will be expected to supervise the implementation of the new system which will gradually transfer SONADER's credit responsibilities to FND, and SONADER's input supply responsibilities to private enterprises. The two systems are integrally linked under current practice in that SONADER purchases inputs and provides these to farmers on subsidized credit terms. This transfer of supply and credit responsibilities will take place gradually over the life of the project, as demand for agricultural inputs and credit increases, input and credit subsidies are reduced, and alternatives to provision of these services by SONADER are created. (See the discussion of the credit program below and the Private Sector Analysis, Volume III, Section 3.10. for the complete presentation of this program.)

(2) Support to Farmer Associations

Farmer associations are the principal institutions targeted for development by the Integrated Development Project. Their evolution is the key to privatization of agriculture in the SRB. The project will support farmer associations directly and indirectly through a variety of activities. First, SONADER has and will continue to assist farmer associations with perimeter development and management. Associations will be assisted by project staff to select sites for irrigation through orientation and planning meetings, discussion of topographical and soils studies, examination of land tenure problems, and development of performance contracts with SONADER. The project staff will also assist asociations with perimeter construction and development involving system design, construction supervision, provision of earth moving equipment when necessary, and installation of the pumping system. The associations will be the decision makers for construction and development, and will have the sole responsibility for irrigation maintenance, involving repair of dikes, cleaning of canals, and operation of the motorpumps.

Second, the project will provide improved extension services to farmers and farmer associations. This will include animal traction, field trials and demonstrations, and crop production assistance. The improvement of extension services is the primary objective of the project in the context of the institutional development of SONADER.

Third, the project will establish a rural credit program which will provide seasonal farm credit, medium-term credit for farm implements, and longer-term credit for Diesel pumpsets. To help the associations better manage the credit and their other financial activities for input supply and perimeter operation, the project will provide for training in credit procedures, basic accounting, and inventory control.

(3) Training for Farmers and Perimeter Technicians

Project field-level training will be provided by several sources: SONADER will provide farmer training through the extension program of the agency; ILN will provide functional literacy and numeracy training using materials developed for the technical programs of the project; and other public or private institutions will be contracted to provide special training identified by project personnel or requested by farmers and farmer associations. This special training will include pump or other agricultural equipment maintenance and repair by SONADER or a private equipment supplier, business operation and management training by CEPI (Centre d'Etude pour la Promotion Industrielle), and animal traction training by a national agency or a private manufacturer.

The project Training Analysis (Volume III, Section 3.3.) identifies the need for the following training programs:

(a) pump operators: (2 per perimeter) capable of identifying the main parts of the pump, operating the pump, maintaining it and making minor repairs;

(b) water managers: (2 per perimeter) able to understand the principles of perimeter construction, manage water distribution, and monitor maintenance of the canal and diking system;

(c) agricultural advisors: (2 per perimeter) able to provide field-level assistance to other farmers in agronomic techniques and in the identification of diseases and pests;

(d) animal traction trainers: (1 per perimeter) knowing how to use animal traction techniques and teach them to other farmers;

(e) bookkeepers: (1 per perimeter) able to maintain village account books, manage village stocks of agricultural supplies, and manage village association funds, and;

(f) functional literacy agents: (1 per participating village) who understand methods for teaching functional literacy and numeracy and are able to give instructions to villagers.

(4) Improved Agricultural Extension

The project will upgrade the technical knowledge of SONADER field agents, give them more mobility, more technical support from regional offices and headquarters, and improve methods for extending new crops and technologies. The extension/training specialist will first organize

in-service training for SONADER staff and then organize and prepare materials for new extension and field training activities. The social scientist will establish a data collection and project monitoring system and will promote ways to make the extension program more responsive to the concerns and needs of farmers. The irrigation engineer will improve SONADER procedures for contracting for perimeter design and construction; and for helping farmers with canal operation and maintenance, water management, and pump operation, maintenance, and repair. The project will introduce a joint program with the agricultural research station at Kaédi to field test promising new crops and techniques through demonstrations in farmers' fields. New extension programs will provide animal traction as a labor saving, intermediate technology, and programs for village-level processing and storage of farm output. Although the extension program will be broadened to include those technical packages for irrigated and upland agriculture that have been identified as most promising by research and field tests, the emphasis of the extension program will not be on increasing the number and diversity of technical packages. It will be rather on improving farmer understanding and use of existing techniques. Sound application of what is already proven about irrigation farming is projected to produce for the committed farmer an income roughly equal to or better than prevailing urban wages in the three SRB countries. It is one of the objectives of the project to make agriculture in the basin a secure and profitable profession.

(5) Construction of Small Perimeters - Phase One

As presented in Table 2, a total of 1,570 hectares of new small perimeters will be constructed during the phase one program (1984-86). The construction of these perimeters will follow construction methods previously used. SONADER will be responsible for land preparation, supervising construction done directly by farmers, or contracting for heavy equipment use, depending on the work involved. The farmer associations will be responsible for development of the tertiary irrigation canals and all agricultural activities. The World Bank is financing construction costs, technical assistance for construction supervision, and SONADER operating costs for this phase.

During this first phase of the project a development plan for the Gouraye Sector will be prepared in order to determine the best options for further development and to identify sites for further perimeter expansion. The continuation of project activities into phase two will follow the recommendations of this plan and of the first special evaluation, which will be completed at the end of project year three.

(6) Upgrading and Expanding Perimeters in Gouraye - Phase Two

In the Gouraye Sector, phase two, which will cover four years (1987-90), will consolidate the existing program by upgrading existing perimeters and by financing some further perimeter expansion. The project design team has estimated that approximately 190 hectares will require some upgrading, and that the perimeter at Soulou can be expanded by another 80 hectares during this phase. The phase two Gouraye program will be based on the recommendation of the Gouraye Regional Development Plan and the first project evaluation mentioned above. AID will finance the costs of the phase two development program, which are $2,800 per hectare for small perimeters and $590 per hectare for rehabilitation.

(7) Construction of Medium Perimeter in Kaedi - Phase Two

As presented on Table 2, a total of 600 hectares of medium-sized perimeters are planned in the Kaédi Sector during phase two. These will be of approximately 300 hectares each and be located near the villages of Winding and Dirol. Both sites involve the construction of small dams to establish seasonal reservoirs in low-lying basins, from which water for perimeter irrigation can be pumped. SONADER will be responsible for contracting for the final design and construction of these perimeters, for supervising farmer participation in some aspects of the construction, and for monitoring the construction contractor. The irrigated area will be divided into sections of approximately 15 hectares each. Independent farmer associations will be responsible for tertiary canal construction and for all agricultural production activities, as they are with the small perimeters. AID will finance the construction costs and provide engineering technical assistance and operating support to SONADER and to the associations. Because of the more sophisticated earthworks involved, the per hectare cost of the medium-sized perimeters is $4,500. This is considerably higher than that of the small perimeters, but, as the economic analysis demonstrates it is programmatically and economically justified. It is programmatically justified by the fact that the agricultural development of the SRB can only proceed in the direction of viable medium and large perimeters. Small perimeters sites in the Kaédi-Gouraye area will have been exhausted before phase two of the IDP begins. Animal traction technology and other labor-saving and productivity-increasing measures that will have been introduced by the project during phase one support the economic viability of medium perimeters.

(8) Improved Rural Credit and Input Supply

To address the constraints of insufficiently available credit and general inexperience of suppliers, artisans, farmer associations, and other private groups, the project will help establish a rural credit and local business assistance program in the project zones. The credit program will first be administered by the Bureau de Credit et de Commercialisation (BCC) operated by SONADER. It will be subsequently shifted to the Fonds Nationals pour le Developpement (FND) as this newly established organization develops its service centers in the project zones. The BCC and later the FND will assign a loan officer to each sector, who will be responsible for managing the credit system established by the project. The project management and credit specialist in the Kaédi regional office of SONADER will provide technical assistance to the Mauritanian loan officers in designing and implementing the credit management systems and the loan monitoring and collection procedures. Additonal short-term specialized assistance will be available from project resources on an as-needed basis.

Four types of credit will be provided by the program. First, seasonal farm credit will be available to farmers and farmer associations for the purchase of production inputs such as fertilizer, seeds, pump fuel, and crop protection supplies. This credit will generally be disbursed through the farmer associations, which will distribute materials and coordinate repayment by association members. Second, medium-term credit will be available for financing farm or irrigation equipment. The major use of this credit will be for the purchase of pumpsets and animal traction equipment. However, farmer

groups may also want to use it to purchase grain threshers, hullers, storage containers, or other implements to increase farm productive capacity. Third, non-farm loans will be extended to promote enterprises capable of providing repair and maintenance services for agricultural equipment. Fourth, the project will evaluate and establish, if merited, a program of credit guarantees for suppliers of agricultural inputs to stock their inventories and to cover their operating costs. The project credit analysis (Volume III, Section 3.5.) recommends specific terms for each type of credit program. These terms will be reviewed and refined as necessary by the project implementation team during the operational phase of project implementation. USAID/Mauritania will have to approve the final terms, administrative system, and implementation plan for the credit system before any funds will be disbursed to capitalize it.

To support the credit program, the project will provide funds to assist local private organizations in developing their organizational and management skills. The major recipients will be the farmer associations as was discussed above. Other recipients will be artisans and suppliers. Special contracts will be arranged with CEPI and other national organizations to provide training as needed by these groups. These contracts will be negotiated during implementation, since training will be provided on a demand basis and it is not possible to predict the level of demand at this time.

(9) Monitoring and Evaluation System

Under the direction of the project management staff and with the guidance of the social scientist, the project will install a system of monitoring project interventions and results through baseline and follow-up farming system surveys, special studies, and regular reporting. These activities will be installed and coordinated with the basin-wide MIS by an information systems specialist based at OMVS for a period of up to two years. It will be the specialist's job to design and test a system that will respond to both national and regional monitoring requirements. (See Volume III, Section 3.9. for a complete presentation of this system.) The project monitoring data will be compiled in regular quarterly project reports for SONADER and USAID/Mauritania and in special six-month reports for the regional project management information system, the OMVS, and USAID/RBDO.

B. The Health Program

The goal of the Mauritanian health component of the IDP is to prevent the deterioration of the health of the population living in villages where irrigated perimeters will be renovated or constructed by the IDP.

Ample experience in Africa as well as throughout the world has demonstrated that irrigated agriculture can increase breeding sites for vectors, such as the snail and the mosquito, which in turn can cause increases in diseases, such as schistosomiasis and malaria, in areas not previously hyperendemic. This project will minimize such adverse consequences to the development of irrigated agriculture in the SRB through proper irrigation planning design and health monitoring. If such adverse consequences are minimized, the increased food production in the SRB should result in a improved nutritional status, and a improved state of health. To determine whether or not the populations nutritional status improves, the project will monitor the height and weight of children in the target villages.

The important measure of the effectiveness of project activities in health will be prevalence rates of schistosomiasis and malaria in the target villages at the end of the project which are not excessively different than they are at the beginning of the project. Progress toward this goal will be monitored by periodic surveys of these disease processes in the villages where IDP is renovating or constructing irrigated perimeters -- referred to here as the "target villages".

Assumptions critical to the achievement of this goal are that health care delivery systems exist or can be put in place in the target villages and that this will allow the rational application of control measures once the disease surveillance systems demonstrates an increase in one of the target diseases.

The purposes of the health surveillance program are to:

(1) Improve the GIRM's ability to conduct disease surveillance in the SRB by:

- training personnel at the national, regional, and local level in techniques of disease surveillance;
- providing material and other support to the Centre National d'Hygiène so that its personnel can supervise disease surveillance teams posted at the regional health centers in Kaédi and Sélibaby;
- providing similar support to the two-above mentioned teams so that they can conduct disease surveillance and control activities in the target villages.

(2) Compare the efficacity of different strategies for the control of schistosomiasis and malaria in the target villages.

(3) Monitor nutritional status among children under age three years in the target villages.

C. The Feeder Road Program

The feeder roads program will include the construction of 136 kilometers of low volume farm-to-market roads in the Gouraye sector. These roads will give villages upstream and downstream from Gouraye access to National Highway (RN) 5 which will be upgraded between Gouraye and Sélibaby by a separate bilateral AID project. The downstream portion will include 74 kilometers from RN 5 to Diaguili to Moulessimou to Diogountourou to Selou to Khabou and serve 715 hectares of irrigated perimeters in these villages. The upstream portion will run between Woumpou to Lougere to Sagné to Bedinke for 62 kilometers and serve 459 hectares of irrigated perimeters. (See Plans No. 3, 4, and 5 attached at the end of this section).

The program will be implemented by the Public Works Service in the Ministry of Equipment. Construction will take place over a two year period (1986-87) using the same equipment and construction brigade that is to be used by the Mauritania Rural Roads Project for the Mbout-Selibaby-Gouraye portion of RN 5.

### 3.3.3. Senegalese Program Activities

The IDP national component program for Senegal will focus geographically on Bakel and Podor. In the Bakel area, most project activities will be located within the arrondissement of Ololdou, which extends upstream and downstream on either side of Bakel, the departmental capital. The Bakel project zone includes a population of 25,000 to 30,000 persons, of which approximately 8,000 live in the commune of Bakel. The IDP program in Bakel will continue and expand the successful prototype agricultural development program that was started under the Bakel Small Irrigated Perimeters Project (685-0208). In the Podor area, the project zone encompasses the urban commune of Podor and neighboring villages with a population of about 14,000 persons. Project activities for Podor will center around the development of the Podor irrigated perimeter, which will ultimately include approximately 1,580 hectares. The health program and the planning and feasibility studies for additional projects will concern a wider area within the Senegal River Basin. The telecommunications program will involve a pilot satellite communications linkage between Dakar, Saint Louis, and Bakel.

As with the Mauritanian program, the strategy for working in the two selected zones is to develop areas that have previously been isolated from the rest of the economy but which show great potential for food production. This strategy conforms with the GOS objectives in the Sixth Development Plan (1982-86) to secure agricultural production, reduce regional disparities, and promote local participation in development. The project will include the developing of irrigated and other agricultural activities, the improving of systems for rural credit and artisan development, and the upgrading of communications and transportation to a level sufficient to create a substantial demand for equipment, spare parts, fertilizer, small hullers, small-scale mills, repair services, and other inputs. The expansion of agriculture will thus be linked as closely as possible to the development of the local economy in general, to increased income and food security for local farmers in particular, and to the active involvement of the private sector throughout the project zone.

#### A. The Agricultural Program

The IDP agricultural strategy is based upon GOS policy and objectives as expressed in the Programme Prioritaire de la SAED 1982-88. The project will help SAED and the GOS to apply the strategy and build new relations with farmers and farmer groups in the Bakel and Podor areas.

The elements of this strategy particularly relevant to IDP are:

- support to SAED to enable it to play a more effective role in providing higher quality technical support and training to irrigation farmers, in accordance with its official mandate;
- maximum participation of the rural populations in all aspects of their development;

- more clearly defined, understood, and accepted responsibilities between regional development agencies and farmer groups;

- increased private sector involvement in the provision of inputs and the marketing and processing of farm produce; increased agricultural efficiency and reduced recurrent costs burdens on SAED, and the GOS;

- development of a system to monitor agricultural production which can be used to evaluate progress, to complete feasibility studies for new perimeters, to aid development policy studies, and to provide analytical tools for both the GOS and the OMVS.

Bakel

The agricultural program in Bakel will continue extension activities in the 25 villages that participated in the Bakel Small Irrigated Perimeters Project. It will expand existing and create new perimeters. Table 4 provides a summary of the perimeters to be rehabilitated, extended, or created in the Bakel area. The Bakel-Collenga perimeter is a medium-sized perimeter. A first phase of 92 hectares is currently being developed under the Bakel Small Irrigated Perimeters Project. This will be completed and expanded to a total of 244 hectares under the IDP program. The irrigated perimeters in the Bakel project zone are farmed within a mixed farming system that includes upland rainfed crops of millet, sorghum, and cowpeas; flood recession crops of millet, sorghum, and vegetables, and herding. The irrigated perimeters system consists of a diesel pump, a network of canals, surface drains, some small flood protection dikes, and partially leveled plots that range in size from 10 to 40 hectares.

While the land preparation has generally been financed by donor projects (such as the Bakel Irrigated Perimeter Project of USAID) and undertaken by SAED, the farm management has been done by farmers, and the pumps and perimeter infrastructure are operated and maintained by farmer associations or groupements. With these types of arrangements, there have been fewer social and land tenure issues than in other areas, and the yields from small perimeters in the Bakel sector are better than in many other parts of the valley.

Under the Bakel project, yields have steadily increased with constant or reduced production costs--rice yields have gone from less than 4 tons per hectare in 1978 to more than 6 tons per hectare in 1980, and diesel fuel consumption has been reduced from an average of 200 liters to 100 liters per hectare. Bakel has become a model SAED perimeter for improved irrigation techniques with farmers using good seed, proper fertilizer applications, economical irrigation methods and appropriate pest control. New technologies (like animal traction and new rice varieties) promise to reduce labor constraints and further increase yields.

Table 4

I. Senegal

| A. Bakel | Existing Perimeters | Ha. to be Upgraded | New Perimeters (gross ha.) |
|---|---|---|---|
| Gandé | 8 | 8 | (ext.) 12 |
| Galladé | 8 | 8 | (1) 20 |
| Moudièri | 45 | 28 | (2) 40 |
| Diawara | 46 | 20 | (2) 40 |
| Yellingara | 7 | - | - |
| Manael | 8 | - | - |
| Tuabou | 12 | - | - |
| Gassambilakhé | 26 | 26 | (2) 40 |
| Collenga-Bakel | -- | - | 244 |
| Kounghani-Marabout | 4 | 4 | (ext) 13 |
| Kounghani-Village | 30 | 30 | (2) 30 |
| Golmy-Marabout | 5 | - | - |
| Golmy-Village | - | - | (1) 15 |
| Yafera | 62 | 62 | (4) 80 |
| Aroundou-Emigré | 10 | - | - |
| Aroundou-Village | 49 | 20 | (2) 40 |
| Ballou | 109 | - | (6) 120 |
| Sebou | 30 | 30 | - |
| Debekhoule | 20 | 20 | (1) 20 |
| Djimbe | 15 | 15 | - |
| Dialiquel | 10 | 10 | - |
| Sinthiou-Dialiquel | 7 | - | - |
| Ouro-Imadou | 10 | - | - |
| Seling | 15 | - | - |
| Kidira | 33 | - | - |
| Nayé | 9 | - | - |
| Guitta | 15 | - | - |
| Senédébou | 18 | - | - |
| Total Bakel | 611 | 281 | 714 |
| B. Podor | | | |
| Podor-Sector C1 | - | - | 294 |
| Podor-Sector M1 | - | - | 214 |
| Podor-Sector C2 | - | - | 173 |
| Fondé As | 20 | - | 60 |
| Dado | - | - | 60 |
| Guia | - | - | 60 |
| Doué | 20 | - | 60 |
| Goumel | - | - | 60 |
| Kodité | 18 | - | 82 |
| Total Podor | 58 | - | 1,063 |
| Total Senegal | 669 | 281 | 1,777 |

With the continuation of existing technical assistance and the development of more irrigated land, the technical skills of the farmers will improve, plot sizes will increase (from less than 0.3 hectare to over 1 hectare per family), and a market surplus should result.

Podor

The agricultural program will begin the development of the Podor perimeter. The total area planned for this perimeter is 1,580 hectares. The project will approach the development of the perimeter with a deliberate, phased program intended to permit resolution of land tenure, participation, organizational, and technical issues at each phase before additional land is brought into production. With this phased approach, approximately two-thirds of the total area, or 1,063 hectares will be brought into production by the end of the project.

Under the project, the final engineering plans for construction will be drawn-up under contract. At the same time, the project will initiate final socioeconomic studies, and village orientation and participation activities as described in the network plan for new perimeter construction (See "Social Analysis, " Volume III, Section 2). Engineering and Socioeconomic development plans will be combined in a site development plan that will have to be approved by USAID before funds are disbursed for construction. (A checklist for this site development plan is attached as part of the "Irrigation Analysis", Volume III, Section 3.2). The construction will be undertaken under contract, and will include a flood protection dike, pump stations for water supply and drainage, main and secondary canals and drains, a perimeter road network, and some offices and storage sheds.

Perimeter development will be carried out in two ways. For the southern part of the perimeter bordering the Doué stream, villages that own the land and presently farm this area will establish groupements, or farmer associations. The village groupements will direct the development of small perimeters of 20 hectares each, using the techniques developed by the Bakel Small Perimeter Project. Approximately 382 hectares will be developed in this manner. When the Podor perimeter dike and other infrastructure is completed and when the farmers have adequately mastered the technical and organizational skills required for irrigated agriculture, these small perimeters can be expanded into larger-scale irrigation networks.

For the eastern part of the perimeter bordering the Senegal River and the town of Podor, larger irrigated sections will be constructed. The first two will contain 294 and 214 hectares and a third will be added later bringing to 681 hectares the total area to be developed by the project. These sections will be farmed by Podor villagers who will organize themselves into farmer associations. The irrigation system will be designed to create farm blocks of approximately 15 hectares which will be as autonomous as possible and responsible for their portion of the irrigation network. A farmer association will be in charge of each block. The development of a federation is planned in order to assure management coordination of the entire perimeter. Within the farm blocks farmers will be responsible for construction, operation, and

maintenance of the irrigation network and for water they use. Distribution of the 1 hectare/per family parcels within each block, and the management of the blocks, will be the responsibility of the farmer associations.

This phased development approach, with farmer associations involved at each step and the construction of a new relationship between farmer associations and SAED, will allow flexibility during implementation. The project will emphasize the introduction of innovative farming techniques, drawing on past experience and the results of research being undertaken at the Fanaye research station, about 35 kms, from Podor. The linkage of the agricultural program to the research efforts will be formalized through a protocol agreement between SAED and ISRA, the Senegal research agency. Research field trials will be undertaken jointly at Podor by farmer associations, SAED, and ISRA.

With the development of the Podor perimeter, the project will be testing a new prototype for medium-sized irrigation development in the Senegal River Basin. Medium-sized perimeter development will be necessary because of physical constraints and because of the need to evolve higher land-to-farmer ratios of cultivation and, consequently, of productivity. The Podor model will combine farmer management of irrigation development and cultivation with more sophisticated irrigation systems, water management, and pump and canal operation and maintenance. This is intended to maximize farmer's control over agricultural decision-making while at the same time expanding their technical skills. The construction of the Podor perimeter in this manner will cost approximately $6,000 per hectare. This is considerably more than small perimeter development costs which have averaged $2,500 per hectare. These costs are however substantially less than the $10-15,000 per hectare development costs of several large perimeters in Senegal, and of numerous medium-sized perimeters in Mauritania. The IDP economic analysis demonstrates, furthermore, that they are costs at which development will be profitable to the farmer, and provide a reasonable rate of return on investment. This profitability and return on investment will be further enhanced by the introduction of animal traction technology and other labor-saving and productivity-increasing measures that will be introduced in Podor during the life of the project.

Elements of the Agricultural Program

In pursuit of the agricultural development strategy and in support of the project activities in Bakel and Podor, the project will provide:

(1) Support to SAED in the two project zones;

(2) Support to existing farmer associations in Bakel, and to new associations in Bakel and Podor;

(3) Training for farmers and agricultural technicians;

(4) Improved agricultural extension;

(5) Upgrading of 281 hectares of existing perimeters and the construction of 714 hectares of new perimeters in Bakel;

(6) Construction of 1,063 hectares of new medium perimeters at Podor;

(7) Improved rural credit and production input supply system;

(8) Continuous monitoring and evaluation systems, and;

(9) Preparation of a feasibility study of the N'Thiagar large perimeter.

(1) Support to SAED

The agricultural program will be coordinated by SAED, with the responsibility for most activities resting with the SAED Directors for the Bakel and Podor Regions. A project team composed of SAED and technical assistance personnel will be set up in each area to direct the activities of the project. The project will pay for the construction of some offices at Podor, for vehicles and office equipment at both locations, for operating expenses covering technical operations and travel, and for certain non-professional support staff. The project will provide a technical assistance team to SAED to assure proper management and technical oversight of project activities, and to train and upgrade SAED staff in the Bakel and Podor Sectors. The technical assistance team will include: (1) an irrigation engineer for 2 years in Bakel and 3 years in Podor; (2) an extension/training specialist for 2 years in Bakel and for 2 years in Podor; (3) a Senegalese sociologist for 5 years, primarily in Podor; and (4) an agronomist/research liaison specialist for 2 years in Podor. In addition, the project will provide a credit specialist for 3 years who will work primarily with the Banque Nationale de Développement Sénégalais (BNDS) to establish credit facilities in Bakel and Podor. SAED will name a general project manager in its headquarters office in Saint Louis and a site project manager in both Bakel and Podor. SAED will assign two irrigation engineers, two senior extension specialists, and two agronomists to Bakel and Podor to work as deputies to the U.S. staff and replace them when they leave. The project staffing plan for the agricultural program in Senegal is presented in Table 5.

The project will finance pre-service training of varying length and sophistication for SAED staff participating in project implementation, followed by continuing in-service training. The technical assistance team will provide on-the-job training to the SAED staff in project management, agronomy, extension, audio-visual techniques, irrigation engineering, contracting and contract supervision, and data collection and monitoring. The team will organize regular in-service training programs and provide additional special training seminars in certain topics. In addition, several agricultural agents and mid-level technicians will be sent to special training programs to upgrade their skills in the areas of research application, agronomy, irrigation, extension techniques, and social science methodologies. At the regional level, the OMVS will organize several seminars to cover various technical subjects relevant to project implementation, and to foster technical interchange among the institutions of the three states.

Table 5

## INTEGRATED DEVELOPMENT PROJECT

## STAFFING PLAN

| Management Units - Senegal | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Total Number of Years of Staff Assignments |
|---|---|---|---|---|---|---|---|---|---|
| 1. SAED General Manager (St. Louis) | | | | | | | | | 7.5 years |
| 2. SAED Project Managers/Bakel | | | | | | | | | 7.5 years |
| /Podor | | | | | | | | | 6.0 years |
| 3. USAID Irrigation Engineer | | Bakel → | | | Podor → | | | | 5.0 years |
| 4. SAED Irrigation Engineers/Bakel | | | | | | | | | 7.0 years |
| /Podor | | | | | | | | | 6.0 years |
| 5. USAID Extension/Training Specialist | | Bakel → | | | Podor → | | | | 4.0 years |
| 6. SAED Senior Extension Specialists/Bakel | | | | | | | | | 7.0 years |
| /Podor | | | | | | | | | 5.0 years |
| 7. USAID - Financed Sociologist | | Bakel | | | Podor | | | | 5.0 years |
| 8. USAID Credit Specialist | | | | | | | | | 3.0 years |
| 9. SAED Agronomist/Bakel | | | | | | | | | 7.5 years |
| /Podor | | | | | | | | | 6.0 years |
| 10. USAID Agronomist/Research liaison | | | | | | | | | 2.0 years |

PRE-IMPLEMENTATION

**SUMMARY:**

SAED - Financed Staff: 3 Managerial; 6 Technical.
USAID - Financed Staff: 4 Expatriate; 1 National.

(2) Support to Farmer Associations

The project will emphasize activities to support farmer associations, since the evolution of these institutions is the key to privatization of agriculture in the SRB. These associations (groupements and cooperatives) will be encouraged to plan agricultural activities; to elaborate plans for credit and repayment; to maintain records and accounts; to consider new initiatives in fish ponds, windbreaks and woodlots, crop diversification, and animal traction; and to generally oversee the operation of village perimeters. The project will support farmer associations directly and indirectly through several activities.

First, SAED will continue to assist farmer associations with perimeter development and management. Associations will be assisted by project staff to select sites for irrigation and to construct the perimeters. The types of services provided to the farmer associations include orientation and planning meetings, topographical and soils studies, examination of tenure problems, development of performance contracts with SAED, irrigation system layout, construction supervision, heavy equipment contracting, and installation of the pumping system. The associations will be the decisionmakers for construction and development and will have sole responsibility for irrigation maintenance involving repair of the dikes, cleaning of canals, and operation of the motorpumps.

Second, the project will provide improved extension services to farmers and farmer associations. This will include animal traction, field trials and demonstrations, and crop production assistance. The improvement of extension services is the primary objective of the project in the context of the institutional development of SAED.

Third, the project will establish a rural credit program which will provide seasonal farm credit, medium-term credit for farm implements, and long-term credit for Diesel pumpsets. To help the associations better manage the credit and their other financial activities for input supply and perimeter operation, the project will provide for training in credit procedures, basic accounting, and inventory control.

Fourth, the project will provide a functional literacy training program to members of farmer associations participating in the project. This program will be directed by the literacy service of SAED and offer courses in Pular and Soninké. The training materials developed and used in the functional literacy program will relate to project activities: agricultural extension, irrigation development, animal traction, farmer association organization and management, rural credit, pump maintenance and repair, primary and preventive health, etc. A description of this program as well as other training activities is provided in the Training Analysis, Volume III, Section 3.3.

(3) Training for Farmers and Agricultural Technicians

SAED will be responsible for coordinating field training for the project, that will be provided through several sources: SAED will provide

farmer training for agricultural activities through its extension program; the literacy service will provide functional literacy and numeracy training; other public and private institutions will be contracted to provide special training identified by project personnel and requested by farmers and farmer associations. This special training will include pump or other agricultural equipment maintenance and repair to be provided by SAED or by a private equipment supplier; business operation and management training by SONEPI (Societé Nationale d'Etude et de Promotion Industrielle); animal traction training by a national agency or a private manufacturer; and fish pond and forestry training by the Water and Forestry Service.

The project Training Analysis (Volume III, Section 3.3) identifies the need for the following training programs:

(a) pump operators (2 per perimeter) capable of identifying the main parts of the pump, operating the pump, maintaining it and making minor repairs;

(b) water managers (2 per perimeter) able to understand the principles of perimeter construction, manage water distribution, and monitor maintenance of the canal and diking system;

(c) agricultural advisors (2 per perimeter) able to provide field-level assistance to other farmers in agronomic techniques and in the identification of diseases and pests;

(d) animal traction trainers (1 per perimeter) knowing how to use animal traction techniques and teach them to other farmers;

(e) bookkeepers (1 per perimeter) able to maintain village account books, manage village stocks of agricultural supplies, and manage farmer association funds; and,

(f) functional literacy agents (1 per participating village) who understand methods for teaching functional literacy and numeracy and are able to instruct villagers.

(4) Improved Agricultural Extension

The project will upgrade the technical knowledge of SAED field agents and give them more mobility, more technical support from regional and headquarters offices, and improved methods for experimenting with new crops and technologies. The extension/training specialist will first organize in-service training for SAED staff and then organize and prepare materials for new extension and field training activities. The social scientist will establish a data collection and project monitoring system and will promote ways to make the extension program more responsive to the concerns and needs of farmers. The irrigation engineer will improve SAED procedures for contracting for perimeter design and construction, and for helping farmers with canal operation and maintenance, water management, and pump operation, maintenance and repair.

The project will introduce a joint program with the ISRA agricultural research program to field-test promising new crops and techniques through demonstrations in farmers' fields. New extension programs will introduce animal traction as a labor saving, intermediate technology, and offer programs for village-level processing and storage of farm output. Although the extension program will be broadened to include those technical packages for irrigated and upland agriculture that have been identified as most promising by research and field tests, the emphasis of the extension program will not be on increasing the number and diversity of technical packages. It will be rather on improving farmer understanding and use of existing techniques. Sound application of what is already known about irrigated farming is projected to produce for the committed farmer an income roughly equal to or better than prevailing urban wages in the three SRB countries. It is one of the objectives of the project to make agriculture in the Basin a secure and profitable profession.

(5) Perimeter Upgrading and Construction in Bakel

As presented on Table 4, a total of 281 hectares will be upgraded and 714 hectares of new perimeters will be constructed under the project in the Bakel area. SAED, with the help of the technical assistance team, will prepare a detailed site plan for each perimeter to be upgraded or constructed. These plans will be based on available village site profiles and provide the additional information needed for construction planning and design and for environmental review. A checklist for the site plan is attached in the Irrigation Analysis, Volume III, Section 3.2. These plans will be submitted to USAID/Senegal for approval prior to the release of funding for construction. The upgrading of perimeters will consist of realigning some canals and releveling some plots to correct engineering design and supervision weaknesses in the original construction, so that the entire developed area of these perimeters can be efficiently irrigated. The cost of this upgrading is $590 per hectare. The new perimeters will be constructed using the small perimeter development techniques successfully introduced and refined by the Bakel Small Irrigated Perimeters Project. The cost will be $1,900 per hectare.

During the first years of the project, a development plan for the Bakel region will be prepared in order to determine the best options for further development and to identify sites for further perimeter expansion. SAED will work closely with the OMVS in the preparation of this plan. The continuation of project activities in Bakel during the latter part of the project will follow the recommendations of this plan and of the first special project evaluation which will be completed at the end of project year three.

(6) Construction of the Podor Medium Perimeter

As presented on Table 4, a total of 1,063 hectares will be developed for the Podor medium perimeter. A phased approach applying techniques from both the small perimeters and the larger systems with fixed pumping stations will be used. The USAID/RBDO irrigation engineer will work closely with SAED to prepare the invitation for bids for the final construction design for the flood protection dike, pump stations for water

supply and drainage, main and secondary canals, perimeter road network, and some offices and storage sheds. The final design and construction will be executed under contract. Bids for the construction will be advertised for firms in the U.S., since the contract may be large enough to attract American firms. In the event that no responses are received from U.S. source and origin firms, or that such responses are more than 50 percent higher than estimates for comparable work by firms resident in Senegal, a waiver of nationality of supplier to Code 935 is requested so that the IFB can be issued locally. Construction supervision will be contracted to a local architectural and engineering firm and construction monitoring will be handled by SAED and USAID. Development of the Podor perimeter will be monitored very closely to keep costs down and to refine the new farmer-managed approach to medium perimeter construction that is being pioneered by the project.

(7) Improved Rural Credit

To address the constraints of insufficiently available credit and general inexperience of suppliers, artisans, farmer associations, and other private groups in the project zones, the project will help establish a rural credit and local business program. Technical assistance, training, and a line of credit will be provided to the BNDS to help it expand its operations and establish programs of financial services and credit for rural producers and suppliers in Podor and Bakel. A credit specialist in the region will provide technical assistance to the BNDS loan officer in designing and implementing the credit management systems and the loan monitoring and collection procedures. Additional short-term specialized assistance will be available from project resources on an as-needed basis.

Three types of credit will be provided by the program. First, seasonal farm credit will be available to farmers and farmer associations for the purchase of production inputs such as fertilizer, seeds, pump fuel and crop protection supplies. This credit will generally be disbursed through the farmer associations, which will distribute materials and coordinate repayment by association members. Second, medium-term credit will be available for financing farm or irrigation equipment. The major use of this credit will be for the purchase of pumpsets and animal traction equipment. However, farmer groups may also want to use it to purchase grain threshers, hullers, storage containers, or other implements to increase farm productive capacity. Third, non-farm loans will be extended to promote enterprises capable of providing repair and maintenance services for agricultural equipment. Fourth, the project will evaluate and establish, if merited, a program of credit guarantees for suppliers of agricultural inputs to stock their inventories and cover their operating costs. The project credit analysis, Volume III, Section 3.10, recommends specific terms for each type of credit program. These terms will be reviewed and refined as necessary by the project implementation team during the operational phase of project implementation. USAID/Senegal will have to approve the final terms, administrative system, and implementation plan for the credit system before any funds will be disbursed to capitalize it.

To support the credit program, the project will provide funds to assist local private organizations in developing their organizational and management skills. The major recipients will be the farmer associations as was discussed above. Other recipients will be artisans and suppliers. Special contracts will be arranged with SONEPI and other national organiza-

tions to provide training as needed by these groups. These contracts will be negotiated during implementation, since training will be provided on a demand basis and it is not possible to predict the level of demand at this time.

(8) Monitoring and Evaluation System

Under the direction of the project management staff and with the guidance of the social scientist, the project will install a system of monitoring project interventions and results through baseline and follow-up farming system surveys, special studies, and regular reporting. These activities will be installed and coordinated with the basin-wide MIS by an information systems specialist based at the OMVS for a period of up to two years. It will be the specialist's job to design and test a system that will respond to both national and regional monitoring requirements. (See Volume III, Section 3.9. for a complete presentation of this system.) The project monitoring data will be compiled in regular quarterly reports for SAED and USAID/Senegal, and in special six-month reports for the regional project management information system, the OMVS, and USAID/RBDO.

(9) The N'Thiagar Feasibility Study

During project design, SAED proposed three sites to the design team to be considered for financing under the IDP. Two sites were studied in detail, Bakel and Podor, and have been included in the project. The third site, N'Thiagar, was examined but not included because of funding constraints and because issues of technical and socioeconomic feasibility arose, which the team was unable to study in depth. Under the project, funds will be provided to complete the feasibility studies of N'Thiagar and prepare a project dossier that can be submitted t other donors for possible funding.

N'Thiagar is one of the older large-scale perimeters constructed in the Delta region by SAED. It has fallen into disrepair, and has a record of low yields high production costs, and farmers not totally committed to working on the perimeter. The rehabilitation of this perimeter is an important priority for SAED and it was included in the Programme Indicatif des Amenagements Prioritaires pour la Periode 1982-1988. Because of this, and because N'Thiagar is representative of the types of problems requiring resolution if agricultural development is to succeed in the Delta region, USAID agreed to finance further studies of this perimeter. This decision was made in close consultation with the principal other donors projecting significant investment in the area.

The N'Thiagar perimeter was developed with financing by the FAC in 1977-78, and covers an area of 870 hectares. Because of limited funding and technical and sociological problems encountered along the way, this area was never fully cultivated. Further study is required to resolve (1) engineering design questions, particularly the evacuation of excess water during the rainy season and more efficient pumping and water management systems; (2) agronomic questions concerning high salinity of the soils, crop rotations, and mechanization strategies; (3) social questions concerning the committment of farmers, role of farmer associations, organization of perimeter management, role of SAED, and land tenure issues; and (4) economic questions

concerning the justification for the apparent high cost of rehabilitation, and the profitability of irrigated farming relative to other employment opportunities in the area.

USAID/Senegal and the RBDO irrigation engineer will work closely with SAED to define the terms of reference for these studies, which will be undertaken under contract. An invitation for bid will be issued locally for the study. The terms of reference will be similar to those developed for the irrigation feasibility studies presented in Volume III, Section 3.8. SAED and USAID/Senegal will monitor the work of the contractor and the final study will be submitted to donors either through SAED or through the OMVS Consultative Committee.

B. The Health Surveillance Program

USAID/Senegal and the Government of Senegal have collaborated fruitfully in the Senegal River Basin previously in Bakel as well as in the Casamance to effect surveillance of schistosomiasis, malaria and other diseases.

The goal of the IDP Health Component is to assist the GOS prevent a deterioration in human health in the SRB due to an increase in the prevalence of malaria, schistosomiasis, or other health problems which might be exacerbated by the introduction and practice of irrigated agriculture. The purpose of this component is:

(1) to improve Senegal's disease surveillance and control capacity by the long-term training of epidemiologists, nurses, and laboratory technicians;

(2) to monitor by the use of periodic epidemiological surveys the prevalence of malaria, schistosomiasis, malnutrition, and other diseases as may become appropriate in the villages around the perimeters of Bakel and Podor;

(3) to evaluate the effectiveness of different approaches to the control of the above diseases.

The project financing will be provided for training, commodities, vehicles, laboratory equipment, teaching aids, medecines, minor renovations to existing buildings, and operating expenses, as well as some technical assistance. A more complete description of this component is presented in Volume III, Section 3.5, "Health Monitoring Technical Analysis."

(C) The Telecommunications Program

The Telecommunications program of the IDP is designed on the premise that the effectiveness of development programs and institutions and the growth of the private sector can be greatly strengthened with telecommunications support. Reliable and regular communications for administration, training, and commercial information are essential to efficient management. The program has two elements:

(1) A rural satellite pilot project. This project is designed to overcome recognized obstacles to the effective operation of rural telecommunications in the region. The project will introduce photovoltaic power sources, an intensive on-the-job training program, the design of simple modular and easy-to-maintain system components, and the design of initial institutional backup service contracts. In addition, training and technical assistance will be provided to the development agencies to exploit the system for maximum management, training, and administrative benefits.

The project will provide reliable long distance telephone links between an earth station in Saint Louis and an earth station in Bakel via the INTELSAT system. It will provide two telephone channels. The link to Dakar will be via the existing Post and Telecommunications system from Saint Louis. One institutional channel of the system will be reserved for shared use of the development agencies. The other channel would terminate in OPT facilities to serve revenue-making private and commerical users.

A radio channel might be brought into the sites through this system to be rebroadcasted by an appropriate facility. A few single channel VHF links will expand the system to key SAED sites, Ross Béthio near Saint Louis, and two sites near Bakel. The institutional channel will terminate at all locations in the offices of key development agencies. At each earth station, a simple teleconferencing facility will be established to allow between 10 and 15 persons to participate in occasional teleconferences. The VHF links from Bakel will be linked into a local teleconference network to allow for contact between those sites and Bakel. At each earth station site and in Ross Béthio, provision will be made for the transmission of hardcopy via facsimile equipment.

(2) A telecommunication policy study. This study will be carried out under the OMVS regional program. It will analyze the communication requirements and linkages of OMVS activities, with the governmental and the commercial sectors. The premise of the study is that reliable telephone services are among the requirements to support the long-term development goals of the OMVS. Also, access to reliable telephone service is considered an important component for the stimulation of business activities in the region.

Telephone service is an essential element for improving the productive capacity of an organization, for planning the use of management and labor time, and for making purchasing and sales decisions economically and more efficiently. The willingness to pay for such services exists. Therefore, the policy study will analyze the telecommunication requirements of the region; identify economic, institutional, and social development benefits; develop a regional system design (with inputs from the pilot project); identify funding and revenue-sharing arrangements; propose institutional operations and maintenance procedures; and outline action items and milestones necessary to implement such telecommunications programs for the Senegal River Basin. A complete description and analysis of the telecommunications program is presented in Volume III, Section 3.7.

(D) The Feeder Roads Program

As part of the IDP design, a feeder roads program for the

Bakel sector was designed. This program includes plans and costs for the construction of 51 kilometers of low volume feeder roads to connect village perimeters to National Highway No. 2 (RN 2). RN 2 runs along the river on high ground several kilometers back from the river. The construction would connect perimeters having a total of 730 hectares under the IDP in Balou, Aroundou, Sebou, Yafera, Koungani, Moudiéri, Gandé, and Galalde to RN 2. Funding for this program is being provided to Senegal under a separate bilateral project of USAID/Senegal.

### 3.3.4. Malian Program Activities

The national program for Mali will focus geographically on the section of the Senegal River starting at the Senegal and Mauritanian borders and going upstream some 130 kilometers to approximately 30 kms above the regional capital of Kayes. This part of the project zone is called the Kayes Sector and falls within the Kayes administrative "cercle" in the First Region of Mali. The agricultural development program will concentrate on 17 villages with a population of 14,000 persons along the river in this sector. The upland agricultural program, the health surveillance program, and the planning and feasibility studies for additional projects will concern a wider area within the First Region of Mali. As in Mauritania and Senegal, the strategy for working in this region of Mali is to develop an area that has previously been cut off from the rest of the economy and to improve the security of its food supplies. This will involve the developing of irrigated and other agricultural activities and preparing feasibility studies to mobilize additional investments sufficient to create a substantial demand in the region for equipment, spare parts, fertilizer, hullers and small-scale mills, repair services, and other inputs. A small surplus output for local marketing is also forseen. The expansion of agriculture will thus be linked as closely as possible to the development of the local economy and to increased income and food security for farmers.

#### A. The Agricultural Program

The agricultural program will start in 11 villages in the Kayes sector where there are existing perimeters and involve new villages as village associations are formed and new perimeters are built. These villages presently have 282 hectares of irrigated land in small village perimeters, farmed within a mixed farming system that includes upland rainfed crops of millet, sorghum, and cowpeas; flood recession crops of millet, sorghum, and vegetables; and herding. The small irrigated perimeters generally consist of a diesel pump, a network of canals, surface drains, some small flood protection dikes, and partially leveled plots that range in size from 10 to 40 hectares. Table 6 provides a summary of existing perimeters in the Kayes Sector.

While land preparation has generally been done by donor financed projects and the Regional Development Agency (FAC, World Bank, USAID, and several PVO's have financed construction in the project zone with OVSTM -- Opération Vallée du Sénégal-Térékolé-Magui--and its predecessor API--Action des Périmèters Irrigués), the planting, harvesting, weeding and threshing are all done by farmers and the pumps and perimeter infrastructure are operated and maintained by farmer associations or groupements. With these types of arrangements, there have been fewer social and land tenure issues than in

Table 6

Perimeters in the Kayes Sector

| Perimeter | Existing Hectares | | Possible New perimeters 1/ | Population |
|---|---|---|---|---|
| | developed | Cultivated in 82 off-season | | |
| Maloum | 26 | 7 | -- | 424 |
| Fanguéné | 15 | 3 | -- | 410 |
| Gumbaye | 50 | 30 | (1) 155<br>(2) 255 | 623 |
| Sapou | 15 | 7 | -- | |
| Dioumékon | 12 | 1 | 35 + 8 | 424 |
| Mousa Goya | 9 | 5 | -- | 138 |
| Kamankolé | 40 | 30 | -- | 430 |
| Samankidi | 20 | 7 | -- | 2,825 |
| Moussala | 20 | 3 | -- | 958 |
| Gakoura | 25 | -- | 115 | 1,426 |
| Sobokou | 50 | 25 | 100 | 1,350 |
| Kounta | -- | -- | 8.4 | 360 |
| Farakotossou | -- | -- | 15.3 | 890 2/ |
| Soukoutolé | -- | -- | 40 | 890 2/ |
| Dakandakpé | -- | -- | 11 | 728 |
| Walinékane | -- | -- | 40 | 336 |
| Duramané-Sobokou | -- | -- | 150 | 2,033 |
| TOTAL | 282 | 118 | 932.7 | 14,246 |

1/ These are to be reviewed within the project-financed planning and feasibility studies for the Kayes Region

2/ These are estimates based on the average village size. Exact figures are not available for these two villages.

other areas, and the yields from small perimeters in the Kayes Sector are good compared to those in the middle valley and Delta. Nevertheless, productivity on the perimeters is far less than optimal. Yields are declining somewhat at the inital fertility of newly irrigated land declines, and production suffers from uncertain and expensive supply of production inputs, poorly maintained pumps and irrigation networks, poor organization of pumping schedules, inefficient water distribution, inadequate crop protection, inadequate understanding and poor application of irrigated farming techniques, as well as poorly adapted technical packages.

Farmers have looked to the irrigated perimeters primarily to provide food security and only secondarily as a source of cash income. In part this results from the small size of family plots--usually well under 1/2 hectares--which prohibits the production of much of a surplus for the market; but it also results from a cautionary approach to a new technology and a new farming system, and from uncertain input supply and marketing constraints. Nonetheless, there is a growing demand for perimeter expansion in some villages and for new perimeters in others, so that increased farmed areas should lead to a greater marketable production.

In pursuit of this strategy the project will provide:

(1) support to national institutions in the project zone;

(2) support to farmer associations for 11 existing perimeters and for new perimeters in the project zone;

(3) training for extension agents, farmers, and farmer associations;

(4) improved agricultural extension;

(5) rehabilitation of 10 existing perimeters with a total of 232 hectares;

(6) construction of 933 hectares of cuvette* irrigation;

(7) improved rural credit and production input supply systems, and;

(8) a continuous monitoring and evaluation system.

A brief description of each of these eight project activities is provided below. The description of the inputs for the agricultural program is provided in Section 3.4.4.; the budget is presented in Section 4; and the implementation plan in Section 5. The analyses supporting the choice of project activities and a more complete description of each activity is found in the corresponding technical analyses of Volume III.

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* Cuvettes are former river beds or depressions lying parallel to the river. They are agricultural alluvial areas with heavy loam soils.

(1) Support to National Institutions

The project strategy is to provide support to existing national institutions in order to strengthen their administrative and technical capabilities to undertake project activities within their jurisdiction. Thus, the project will provide separate support for distinct activities in several different national agencies. The project will not combine the management of these activities in one administrative unit since the lesson of recent development efforts in Mali has been that such administrative integration of multiple activities in one rural development agency overburdens the administrative and technical capabilities of that organization and results in inefficient and ineffective project management. The integration of project activities will come through the coordinated and combined effect of project activities at the village and farm level, not through administrative control by one implementing agency. For the agricultural program, the main implementing agencies will be OVSTM for agricultural extension activities; DNAFLA (Direction Nationale de l'Alphabétisation Fonctionnelle et de la Linguistique Appliquée) for the functional literacy program; and the BNDA (Banque Nationale de Développement Agricole) for the rural credit program. (See "Administrative Analysis", Volume III, Section 4.4., for a complete description of these agencies and their project responsibilities.)

Since the major part of the project concerns irrigated perimeter development and agricultural extension, the OVSTM will have the greatest project implementation responsibilities. The project will pay for the construction of additional office space, for vehicles and office equipment, for operating expenses covering technical operations and travel, and for certain project staff. The project will provide a technical assistance team to OVSTM to assure proper management and technical implementation of the project and to train and upgrade OVSTM staff. The technical assistance team will include a project management and credit specialist, who will share project management responsibilities with the Director General of OVSTM, and specialists in agricultural extension and training, irrigation engineering, and social science. They will direct technical operations at Headquarters for the project and train Malian counterparts. The technical assistance team will also provide on-the-job technical training to counterpart OVSTM staff in project management, agronomy, extension pedagogy, audiovisual techniques, irrigation engineering contracting, contract supervision, and data collection as well as monitoring. The team will also organize semi-annual in-service training programs (one for dryland and one for irrigated agriculture) for all the sector staff of OVSTM, and provide additional special training seminars in certain topics. In addition, several agricultural agents will be sent to special training programs to upgrade their skills in areas including research demonstrations, agronomy, irrigation, extension techniques, and social science methodologies through a program that will be coordinated by the OMVS regional program. The OMVS will also organize several regional seminars to cover various technical subjects relevant to project implementation and provide funding for OVSTM participation. The project staffing plan is presented in Table 7.

For functional literacy activities, the project will provide support to DNAFLA. This support will permit DNAFLA to open a regional

Table 7

## INTEGRATED DEVELOPMENT PROJECT

## STAFFING PLAN

| Management Units | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | Total Number of Years of Staff Assignments |
|---|---|---|---|---|---|---|---|---|---|
| MALI | | | | | | | | | |
| 1. OVSTM Project Manager | | | | | | | | | 7.5 years |
| 2. USAID Deputy Project Manager/ Specialist in Financial and Credit Management | | | | | | | | | 6.0 years |
| 3. OVSTM Senior Extension Agronomist | | | | | | | | | 7.5 years |
| 4. USAID Extension/Training Specialist | PRE-IMPLEMENTATION | | | | | | | | 3.0 years |
| 5. OVSTM Extension/Training Specialist | | | | | | | | | 7.0 years |
| 6. USAID - Financed Malian Irrigation Engineer | | | | | | | | | 4.0 years |
| 7. OVSTM - Irrigation Engineer | | | | | | | | | 7.0 years |
| 8. USAID - Financed Malian Sociologist | | | | | | | | | 3.0 years |

SUMMARY

A. OVSTM - Financed Staff: 4 Senior Staff; 20 Field Staff
B. USAID - Financed Staff: 2 Expatriates; 2 Nationals.

office in Kayes where two literacy agents and a secretary will be assigned. These two agents will organize and implement local language functional literacy programs in villages participating in the project. The training materials developed and used in the functional literacy program will relate to project activities: agricultural extension, irrigation development, animal traction, farmer association organization and management, rural credit, pump maintenance and repair, primary and preventive health, etc. For functional literacy, the project will pay for rental and equipment of the DNAFLA office in Kayes, for a vehicle and its operation and maintenance, and operating costs for the office and for village training programs.

For the rural credit program, the project will help open a regional loan office in Kayes. (It is proposed that this office be opened as a credit window by BNDA in the existing offices of the BDM--Banque de Développement au Mali--so that a new office building will not be necessary.) The project will provide modest operating support to BNDA to get the program underway; after the first few years, the credit program is expected to be self-supporting and should not require operational support. (See the discussion of the credit program below and the "Private Sector Analysis, "Volume III, Section 3.10. for the complete presentation of this program.)

(2) Support to Farmer Associations

The project will support farmer associations directly and indirectly through a variety of activities. First, a farmer association infrastructure fund will be established to help associations finance infrastructure development for office, storage, and training needs. A special committee will be set up to receive proposals from farmer associations and award funds for infrastructure development on a matching basis up to 65 percent of the cost, not to exceed $10,000 per farmer association. The committee will consist of several representatives of farmer associations, the Director of OVSTM and the contract project manager. The contract manager will be responsible for the administration and financial management of the program.

Second, the project will establish a rural credit program that will provide seasonal farm credit, medium-term credit for farm implements, and longer-term credit for diesel pumpsets. To help the associations better manage credit, input supply, and perimeter operation, the project will support the credit program by providing accounting and management training to the associations. This program will be implemented by a local private voluntary organization already operating in the area. The organization that appears best suited for this is the Committee for Perimeter Coordination (CCP). It was founded in 1979 as a cooperative enterprise of several farmer associations in the Kayes area and has already successfully undertaken market research and has assisted some perimeters by organizing training seminars and obtaining agricultural credit.

Third, the project will provide a functional literacy program to villages with farmer associations participating in the project.

Fourth, the project will provide improved and increased extension services to farmer associations and to farmers, as is discussed below.

(3) Training for Agricultural Agents, Farmers and Farmer Associations

Project field-level training will be provided by several sources: OVSTM will provide farmer training for activities within the extension program of the agency; DNAFLA will provide functional literacy and numeracy using materials developed for the technical programs of the project; a local PVO will provide farmer association organization, management, and accounting training; and other public or private institutions will be contracted to provide special training identified by the project or requested by farmers or farmer associations. This special training will include pump or other agricultural equipment maintenance and repair by SEMI (Service d'Enseignement pour le Machinisme Agricole), business operation and management by CEPI (Centre d'Etude pour la Promotion Industrielle), and animal traction training by a national agency or private implement manufacturer.

The project training analysis (Volume III, Section 3.3.) indentified the need for the following training programs:

(a) pump operators (34 persons) capable of identifying the main parts of the pump, operating the pump, maintaining the pump and making minor repairs;

(b) water managers (34 persons) able to understand the principles of perimeter construction and to manage water distribution, and to monitor maintenance of the canal and diking system of the perimeter;

(c) agricultural advisors (34 persons) able to provide field-level assistance to other farmers in agronomic techniques and in the identification of diseases and pests;

(d) animal traction trainers (17 persons) knowing how to use and teach other farmers animal traction techniques;

(e) bookkeepers (17 persons) able to maintain vilage account books, to manage village stocks of agricultural supplies, and to manage village association funds, and;

(f) functional literacy agents (17 persons) who understand methods for teaching functional literacy and numeracy and are able to give classes to the villagers.

(4) Improved Agricultural Extension

The project will upgrade the technical knowledge of OVSTM field agents and give them more mobility, more technical support from headquarters, and improved methods for extending new crops and technologies. The extension/training specialist will first organize in-service training for OVSTM

staff and then organize and prepare materials for new extension and field training activities. The social scientist will establish a data collection and project monitoring system and will work to establish ways to make the extension program more responsive to the concerns and needs of farmers. The irrigation engineer will improve OVSTM procedures for contracting perimeter design and construction, and for helping farmers with canal operation and maintenance, water management, and pump operation, maintenance and repair. The project will introduce a joint program with the agricultural research station at Samé to field test promising new crops and techniques through demonstrations in farmers' fields. New extension programs will provide animal traction as a labor saving intermediate technology, and programs for village-level processing and storage improvements that have been requested by the farmers. Although the extension program will be broadened to include those technical packages for irrigated and upland agriculture that are identified as most promising by research and field tests, the emphasis of the extension program will not be on increasing the number and diversity of technical packages, but on improving farmer understanding and use of existing techniques. With good application of these existing techniques, irrigated farming can be successful and profitable in the Kayes region.

(5) Perimeter Rehabilitation

The project will finance the rehabilitation of approximately 232 hectares of existing small village perimeters in the Kayes project zone. The IDP irrigation engineer, with his OVSTM counterpart, will be responsible for the implementation of this program. They will establish a site plan for each perimeter to be rehabilitated and contract for construction design assistance, if needed. How the work will be done and paid for will be decided on a case-by-case basis. The project will pay for the costs of rehabilitation necessitated by construction shortcomings and unfavorable terrain. The village associations will pay directly or through some type of credit (particularly for new equipment) for rehabilitation undertaken for the convenience of the association or to correct problems arising from inadequate maintenance. The site development plan prepared for each perimeter will be submitted to USAID/Mali for approval before the funds are disbursed for rehabilitation. The construction (major earthworks) will be done under contract by another government agency or private firm. The irrigation engineer will manage the contracting process for OVSTM and be responsible for contract monitoring. The farmers will be responsible for constructing the smaller canals and earthworks of the interior irrigation network.

(6) New Perimeters

As presented on Table 6, a total of 933 hectares for possible irrigation development has been identified in the Kayes sector. The project will work closely with the OMVS in preparing the Kayes Regional Development Plan, in order to determine the best options for and mix between further irrigation development and upland rainfed agriculture or livestock development. Following the recommendations of this plan and of the first special project evaluation project funds will be used for the construction of the 923 hectares of the irrigation planned, for alternative upland agricultural and livestock development, or for a combination of both.

Elaboration of the Kayes Regional Development Plan will be done under the auspices of the OMVS in order to assure consistency with similar plans to be drawn up in the geographically contiguous areas of Mauritania and Senegal. Harmonization of the three regional plans is essential, most espeially in the area of agriculture input provision, and marketing of outputs. The terms of reference for the upper valley development plan, including the plan for the Kayes Region, are provided in Volume III, Section 3.8.

(7) Improved Rural Credit

To address the constraints of lack of credit availability and general inexperience of suppliers, artisans, farmer associations, and other private groups, the project will help establish a rural credit and local business assistance program in the project zone. The credit program will be administered by the Banque Nationale de Développement Agricole (BNDA). The BNDA will assign to Kayes a loan officer who will be responsible for managing the credit system established by the project. Besides providing funds to capitalize the new credit program, the project will also provide short-term training, technical assistance, and operating support to get the new program established. The contract management specialist in OVSTM will provide technical assistance to the BNDA loan officier in designing and implementing the credit management systems and the loan monitoring and collection procedures, and additional short-term technical assistance will be available from the contractor on an as-needed basis.

Four types of credit will be provided by the program. First, seasonal farm credit will be available to farmers and farmer associations for the purchase of production inputs such as fertilizer, seeds, pump fuel, and crop protection supplies. This credit will generally be disbursed through the farmer associations, who will distribute materials and coordinate repayment by association members. Second, medium-term credit will be available for financing farm or irrigation equipment. The major use of this credit will be for the purchase of Diesel pumpsets and animal traction equipment. However, farmer groups may also want to use it to purchase grain threshers, hullers, storage containers, or other implements to increase farm productive capacity. Third, non-farm loans will be extended to promote enterprises capable of providing repair and maintenance services for agricultural equipment, and fourth, the project will evaluate and establish, if merited, a program of credit guarantees for suppliers to stock inventories and to cover operating costs. The project credit analysis (Volume III, Section 3.5) recommends specific terms for each type of credit program. These terms will be reviewed the the project implementation team during the final design of the credit implementation system. USAID/Mali will have to approve the final terms, administrative system, and implementation plan for the credit system before any funds will be disbursed to capitalize the system.

To support the credit program, the project will provide funds to assist local private organizations in developing their organizational and management skills. The major recipients will be the farmer associations through a contract with a local private voluntary organization, probably CCP, as was discussed above. Other recipents will be artisans and suppliers. Special contracts will be arranged with SEMI, CEPI, and other national

organizations to provide training as needed by these groups. These contracts will be negotiated during implementation, since training will be provided on a demand basis and it is not possible to predict the level of demand at this time.

(8) Monitoring and Evaluation System

Under the guidance of the contract social scientist, the project will install a system of monitoring through baseline and follow-up farming system surveys, special studies, and regular reporting on project activities and results. These activities will be coordinated through the regional program by an information systems specialist who will complete the design and oversee the implementation of the project management information system. (See Volume III, Section 3.9. for a complete presentation of this system.) The project monitoring data will be compiled in regular quarterly project reports for OVSTM and USAID/Mali and in special six-month reports for the regional project management information system, the OMVS, and USAID/RBDO.

B. The Health Program

The goal of the IDP health program for Mali is to help the Malian Ministry of Health prevent the deterioration of the health status of the population of the First Region because of the construction of the Manantali Dam and the expansion of irrigated agriculture. The program will strengthen the capabilities of the research and training center located in Mahina and administered by INRSP (Institut National de Recherche en Santé Publique) by establishing an Epidemiological Surveillance Unit and testing approaches to the control of certain target diseases.

The Epidemiological Surveillance Unit will carry out three major activities under the IDP project. First, it will conduct epidemiological surveys of specific diseases in the villages where irrigated perimeters will be constructed in the cercle of Kayes, and in villages to be resettled because of the construction of the Manantali Dam. Second, the unit will provide technical support to the health center personnel in the cercle to help them design surveillance and monitoring systems and to support some limited disease control activities. Third, the unit will provide training for medical and paramedical students in the theory and practice of epidemiologic surveys and surveillance.

The strategy for the health program is to assure that the surveillance and control activities developed under the project are compatible with the human and financial resources of the GRM. The project will be based in the research and training center in Mahina and activities will be integrated with the model health centers being financed by the World Bank (Health Development Project - (HDP).

For the health program USAID will finance training for the staff of the surveillance unit, renovation and equipment for unit offices, logistical support, medicines, supplies, and some operating support. The GRM will provide for all direct or indirect remuneration of GRM professionals.

A detailed budget for USAID contributions is provided in the budget, Section 4.2. The detailed description of the health program is presented in the analysis of the health program, Volume III, Section 3.5.

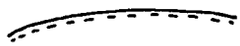
C. The Feeder Roads Program

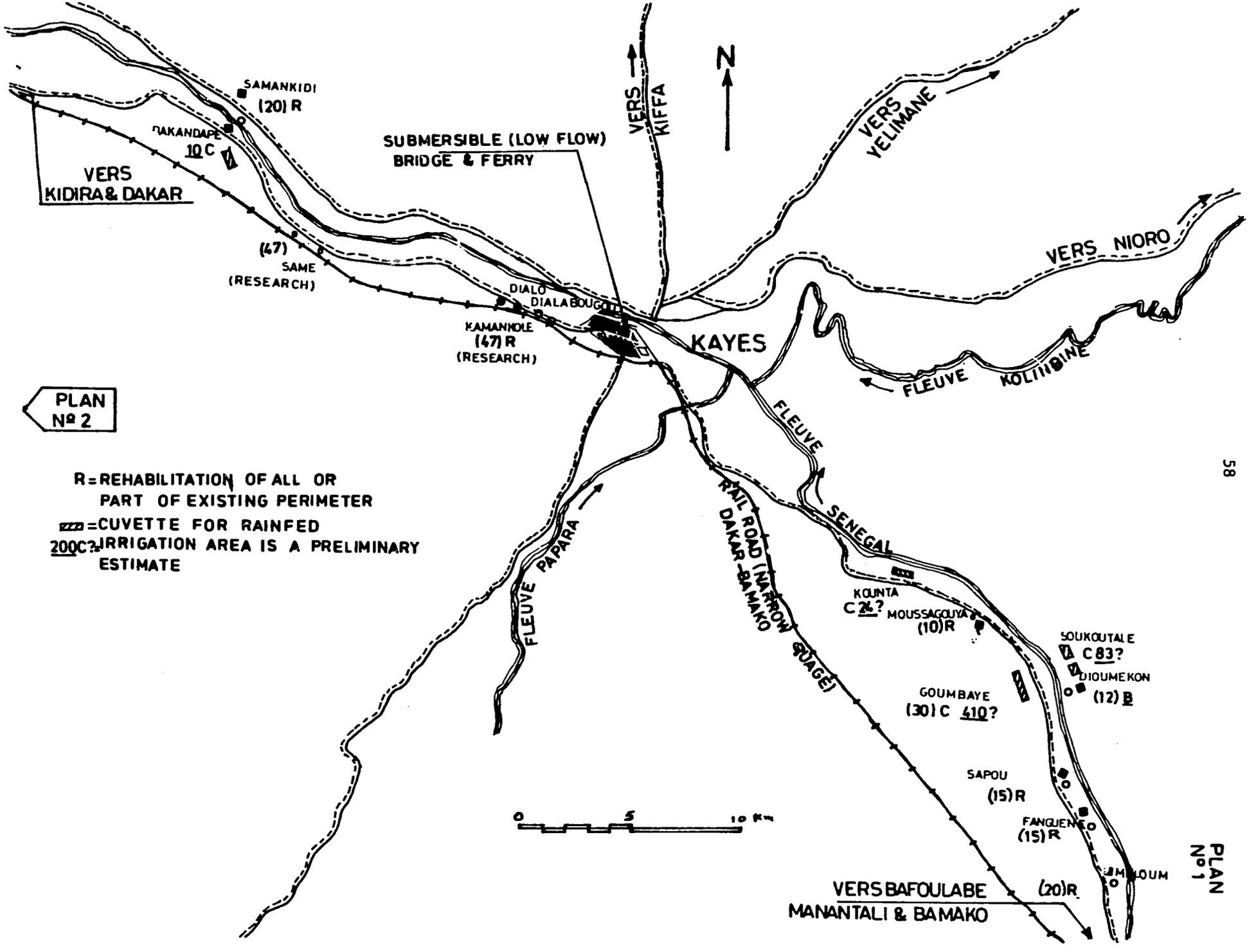
For Mali, a feeder roads program was designed for 26 kilometers of low volume feeder roads to connect village perimeters to National Highway No. 1 (RN 1). Upon reviewing this program, the government of Mali requested, and USAID concurred, that financing for these feeder roads be used instead to complete the feasibility studies for RN 1 from Kayes to the Senegal border at Diboli, approximately 96 kms. The existing RN 1 runs along the left bank of the river close to all the perimeters upstream from Ambidedi (See attached Plans No. 1 and 2). It is little more than a track battered by heavy trucks and seldom repaired or maintained by the Public Works subdivision in Kayes.

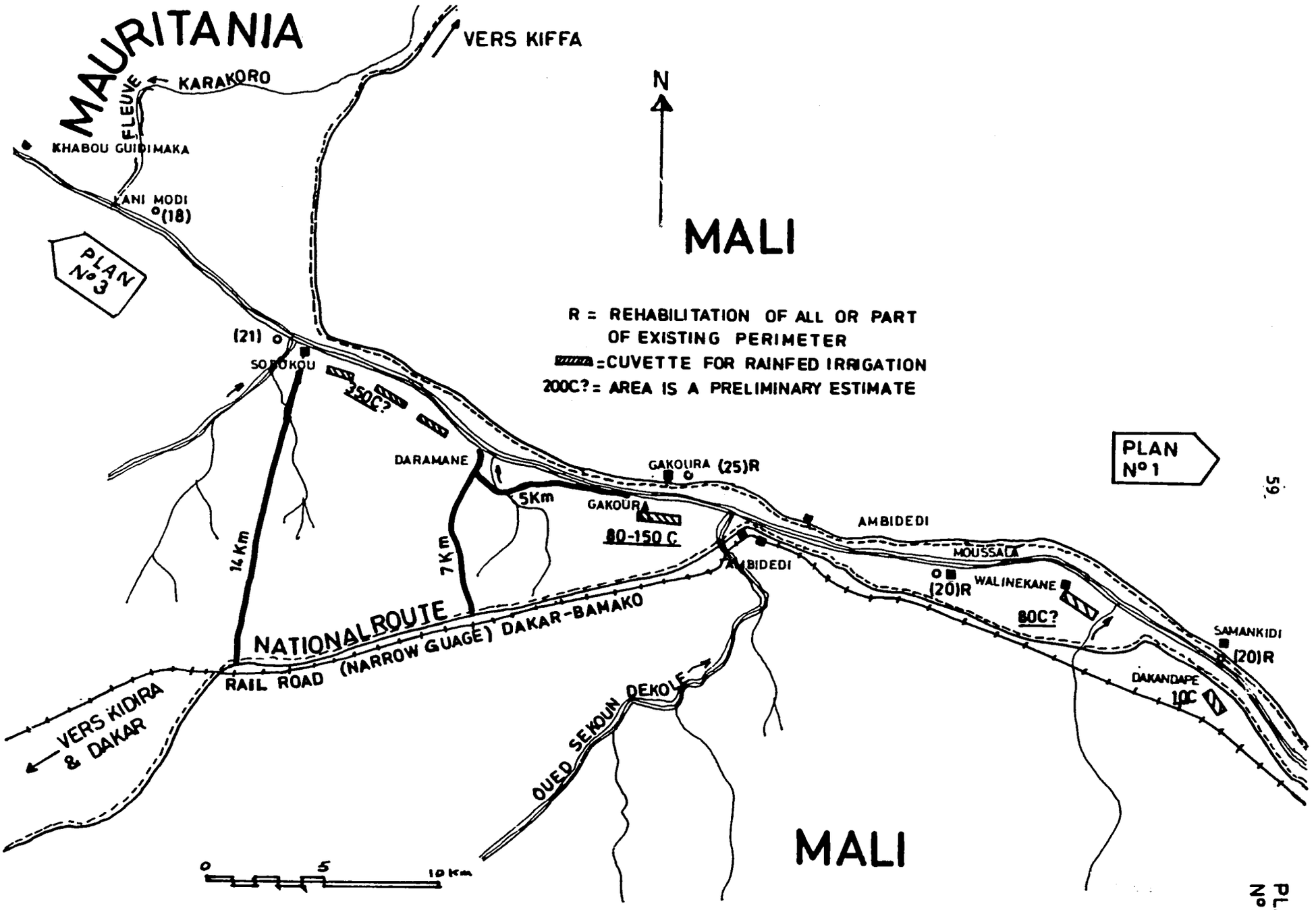
The upgrading of this road is the number one transportation development priority for the Kayes region. The feeder roads identified for the project will be of little value unless RN 1 is suitably upgraded. Therefore, it now recommended that the project finance the feasibility study for upgrading the westernmost section of RN 1. The feasibility study for the eastern section from Kayes to Nioro du Sahel (250 kms.) has already been conducted with AID financing.

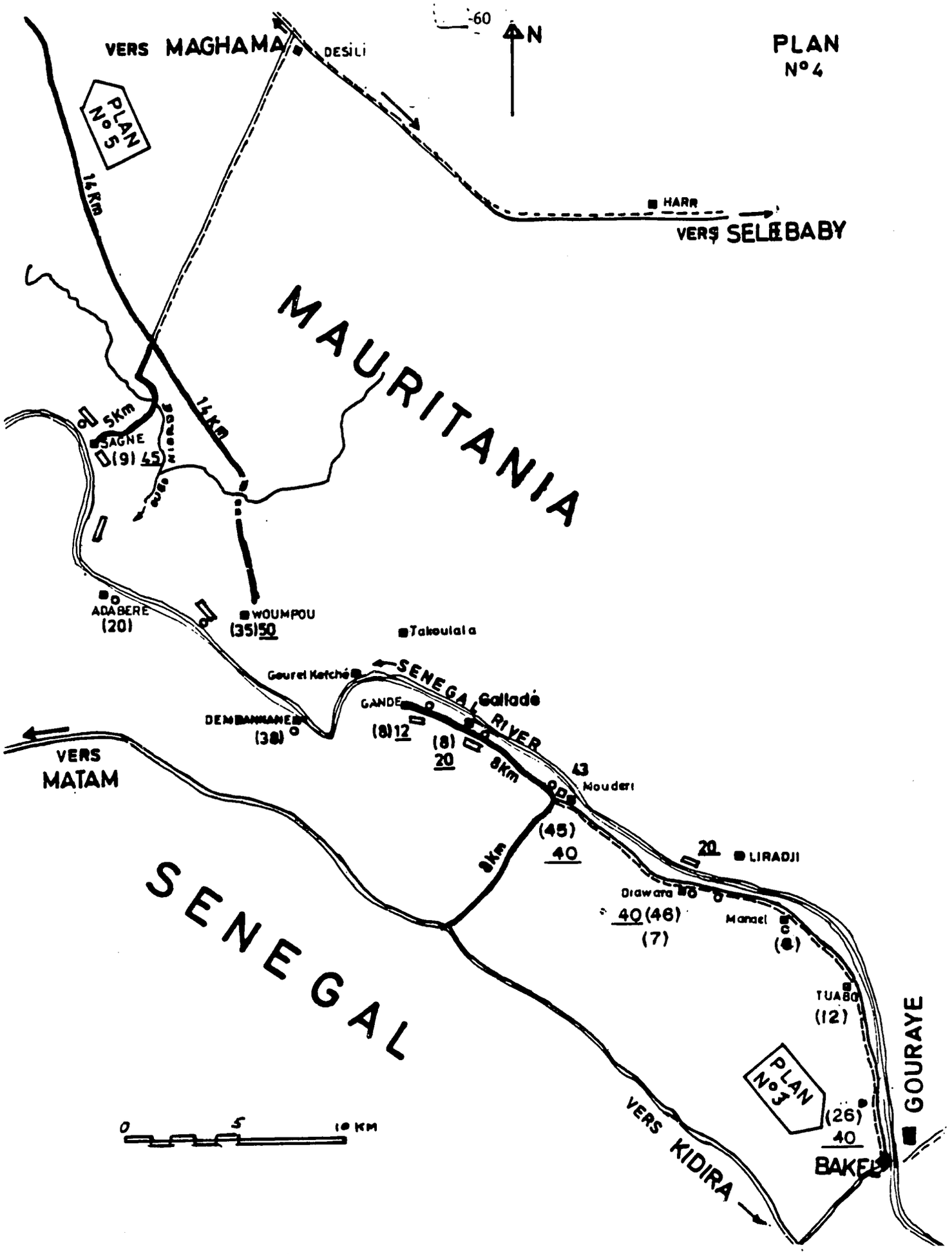
The terms of reference for the feasibility study have been developed and are contained in the technical analysis for feeder roads, Volume III, Section 3.4. USAID/Mali will handle contracting for the GRM with a U.S. or local engineering firm to complete this feasibility study. The engineering office of USAID/Mali will be responsible for contract supervision under the overall direction of the USAID/Mali project officer for IDP.

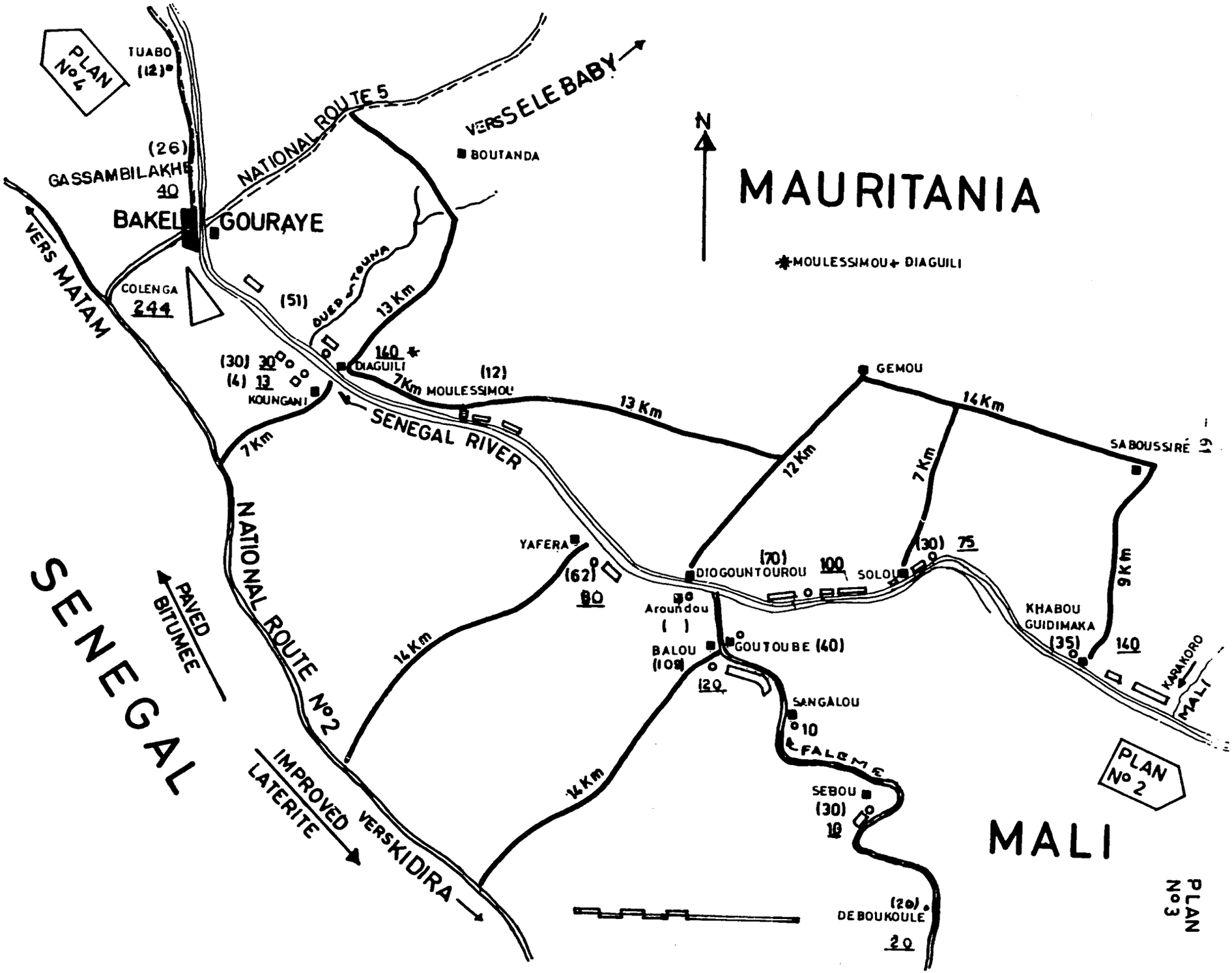
# P L A N S

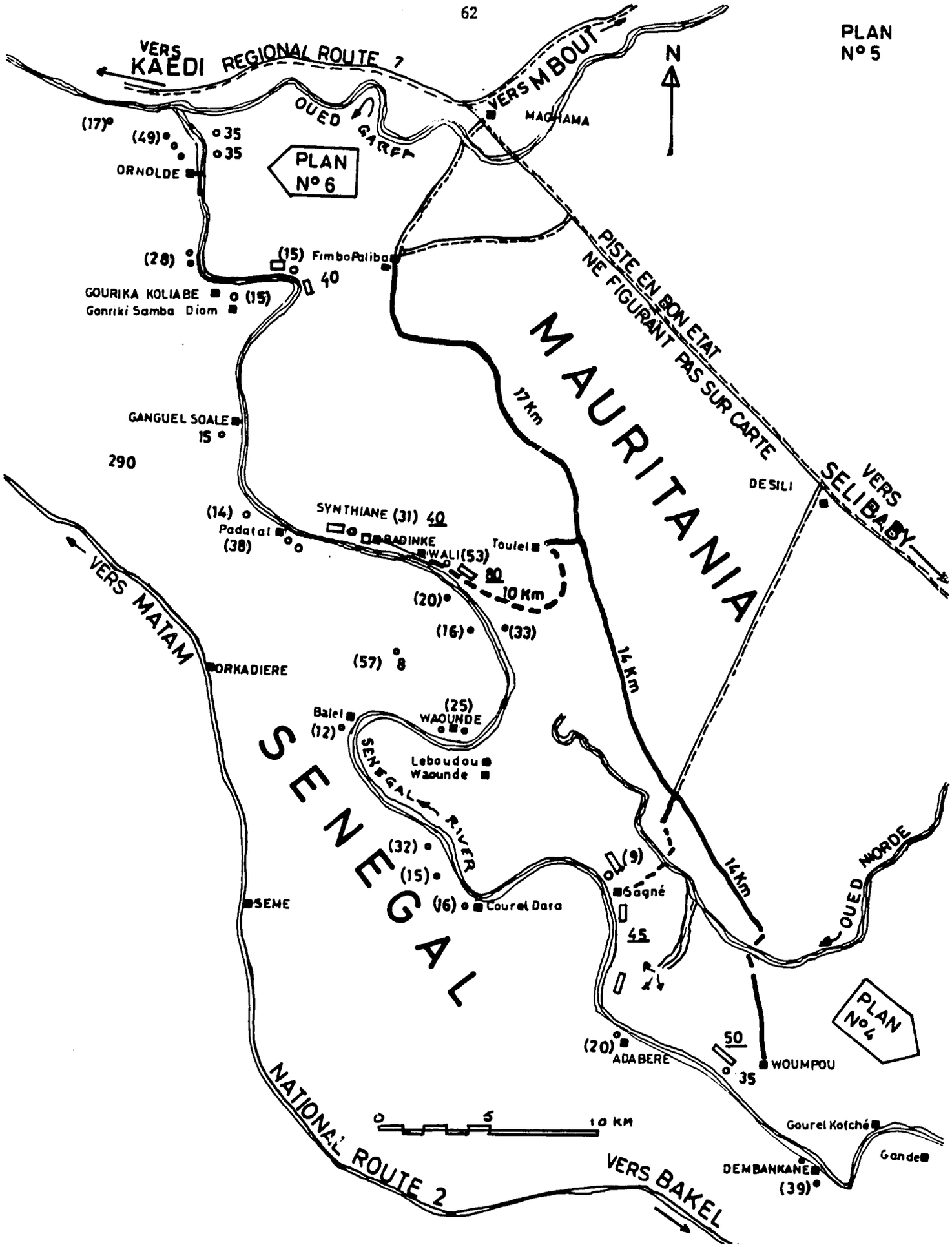
| LEGEND | | LEGENDE |
|---|---|---|
| **EXISTING** | | **Actuel** |
| RIVER |  | FLEUVE |
| PAVED ROAD |  | ROUTE BITUMEE |
| (UNPAVED) ROAD |  | ROUTE AMENAGEE |
| EXISTING PERIMETER(S) AND AREA (Ha) |  | PERIMETRE(S) EXISTANT(S) ET SUPERFICIE (Ha) |
| **PROPOSED** | | **PROPOSE** |
| FEEDER ROAD |  | PISTE DE PRODUCTION |
| FEEDER ROAD IN FLOOD ZONE |  | PISTE DE PRODUCTION EN ZONE D'INONDATION |
| PROPOSED PERIMETER(S) AND AREA (Ha) |  | PERIMETRE(S) PROPOSE(S) ET SUPERFICIE(Ha) |

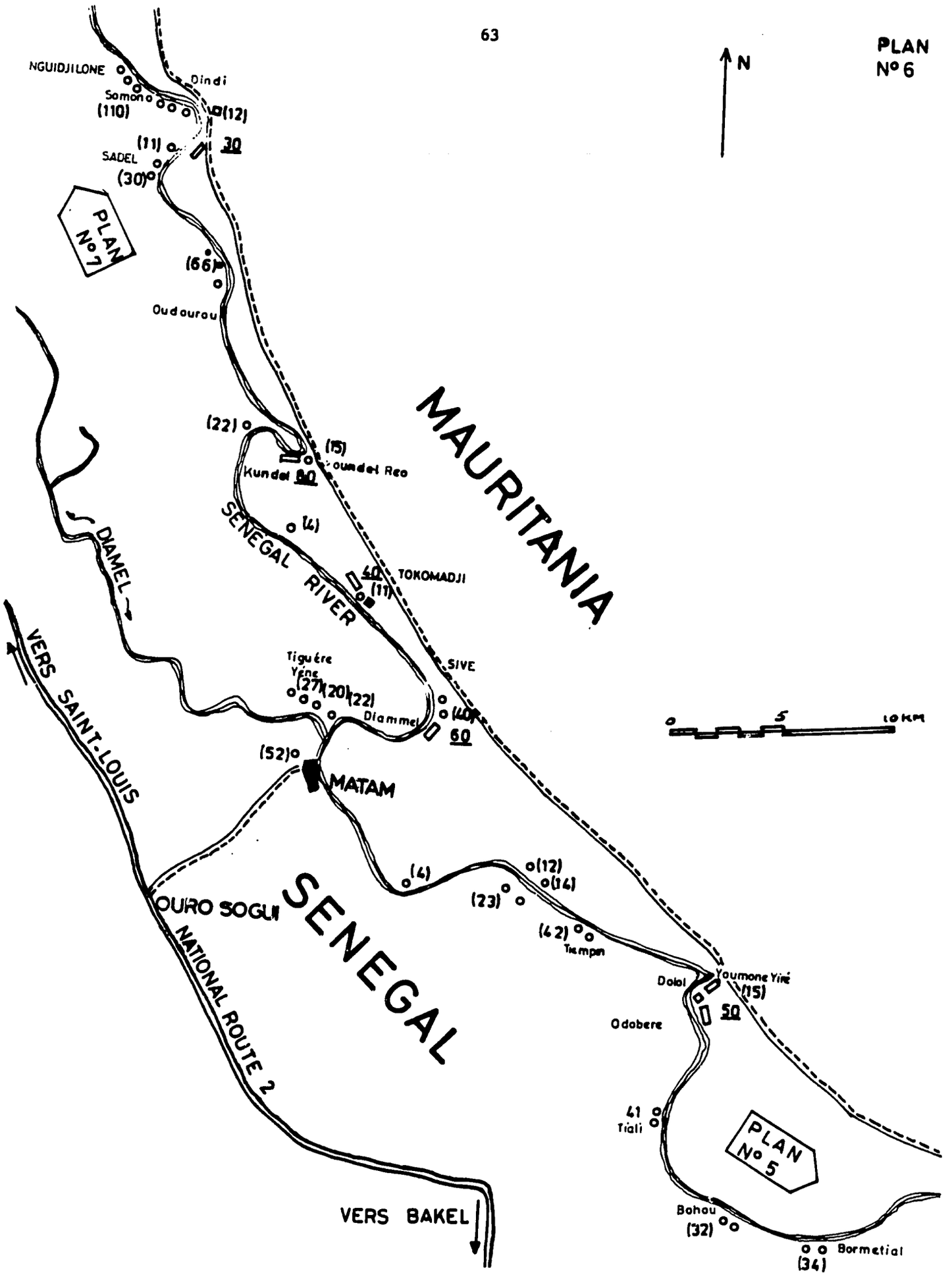

SAMANKIDI
(20) R
DAKANDAPE
10 C
VERS
KIDIRA & DAKAR
(47)
SAME
(RESEARCH)
SUBMERSIBLE (LOW FLOW)
BRIDGE & FERRY
VERS
KIFFA
N
VERS
YELIMANE
VERS NIORO
DIALO
DIALA BOUGOU
KAMANKOLE
(47) R
(RESEARCH)
KAYES
FLEUVE KOLIIBINE
PLAN
Nº 2
R = REHABILITATION OF ALL OR
PART OF EXISTING PERIMETER
=CUVETTE FOR RAINFED
200C? IRRIGATION AREA IS A PRELIMINARY
ESTIMATE
FLEUVE
SENEGAL
FLEUVE PAPARA
RAIL ROAD (NARROW GUAGE)
DAKAR-BAMAKO
KOUNTA
C 2%?
MOUSSAGOUYA
(10) R
SOUKOUTALE
C 83?
DIOUMEKON
(12) B
GOUMBAYE
(30) C 410?
SAPOU
(15) R
FANGUENE
(15) R
VERS BAFOULABE
MANANTALI & BAMAKO
(20) R
0 5 10 Km
PLAN
Nº 1

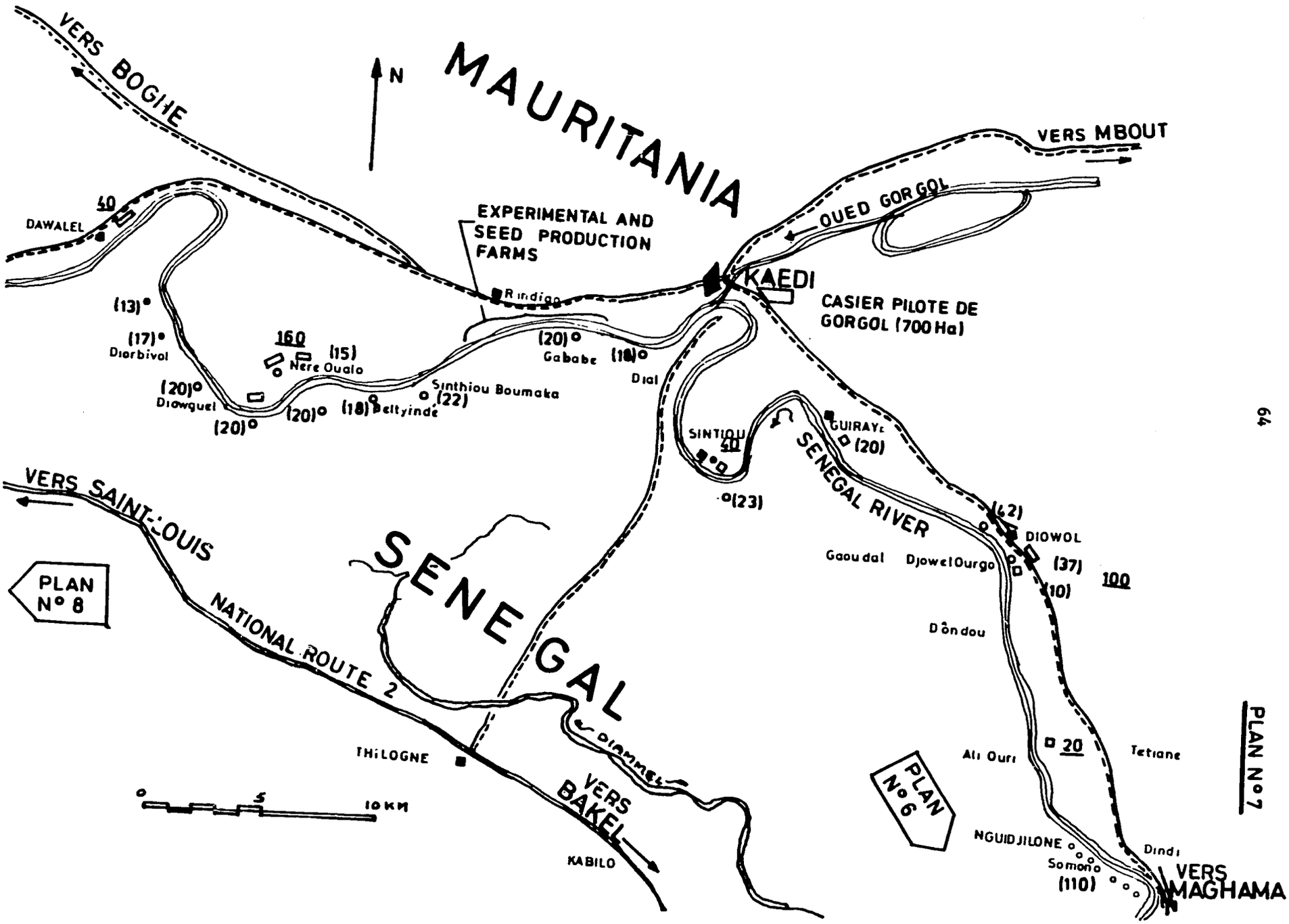

MAURITANIA
VERS KIFFA
FLEUVE
KARAKORO
KHABOU GUIDIMAKA
KANI MODI
(18)
PLAN N°3
N
MALI
R = REHABILITATION OF ALL OR PART OF EXISTING PERIMETER
=CUVETTE FOR RAINFED IRRIGATION
200C? = AREA IS A PRELIMINARY ESTIMATE
(21)
SOBOKOU
350C?
DARAMANE
GAKOURA (25)R
PLAN N°1
5Km
GAKOURA
80-150 C
AMBIDEDI
MOUSSALA
AMBIDEDI
(20)R
WALINEKANE
80C?
SAMANKIDI
(20)R
DAKANDAPE
10C
14 Km
7 Km
NATIONALROUTE
RAIL ROAD (NARROW GUAGE) DAKAR-BAMAKO
VERS KIDIRA & DAKAR
OUED SEKOUN DEKOLE
MALI
0 5 10 Km
PLAN N°2
59

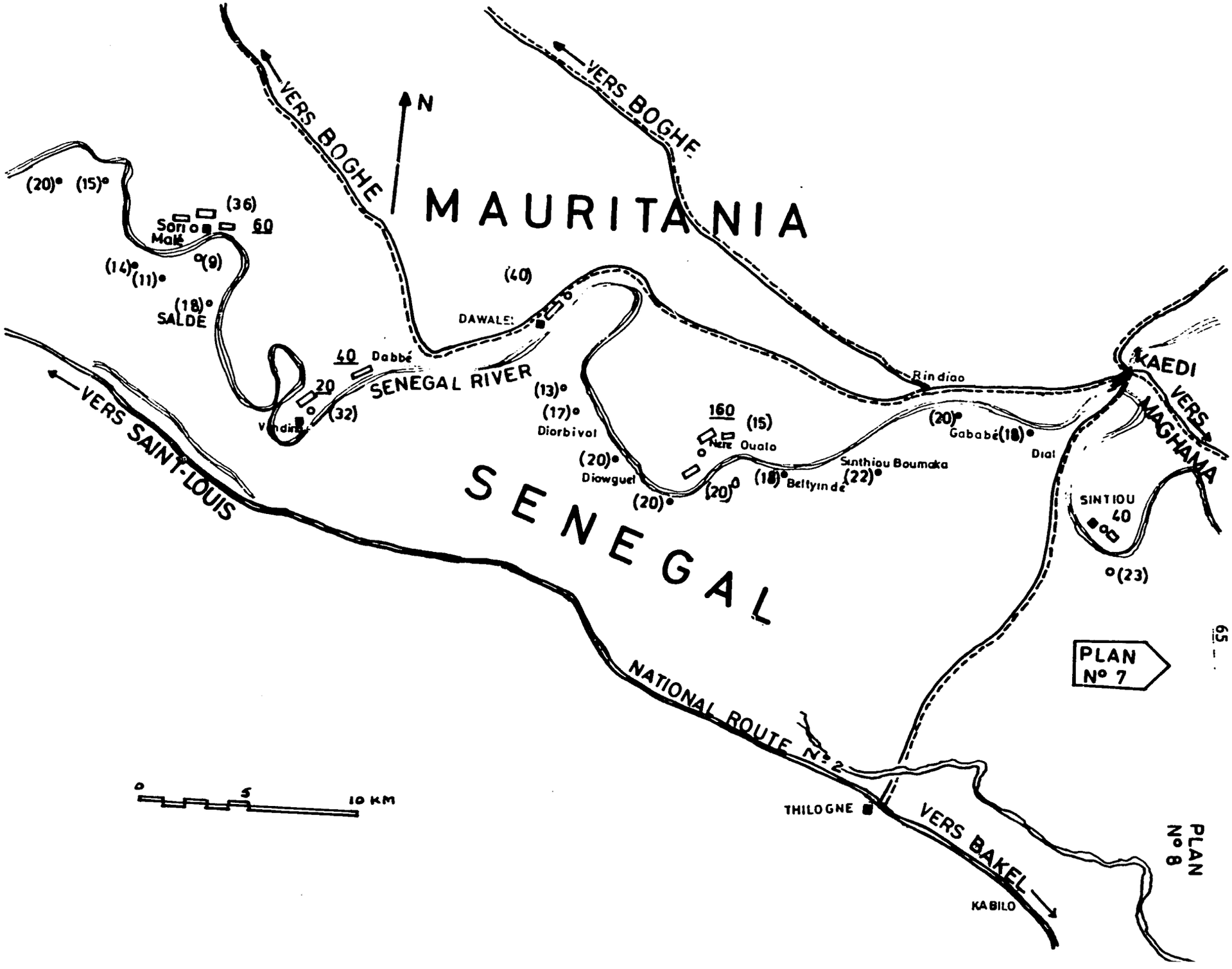

PLAN
N°4
N
60
VERS MAGHAMA
DESILI
PLAN N°5
14Km
HARR
VERS SELIBABY
MAURITANIA
5Km
14Km
SAGNE
(9) 45
ADABERE
(20)
WOUMPOU
(35) 50
Takoulaia
Gouret Ketché
SENEGAL River
Galladé
GANDE
(8) 12
DEMBANKANE
(38)
(8)
20
8Km
43
Mouderi
VERS
MATAM
(45)
40
8Km
20
LIRADJI
Diawara
40 (46)
(7)
Manael
(8)
TUABO
(12)
SENEGAL
PLAN N°3
(26)
40
BAKEL
GOURAYE
VERS KIDIRA
0
5
10 KM


PLAN No 4
TUABO
(12)
(26)
GASSAMBILAKHE
40
BAKEL
GOURAYE
NATIONAL ROUTE 5
VERS SELEBABY
BOUTANDA
N
MAURITANIA
MOULESSIMOU
DIAGUILI
VERS MATAM
COLENGA
244
(51)
OUED TOUNA
13 Km
140
DIAGUILI
(30) 30
(4) 13
KOUNGANI
7Km
MOULESSIMOU
(12)
SENEGAL RIVER
13 Km
GEMOU
14Km
12Km
7Km
SABOUSSIRE
9Km
7Km
NATIONAL ROUTE No 2
YAFERA
(62)
80
(70)
100
DIOGOUNTOUROU
SOLOL
(30) 75
Aroundou
( )
BALOU
(10)
GOUTOUBE (40)
120
KHABOU
GUIDIMAKA
(35)
140
KARAKORO
MALI
14Km
SANGALOU
10
FALEME
14Km
SEBOU
(30)
10
(20)
DEBOUKOULE
20
SENEGAL
PAVED
BITUMEE
IMPROVED
LATERITE
VERS KIDIRA
MALI
PLAN No 2
PLAN No 3


PLAN
N° 5
VERS KAEDI REGIONAL ROUTE 7
VERS MBOUT
N
OUED GARFA
MAGHAMA
PLAN
N° 6
ORNOLDE
(17)
(49)
35
35
(28)
(15) FimboPaliba
40
GOURIKA KOLIABE
(15)
Gonriki Samba Diom
PISTE EN BON ETAT
NE FIGURANT PAS SUR CARTE
MAURITANIA
17 Km
GANGUEL SOALE
15
290
DESILI
VERS SELIBABY
(14)
Padatal
(38)
SYNTHIANE (31) 40
BADINKE
WALI (53)
Toulel
80
10 Km
VERS MATAM
(20)
(16)
(33)
14 Km
ORKADIERE
(57)
8
(25)
WAOUNDE
Balel
(12)
SENEGAL
Leboudou
Waounde
SENEGAL RIVER
(32)
(15)
(16)
Courel Dara
(9)
Sagné
45
14 Km
OUED NIORDE
SEME
PLAN
N°4
(20)
ADABERE
50
35
WOUMPOU
0
5
10 km
Gourel Kotché
Gande
DEMBANKANE
(39)
NATIONAL ROUTE 2
VERS BAKEL


PLAN Nº 6
N
NGUIDJILONE
Somano
(110)
Dindi
(12)
30
(11)
SADEL
(30)
PLAN Nº 7
(66)
Oudourou
(22)
(15)
Kundel 80
Koumdel Reo
(4)
SENEGAL RIVER
40
(11)
TOKOMADJI
DIAMEL
MAURITANIA
VERS SAINT-LOUIS
Tiguére Yéne
(27)
(20)
(22)
Diammel
SIVE
40
60
0 5 10 KM
(52)
MATAM
OURO SOGUI
SENEGAL
NATIONAL ROUTE 2
(4)
(12)
(14)
(23)
(42)
Tiempen
Dolol
Youmone Yiré
(15)
50
Odobere
41
Tiali
PLAN Nº 5
VERS BAKEL
Bohou
(32)
Bormetial
(34)


VERS BOGHE
N
MAURITANIA
VERS MBOUT
OUED GORGOL
EXPERIMENTAL AND SEED PRODUCTION FARMS
KAEDI
CASIER PILOTE DE GORGOL (700 Ha)
DAWALEL
40
Rindiago
(13)
(17)
Diorbivol
160
(15)
Nere Oualo
(20)
Gababe
(18)
Dial
(20)
Diowguel
Sinthiou Boumaka
(22)
(20)
(20)
(18)
Beltyinde
SINTHIOU
50
GUIRAYE
(20)
(23)
SENEGAL RIVER
(42)
DIOWOL
(37)
100
(10)
Gaoudal
Djowel Ourgo
Dôndou
VERS SAINT-LOUIS
PLAN N° 8
NATIONAL ROUTE 2
SENEGAL
DIAMMEL
THILOGNE
VERS BAKEL
KABILO
0
5
10 KM
PLAN N° 6
20
Ali Ouri
Tetiane
PLAN N° 7
NGUIDJILONE
Somono
(110)
Dindi
VERS MAGHAMA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## 3.4. Project Inputs

### 3.4.1. O.M.V.S.

In order to carry out the regional project activities of IDP, the following inputs will be required.

#### (1) Technical Assistance - OMVS Project Management

AID will provide a technical assistance team for project management to increase the institutional capabilities of the OMVS and to provide implementation support for the regional program activities of IDP. This team will be located in the OMVS project management unit for IDP which will be in the Direct rate of Development and Coordination. However, several members of this team will have a dual assignments with another division within DDC, in order to supervise specific project activities and to assure inter-divisional coordination. The contract team will consist of the following:

- Project and Financial Management Specialist : 4 years
- Applied Anthropologist and Training Specialist : 4 years
- Management Information Specialist : 2 years
- Business Development Specialist : 2 years
- Consultants (statistician, others) : 18 months

Several other experts will be provided for implementation of the policy, planning, and feasibility studies and the health surveillance surveys. These are presented separately, below.

The Project and Financial Management Expert will serve as the Deputy to the OMVS Project Manager and will have overall responsibility for the financial and administrative management aspects of the project. He/She will be located in the project management unit, be the contractor chief of party, and be in charge of managing project funds and material resources in accordance with the project agreements and instructions issued by the OMVS and RBDO. The Management Expert will also provide technical direction for the management and coordination of all regional project activities.

The Applied Anthropologist will be assigned to the project management unit in DCC. He/She will be responsible for several major areas including social policy studies, evaluation, training, and sociological support to the national programs.

The Management Information Specialist will be assigned to the Project Management Unit in DCC, but will work closely with the Unit for Permanent Evaluation and Planning and other divisions involving information management systems. This specialist will design and implement a Management Information System (MIS) for the project.

The Business Development Specialist will be assigned to the project management unit in DCC but work closely with the Industrial Development Division. This specialist will direct the business opportunities promotion activities of the project.

A Statistician will be provided by the contractor for short-term intervals during project implementation to help with statistical analysis on the studies, monitoring, and evaluation data. Other consultants will also be provided by the contractor in areas that are needed to support implementation.

Job descriptions and qualifications for each of the technical experts are provided in Volume III, Section 7, "Scopes of Work for Technical Assistance."

(2) Technical Assistance - RBDO Project Management

IDP will finance some additional professonal staff needed by the USAID River Basin Development Office to properly direct project activities. These specialists will be located in RBDO, but will work closely with the OMVS project staff in all aspects of project implementation.

- Deputy Project Manager : 6 years
- Irrigation Engineer : 6 years

The Deputy Project Manager and Irrigation Engineer will work as part of the RBDO staff under the supervision of the RBDO Project Officer. They will provide technical direction and monitoring for project activities within their fields of expertise. The Deputy Project Manager will assure that all project administrative needs are promptly met and the Irrigation Engineer will monitor all irrigation development and provide technical support as required by the national components.

(3) Studies

IDP will finance contracts for additional technical expertise needed for the project studies. It is estimated that the following expertise will be needed:

| Type of Expertise | Source | Number of Months |
|---|---|---|
| (a) Long-Range Development Plan for the Upper Valley | | |
| Macro Economist/Group Leader | Contract | 24 |
| Agricultural Economists (2) | Contract | 24 |
| Agronomists (4) | OMVS & RDA's | 30 |
| Irrigation Engineers (3) | OMVS & RDA's | 32 |
| Land Use Planner | Contract | 4 |
| Marketing Economist | Contract | 18 |
| Business Development | OMVS Mgt. Unit | 12 |
| Human Geographer | OMVS | 10 |
| Livestock Specialist | Contract | 6 |
| Fishing Specialist | Contract | 3 |
| Anthropologist | OMVS Mgt. Unit | 12 |
| Statistician | OMVS Mgt. Unit | 8 |
| Consultants | Contract | 6 |
| Secretarial and Administrative | Contract | 24 |

(b) Irrigation Feasibility Studies

| | | |
|---|---|---|
| Irrigation Engineer/Team Leader | Contract | 12 |
| Irrigation Engineer | Contract | 6 |
| Agricultural Economist | Contract | 6 |
| Soil Scientist/Agronomist | Contract | 6 |
| Land Use Planner | Contract | 6 |
| Secretarial and Administrative | Contract | 12 |
| Anthropologist | OMVS Mgt. Unit | 3 |
| Irrigation Engineer | RBDO | 3 |
| Agronomists (3) | RDA's | 9 |
| Irrigation Engineers | RDA's | 9 |
| Social Scientists | RDA's | 9 |

(c) Land Tenure Studies

| | | |
|---|---|---|
| Anthropologist | OMVS Mgt. Unit | 6 |
| OMVS Study Director | OMVS | 6 |
| Land Tenure Specialist | Contract | 6 |
| Regional Consultants | Contract | 9 |
| Member State Professional | Member States | 12 |
| National Consultants | Contract | 9 |

(d) Women, Pastoralists, and Fishermen

| | | |
|---|---|---|
| Anthropologist | OMVS Mgt. Unit | 12 |
| OMVS Study Director | OMVS | 12 |
| Social Scientists (3) | RDA's | 9 |
| Research Support Staff | Contract | 12 |

(e) Fishing Estuary Study

| | | |
|---|---|---|
| Fisheries Biologist | Contract | 4 |
| Hydraulic Engineer | Contract | 6 |
| Technician (topographic and bathymetric surveys) | Contract | 3 |
| Economist | Contract | 1 |
| Support Personnel | Contract | 2 |

(f) Telecommunications Study

| | | |
|---|---|---|
| Study Director | Contract | 6 |
| Systems Engineer | Contract | 2 |
| Research Assistant | Contract | 7 |
| Economist | Contract | 1 |
| Support Personnel | Contract | 1 |

(g) Farm/Household Surveys and Monitoring

| | | |
|---|---|---|
| Agricultural Economist | Contract-Develop. Plan | 12 |
| Anthropologist | OMVS Mgt. Unit | 6 |
| Statistician | OMVS Mgt. Unit | 3 |

| | | |
|---|---|---|
| (g) (continued) | | |
| Agronomists | RDA's | 6 |
| Social Scientists | RDA's | 6 |
| Research Assistants | Contract | 30 |
| (h) Health Surveillance Surveys | | |
| OMVS Study Director | OMVS | 60 |
| Epidemiologist | AID | 60 |
| Health Planner | Contract | 24 |
| Health Administrator | Contract | 36 |
| Support Personnel | Contract | 60 |
| Parasitologist | OCCGE | 60 |
| Environmental Health Specialist | OCCGE | 60 |
| Nutritionist | OCCGE | 60 |

The terms of reference for each study are presented in the Technical Analyses, Volume III, Section 3.

(4) Training

AID will finance special short-term training, regional workshops and conferences, and the costs of sending a few persons to international conferences. The OMVS project management unit will coordinate these activities in support of the field-level training conducted by the national programs of IDP.

(5) Commodities

AID will finance commodities needed to support the regional operations of the project. These include: vehicles with replacements in the fourth year of the project, house furnishings for the contract technical assistants, office furnishings and equipment for the OMVS project management unit in AID, and computers for the project studies.

(6) Operating Costs

AID will pay for project-related travel costs of several OMVS and other agency personnel assigned to the project and for the salaries of several locally-hired project support staff within the OMVS project management unit. Other operating costs will include vehicle operation and maintenance, office operations, and expandable supplies.

(7) Regional Project Costs

OMVS costs for the project for professional counterpart staff and administration are estimated to be $351,000 during the project (See the Economic and Financial Analysis, Volume III, Section 1, Table 95, for details.) AID financing for the OMVS regional program of IDP for foreign exchange and local currency costs is as follows:

| ($ in 000's) | FX | Local | Total |
|---|---|---|---|
| Technical Assistance | 2,576 | 399 | 2,975 |
| Planning Studies | 1,275 | 325 | 1,600 |
| Feasibility Studies | 575 | 125 | 700 |
| Training | 200 | 150 | 350 |
| Commodities | 520 | 30 | 550 |
| Health Surveillance | 775 | 325 | 1,100 |
| Operating Costs | 640 | 883 | 1,523 |
| Contingency | 375 | 127 | 502 |
| TOTAL | 6,936 | 2,364 | 9,300 |

3.4.2. Mauritania

To achieve maximum benefits and efficient use of external donor financing, the Mauritanian program of IDP was designed parallel with the World Bank project for irrigation development in the Kaédi and Gouraye Sectors. AID financing for the Mauritanian national program is $21.7 million and the World Bank will provide approximately $11 million of additional financing. This financing by the World Bank will be used for technical assistance, equipment, construction, and operating costs required to develop 75 perimeters with 1,570 hectares during phase one of the Mauritanian program as described above.

AID financing will provide $13 million for agricultural development, $5 million for feeder roads, $1.7 million for health surveillance and $2 million for contingencies. The Government of Mauritania will pay for salaries and indemnities for national project personnel in SONADER, and the Ministries of Health, and of Public Works; for the costs of zone-level administrative support; and for any input or price subsidies still in existence when the project begins.

In order to carry out the agricultural, health, and feeder road development programs the following inputs will be required:

(1) Technical Assistance

AID will provide a technical assistance team based in Kaédi and a subteam in Gouraye for increasing the institutional capabilities of SONADER and providing implementation support for project agricultural activities. (The project staffing plan was presented in Section 3.3.2., Table 2.) This team will consist of the following:

- SONADER/Kaédi

| | | |
|---|---|---|
| Project Manager/Credit Specialist | (expatriate) | 5 years |
| Agronomist/Extension Specialist | (expatriate) | 3 years |
| Irrigation Engineer | (expatriate) | 2 years |
| Social Scientist | (Mauritanian) | 2 years |

SONADER/Gouraye

| | | |
|---|---|---|
| Agronomist/Extension Specialist | (expatriate) | 3 years |
| Social Scientist | (Mauritanian) | 2 years |

The Project Manager/Credit Specialist will serve as Deputy to the SONADER Regional Director in Kaédi with responsibility for overall financial and administrative aspects of the agricultural program. He/she will share responsibility with the Regional Director for financial planning and material resources. He/she will also work with the supply and credit divisions of SONADER and with Mauritanian financial institutions to establish the credit program for the project. He/she will help establish bookkeeping, and financial reporting, loan monitoring and collection techniques, internal audit procedures, input supply management, membership and savings promotion for this program. He/she will also train loan officers to direct the credit activities.

The Agronomist/Extension Specialists will develop and direct the training programs planned for the Kaédi and Gouraye Sectors. The Extension Specialists at Kaédi will serve as a technical supervisor within SONADER Regional Center at Kaédi and be administratively responsible to the project manager. His/her responsibilities will include supervision of the plans for the mobile training units, of the development and preparation of agent and farmer training programs, training materials, educational methods, and of the budgeting and logistical support planning for the training programs. He/she will also train two SONADER officials who will be responsible for field training in the two sectors.

The Extension Specialist in Gouraye will serve as the project coordinator for the Gouraye Sector and work as the deputy to the SONADER sector chief for Gouraye. He/she will be responsible to the project manager in Kaédi for the implementation of training and agricultural activities in Gouraye.

The Irrigation Engineer will, in collaboration with SONADER and its technical assistance personnel, plan, budget and execute programs for planning, design, construction, rehabilitation, and maintenance activities of irrigated perimeters during phase two of the project. He/she will supervise SONADER national technicians and train personnel to replace him/her at the end of the assignment. (The World Bank will provide engineers for directing small perimeters development during phase one of the project.)

The Social Scientists will have primary responsibility for conducting the socioeconomic studies required in the implementation strategy, and for the collection and analysis of monitoring and evaluation data. They will identify social, economic, and land tenure issues and work with the project staff and villagers to resolve them. They will assist in adapting technical packages and project activities to the local context. One social scientist will have responsibility for the Kaédi sector and one for the Gouraye sector.

The Contractor will also provide a total of 18 person months of consultants over the life of project in disciplines such as agronomy, soils

science, crop protection, economics, hydrology, and finance that will be needed for project implementation.

(2) Construction

AID will provide financing for final design and construction of 136 kilometers of feeder road. Implementation of this program will be undertaken by the Department of Public Works in the Ministry of Equipment and Transport and be monitored by the USAID/Mauritania Project Officer with assistance from the REDSO/WA Engineering Office as needed.

During phase two, AID will also provide financing for the final design and construction of some additional small irrigated perimeters in the Gouraye Sectors and of two medium perimeters of 300 hectares each in the Kaédi Sectors. During phase one, the World Bank will finance construction costs for 75 perimeters, plus commodities and operating support for SONADER. The phase two program will use the results of the Gouraye Regional Development Plan and the middle valley feasibility studies that will be undertaken as part of the OMVS Regional Program of IDP.

(3) Commodities

AID will finance commodities needed to support the field-level operations of the project. These include: vehicles with replacements in the fourth year of the project, house furnishings for the technical assistance, office equipment, technical equipment for the mobile training units, and pumps and irrigation equipment for new perimeters.

(4) Rural Credit

AID will provide funds to capitalize the special credit fund in the two project zones. Short-term seasonal loans and medium-term equipment loans will be available to producers and suppliers participating in the project.

(5) Operating Support

AID will pay for the salaries for short-term project personnel in the Kaédi and Gouraye Sectors during phase two, for local travel and technical operations in support of project activities, for vehicle operation and maintenance, for office operation, and for some support from the national SONADER office. The World Bank will pay for most SONADER operating costs during phase one. The Government of Mauritania will pay personnel costs for permanent professional employees of SONADER, and for zone-level administrative costs required to support the project. These costs are estimated to be $758,000 during the project. (See the Economic and Financial Analyses, Volume IV, Section 1, Table 95 for details.) Farmer contributions over the life of project are $38.5 million in the Kaédi and Gouraye Sectors.

(6) Project Financing

Total AID financing for the Mauritanian national program for foreign exchange and local currency costs are as follows:

| ($ in 000's) | FX | Local | Total |
|---|---|---|---|
| Technical Assistance | 3,060 | 200 | 3,260 |
| Construction | - | 8,479 | 8,479 |
| Commodities | 260 | 1,505 | 1,765 |
| Rural Credit | - | 1,500 | 1,500 |
| Operating Cost | 502 | 2,632 | 3,134 |
| Health Monitoring | 400 | 1,300 | 1,700 |
| Contingency | 345 | 1,517 | 1,862 |
| TOTAL | 4,567 | 17,133 | 21,700 |

3.4.3. Senegal

In order to carry out the Senegal program, the project will provide the inputs presented below.

(1) Technical Assistance

USAID will provide a technical assistance team to SAED to increase its institutional capabilities in the Bakel and Podor sectors and to provide implementation support for project agricultural activities. This team will consist of the following:

- Irrigation Engineers (2 years Bakel, 2 years Podor)
- Agronomists/Extension Specialists (3 years Bakel, 2 years Podor)
- Social Scientist (Senegalese national) (5 years Bakel and Podor)
- Agronomist/Research Specialist (2 years Saint Louis)
- Credit Specialist* (3 years Bakel and Podor)

The Irrigation Engineers will work under the supervision of the SAED project managers in Bakel and Podor as deputies. They will provide technical assistance in planning, budgeting, and implementing project activities for perimeter construction, rehabilitation, and maintenance. They will work with and train SAED national engineers to replace them at the end of the assignments. The engineers will also work on the preparation of the Bakel regional development plan and the irrigation feasibility studies to be coordinated by the OMVS under the regional program.

*The credit specialist will work primarily with the BNDS for credit and rural enterprise development activities, but his activities will be closely coordinated with the agricultural program of SAED.

The Agronomist/Extension specialists will work under the supervision of the SAED project managers in Bakel and Podor, and provide technical assistance for the agronomic and extension programs of the project. They will help the SAED extension supervisors prepare the in-service training programs for SAED agents and the farmer training programs, and will assist in the operation of the training, extension, and research demonstration programs to assure the technical appropriateness of the agronomic packages, animal traction, farm equipment, and other farm-level interventions.

The Social Scientists will work under the supervision of the SAED project managers in Bakel and Podor and within the Direction de la Production of SAED in Saint Louis. They will be responsible for conducting the socioeconomic studies required in the implementation strategy, and for the collection and analysis of monitoring and evaluation data. They will identify social, economic, and land tenure issues and work with the project staff and villagers to resolve them, and will assist in adapting technical packages and project activities to the local context. They will also be responsible for training SAED staff in socioeconomic and survey methodologies.

The Agronomist/Research specialist will continue the extension and research demonstration activities started by the agronomist funded under the Bakel Irrigated Perimeters Project. He/she will work under the supervision of the Directeur de la Production of SAED in Saint Louis, and will provide technical support and coordination for the farming training, extension, and research demonstration activities in Podor and Bakel.

The Credit Specialist will work with the BNDS (Banque Nationale de Développement du Sénégal). He/she will provide technical assistance and training to a BNDS loan officers for Bakel and Podor and to SAED staff involved in credit activities. He/she will also work with SONEPI-SOFISEDIT and the Chambre de Métiers to expand their activities for rural artisan development in the project areas in coordination with the credit program. This work will be undertaken in close collaboration with the rural credit activities of the USAID/Senegal Agricultural Sector Grant (Project No. 685-0249).

The technical assistance contractor will also provide a total of 18 person months of consultants over the life of the project in disciplines such as agronomy, soils science, crop protection, economics, hydrology, and finance that will be needed to support project implementation. The Senegal staffing plan including SAED senior staff is presented in Section 3.3.3, Table 5.

(2) Construction

USAID will provide financing for the final design and construction of the 714 new or extended perimeters in Bakel and of the 1,063 hectares of the Podor perimeter, and for the rehabilitation of 281 hectares of existing perimeters in Bakel. The final design and construction will be done under contracts to be supervised by SAED with the support of the technical assistance team. A construction site plan will be required for USAID/Senegal approval before funds are disbursed for construction.

USAID will also provide financing for the final design and construction of 100/m2 of office space for the SAED project office at Podor.

The design and construction will be undertaken by a local contractor under SAED supervision, and the monitoring of the USAID/Senegal engineer.

(3) Commodities

USAID will finance commodities needed to support the field-level operations of the project. These include: vehicles and mobylettes with replacements in the fourth year of the project, house furnishings for the contract technical assistants, office equipment for the project offices, technical equipment for the mobile training unit and other field operations, and some pumps and irrigation equipment for new perimeters.

(4) Rural Credit

USAID will provide funds to capitalize the special credit fund being established for project activities in Bakel and Podor. Short-term seasonal loans and medium-term equipment loans will be available to producers and suppliers and artisans participating in the project.

(5) Operating Costs

USAID will pay for the travel and operational support for several SAED and other agency personnel assigned to the project and for several local-hire project support staff. The project will not pay for salaries, indemnities, nor other renumerations for SAED professional employees. Other operating costs will include technical operations in support of the fishery and forestry, functional literacy, extension/research, credit, and in-service training activities; vehicle operation and maintenance costs; and office operations. The GOS will pay the salaries and other renumerations of SAED and other government personnel associated with the project and for zone level administrative costs required to support the project. The costs are estimated to be $996,000 during the project. (See the Economic and Financial Analysis, Volume III, Section 1, Table 95 for details.) Farmer contributions over the life of the project are $19.9 million.

(6) Project Financing

Total USAID financing for the Senegalese national program for foreign exchange and local currency costs is as follows:

| ($ in 000's) | FX | Local | Total |
|---|---|---|---|
| Technical Assistance | 2,815 | 180 | 2,995 |
| Construction | 3,216 | 5,219 | 8,435 |
| Commodities | 1,716 | 473 | 2,189 |
| Rural Credit | - | 1,200 | 1,200 |
| Operating Costs | 432 | 1,945 | 2,377 |
| Health Surveillance | 390 | 710 | 1,100 |
| Telecommunications | 1,150 | 350 | 1,500 |
| N'Thiagar Study | - | 100 | 100 |
| Contingency | 540 | 564 | 1,104 |
| TOTAL | 10,259 | 10,741 | 21,000 |

3.4.4. Mali

In order to carry out the agricultural program, the health surveillance, and road feasibility study, the following inputs will be required:

(1) Technical Assistance

(a) Agriculture

USAID will provide a technical assistance team based in Kayes, to increase the institutional capabilities of OVSTM, and to provide implementation support for project agricultural activities. This team will consist of the following:

| | | | |
|---|---|---|---|
| - | Project Management/Credit Specialist | (expatriate) | 6 years |
| - | Extension Training Specialist | (expatriate) | 3 years |
| - | Irrigation Engineer | (Malian) | 4 years |
| - | Social Scientist | (Malian) | 3 years |

The Project Management and Credit Specialist will serve as deputy to the OVSTM Director General in Kayes and will have overall responsibility for the financial, administrative, and credit aspects of the program. He/she will share responsibility for managing project budgets with the Director General of OVSTM, and will be in charge of managing material resources in accordance with the project agreements. He/she will be the contractor chief of party and have administrative supervisory responsibility for contract personnel. The project manager will also provide technical assistance for the rural credit and business development program to be under the direction of a loan officer assigned to Kayes by the Agricultural Development Bank--BNDA.

The Extension/Training Specialist will direct the extension program for the project. This expert will work as the chief of the extension and training section in the OVSTM Technical Division. He/she will prepare the in-service training programs for OVSTM agents and the farmer training programs. He/she will supervise the operation of the training, extension, and research demonstration programs and assure the technical appropriateness of the agronomic packages, animal traction, farm equipment, and other farm-level interventions. OVSTM will assign a qualified extension agronomist as the deputy to this specialist. The deputy will be trained by the specialist and replace him/her as Section Chief at the end of three years.

The Irrigation Engineer will be responsible for planning, budgeting and executing programs for the design, construction, rehabilitation, and maintenance activities on irrigated perimeters. He/she will work as the chief of the OVSTM Technical Support Section, with a deputy assigned by OVSTM, who will be trained to replace him/her at the end of assignment. The irrigation engineer will also assist with work on the Kayes Regional Development Plan that will be prepared by the IDP Regional Program as part of the Upper Valley Development Plan.

The Social Scientist will have primary responsibility for conducting the socioeconomic studies required in the implementation strategy, and for the collection and analysis of monitoring and evaluation data. He/she will identify social, economic, and land tenure issues and work with the project staff and villagers to resolve them, and will assist in adapting technical packages and project activities to the local context. The Social Scientist will be assigned to the extension training section of OVSTM. He/she will work under the administrative supervision of the contractor project manager and the technical supervision of the extension specialist and will be responsible for supervising and training OVSTM agents in socioeconomic survey metholologies.

The Contractor will also provide a total of 18 person months of consultants over the life of the project in disciplines such as agronomy, soils science, crop protection, economics, hydrology, and finance that will be needed to support project implementation. Requests for short-term assistance will have to be approved by the OVSTM Director and USAID/Mali project officer. A scope of work for each technical assistant is provided in Volume III, Section 7.

(b) Health Surveillance

For the health surveillance program, short-term technical assistance will be provided from two sources: (a) Government of Mali Institutions such as the School of Medicine and the Ministry of Health, and (b) the OCCGE (Organization for Coordination and Control of Communicable Diseases). This short-term assistance will provide specialized skills in parasitology, entomology, malacology, etc., required to finalize and implement the epidemiologic program. A collaboration between Malian experts and those from the OCCGE will assure that the methodologies respond to the priorities of the GRM and at the same time are as compatible as possible with similar methodologies and project activities in Senegal and Mauritania. Short-term technical assistance from the OCCGE will also assure the follow-up supervision of the staff trained at the OCCGE and the appropriate revision of the OCCGE training so that it responds to the realitites encountered in the field. A full description is provided in the technical analysis for health, Volume III, Section 3.10.

(c) Road Feasibility Study

The feasibility study for the construction of an all-weather road of approximately 96 kms. between Kayes and the Senegal border at Diboli will be done under contract with a U.S. or local engineering firm. The engineering firm will analyze the technical, economic, financial, social, and environmental feasibility of the project and prepare a detailed report for AID and the GRM. Preparation of the study is expected to require a total of 24 persons months of professional services of a civil engineer, structural engineer, soils and materials engineer, equipment specialist, financial analyst, transportation economist, rural development economist, social anthropologist, environmentalist, and project director. The terms of reference for this study are in Volume III, Section 3.4.

(2) Construction

(a) Project Office

USAID will provide financing for the final design and construction of 100 m2 of additional space at OVSTM in Kayes to accomodate the project activities. The design and construction will be undertaken by a local contractor under the supervision of USAID/Mali.

(b) Cooperative Infrastructure

The project will provide funding to farmer associations for the construction of buildings for offices, storage, classrooms, etc. Up to $10,000 per farmer association will be given on a matching basis (65 percent of the costs of the infrastructure). The farmer associations will use local materials as much as possible, purchase other materials like cement locally, and construct the buildings themselves.

The third construction component is the rehabilitation of existing perimeters and the possible construction of new cuvette irrigation systems. The planning, design, and construction supervision will be the responsibility of the TA irrigation engineer. The construction will be carried out under a contract with one of the governmental construction agencies or with a local private firm. Final selection of contractor will be made by OVSTM based on cost and proven competence, and will be approved by USAID/Mali.

(3) Commodities

USAID will finance commodities needed to support the field-level operations of the project. These include: vehicle and mobylettes and replacements in the fourth year of the project, house furnishing for the contract technical assistants, office equipment, technical equipment, and some pumps and irrigation equipment for new perimeters.

(4) Rural Credit

USAID will provide funds to capitalize or to guarantee the special credit fund being established in Kayes through the BNDA. Short-term seasonal loans and medium-term equipment loans will be available to producers and suppliers participating in the project. Project funds will also be available to assist BNDA with start-up operating costs and to provide special short-term technical skill and financial management training to local artisans and businesses.

(5) Operating Costs

USAID will provide operating support to national implementing agencies for the agriculture, health surveillance, functional literacy, and credit activities. Other operating costs will include local travel and technical operations, in-service training, vehicle operation and maintenance, and office operations. The GRM will pay the salaries and indemnities of all

government personnel associated with the project and for zone-level administrative costs required to support the project. These costs are estimated to be $391,000 during the project. (See the Economic and Financial Analysis, Volume III, Section 1, Table 95 for details.) Farmer contributions over the life of project are $3.6 million.

(6) Project Financing

Total USAID financing for the Malian national program for foreign exchange and local currency costs is as follows:

| ($ in 000's) | FX | Local | Total |
|---|---|---|---|
| Agricultural Program | 3,415 | 4,250 | 7,665 |
| Functional Literacy | 50 | 235 | 285 |
| Road Feasibility | 300 | - | 300 |
| Rural Credit | - | 800 | 800 |
| Health Surveillance | 839 | 261 | 1,100 |
| Contingency | 400 | 450 | 850 |
| TOTAL | 5,004 | 5,996 | 11,000 |

## 4.0 COST ESTIMATE AND FINANCIAL PLAN

### 4.1 Explanation of Cost Elements

#### 4.1.1. Technical Assistance

For implementation of the agricultural development program the project provides for a total of 48 person-years of long-term expatriate and 16 person-years of long-term OMVS-national technical assistance. This includes 12 expatriate person-years for the OMVS regional program; 13 expatriate and 4 national person-years for the Mauritanian national program; 14 expatriate and 5 national person-years for the Senegalese national program and 9 expatriate and 7 national person-years for the Malian national program. This technical assistance will be provided by competitively-selected U.S. contractors. A detailed cost breakdown for each contract is presented in Tables 2A, 3A, 4A and 5A for the OMVS Regional, Mauritanian, Senegalese, and Malian programs, respectively. The total technical assistance cost includes:

(1) recurring costs for salaries, benefits, post differentials, insurance, post allowances, educational allowances, housing and utilities;

(2) non-recurring costs for travel and transport to post, rest and recuperation travel, repatriation/separation costs, and language training;

(3) operational support for operational travel and per diem within the IDP project area, and for administrative expenses such as supplies, communications, etc.; and,

(4) overhead and fee of the contractor.

The project also provides technical backstopping and administrative personnel to the project offices of USAID/RBDO and USAID's Mauritania, Senegal and Mali. These include an Irrigation Engineer for USAID/RBDO, and deputies to the project officers in USAID/RBDO and each of the three USAID Missions. These costs are shown as USAID support under Operating Costs.

For implementation of the health surveillance program, there will be 10 person-years of expatriate long-term technical assistance by an Epidemiologist, Health Administrator, and Health Planner; and 15 person years of long-term OMVS-national technical assistance from the OCCGE. This technical team will work at the regional level in support of the national programs and be supplemented by 18 person months of specialized consultancies.

For the telecommunications program, a field team leader will be assigned in Dakar for 2 years. This team leader will coordinate the short-term work of engineers and consultants to be provided by the contractor for specialized task for the pilot rural satellite system and the regional telecommunications policy study.

Besides this long-term personnel, the project provides a total of 78 person-months of consultants for implementation support and evaluation for the OMVS and national programs, and 13 person-years of supplemental technical

assistance for the OMVS to prepare the policy, planning and feasibility studies of the project. For consultants $15,000 per month is budgeted. This is based on an average salary of $180 per day, roundtrip airfare from the U.S., in-country per diem and travel, insurance, and a 150 percent estimated overhead.

All technical assistance costs are calculated with 1983 as the base year and are inflated by 8 percent for each subsequent year during the life of the project.

4.1.2. Training

The project provides for extensive field training and limited short-term participant training. Field training for RDA personnel, village technicians, and farmers is budgeted within the technical assistance and operating support costs so that a line item does not appear in the budget. The participant training includes:

(1) the upgrading of approximately 10 extension agents to agricultural advisors by providing two years of additional formal training at a training institute in the region;

(2) special short-term training for national agents in areas such as fish pond development, reforestation, rural credit operations, improved agricultural techniques, survey methodologies, etc.;

(3) special training for selected OMVS officials in organization and management techniques, information systems, evaluation methodology, etc. and

(4) special training for doctors and nurses in epidemiology, disease and nutrition surveillance. A total of $580,000 is budgeted for this participant training, including national and regional workshops as well as technical seminars.

4.1.3. Construction

The cost estimating procedures for irrigation development are presented in the "Technical Analysis for Irrigation", Volume III, Section 3.2. Budget breakdowns for the construction costs are presented in Financial Tables 3B, 4B, and 5B for Mauritania, Senegal, and Mali, respectively. The estimation procedures and results have been verified with the REDSO/WA Irrigation Engineer and the USAID engineers in Senegal and Mali.

4.1.4. Commodities

The commodity list is provided as part of the "Procurement Plan", Section 5.3.4. The more detailed list of specifications and cost for commodities is provided in Volume III, Section 7. The commodity specifications and costs were developed by the Supply Management Office of USAID/Senegal.

### 4.1.5. Rural Credit

The budget for the rural credit program was established following the recommendations of the private sector development specialist and the economist on the PP design team. The budget is based on their estimates of credit demand for the short and medium-term programs that are recommended. Credit demand calculations and details on the credit and artisan assistance program are found in the "Private Sector Analysis", Volume III, Section 3.10.

### 4.1.6. Operating Support

Operating support budgets have been developed for each of the national programs and the OMVS regional program. These are presented in Financial Tables 2E, 3D, 4D, and 5D. Operating support costs include:

(1) local project support staff--professional OMVS and RDA project staff are paid for by the OMVS and member states as part of their project contributions;

(2) technical operations, travel, per diem, materials and other items in support of field training activities, fish ponds, woodlots, functional literacy, research field demonstrations, cooperative development, credit promotion, project monitoring and evaluation, and in-service training;

(3) vehicle operation and maintenance costs;

(4) office operations; and,

(5) USAID support - costs for hiring a deputy project officer for RBDO and each USAID.

## 4.2. Cost Estimates and Financial Plans

The following budget tables are attached:

| Financial Table No. | Title |
|---|---|
| 1A | "Summary Cost Estimate and Financial Plan by Function" |
| 1B | "Summary Cost Estimate and Financial Plan by Country" |
| 2 | "Summary Cost Estimate - OMVS Regional Program" |
| 2A | "Personnel Cost Breakdown - OMVS Management" |
| 2B | "Cost Breakdown - OMVS Studies" |
| 2C | "Cost Breakdown for Training" |
| 2D | "Cost Breakdown - OMVS Commodities" |
| 2E | "Cost Breakdown - OMVS Operating Costs" |
| 2F | "Health Surveillance Cost Breakdown - OMVS Regional" |
| 3 | "Summary Cost Estimate - Mauritania" |
| 3A | "Personnel Cost Breakdown - Mauritania" |
| 3B | "Construction Cost Breakdown - Mauritania" |
| 3C | "Commodities Cost Breakdown - Mauritania" |
| 3D | "Operating Cost Breakdown - Mauritania" |
| 3E | "Health Surveillance Costs - Mauritania" |
| 4 | "Summary Cost Estimate - Senegal" |
| 4A | "Technical Assistance Cost Breakdown - Senegal" |
| 4B | "Construction Cost Breakdown - Senegal" |
| 4C | "Commodities Cost Breakdown - Senegal" |
| 4D | "Operating Cost Breakdown - Senegal" |
| 4E | "Health Surveillance Costs - Senegal" |
| 4F | "Telecommunications Cost - Senegal" |

| | |
|---|---|
| 5 | "Summary Cost Estimate - Mali" |
| 5A | "Personnel Cost Breakdown - Mali" |
| 5B | "Construction Cost Breakdown - Mali" |
| 5C | "Commodities Cost Breakdown - Mali" |
| 5D | "Operating Cost Breakdown - Mali" |
| 5E | "Health Surveillance Costs - Mali" |
| 5F | "Functional Literacy - DNAFLA" |

Financial Table 1A ($ in 000)

Summary Cost Estimate and Financial Plan by Function & Year

| | | FY 84 | FY 85 | FY 86 | FY 87 | FY 88 | FY 89 | FY 90 | Total |
|---|---|---|---|---|---|---|---|---|---|
| A. | Agriculture | | | | | | | | |
| | Technical Asst. | 501 | 1,649 | 1,832 | 2,285 | 1,680 | 889 | 377 | 9,213 |
| | Construction | 1,068 | 2,153 | 2,080 | 5,301 | 4,782 | - | - | 15,384 |
| | Commodities | 1,212 | 1,112 | 266 | 1,525 | 480 | 1 | - | 4,596 |
| | Rural Credit | 120 | 311 | 931 | 959 | 525 | 479 | 175 | 3,500 |
| | Operating Costs | 421 | 667 | 774 | 1,123 | 1,068 | 1,066 | 725 | 5,844 |
| | Participant Training | 120 | 162 | 105 | 189 | 123 | 177 | - | 876 |
| | Sub-total | 23,442 | 6,054 | 5,988 | 11,382 | 8,658 | 2,612 | 1,277 | 39,413 |
| B. | Health | | | | | | | | |
| | Technical Asst. | 61 | 406 | 383 | 397 | 240 | 243 | 40 | 1,770 |
| | Training | 91 | 158 | 125 | 115 | 77 | 14 | - | 580 |
| | Commodities | 810 | - | 155 | 270 | 150 | - | - | 1,385 |
| | Renovation | 70 | - | - | - | - | - | - | 70 |
| | Operating Costs | 64 | 242 | 213 | 245 | 208 | 216 | 7 | 1,195 |
| | Sub-total | 1,096 | 806 | 876 | 1,027 | 675 | 473 | 47 | 5,000 |
| C. | Feeder Roads | - | 300 | - | 2,394 | 2,628 | - | - | 5,322 |
| D. | Telecommunications 1/ | 900 | 400 | 200 | - | - | - | - | 1,500 |
| E. | Regional Coordination & Planning | | | | | | | | |
| | Technical Asst. | 470 | 833 | 775 | 500 | 313 | 84 | - | 2,975 |
| | Planning Studies | 370 | 720 | 395 | 45 | 35 | 35 | - | 1,600 |
| | Feasibility Studies | - | 200 | 200 | 300 | - | - | - | 700 |
| | Training | 78 | 78 | 108 | 48 | 28 | 5 | 5 | 350 |
| | Commodities | 425 | - | 125 | - | - | - | - | 550 |
| | Operating Costs | 235 | 255 | 275 | 283 | 301 | 105 | 69 | 1,523 |
| | Sub-total | 1,578 | 2,086 | 1,878 | 1,176 | 677 | 229 | 74 | 7,699 |
| F. | Contingencies | 436 | 591 | 575 | 1,189 | 954 | 233 | 89 | 4,067 |
| G. | Total | 7,452 | 10,237 | 9,517 | 17,168 | 13,592 | 3,547 | 1,487 | 63,000 |

1/ Funding requirements for the telecommunications program are $2 million. Of this amount $500,000 is included in the original $62 million budget, $500,000 is being provided by the AID/Washington centrally funded Rural Satellite Project, and an additional $1 million is being requested under IDP for full funding.

## Financial Table 1-B

### Summary Cost Estimate by Country ($ in 000's)

| | | OMVS | Mauritania | Senegal | Mali | Total |
|---|---|---|---|---|---|---|
| A. | Agriculture | | | | | |
| | Technical Assistance | - | 3,260 | 2,995 | 2,958 | 9,213 |
| | Construction | - | 3,457 | 8,435 | 3,492 | 15,384 |
| | Commodities | - | 1,765 | 2,189 | 642 | 4,596 |
| | Rural Credit | - | 1,500 | 1,200 | 800 | 3,500 |
| | Operating Costs | - | 2,842 | 2,185 | 817 | 5,844 |
| | Training | - | 292 | 292 | 292 | 876 |
| | Sub-total | - | 13,116 | 17,296 | 9,001 | 39,413 |
| B. | Health | | | | | |
| | Technical Assistance | 945 | 275 | 275 | 275 | 1,770 |
| | Training | - | 260 | 150 | 170 | 580 |
| | Commodities | 30 | 565 | 390 | 400 | 1,385 |
| | Renovation | - | 10 | 10 | 50 | 70 |
| | Operating Costs | 125 | 590 | 275 | 205 | 1,195 |
| | Sub-total | 1,100 | 1,700 | 1,100 | 1,100 | 5,000 |
| C. | Feeder Roads | - | 5,022 | - | 300 | 5,322 |
| D. | Telecommunications | - | - | 1,500 | - | 1,500 |
| E. | Regional Coordination and Planning | | | | | |
| | Technical Assistance | 2,975 | - | - | - | 2,975 |
| | Planning Studies | 1,600 | - | - | - | 1,600 |
| | Feasibility Studies | 700 | - | - | - | 700 |
| | Training | 350 | - | - | - | 350 |
| | Commodities | 550 | - | - | - | 550 |
| | Operating Costs | 1,523 | - | - | - | 1,523 |
| | Sub-total | 7,698 | - | - | - | 7,698 |
| F. | Contingencies | 502 | 1,862 | 1,104 | 599 | 4,067 |
| G. | Total | 9,300 | 21,700 | 21,000 | 11,000 | 63,000 |

Financial Table 2

Summary Cost Estimate: OMVS Regional Program ($ in 000)

| | | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | Total |
|---|---|---|---|---|---|---|---|---|---|
| A. | Technical Assistance | | | | | | | | |
| | (Management - OMVS) | (470) | (833) | (775) | (500) | (313) | ( 84) | - | (2,975) |
| B. | Planning Studies | 370 | 720 | 395 | 45 | 35 | 35 | - | 1,600 |
| C. | Feasibility Studies | 200 | 200 | 300 | - | - | - | - | 700 |
| D. | Training | 78 | 78 | 108 | 48 | 28 | 5 | 5 | 350 |
| E. | Commodities | 425 | - | 125 | - | - | - | - | 550 |
| F. | Operating Costs | 235 | 255 | 275 | 283 | 301 | 105 | 69 | 1,523 |
| G. | Health Surveillance | 115 | 282 | 237 | 257 | 79 | 83 | 47 | 1,100 |
| H. | Contingency | 199 | 134 | 119 | 83 | 43 | 18 | 6 | 502 |
| I. | Total | 1,792 | 2,502 | 2,234 | 1,516 | 799 | 330 | 127 | 9,300 |

## Financial Table 2A

Personnel Cost Breakdown - OMVS Management Contract

(1) Financial Management Specialist - MBA and substantial experience; 2 dependents; language S-3, R-3 French; located in Dakar or St. Louis.
(2) Information System Specialist - MS and substantial experience; 2 dependents; language S-3, R-3 French; located in Dakar or St. Louis.
(3) Anthropologist/Training Specialist - MS and substantial experience; 2 dependents; language S-3, R-3 French; located in Dakar or St. Louis.
(4) Entreprise Development Specialist - MBA and substantial experience; 2 dependents; language S-3, R-3 French; located in Dakar or St. Louis.
(5) Statistician/Computer Programmer - MS and substantial experience; language S-3, R-3 French; located in Dakar or St. Louis; will work on short-term consultancies - 24 months over life of project.

Cost Breakdown (in $ 000)

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | Total |
|---|---|---|---|---|---|---|---|
| A. Recurring | | | | | | | |
| 1. Salary/Benefits | 60 | 160 | 140 | 80 | 40 | - | 480 |
| a. Financial Mgt. | (20) | (40) | (40) | (40) | (20) | - | |
| b. Entreprise Devl. | - | (40) | (40) | - | - | - | |
| c. Information Spec. | (20) | (40) | (20) | - | - | | |
| d. Anthro./Training | (20) | (40) | (40) | (40) | (20) | - | |
| 2. Consultancies | 75 | 75 | 75 | 75 | 50 | 50 | 400 |
| a. Statistician | (50) | (50) | (50) | (50) | - | - | |
| b. Other | (25) | (25) | (25) | (25) | (50) | (50) | |
| 3. Post Diff/Ins. | 30 | 40 | 30 | 20 | 10 | - | 130 |
| 4. Post Allowance | 15 | 20 | 15 | 10 | 5 | - | 65 |
| 5. Educ. Allowance | 15 | 20 | 15 | 10 | 5 | - | 65 |
| 6. Housing/Utilities | 60 | 80 | 60 | 30 | 20 | - | 250 |
| Subtotal | 255 | 395 | 335 | 225 | 130 | 50 | 1,390 |
| B. Non-recurrring | | | | | | | |
| 1. Travel & Transport (post assignment) | 45 | 15 | - | - | - | - | 60 |
| 2. R & R | - | 12 | 12 | 8 | - | - | 32 |
| 3. Repatriation/Separ. | - | - | 20 | - | 20 | - | 40 |
| 4. Language Training | 5 | - | - | - | - | - | 5 |
| Subtotal | 50 | 27 | 32 | 8 | 20 | - | 137 |
| C. Operational Support | | | | | | | |
| 1. Operational Travel | 30 | 40 | 30 | 10 | - | - | 110 |
| 2. Other operations | 10 | 10 | 8 | 5 | 3 | 3 | 39 |
| Subtotal | 40 | 50 | 38 | 15 | 3 | 3 | 149 |

Table 2 A (cont'd)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| D. | Overhead, Fee, G & A (150% base salaries) | 90 | 240 | 210 | 120 | 60 | - | 720 |
| E. | Uninflated Cost | 435 | 712 | 615 | 368 | 213 | 53 | 2,396 |
| F. | Inflation (8% py) | 35 | 121 | 160 | 132 | 100 | 31 | 579 |
| G. | Total Cost | 470 | 833 | 775 | 500 | 313 | 84 | 2,975 |

## Financial Table 2 B

### Cost Breakdown - OMVS Studies

| | | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | Total |
|---|---|---|---|---|---|---|---|---|
| 1. | Upper Valley Development[1/] | 325 | 650 | 325 | - | - | - | 1,300 |
| | Professionel personnel | (300) | (600) | (300) | - | - | - | |
| | Staff & Field Support | (25) | (50) | (25) | - | - | - | |
| 2. | Irrigation Feasibility | - | - | 200 | 300 | - | - | 500 |
| 3. | Land Tenure | 25 | 50 | 50 | 25 | 25 | 25 | 200 |
| 4. | Women, Pastoralists, Fishermen | 10 | 10 | 10 | 10 | - | - | 40 |
| 5. | Fishing Estuary | - | 200 | - | - | - | - | 200 |
| 6. | Telecommunications [2/] | - | - | - | - | - | - | - |
| 7. | Farm Surveys and Monitoring | 10 | 10 | 10 | 10 | 10 | 10 | 60 |
| 8. | Total | 370 | 925 | 595 | 345 | 35 | 35 | 2,300 |

1/ Logistics support for all studies is budgeted under the line items for commodities and operating support.

2/ Telecommunications Study will be funded for approximately $100,000 from additional funds being requested from AID/Washington.

## Financial Table 2C

## Cost Breakdown for Training

| | | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | Total |
|---|---|---|---|---|---|---|---|---|---|
| 1. | Participant Training | 50 | 50 | 80 | 20 | - | - | - | 200 |
| | Computer Programming | (30) | (30) | (30) | - | - | - | - | - |
| | Other | - | (20) | (30) | - | - | - | - | - |
| | Management | (20) | - | (20) | (20) | - | - | - | - |
| | Health 1/ | - | - | - | - | - | - | - | - |
| 2. | Program Mgt. Seminars | 8 | 8 | 8 | 8 | 8 | 5 | 5 | 50 |
| 3. | Technical Seminars | 20 | 20 | 20 | 20 | 20 | - | - | 100 |
| 4. | Total | 70 | 78 | 108 | 48 | 28 | 5 | 5 | 350 |

1/ Health training is budgeted under the national programs for Health Surveillance.

## Financial Table 2 D

### Cost Breakdown - OMVS Commodities

| | | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | Total |
|---|---|---|---|---|---|---|---|---|
| 1. | Vehicles | 110 | - | 82 | - | - | - | 192 |
| | Four-wheel drive (10) | (96) | - | (72) | - | - | - | |
| | Cars (3) | (14) | - | (10) | - | - | - | |
| 2. | Office Equipment | 130 | - | 5 | - | - | - | 135 |
| | Furniture | (20) | - | - | - | - | - | |
| | Equipment | (10) | - | (5) | - | - | - | |
| | Micro-computers | (100) | - | - | - | - | - | |
| 3. | Field Equipment | 43 | - | - | - | - | - | 43 |
| | Survey equipment | (20) | - | - | - | - | - | |
| | Engineering equipment | (15) | - | - | - | - | - | |
| | Camping equipment | ( 8) | - | - | - | - | - | |
| 4. | Shipping & Insurance | 142 | - | 38 | - | - | - | 180 |
| 5. | Total | 425 | - | 125 | - | - | - | 550 |

## Financial Table 2-E

### Cost Breakdown - OMVS Operating Costs

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | Total |
|---|---|---|---|---|---|---|---|---|
| 1. Project Support Staff | 38 | 38 | 38 | 30 | 30 | 15 | - | 189 |
| Secretary | (10) | (10) | (10) | (10) | (10) | (10) | (15) | - |
| Accountant | (12) | (12) | (12) | (12) | (12) | (12) | ( 6) | - |
| Drivers | (16) | (16) | (16) | ( 8) | ( 8) | ( 4) | - | |
| 2. RBDO Support | 160 | 160 | 160 | 160 | 160 | 40 | 40 | 880 |
| Deputy Manager | (40) | (40) | (40) | (40) | (40) | (40) | (40) | |
| Irrigation Engineer | (120) | (120) | (120) | (120) | (120) | - | - | |
| 3. Travel & Per Diem | 8 | 8 | 8 | 8 | 6 | 3 | - | 41 |
| 4. Vehicle Operations | 8 | 8 | 8 | 6 | 5 | 5 | - | 40 |
| 5. Office Operations | 4 | 4 | 4 | 4 | 4 | 3 | - | 23 |
| 6. Inflation (8% per year) | 17 | 37 | 57 | 75 | 96 | 39 | 29 | 350 |
| 7. Total | 235 | 255 | 275 | 283 | 301 | 105 | 69 | 1,523 |

## Financial Table 2-F

## Health Surveillance Cost Breakdown - OMVS Regional Program

| Line Item | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | Total |
|---|---|---|---|---|---|---|---|---|
| 1. Technical Assistance | | | | | | | | |
| -Epidemiologist | - | - | - | - | - | - | - | - |
| -Health Planner | 35 | 35 | - | - | - | - | - | 70 |
| -Mgt. Officer | - | 125 | 125 | 125 | - | - | - | 375 |
| -Admin, Assist. | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 140 |
| -Secretary | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 42 |
| -Inflation 8%py | - | 15 | 27 | 42 | 9 | 12 | 14 | 118 |
| Sub-Total | 61 | 201 | 178 | 192 | 35 | 38 | 40 | 745 |
| 2. OCCGE Support | - | 40 | 40 | 40 | 40 | 40 | - | 200 |
| 3. Commodities | | | | | | | | |
| -Office Equipment | 20 | - | - | - | - | - | - | 20 |
| -Micro-computer | 10 | - | - | - | - | - | - | 10 |
| Sub-Total | 30 | - | - | - | - | - | - | 30 |
| 4. Operating Costs | | | | | | | | |
| -Travel/H. Planner | 15 | 15 | - | - | - | - | - | 30 |
| -Travel/Mgt. Officer | - | 10 | 10 | 10 | - | - | - | 30 |
| -Regional Meetings | 5 | 5 | - | 5 | | | 5 | 20 |
| Sub-Total | 20 | 30 | 10 | 15 | - | - | 5 | 80 |
| 5. Contingency | 4 | 11 | 9 | 10 | 4 | 5 | 2 | 45 |
| 6. TOTAL COST | 115 | 282 | 237 | 257 | 79 | 83 | 47 | 1,100 |

## Financial Table 3

### Summary Cost Estimate: Mauritania National Program ($in 000)

| Item | Fiscal Years | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 84 | 85 | 86 | 87 | 88 | 89 | 90 | Total |
| A. Technical Assistance | | | | | | | | |
| Long-term | - | 451 | 679 | 861 | 646 | 231 | - | 2,868 |
| Consultants | - | 32 | 70 | 113 | 41 | 88 | 48 | 392 |
| Sub-Total | - | 483 | 749 | 974 | 687 | 319 | 48 | 3,260 |
| B. Construction | | | | | | | | |
| Roads | - | - | - | 2,394 | 2,628 | - | - | 5,022 |
| Irrigation | - | - | - | 1,817 | 1,640 | - | - | 3,457 |
| Sub-Total | - | - | - | 4,211 | 4,268 | - | - | 8,479 |
| C. Commodities | | | | | | | | |
| Vehicles | 216 | 15 | - | 231 | - | - | - | 462 |
| House furnishings | 162 | - | - | - | - | - | - | 162 |
| Office and technical equipment | 100 | - | - | 102 | - | - | - | 202 |
| Irrigation equipment | - | - | - | 498 | 441 | - | - | 939 |
| Sub-Total | 478 | 15 | - | 831 | 441 | - | - | 1,765 |
| D. Rural Credit | - | 250 | 500 | 500 | 150 | 100 | - | 1,500 |
| E. Operating Cost | | | | | | | | |
| Project staff | - | - | - | 188 | 158 | 101 | - | 447 |
| Local Travel/Operations | - | 15 | 20 | 28 | 28 | 55 | 56 | 202 |
| Participant Training | 40 | 50 | 30 | 50 | 30 | 40 | - | 240 |
| Office Operation | - | 8 | 8 | 8 | 8 | 8 | 8 | 48 |
| Vehicle O & M | - | 30 | 30 | 30 | 30 | 30 | 30 | 180 |
| Contractor Support | - | 128 | 126 | 126 | 98 | 90 | - | 568 |
| USAID Support | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 560 |
| Inflation (8% py) | 10 | 53 | 76 | 184 | 203 | 238 | 125 | 889 |
| Sub-Total | 130 | 364 | 370 | 694 | 635 | 642 | 299 | 3,134 |
| F. Health Surveillance | 462 | 222 | 275 | 348 | 223 | 170 | - | 1,700 |
| G. Contingency | 101 | 125 | 178 | 710 | 602 | 116 | 30 | 1,862 |
| H. Total Cost | 1,171 | 1,459 | 2,072 | 8,268 | 7,006 | 1,347 | 377 | 21,700 |

## Financial Table 3A

## Personnel Cost Breakdown: Mauritania

I. Long-term Personnel

(1) Project Management/Credit Specialist - (Contractor Chief of Party) MBA or MS and substantial experience; 2 dependents; language S-3, R-3; located in Kaedi; 5 years.
(2) Agricultural Extension Specialist - MS and substantial experience; 2 dependents; language S-3, R-3; located in Kaedi; 3 years.
(3) Agricultural Extension Specialist - MS and substantial experience; 2 dependents; language S-3, R-3; located in Gouraye; 3 years.
(4) Irrigation Engineer - MS or BS and substantial experience; 2 dependents; language S-3, R-3; located in Kaedi; 2 years.
(5) Social Scientists (2) - BS and substantial experience; French and local language capacity; one in Kaedi and one in Gouraye; 2 years each.

Cost Breakdown

| | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | Total |
|---|---|---|---|---|---|---|---|
| A. Recurring | | | | | | | |
| 1. Salary/Benefits | 111 | 175 | 200 | 136 | 45 | - | 667 |
| a. Prj. Mgt./Credit | (45) | (45) | (45) | (45) | (45) | - | |
| b. Ag. Ext.-Kaedi | (23) | (45) | (45) | (23) | - | - | |
| c. Ag. Ext.-Gouraye | (23) | (45) | (45) | (23) | - | - | |
| d. Irr. Engineer | - | - | (45) | (45) | - | - | |
| e. Social Sci.(2) | (20) | (40) | (20) | - | - | - | |
| 2. Post Diff/Ins. | 25 | 40 | 45 | 30 | 10 | - | 150 |
| 3. Post Allowance | 10 | 15 | 20 | 15 | 5 | - | 65 |
| 4. Educ. Allowance | 10 | 15 | 20 | 15 | 5 | - | 65 |
| 5. Housing/Utilities | 30 | 50 | 50 | 30 | 10 | - | 170 |
| Sub-Total | 186 | 295 | 335 | 226 | 75 | - | 1,117 |
| B. Non-recurring | | | | | | | |
| 1. Travel & Transport (post assignment) | 55 | - | 15 | 15 | - | - | 85 |
| 2. R & R | - | 12 | 8 | - | 4 | - | 24 |
| 3. Repatriation/Separ. | - | 10 | 20 | 30 | 10 | - | 70 |
| 4. Language Training | 10 | - | 5 | - | - | - | 15 |
| Sub-Total | 65 | 22 | 48 | 45 | 14 | - | 194 |
| C. Overhead Fee, G & A (150% base salaries) | 167 | 263 | 300 | 204 | 68 | - | 1,002 |

Financial Table 3A -page 2

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| D. Uninflated Cost | 418 | 580 | 683 | 475 | 157 | - | 2,313 |
| E. Inflation (8% py) | 33 | 99 | 178 | 171 | 74 | | 555 |
| F. Total Cost | 451 | 679 | 861 | 646 | 231 | | 2,868 |

II. Consultants: Average daily rate: $180.
Average TDY 1 month - days in capital, rest in field.
Cost per consultancy: $15,000 including salary, travel, per diem, insurance and overhead.

Cost Breakdown:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A. Implementation Support | 30 | 60 | 60 | 30 | 30 | 30 | 240 |
| B. Evaluation | - | - | 30 | - | 30 | - | 60 |
| C. Uninflated Cost | 30 | 60 | 90 | 30 | 60 | 30 | 300 |
| D. Inflation (8% py) | 2 | 10 | 23 | 11 | 28 | 18 | 92 |
| | 32 | 70 | 113 | 41 | 88 | 48 | 392 |

## Financial Table 3B

## Construction Cost Breakdown - Mauritania

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | Total |
|---|---|---|---|---|---|---|---|---|
| 1. Roads | | | | | | | | |
| Construction | - | - | - | 1,800 | 1,800 | - | - | 3,600 |
| Supervision | - | - | - | 126 | 180 | - | - | 306 |
| Inflation (8% py) | - | - | - | 468 | 648 | - | - | 1,116 |
| Sub total | - | - | - | 2,394 | 2,628 | - | - | 5,022 |
| 2. Perimeters | | | | | | | | |
| Rehabilitation | - | - | - | 62 | 62 | - | - | 124 |
| New Perim.-Gouraye | * | * | * | 220 | - | - | - | 220 |
| New Perim.-Kaedi | * | * | * | 1,054 | 1,054 | - | - | 2,108 |
| Inflation (8% py) | - | - | - | 481 | 524 | - | - | 1,005 |
| Sub-Total | - | - | - | 1,817 | 1,640 | - | - | 3,457 |
| 3. Total | - | - | - | 4,211 | 4,268 | - | - | 8,479 |

* Village perimeters in these years are financed by the World Bank.

## Financial Table 3C - Option 1

## Commodities Cost Breakdown - Mauritania

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | Total |
|---|---|---|---|---|---|---|---|---|
| 1. Vehicles | | | | | | | | |
| 4-wheel drive | 200(8) | - | - | 150(6) | - | - | - | 350 |
| Motorbikes | - | 5 | - | 20 | - | - | - | 25 |
| Pirogues and motors | - | 8 | - | - | - | - | - | 8 |
| Inflation (8% py) | 16 | 2 | - | 61 | - | - | - | 79 |
| Sub-Total | 216 | 15 | - | 231 | - | - | - | 462 |
| 2. House furnishing | | | | | | | | |
| Kaedi | 100 | - | - | - | - | - | - | 100 |
| Gouraye | 50 | - | - | - | - | - | - | 50 |
| Inflation (8% py) | 12 | - | - | - | - | - | - | 12 |
| Sub-Total | 162 | - | - | - | - | - | - | 162 |
| 3. Office equipment | 100 | - | - | 102 | - | - | - | 202 |
| 4. Irrigation equipment | | | | | | | | |
| Kaedi | * | * | * | 300 | 300 | - | - | 600 |
| Gouraye | * | * | * | 66 | - | - | - | 66 |
| Inflation | * | * | * | 132 | 141 | - | - | 273 |
| Sub-Total | * | * | * | 498 | 441 | - | - | 939 |
| 5. Total | 478 | 15 | - | 831 | 441 | - | - | 1,765 |

*Irrigation equipment in these years is financed by the World Bank.

## Financial Table 3D

### Operating Costs - Mauritania (in $000)

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | Total |
|---|---|---|---|---|---|---|---|---|
| 1. Project Staff | | | | | | | | |
| a. Kaedi Sector | | | | | | | | |
| Constr. Supervisor | * | * | * | 7.5 | 7.5 | - | - | 15.0 |
| Credit Agent | * | * | * | 6.0 | - | - | - | 6.0 |
| Constr. Agents | * | * | * | 13.5 | 13.5 | - | - | 27.0 |
| Mechanics | * | * | * | 18.0 | 12.0 | 12.0 | - | 42.0 |
| Asst. Mechanics | * | * | * | 12.0 | 8.0 | 8.0 | - | 28.0 |
| Drivers | * | * | * | 18.0 | 18.0 | 9.0 | - | 45.0 |
| Secretary | * | * | * | 4.8 | 4.8 | 4.8 | - | 14.4 |
| Clerk | * | * | * | 3.0 | 3.0 | 3.0 | - | 9.0 |
| Janitor | * | * | * | 2.5 | 2.5 | 2.5 | - | 7.5 |
| Accountant | * | * | * | 5.0 | 5.0 | 5.0 | - | 15.0 |
| Temporary Staff | * | * | * | 6.0 | 6.0 | 6.0 | - | 18.0 |
| b. Gouraye Sector | | | | | | | | |
| Constr. Supervisor | * | * | * | 7.5 | 7.5 | - | - | 15.0 |
| Credit Agents | * | * | * | 6.0 | 6.0 | - | - | 12.0 |
| Constr. Agents | * | * | * | 13.5 | 13.5 | - | - | 27.0 |
| Mechanics | * | * | * | 18.0 | 12.0 | 12.0 | - | 42.0 |
| Asst. Mechanics | * | * | * | 12.0 | 8.0 | 8.0 | - | 28.0 |
| Drivers | * | * | * | 13.5 | 9.0 | 9.0 | - | 31.5 |
| Secretary | * | * | * | 4.8 | 4.8 | 4.8 | - | 14.4 |
| Clerk | * | * | * | 3 | 3 | 3 | - | 9.0 |
| Janitor | * | * | * | 2.5 | 2.5 | 2.5 | - | 7.5 |
| Accountant | * | * | * | 5.0 | 5.0 | 5.0 | - | 15.0 |
| Temporary Staff | * | * | * | 6.0 | 6.0 | 6.0 | - | 18.0 |
| Sub-Total | * | * | * | 188 | 158 | 101 | - | 447 |
| 2. Staff Training | | | | | | | | |
| Agriculture | 30 | 30 | 30 | 30 | 30 | 30 | - | 180 |
| Credit | 10 | 10 | - | 10 | - | - | - | 30 |
| Management | - | 10 | - | 10 | - | 10 | - | 30 |
| Sub-Total | 40 | 50 | 30 | 50 | 30 | 40 | - | 240 |
| 3. Local Travel/Operations | | | | | | | | |
| Mobile training units | - | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 18.0 |
| Functional literacy radio | - | - | 2.0 | 10.0 | 10.0 | 10.0 | 10.0 | 42.0 |
| Fish ponds/woodlots | - | - | 2.0 | 2.0 | 3.0 | 3.0 | 4.0 | 14.0 |
| In-service training | - | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 30.0 |
| Ag. research liaison | - | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 30.0 |
| Credit/Coop. | - | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 14.0 |
| Road Maintenance | - | - | - | - | - | 27.0 | 27.0 | 54.0 |
| Sub-Total | - | 15.0 | 20.0 | 28.0 | 28.0 | 55.0 | 56.0 | 202.0 |

Financial Table 3E, page 2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4. | Vehicle O & M | - | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 180.0 |
| 5. | Office Operations | - | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 48.0 |
| 6. | Contractor Support | - | 128 | 126 | 126 | 98 | 90 | - | 568 |
| 7. | USAID Support | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 560 |
| | Sub-Total | 80 | 208 | 206 | 206 | 178 | 170 | 80 | 1,128 |
| 8. | Uninflated Total | 120 | 311 | 294 | 510 | 432 | 404 | 174 | 2,245 |
| 9. | Inflation (8% py) | 10 | 53 | 76 | 184 | 203 | 238 | 125 | 889 |
| 10. | Total | 130 | 364 | 370 | 694 | 635 | 642 | 299 | 3,134 |

## Financial Table 3E

## Health Surveillance Cost Breakdown - Mauritania

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | Total |
|---|---|---|---|---|---|---|---|---|
| 1. Technical Assistance | | | | | | | | |
| OCCGE Technical Assistance | - | 40 | 40 | 40 | 40 | 40 | | 200 |
| U.S. Technical Assistance | - | 15 | 15 | 15 | 15 | 15 | - | 75 |
| Sub-Total | - | 55 | 55 | 55 | 55 | 55 | - | 275 |
| 2. Training | | | | | | | | |
| Physicians, Long-term | 25 | 50 | 50 | - | - | - | - | 125 |
| Nurses, Long-term | 41 | - | - | 41 | - | - | - | 82 |
| Computer Programmer | 25 | - | - | - | - | - | - | 25 |
| Seminars | - | 3 | 3 | 3 | 3 | 3 | - | 15 |
| In-service training | - | 2 | 2 | 3 | 3 | 3 | - | 13 |
| Sub-Total | 91 | 55 | 55 | 47 | 6 | 6 | - | 260 |
| 3. Office Renovation | 10 | - | - | - | - | - | - | 10 |
| 4. Commodities | | | | | | | | |
| Vehicles | 100 | - | - | 125 | - | - | - | 225 |
| Lab equipment | 90 | - | - | - | - | - | - | 90 |
| Office equipment | 20 | - | - | - | - | - | - | 20 |
| Micro-Compucer | 15 | - | - | - | - | - | - | 15 |
| Medicines | 100 | - | 50 | - | 50 | - | - | 200 |
| Camping equipment | 7 | - | - | - | - | - | - | 7 |
| Documentation | 5 | - | - | 3 | - | - | - | 8 |
| Sub-Total | 337 | - | 50 | 128 | 50 | - | - | 565 |
| 5. Operating Costs | | | | | | | | |
| a. Project Staff | | | | | | | | |
| Computer Programmer | - | 8 | 8 | 8 | 8 | 8 | - | 40 |
| Secretary | - | 6 | 6 | 6 | 6 | 6 | - | 30 |
| Drivers (3) | - | 7 | 7 | 7 | 7 | 7 | - | 35 |
| Accountant | - | 6 | 6 | 6 | 6 | 6 | - | 30 |
| Other | - | 3 | 3 | 3 | 3 | 3 | - | 15 |
| b. Vehicles Operation | - | 40 | 40 | 40 | 40 | 40 | - | 200 |
| c. Travel/Technical Reports | - | 30 | 30 | 30 | 30 | 30 | - | 150 |
| Sub-Total | - | 100 | 100 | 100 | 100 | 100 | - | 500 |
| 6. Contingency | 24 | 12 | 15 | 18 | 12 | 9 | - | 90 |
| 7. Total | 462 | 222 | 275 | 348 | 223 | 170 | - | 1,700 |

FINANCIAL TABLE 4.

SUMMARY COST ESTIMATE : SENEGAL NATIONAL PROGRAM (in 000 $)

| ITEM | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| A. TECHNICAL ASSISTANCE | | | | | | | | |
| Long-term | 469 | 721 | 389 | 604 | 417 | - | - | 2,600 |
| Consultants | 32 | 70 | 113 | 41 | 44 | 95 | - | 395 |
| Sub Total | 501 | 791 | 502 | 645 | 461 | 95 | - | 2,995 |
| B. CONSTRUCTION | | | | | | | | |
| Bakel Small Perimeters | 278 | 287 | 101 | - | - | - | - | 666 |
| Bakel/Collenga | 606 | 648 | - | - | - | - | - | 1,254 |
| Podor | 83 | 1,087 | 1,618 | 1,295 | 2,349 | - | - | 6,432 |
| Podor Office | 6 | 77 | - | - | - | - | - | 83 |
| Sub Total | 973 | 2,099 | 1,719 | 1,295 | 2,349 | - | - | 8,435 |
| C. COMMODITIES | | | | | | | | |
| Vehicles | 125 | - | - | 82 | - | - | - | 207 |
| House furnish | 43 | 47 | - | - | - | - | - | 90 |
| Office equipment | - | 50 | - | 20 | - | - | - | 70 |
| Irrigation equipment | 316 | 826 | 266 | 369 | - | - | - | 1,777 |
| Technical equipment | 20 | - | - | 25 | - | - | - | 45 |
| Sub Total | 504 | 923 | 266 | 496 | - | - | - | 2,189 |
| D. RURAL CREDIT | 120 | 50 | 175 | 185 | 220 | 300 | 150 | 1,200 |
| E. OPERATING COSTS | | | | | | | | |
| Project Staff | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 269 |
| Technical Oper. | 116 | 120 | 125 | 125 | 85 | 76 | 56 | 703 |
| Vehicle O&M | 10 | 15 | 20 | 20 | 15 | 10 | 10 | 100 |
| Participant Training | 40 | 50 | 30 | 50 | 30 | 40 | - | 240 |
| Contractor Support | - | - | 40 | 40 | 40 | 40 | - | 160 |
| USAID Support | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 280 |
| Inflation (8 % p/y) | 18 | 45 | 77 | 114 | 118 | 146 | 107 | 625 |
| Sub Total | 241 | 312 | 374 | 431 | 370 | 394 | 255 | 2,377 |
| F. HEALTH | 249 | 169 | 185 | 204 | 186 | 107 | - | 1,100 |
| G. TELECOMMUNICATIONS | 900 | 400 | 200 | - | - | - | - | 1,500 |
| H. NTHIOGAR STUDY | 100 | - | - | - | - | - | - | 100 |
| I. CONTINGENCY | 198 | 263 | 191 | 181 | 200 | 49 | 22 | 1,104 |
| J. TOTAL | 3,786 | 5,007 | 3,612 | 3,437 | 3,786 | 945 | 427 | 21,000 |

FINANCIAL TABLE 4 - A

TECHNICAL ASSISTANCE COST BREAKDOWN - SENEGAL

1. LONG-TERM PERSONNEL

(1) Engineer : BS and substantial experience ; 2 dependents; language S-2, R-2 French - 2 yrs. Bakel, 3yrs. Podor.

(2) Extension/Training Specialist - MS and substantial experience; 2 dependents; language S-3, R-3 French. 2 yrs. Bakel, 2 yrs. Podor.

(3) Social Scientist - BS and substantial experience : Senegalese national with French and local language fluency - Bakel and Podor; 5yrs.

(4) Credit Spec. MBA and substantial experience; 2 dependents; language S-3, R-3 French - Bakel & Podor; 3 yrs.

(5) Agronomist/Applied Research Specialist - MS and substantial experiences; 2 dependents; language S-3, R-3 French - SAED Saint-Louis.

COST BREAKDOWN:

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| A. RECURRING | | | | | | | | |
| 1. Salary/Benefits | 130 | 165 | 90 | 125 | 90 | -- | -- | 600 |
| a. Engineer | (35) | (35) | (35) | (35) | (35) | - | - | |
| b. Extension/Trg. | (35) | (35) | - | (35) | (35) | - | - | |
| c. Social Scientists | (20) | (20) | (20) | (20) | (20) | - | - | |
| d. Credit Spec. | - | (35) | (35) | (35) | - | - | - | |
| e. Agron/Ap. Res. Spec. | (40) | (40) | - | - | - | - | - | |
| 2. Post diff./insur. | 35 | 45 | 25 | 35 | 15 | - | - | 155 |
| 3. Post Allowance | 15 | 20 | 10 | 15 | 5 | - | - | 65 |
| 4. Educ. Allowance | 15 | 20 | 10 | 15 | 5 | - | - | 65 |
| 5. Housing Utilities | 32 | 40 | 24 | 32 | 24 | - | - | 152 |
| Sub Total | 227 | 290 | 159 | 222 | 139 | - | - | 1,037 |
| B. NON-RECURRING | | | | | | | | |
| 1. Travel & transport (post assignment) | - | 20 | - | 10 | - | - | - | 30 |
| 2. R & R | 12 | 8 | 4 | 4 | - | - | - | 28 |
| 3. Repatriation/Separ. | - | 30 | 10 | 20 | 10 | - | - | 70 |
| 4. Language Training | - | 20 | - | - | - | - | - | 20 |
| Sub Total | 12 | 78 | 14 | 34 | 10 | - | - | 148 |

FINANCIAL TABLE 4 - A (P. 2)

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| C. OVERHEAD FEE, G&A | | | | | | | | |
| 15% base salaries | 195 | 248 | 135 | 188 | 135 | - | - | 901 |
| D. UNINFLATED COST | 434 | 616 | 308 | 444 | 284 | - | - | 2,086 |
| E. INFLATION (8% p/y) | 35 | 105 | 81 | 160 | 417 | - | - | 514 |
| F. TOTAL COST | 469 | 721 | 389 | 604 | 417 | - | - | 2,605 |

2. CONSULTANTS

Average daily rate: $ 180
Average TDY of 1 month - 5 days in capital, rest in field.
Cost per consultancy: $ 15,000 including salary, travel per diem, insurance and overhead.

COST BREAKDOWN

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| A. IMPLEMENTATION SUPPORT | 30 | 60 | 60 | 30 | 30 | 30 | - | 240 |
| B. EVALUATION | - | - | 30 | - | - | 30 | - | 60 |
| C. UNINFLATED COST | 30 | 60 | 90 | 30 | 30 | 60 | - | 300 |
| D. INFLATION (8% p/y) | -2 | 10 | 23 | 11 | 14 | 35 | - | 95 |
| E. TOTAL COST | 32 | 70 | 113 | 41 | 44 | 95 | - | 395 |

## FINANCIAL TABLE 4 - B

CONSTRUCTION COST BREAKDOWN ($ in 000)

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| 1. BAKEL SMALL PERIMETERS | | | | | | | | |
| Upgrading existing | 47 | 85 | 37 | - | - | - | - | 169 |
| New Perimeters | 210 | 160 | 43 | - | - | - | - | 413 |
| Inflation (8 % py) | 21 | 42 | 21 | - | - | - | - | 84 |
| Sub Total | 278 | 287 | 101 | - | - | - | - | 666 |
| 2. BAKEL/COLLENGA | | | | | | | | |
| Dike | 218 | - | - | - | - | - | - | 218 |
| Pump station | 62 | - | - | - | - | - | - | 62 |
| Irrigation network | 281 | 554 | - | - | - | - | - | 835 |
| Inflation (8 % py) | 45 | 94 | - | - | - | - | - | 139 |
| Sub Total | 606 | 648 | - | - | - | - | - | 1,254 |
| 3. PODOR | | | | | | | | |
| Design | 73 | - | - | - | - | - | - | 73 |
| Dike | - | 724 | - | - | 724 | - | - | 1,448 |
| Pump stations | - | 18 | 167 | 88 | 79 | - | - | 352 |
| Power plants | - | 22 | 110 | 55 | 55 | - | - | 242 |
| Canals, drains, roads | - | - | 767 | 558 | 458 | - | - | 1,783 |
| Village perimeters | - | 77 | 156 | 182 | 192 | - | - | 607 |
| Supervision | 4 | 88 | 84 | 69 | 90 | - | - | 335 |
| Inflation (8 % py) | 6 | 158 | 334 | 343 | 751 | - | - | 1,592 |
| Sub Total | 83 | 1,087 | 1,618 | 1,295 | 2,349 | - | - | 6,432 |
| 4. PODOR OFFICE | | | | | | | | |
| Design | 6 | - | - | - | - | - | - | 6 |
| Construction | - | 60 | - | - | - | - | - | 60 |
| Supervision | - | 6 | - | - | - | - | - | 6 |
| Inflation | - | 11 | - | - | - | - | - | 11 |
| Sub Total | 6 | 77 | - | - | - | - | - | 83 |
| 6. TOTAL | 973 | 2,099 | 1,719 | 1,295 | 2,349 | - | - | 8,435 |

+ Construction costs include a contingency of 10 %.

FINANCIAL TABLE 4 - C

COMMODITIES COSTS BREAKDOWN - SENEGAL

| (in 000's US $) | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| 1. VEHICLES | | | | | | | | |
| All terrain | 36(3) | -- | -- | 24(2) | -- | -- | -- | 60 |
| Pick up trucks | 66(6) | -- | -- | 22(2) | -- | -- | -- | 88 |
| Cars | 14(2) | -- | -- | 14(2) | -- | -- | -- | 28 |
| Inflation | 9 | -- | -- | 22 | -- | -- | -- | 31 |
| Sub Total | 125 | -- | -- | 82 | -- | -- | -- | 207 |
| 2. FURNITURE | | | | | | | | |
| Bakel | 40 | -- | -- | -- | -- | -- | -- | 40 |
| Podor | -- | 40 | -- | -- | -- | -- | -- | 40 |
| Inflation | 3 | 7 | -- | -- | -- | -- | -- | 10 |
| Sub Total | 43 | 47 | -- | -- | -- | -- | -- | 90 |
| 3. OFFICE EQUIPMENT | -- | 50 | -- | 20 | -- | -- | -- | 70 |
| 4. EQUIPMENT FOR IRRIGATION | | | | | | | | |
| Bakel 1/ | 125 | 75 | 26 | -- | -- | -- | -- | 226 |
| Collenga | 168 | -- | -- | -- | -- | -- | -- | 168 |
| Podor | -- | 631 | 185 | 271 | -- | -- | -- | 1,087 |
| Inflation | 23 | 120 | 55 | 98 | -- | -- | -- | 296 |
| Sub Total | 316 | 826 | 266 | 369 | -- | -- | -- | 1,777 |
| 5. TECHNICAL EQUIPMENT | 20 | -- | -- | 25 | -- | -- | -- | 45 |
| 6. TOTAL | 504 | 923 | 266 | 496 | -- | -- | -- | 2,189 |

1/ Since the first pumpset for new perimeters is subsidized at 50%, the equipment cost to the project is one half of its value - Farmers will pay one-half directly or with a loan.

FINANCIAL TABLE 4 - D

OPERATIONAL EXPENSES BREAKDOWN

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| 1. PROJECT STAFF | | | | | | | | |
| Bakel | | | | | | | | |
| Secretary | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 49 |
| Driver | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 42 |
| Janitor | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 28 |
| Podor | | | | | | | | |
| Accountant | | 8 | 8 | 8 | 8 | 8 | 8 | 48 |
| Secretary | | 7 | 7 | 7 | 7 | 7 | 7 | 42 |
| Driver | | 6 | 6 | 6 | 6 | 6 | 6 | 36 |
| Janitor | | 4 | 4 | 4 | 4 | 4 | 4 | 24 |
| Sub Total | 17 | 42 | 42 | 42 | 42 | 42 | 42 | 269 |
| 2. TECHNICAL OPERATIONS | | | | | | | | |
| Fish ponds/woodlots | 50 | 50 | 50 | 50 | 30 | 30 | 20 | 260 |
| Functional literacy | 5 | 5 | 10 | 10 | 10 | 5 | 5 | 50 |
| Extension/research liaison | 10 | 10 | 10 | 10 | 10 | 6 | 5 | 56 |
| Credit/Coops | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 33 |
| In-dervice Train | 3 | 5 | 5 | 5 | 5 | 3 | 3 | 29 |
| Sub Total | 116 | 120 | 125 | 125 | 85 | 76 | 56 | 703 |
| 3. VEHICLE O&M | 10 | 15 | 20 | 20 | 15 | 10 | 10 | 100 |
| 4. PARTICIPANT TRAINING | | | | | | | | |
| Agriculture | 30 | 30 | 30 | 30 | 30 | 30 | - | 180 |
| Credit | 10 | 10 | - | 10 | - | - | - | 30 |
| Management | - | 10 | - | 10 | - | 10 | - | 30 |
| Sub Total | 40 | 50 | 30 | 50 | 30 | 40 | - | 240 |

FINANCIAL TABLE 4-D (P. 2)

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| 5. CONTRACTOR SUPPORT | - | - | 40 | 40 | 40 | 40 | - | 160 |
| 6. USAID SUPPORT | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 280 |
| 7. UNINFLATED TOTAL | 223 | 267 | 297 | 317 | 252 | 248 | 148 | 1,752 |
| 8. INFLATION (8 % per year) | 18 | 45 | 77 | 114 | 118 | 146 | 107 | 625 |
| 9. TOTAL | 241 | 312 | 374 | 431 | 370 | 394 | 255 | 2,377 |

## FINANCIAL TABLE 4 - E

### BREAKDOWN OF COSTS FOR HEALTH SURVEILLANCES - SENEGAL (in 000 $)

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| 1. TECHNICAL ASSISTANCE | | | | | | | | |
| Technical Assist. OCGGE | - | 40 | 40 | 40 | 40 | 40 | - | 200 |
| Technical Assist. U.S. | - | 15 | 15 | 15 | 15 | 15 | - | 75 |
| Sub Total | - | 55 | 55 | 55 | 55 | 55 | - | 275 |
| 2. TRAINING | | | | | | | | |
| Long-Term Doctor (2) | - | 25 | 25 | 25 | 25 | - | - | 100 |
| Long-Term Computer Programer | - | 25 | - | - | - | - | - | 25 |
| Short-Term | - | 10 | - | - | - | - | - | 10 |
| Conferences/Seminars | - | 3 | 3 | 3 | 3 | 3 | - | 15 |
| Sub Total | - | 63 | 28 | 28 | 28 | 3 | - | 150 |
| 3. OFFICE RENOVATION | 10 | - | - | - | - | - | - | 10 |
| 4. COMMODITIES | | | | | | | | |
| Vehicles | 50 | - | - | 67 | - | - | - | 117 |
| Laboratory Equipment | 45 | | | | | | | 45 |
| Office Equipment | 18 | | | | | | | 18 |
| Micro-Computer | 10 | | | | | | | 10 |
| Medicines | 100 | - | 50 | - | 50 | - | - | 200 |
| Sub-Total | 223 | - | 50 | 67 | 50 | - | - | 390 |
| 5. OPERATING COSTS | | | | | | | | |
| Travel | - | 10 | 10 | 10 | 10 | 10 | - | 50 |
| Vehicles Operations | - | 20 | 20 | 21 | 21 | 22 | - | 104 |
| Project Personnel | - | 9 | 9 | 9 | 9 | 10 | - | 46 |
| Sub Total | - | 39 | 39 | 40 | 40 | 42 | - | 200 |
| 6. CONTINGENCY | 16 | 12 | 13 | 14 | 13 | 7 | - | 75 |
| 7. TOTAL | 249 | 169 | 185 | 204 | 186 | 107 | - | 1,100 |

## FINANCIAL TABLE 4-F

## BREAKDOWN OF COSTS FOR TELECOMMUNICATIONS[1/] - SENEGAL (in 000 $)

| | FY84 | FY85 | FY86 | Total |
|---|---|---|---|---|
| 1. Salaries | 29,095 | 87,890 | 34,855 | 151,840 |
| 2. Consultants | -- | 33,600 | 12,600 | 46,200 |
| 3. Travel | 36,394 | 75,158 | 43,563 | 155,115 |
| 4. Other Dir. Costs | 7,100 | 24,600 | 14,500 | 46,200 |
| 5. Equipment [2/] | 533,000 | 394,000 | 11,000 | 938,000 |
| 6. Allowances | 2,725 | 27,030 | 7,230 | 36,985 |
| 7. Part. Training | 45,400 | 26,300 | 29,750 | 101,450 |
| 8. Subcontracts | 226,800 | 75,600 | -- | 302,400 |
| 9. Policy Study | 87,260 | -- | -- | 87,260 |
| 10. Sub Total | 967,774 | 744,178 | 153,498 | 1,865,450 |
| 11. Indirect Costs | 37,702 | 61,949 | 29,545 | 129,196 |
| 12. TOTAL | 1,005,476 | 806,127 | 183,043 | 1,994,646 |

1/ Funding for the Telecommunications program will be provided partially by the project ($1.5 million) and partially by AID/Washington ($0.5 million from the Rural Satellite Project.

2/ The list of equipment and estimated prices are provided in the Procurement Annexes, Volume III, Section 7.

FINANCIAL TABLE 5

SUMMARY COST ESTIMATE - MALI NATIONAL PROGRAM ($ in 000)

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| I. AGRICULTURAL PROGRAM | | | | | | | | |
| a. Technical Assistance | - | 375 | 581 | 666 | 532 | 475 | 329 | 2,958 |
| Long term | - | (343) | (511) | (553) | (491) | (387) | (281) | (2,566) |
| Consultants | - | (32) | (70) | (113) | (41) | (88) | (48) | (392) |
| b. Participant Training | 40 | 54 | 35 | 63 | 41 | 59 | - | 292 |
| c. Construction | 95 | 54 | 361 | 2,189 | 793 | - | - | 3,492 |
| d. Commodities | 230 | 149 | - | 197 | 19 | - | - | 595 |
| e. Operating Costs OVSTM | - | 42 | 44 | 49 | 53 | 59 | 64 | 311 |
| f. Operating Costs USAID | 30 | 32 | 35 | 38 | 41 | 44 | 48 | 268 |
| Sub Total | 395 | 706 | 1,056 | 3,202 | 1,479 | 637 | 441 | 7,916 |
| II. FUNCTIONAL LITERACY | | | | | | | | |
| a. Commodities | - | 25 | - | 1 | 20 | 1 | - | 47 |
| b. Office Operators | - | 11 | 11 | 11 | 11 | 11 | 11 | 66 |
| c. Village Operations | - | 4 | 1 | 12 | 15 | 13 | 20 | 65 |
| d. National Support | - | 6 | 6 | 6 | 6 | 6 | 6 | 36 |
| e. Inflation | - | 4 | 3 | 8 | 19 | 15 | 22 | 71 |
| Sub Total | - | 50 | 21 | 38 | 71 | 46 | 59 | 285 |
| III. ROAD FEASIBILITY STUDY | - | 300 | - | - | - | - | - | 300 |
| IV. RURAL CREDIT PROGRAM | | | | | | | | |
| a. Credit | - | 204 | 204 | 208 | 104 | 49 | 11 | 576 |
| b. Operating Support | - | 10 | 10 | 5 | 5 | - | - | 30 |
| c. Business Assistance | - | - | 5 | 5 | 5 | 5 | 5 | 25 |
| d. Inflation | - | 1 | 37 | 56 | 41 | 25 | 9 | 169 |
| Sub Total | - | 11 | 256 | 274 | 155 | 79 | 25 | 800 |
| V. HEALTH SURVEILLANCE | | | | | | | | |
| a. Technical Assistance | - | 55 | 55 | 55 | 55 | 55 | - | 275 |
| b. Training | - | 40 | 42 | 40 | 43 | 5 | - | 170 |
| c. Office Reno | 50 | - | - | - | - | - | - | 50 |
| d. Commodities | 220 | - | 55 | 75 | 50 | - | - | 400 |
| e. Operating Costs | - | 32 | 17 | 32 | 17 | 32 | - | 130 |
| f. Inflation | - | 6 | 10 | 16 | 22 | 21 | - | 75 |
| Sub Total | 270 | 133 | 179 | 218 | 187 | 113 | - | 1,100 |
| VI. CONTINGENCY | 38 | 69 | 87 | 215 | 109 | 50 | 31 | 599 |
| VII. TOTAL | 703 | 1,269 | 1,599 | 3,947 | 2,001 | 925 | 556 | 11,000 |

# FINANCIAL TABLE 5-A

## PERSONNEL COST BREAKDOWN: MALI

### I. LONG-TERM PERSONNEL

(1) Project Manager - with MBA - specialization on rural credit and substantial experience; 2 dependents; languages S-3, R-3; located in Kayes (Bamako for first 6 months); 6 years.

(2) Extension/Training Specialist - with MS in extension/ag. education and substantial experiences; 2 dependents; language S-3, R-3; located in Kayes; 3 years.

(3) Irrigation Engineer - BS plus experience, Malian national, located in Kayes; 3 years.

(4) Social Scientist - BS plus experience; Malian national; located in Kayes; 3 years.

COST BREAKDOWN:

| | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|
| A. RECURRING | | | | | | | |
| 1. Salary/Benefits | 73 | 120 | 120 | 93 | 65 | 45 | 516 |
| a. Proj. Manager | (45) | (45) | (45) | (45) | (45) | (45) | - |
| b. Ext./Training Spec. | (18) | (35) | (35) | (18) | - | - | - |
| c. Irrig. Engineer | - | (20) | (20) | (20) | (20) | - | - |
| d. Social Scientist | (10) | (20) | (20) | (10) | - | - | - |
| 2. Post Diff./Ins. | 20 | 30 | 30 | 25 | 15 | 10 | 130 |
| 3. Post Allowance | 8 | 10 | 10 | 8 | 5 | 5 | 46 |
| 4. Educ. Allowance | 8 | 10 | 10 | 8 | 5 | 5 | 46 |
| 5. Housing/Utilities | 25 | 32 | 32 | 30 | 15 | 10 | 144 |
| Sub Total | 134 | 202 | 202 | 164 | 105 | 75 | 882 |
| B. NON-RECURRING | | | | | | | |
| 1. Travel & Transport (Post assignment) | 35 | 5 | 15 | - | 15 | - | 70 |
| 2. R & R | - | 8 | 8 | 8 | 8 | - | 32 |
| 3. Repatriation/Separation | - | 10 | - | 20 | | 10 | 40 |
| 4. Language Training | 5 | - | 5 | - | 5 | - | 15 |
| Sub Total | 40 | 23 | 28 | 28 | 28 | 10 | 157 |
| C. OPERATIONAL SUPPORT | | | | | | | |
| 1. Operational Travel | 12 | 15 | 12 | 12 | 12 | 8 | 71 |
| 2. Other Operations | 8 | 3 | 3 | 3 | 3 | 2 | 22 |
| 3. Admin. Assistance | 6 | 6 | 6 | 6 | 6 | 6 | 36 |
| 4. Secretary | 5 | 5 | 5 | 5 | 5 | 5 | 30 |
| 5. Chauffeur | 3 | 3 | 3 | 3 | 3 | 3 | 18 |
| | 34 | 32 | 29 | 29 | 29 | 24 | 177 |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| D. OVERHEAD FEE, G&A (15 % base salary) | 110 | 180 | 180 | 140 | 98 | 68 | 776 |
| E. UNINFLATED COST | 318 | 437 | 439 | 361 | 260 | 177 | 1992 |
| F. INFLATION (8 % p/y) | 25 | 74 | 114 | 130 | 127 | 104 | 574 |
| G. TOTAL COST | 343 | 511 | 553 | 491 | 387 | 281 | 2566 |

II. CONSULTANTS: Average daily rate of $ 180
Average TDY of 1 month - 5 days in capital, rest in field
Cost per consultant: $ 15,000 including salary, travel, per diem, insurance and overhead.

COST BREAKDOWN:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A. IMPLEMENTATION SUPPORT | 30 | 60 | 60 | 30 | 30 | 30 | 270 |
| B. EVALUATION | - | - | 30 | - | 30 | - | 60 |
| C. UNINFLATED COST | 30 | 60 | 90 | 30 | 60 | 30 | 300 |
| D. INFLATION 8 % p/y | 2 | 10 | 23 | 11 | 28 | 18 | 92 |
| E. TOTAL COST | 32 | 70 | 113 | 41 | 88 | 48 | 392 |

## FINANCIAL TABLE 5-B

### CONSTRUCTION COST BREAKDOWN - MALI

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| A. PROJECT OFFICE | | | | | | | | |
| 1. Design | 5 | - | - | - | - | - | - | 5 |
| 2. Construction | 75 | - | - | - | - | - | - | 75 |
| 3. Supervision | 7 | - | - | - | - | - | - | 7 |
| 4. Contingency | 8 | - | - | - | - | - | - | 8 |
| Sub Total | 95 | - | - | - | - | - | - | 95 |
| B. PERIMETER REHABILITATION | | | | | | | | |
| 1. Design | - | - | 15 | - | - | - | - | 15 |
| 2. Rehabilitation | - | - | 72 | 72 | - | - | - | 144 |
| 3. Inflation | - | - | 15 | 19 | - | - | - | 34 |
| Sub Total | - | - | 102 | 91 | - | - | - | 193 |
| C. CUVETTE DEVELOPMENT | | | | | | | | |
| 1. Design | - | - | 200 | - | - | - | - | 200 |
| 2. Construction | - | - | - | 1530 | 497 | - | - | 2027 |
| 3. Inflation | - | - | - | 505 | 228 | - | - | 733 |
| Sub Total | - | - | 200 | 2035 | 725 | - | - | 2960 |
| D. COOP OFFICES | | | | | | | | |
| 1. Construction | - | 50 | 50 | 50 | 50 | - | - | 200 |
| 2. Inflation | - | 4 | 9 | 13 | 18 | - | - | 44 |
| Sub Total | - | 54 | 59 | 63 | 68 | - | - | 244 |
| E. TOTAL | 95 | 54 | 361 | 2189 | 793 | - | - | 3492 |

## FINANCIAL TABLE 5-C

### COMMODITIES COST BREAKDOWN - MALI

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| A. VEHICLES | | | | | | | | |
| 1. 4-Wheel Drive | 80(4) | 80(4) | - | 80(4) | - | - | - | 240 |
| 2. Pirogues (2) | - | 5 | - | - | - | - | - | 5 |
| 3. Motorbikes (25) | - | 25 | - | - | - | - | - | 25 |
| 4. Outboard Motors | - | 5 | - | 5 | - | - | - | 10 |
| 5. Inflation | - | 9 | - | 22 | - | - | - | 31 |
| Sub Total | 80 | 124 | - | 107 | - | - | - | 311 |
| B. OFFICE EQUIPMENT | 50 | - | - | 25 | - | - | - | 75 |
| C. TECHNICAL EQUIPMENT | - | 25 | - | 30 | - | - | - | 55 |
| D. HOUSE FURNISHINGS | 100 | - | - | - | - | - | - | 100 |
| E. IRRIGATION EQUIPMENT | | | | | | | | |
| 1. Equipment (Cuvette Div) | - | - | - | 28 | 14 | - | - | 42 |
| 2. Inflation | - | - | - | 7 | 5 | - | - | 12 |
| Sub Total | - | - | - | 35 | 19 | - | - | 54 |
| G. TOTAL | 230 | 149 | - | 197 | 19 | - | - | 595 |

FINANCIAL TABLE 5-D

OPERATING COSTS - OVSTM

| | FY84 | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| A. SUPPORT STAFF | - | 6 | 6 | 7 | 7 | 8 | 8 | 42 |
| 1. Secretary (1) | | (1.5) | (1.5) | (1.5) | (1.5) | (1.5) | (1.5) | (9) |
| 2. Chauffeur (1) | | (1.5) | (1.5) | (1.5) | (1.5) | (1.5) | (1.5) | (9) |
| 3. Enqueteurs (tempor.) | | (3.0) | (3.0) | (4.0) | (4.0) | (5.0) | (5.0) | (24) |
| B. OFFICE SUPPLIES | | 5 | 5 | 5 | 5 | 5 | 5 | 30 |
| C. FIELD OPERATIONS | | 8 | 7 | 7 | 7 | 7 | 7 | 43 |
| 1. HQ staff travel | | (1.5) | (1.5) | (1.5) | (1.5) | (1.5) | (1.5) | 9 |
| 2. Training - field staff | | (2.5) | (1.0) | (1.0) | (1.0) | (1.0) | (1.0) | 6 |
| 3. Ag. Research liaison | | (1.0) | (1.0) | (1.0) | (1.0) | (1.0) | (1.0) | 6 |
| 4. Farmer training | | (3.0) | (3.5) | (3.5) | (3.5) | (35) | (35) | 21 |
| D. VEHICLE O&M | - | 20 | 20 | 20 | 20 | 20 | 20 | 120 |
| E. UNINFLATED TOTAL | - | 39 | 38 | 39 | 39 | 40 | 40 | 235 |
| F. INFLATION (8 % p/y) | - | 3 | 6 | 10 | 14 | 19 | 24 | 76 |
| G. TOTAL | - | 42 | 44 | 49 | 53 | 59 | 64 | 311 |

STAFF PARTICIPANT TRAINING

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| A. AGRICULTURE | 30 | 30 | 30 | 30 | 30 | 30 | - | 180 |
| B. CREDIT | 10 | 10 | - | - | - | - | - | 30 |
| C. MANAGEMENT | - | 10 | - | 10 | - | 10 | - | |
| D. INFLATION (8 %) | - | 4 | 5 | 13 | 11 | 19 | | 52 |
| E. TOTAL | 40 | 54 | 35 | 63 | 41 | 59 | - | 292 |

FINANCIAL TABLE 5-E

HEALTH SURVEILLANCE COST BREAKDOWN — MALI

| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | TOTAL |
|---|---|---|---|---|---|---|---|---|
| 1. Technical Assistance | | | | | | | | |
| OCGGE Technical Assistance | - | 40 | 40 | 40 | 40 | 40 | - | 200 |
| U.S. Technical Assistance | - | 15 | 15 | 15 | 15 | 15 | | 75 |
| Sub Total | - | 55 | 55 | 55 | 55 | 55 | - | 275 |
| 2. Training | | | | | | | | |
| Physicians | - | 12 | 37 | 12 | 38 | - | - | 99 |
| Nurses | - | 23 | | 23 | - | - | - | 46 |
| Seminars | - | 3 | 3 | 3 | 3 | 3 | - | 15 |
| In-service training | - | 2 | 2 | 2 | 2 | 2 | - | 10 |
| Sub Total | - | 40 | 42 | 40 | 43 | 5 | - | 170 |
| 3. Office Renovation | 50 | - | - | - | - | - | - | 50 |
| 4. Commodities | | | | | | | | |
| Vehicles | 50 | - | - | 75 | - | - | - | 125 |
| Medicines | 100 | - | 50 | - | 50 | - | - | 200 |
| Documentation | 10 | - | 5 | - | - | - | - | 15 |
| Office equipment | 30 | - | | - | | - | - | 30 |
| Lab equipment | 30 | - | - | - | - | - | - | 30 |
| Sub Total | 220 | - | 55 | 75 | 50 | - | - | 400 |
| 5. Operating Costs | | | | | | | | |
| Project Personnel | - | 6 | 8 | 6 | 8 | 6 | - | 34 |
| Vehicle Operation | - | 12 | 6 | 12 | 6 | 12 | - | 48 |
| Travel/Technical Reports | - | 14 | 3 | 14 | 3 | 14 | - | 48 |
| Contingency | | | | | | | | |
| Sub Total | | 32 | 17 | 32 | 17 | 32 | - | 130 |
| 6. Inflation | - | 6 | 10 | 16 | 22 | 21 | - | 75 |
| 7. TOTAL | 270 | 133 | 179 | 218 | 187 | 113 | - | 1,100 |

## FINANCIAL TABLE 5-F

FUNCTIONAL LITERACY - DNAFLA

| | FY85 | FY86 | FY87 | FY88 | FY89 | FY90 | TOTAL |
|---|---|---|---|---|---|---|---|
| A. Personnel | | | | | | | |
| 1. Literacy Agents (2) | pm | pm | pm | pm | pm | pm | - |
| 2. Secretary (1) | pm | pm | pm | pm | pm | pm | - |
| B. Commodities | | | | | | | |
| 1. Vehicles | 20 | - | - | 20 | - | - | 40 |
| 2. Motorbike | 1 | - | 1 | - | 1 | - | 3 |
| 3. Office Furnishings | 4 | - | - | - | - | - | 4 |
| Sub Total | 25 | - | 1 | 20 | 1 | - | 47 |
| C. Office Operations | | | | | | | |
| 1. Office Supplies | 2 | 2 | 2 | 2 | 2 | 2 | 12 |
| 2. Vehicle O & M | 3 | 3 | 3 | 3 | 3 | 1 | 18 |
| 3. Staff Travel | 1 | 1 | 1 | 1 | 1 | 1 | 6 |
| 4. Office Rental | 5 | 5 | 5 | 5 | 5 | 5 | 30 |
| Sub Total | 11 | 11 | 11 | 11 | 11 | 11 | 66 |
| D. Village Operations | | | | | | | |
| 1. Village Center | pm(11) | - | - | pm(9) | - | - | - |
| 2. Teacher Training | 1 | 1 | - | 1 | 1 | - | 4 |
| 3. Training Materials | 3 | - | - | 2 | - | - | 5 |
| 4. Spec. Training | - | - | 8 | 8 | 8 | 14 | 38 |
| 5. Village Libraries | - | - | 3 | 3 | 3 | 5 | 14 |
| 6. Radio Clubs | - | - | 1 | 1 | 1 | 1 | 4 |
| Sub Total | 4 | 1 | 12 | 15 | 13 | 20 | 65 |
| E. National Assistance | 6 | 6 | 6 | 6 | 6 | 6 | 36 |
| F. Uninflated Total | 46 | 18 | 30 | 52 | 31 | 37 | 214 |
| G. Inflation (8 % p/y) | 4 | 3 | 8 | 19 | 15 | 22 | 71 |
| H. TOTAL | 50 | 21 | 38 | 71 | 46 | 59 | 285 |

# 5.0. IMPLEMENTATION PLAN

## 5.1. Programming and Fiscal Procedures

The OMVS Integrated Development Project (625-0621) is a regional project to be implemented by the OMVS and specialized agencies of its three member states, and managed jointly by the River Basin Development Office (USAID/RBDO) and the three USAID's in Mauritania, Senegal, and Mali. Programming and fiscal procedures for the project will be set-up to maintain clear distinctions and lines of authority for implementation. These procedures will be established by the project agreements through the process described below.

### 5.1.1. Overall Protocol Accord

A series of formal negotiations with the OMVS and its three member states has led to an agreed draft of the overall protocol accord which is in Volume III, Section 8. This protocol will be refined and put into final form when the project is authorized. At that time the OMVS will convoke a special meeting of the three states to review the accord and make recommendations to the Council of Ministers. The President of the OMVS Council of Ministers will sign the protocol agreement authorizing the project on behalf of the three member states of the OMVS.

The overall protocol sets forth the responsibilities and obligations of the parties---A.I.D., the OMVS, and the member states---for all activities and the entire budget of the project. Thus, it represents a life of project commitment by all parties for the entire project. The protocol presents the general understanding that all parties have regarding this regional project. It contains the elements of and the instructions for the execution of the four separate project agreements--with the OMVS and each member state--that will be the obligating documents for the project. The protocol will stipulate the major conditions precedent and covenants that are required for each of the project agreements to assure that the regional objectives of the project are achieved. These include as conditions precedent (1) the establishment of national programs for the reduction and eventual elimination of input and credit subsidies, (2) the appointment of a project manager within each implementing agency for project execution, and (3) the establishment of an independent project-specific financial management and administrative system. The covenants are that each government (1) establish an interministerial coordinating committee for policy level project coordination, (2) agree to the liberalization of agricultural and related marketing within and across national borders, and (3) agree to actively encourage participation of the private sector in input supply and produce marketing in the Basin. The national project agreements will contain several additional conditions precedent and covenants as required by AID regulations concerning irrigation construction, feeder road construction, local currency disbursement, and customs and tax exemptions. These are specific to the national programs and will not be included in the protocol.

### 5.1.2. The Regional Project Agreement

Following the instructions set forth by the protocol, RBDO will execute a project agreement with the OMVS High Commission for the regional component of the project. This agreement will concern only those elements of the project that are to be implemented directly by the OMVS in cooperation with the USAID River Basin Development Office. Following the fulfillment of pertinent conditions precedent, USAID/RBDO will issue implementation guidence for the regional program as called for in the agreement, and on the basis of operating plans and budgets prepared by the OMVS.

### 5.1.3. The Country Project Agreements

Consistent with guidance set forth in the project, each USAID will execute a project agreement with the cooperating host country government for the national programs of the IDP. These project agreements will obligate funds from the Regional Project allotment for the national programs and contain the general conditions and covenants specified by the protocol, as well as additional conditions and covenants required for national implementation. There will be three country project sub-agreements: (1) one between the Government of the Islamic Republic of Mauritania (GIRM) and the USAID/Mauritania; (2) one between the Government of Senegal (GOS) and USAID/Senegal; and (3) one between the Government of the Republic of Mali (GRM) and USAID/Mali. These sub-agreements will be prepared together to assure harmony and consistency on the conditions, covenants, goals, objectives, host country contributions, and other elements of the project, but will be executed individually.

Management of the national programs will be under the jurisdiction of the USAID's as established by the respective project agreements. Each USAID will assign a project officer having oversight authority for the national program. The certification and payment of all vouchers for the national programs will be handled by the respective USAID controller's office. Copies of project officers' implementation reports and controller offices' financial status reports will be submitted to the USAID/RBDO regional project officer and the regional controller's office in USAID/Senegal for consolidation into an overall project report. To assure overall project coordination, workplans and budgets for each component will be prepared annually and periodically updated. The USAID and RBDO project officers will meet annually, or more often if necessary, to review implementation and consolidate budget requests. Through this process, the annual requests for allotments for the regional and national components will be developed and submitted to AID/Washington. Funds will be allotted directly from AID/Washington to the USAID responsible for each project component. To maintain clear project records for overall and individual country project reporting, the project number for all of the components will be the same but with country designated numerals. Thus, the overall project is 625-0621 with the OMVS project agreement being 625-0621.1; the project agreement for Mauritania 625-0621.2; the project agreement for Senegal 625-0621.3; and the project agreement for Mali 625-0621.4.

## 5.2. Project Management

### 5.2.1. Regional Management - OMVS

The OMVS Directorate of Development and Coordination (DDC) will be responsible for implementing the regional component of the project that includes: implementing the policy, planning, and feasibility studies; the management information system; coordinating participant training; and providing certain technical support to the national programs. The OMVS will name a project manager who will have sufficient authority to direct division-level staff within DDC. The Project Manager will direct the project management unit and coordinate implementation responsibilities that will be handled by several divisions within the DDC.

For project monitoring and evaluation, the OMVS will have a dual role. First, it will be responsible for the control of and reporting on activities under the regional component of the project. Second, it will be responsible for assisting each member state in establishing a uniform project monitoring system, and for combining national and regional reports into overall project reports. An information system specialist is being provided to the OMVS under the project to help organize the project management information system and to train OMVS and national agency staff in its operation.

For the policy, planning, and feasibility studies, the OMVS will be the overall implementing agency, but the execution of certain studies will be done bilaterally by subgroups working in each country. The OMVS role is to provide consistency in methodology, and consideration of issues that transcend national boundaries. This is in keeping with the mandate of the OMVS to coordinate and harmonize agricultural development in the Senegal River Basin. For regional policy issues concerning agricultural development in the Basin, the OMVS will pay the role of analyst, communicator, catalyst, expediter, and trainer by organizing seminars, publishing and disseminating reports, and sponsoring special training. To coordinate the use of external resources, the OMVS will work with donors (including the USAID's in all three countries), businesses and other public and private organizations to mobilize resources for the integrated development of the SRB.

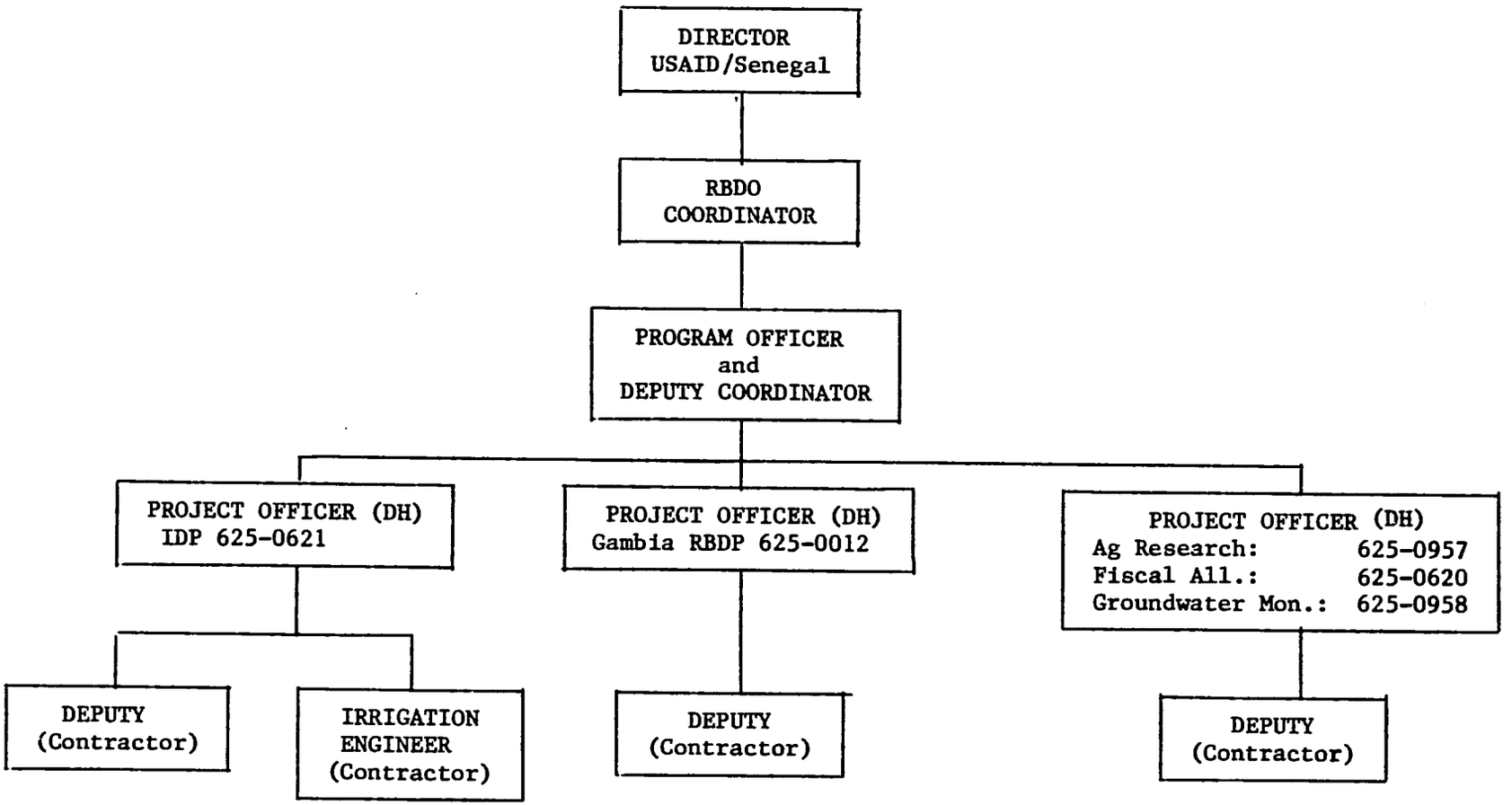
The regional project component will be contained in the overall protocol accord approved by the OMVS Council of Ministers, and it will be a binding agreement on the three member states. Within the limits established by the project authorization, the regional protocol and the regional project agreement, the OMVS will implement the regional program working directly with the RBDO. Implementation actions will be the object of project implementation orders or implementation letters between the OMVS and the RBDO.

### 5.2.2. Regional Management - USAID/RBDO

The USAID River Basin Development Office (USAID/RBDO) in Dakar will have overall project coordinating responsibility for AID. This responsibility includes direct management authority for the regional component of the project and general monitoring and reporting responsibilities for the entire project.

ORGANIZATIONAL CHART

USAID River Basin Development Office (RBDO)



Within the RBDO, an AID direct-hire project officer will be responsible for project management. For the regional component, the project officer will be responsible for project implementation actions, for preparing regional project documentation, for supervising the work of regional contractors, and for monitoring and reporting on regional activities. For the entire project, the RBDO project officer's responsibilities include:

a. Programmatic and managerial interaction with the OMVS;

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

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.

The RBDO regional project officer will be assisted by a deputy project officer and a staff irrigation engineer funded under the project, and by the various support offices of USAID/Senegal. The deputy project officer will work under the supervision of the regional project officer to assure that the administrative requirements for implementation are met. His/her duties will include monitoring of activities for procurement, customs and tax exemptions, technical assistance contracting, and training. The irrigation engineer will occupy a staff position in RBDO under the supervision of the project officer and provide technical backstopping for the project. The Supply Management Office, the Regional Health Office, and the Engineering Office of USAID/Senegal will provide specialized support to the project under the coordination of the regional project officer.

### 5.2.3. National Management - Member States

National project agreements, which will be signed by one ministry (Finance & Plan) having overall project authority, will specify the role and responsibilities of each national implementing agency and of the mechanism established to coordinate their activities. In Mauritania, there will be three primary implementing agencies: SONADER for the agricultural program; the Ministry of Health for the health surveillance program; and the Ministry of Equipment for the feeder roads program. An interministerial coordinating committee will be set up under the new Ministry of Plan to assure coordination among the implementing agencies. In Senegal, there will be three primary implementing agencies---SAED, for the agricultural program, the Ministry of Public Health, for the health surveillance program, and SERST, for the

telecommunications program. In Mali, there will be the Ministry of Agriculture/OVSTM for the agricultural program, the Ministry of Health for the health surveillance program, the Ministry of Transportation and Public Works for the feasibility study for the Kayes-Diboli road, and DNAFLA for the functional literacy program. In all three countries, the governments will be requested to formalize interministerial coordination for project implementation.

The USAID in each country will be responsible for dealing with each national implementing agency. Instructions on implementation procedures to be followed for each activitiy will be the object of program implementation letters issued by the USAID. The extent to which the host country inplementing agencies will directly manage project resources will depend on their institutional and managerial capabilities, which vary for each country and each agency. (See the Administrative Analysis, Volume III, Section 4, for more detail.) In general, there will be initial tight control over the disbursement of project resources by AID. Technical assistance will be provided under the project to build financial management and implementation capabilities. Management control will be turned over to national implementing agencies in a gradual and progressive manner until full control is assumed by them at year six of the project.

### 5.2.4. National Management - USAID

The USAID's for Mauritania, Senegal, and Mali will have responsibility for management of the respective national components of the project. Each USAID will assign a direct-hire AID project officer to oversee project implementation. For each USAID this may mean an increase in the direct-hire mode ceiling. This project officer will oversee the national components of other OMVS projects--Agricultural Research II, Groundwater Monitoring, and Manatali Resettlement. The AID project officer will maintain professional relations with national implementing agencies and with RBDO; prepare project documentation including agreements, implementation orders and letters, and national project reports; supervise national technical assistance contracts; and monitor all national project implementation actions.

The AID country project officer will be assisted by a contract deputy project officer and by the various support offices of the USAID. The deputy project officer will work under the supervision of the project officer to assure that the administrative needs for implementation are met. His/her duties will include management of activities for procurement, tax exoneration, technical assistance and contruction contracting, field-level liaison with project contractors, and working relations with host country departments involved in project execution. The USAID controller's office, project support office, engineering office economics units, design and evaluation offices, will provide specialized support under the coordination of the project officer. (See pages 123 a,b,c for missions organizational charts and offices having responsibility for OMVS activities.)

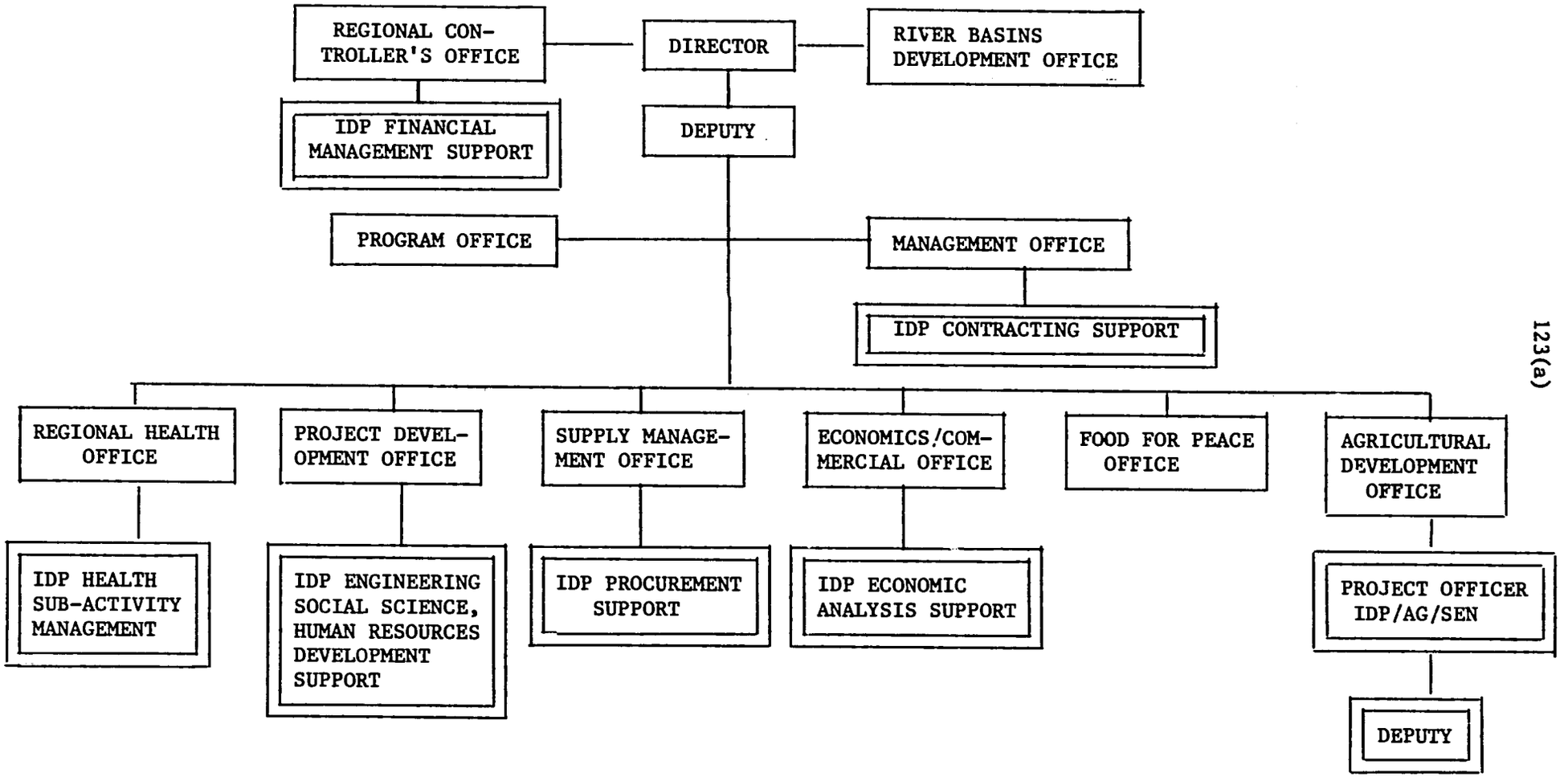
## 5.3. PROCUREMENT PLAN

### 5.3.1. Technical Assistance Contracting

Technical Assistance contracting under this project will be direct contracting by AID, as approved by the Mission Director of USAID/Senegal, in

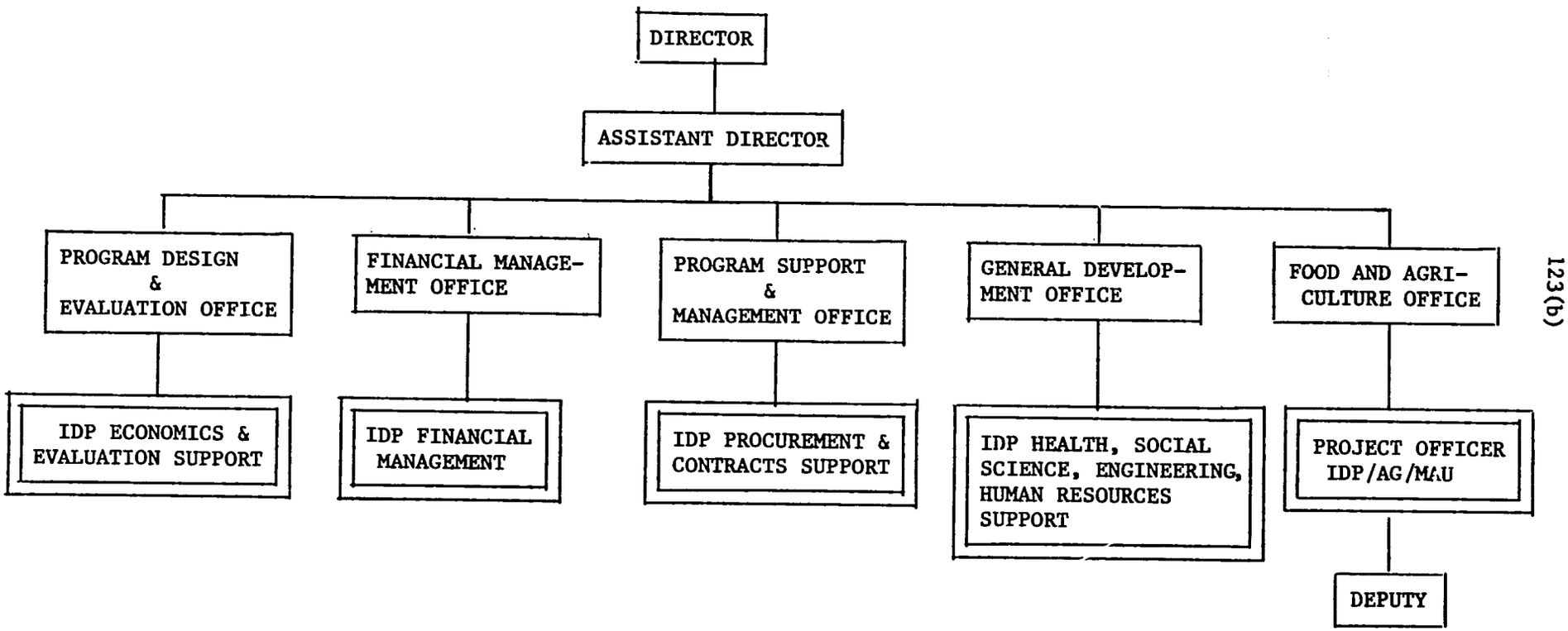
## USAID/SENEGAL

## ORGANIZATIONAL CHART



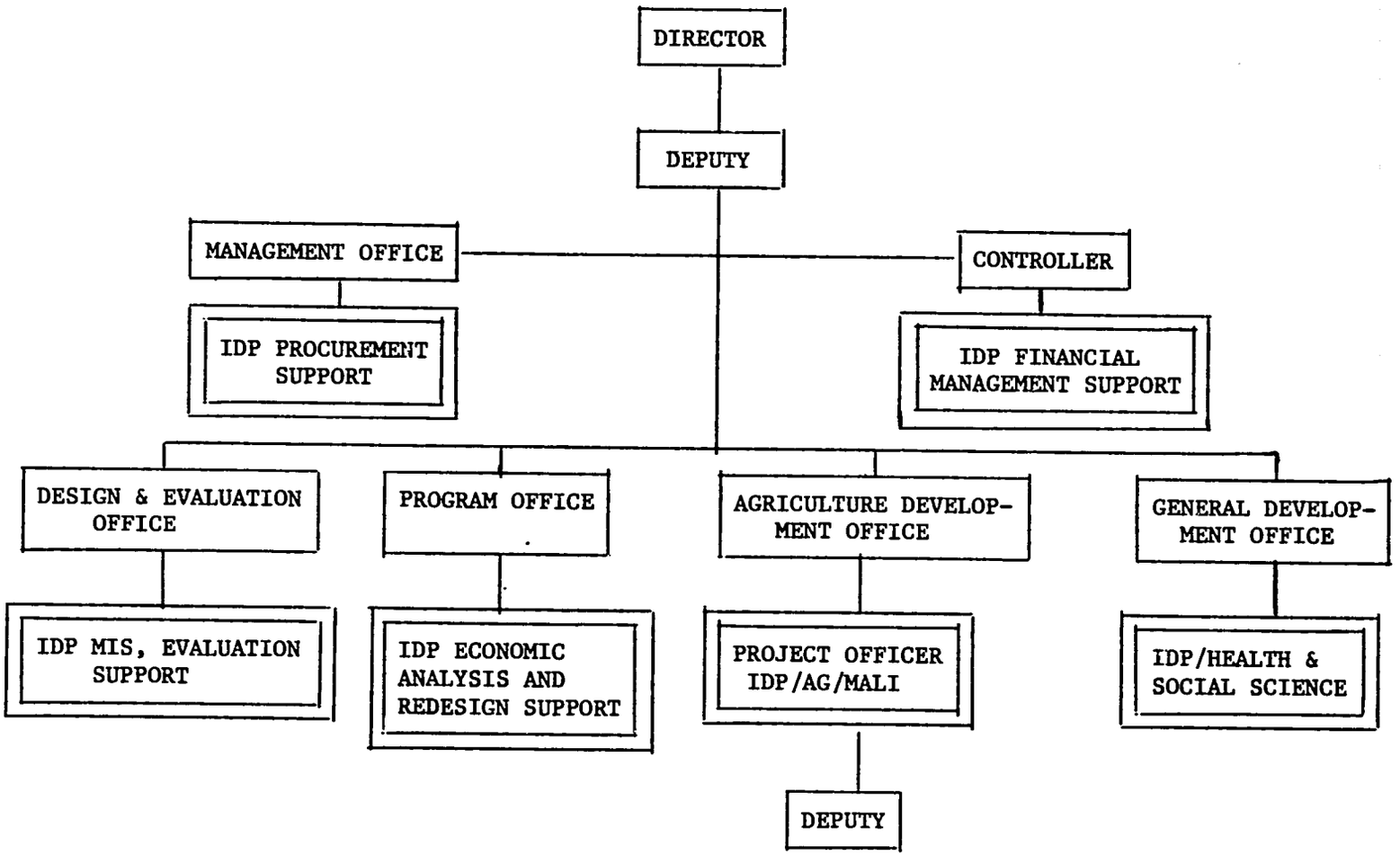
## USAID/MAURITANIA

## ORGANIZATIONAL CHART



USAID/MALI

ORGANIZATIONAL CHART



concurrence with the Directors of USAID/Mauritania and USAID/Mali. The OMVS and the three countries involved all have poor records of contracting performance and lack staff resources to properly execute contracting functions within the time frame required by the project.

(a) Regional Contracts

The USAID/RBDO will be contracting for three types of assistance under the project agreement with the OMVS:

(1) There will be contracts for three project support personnel: a deputy regional project officer and a staff irrigation engineer in RBDO and a deputy project officer for health monitoring assigned in the health office of USAID/Senegal. These individuals will be recruited and hired either directly by AID or under a support services contract used by USAID/Senegal. The scopes of work for these positions are provided in Volume III, Section 7.1.

(2) There will be a contract with a U.S. firm for technical assistance for the OMVS. This contract will include long-term technical assistance in project management, anthropology/training, business promotion, information systems development, and statistics/computer programming. It will also include short-term assistance in several disciplines expected to be needed for project implementation support. The terms of reference for this contract are provided in Volume III, Section 7.1.

(3) There will be contracts for supplementary technical assistance needed to implement the upper valley development plan, the irrigation feasibility studies, the policy studies, and the health surveillance program. The terms of reference for these studies and the estimates of the supplementary personnel needed are presented in the respective technical analyses: Volume III, Section 3.5 for Health Surveillance; Volume III, Section 3.8 for Policy and Feasibility Studies.

(b) Country Specific Contracts

USAID's in Mauritania, Senegal, and Mali will be contracting for two types of technical assistance under the terms of the sub-project agreement that each will sign with the respective government.

(1) The USAID's will contract for a Deputy Country Project Officer to assist with the administration of the project by USAID.

(2) The USAID's will contract for technical assistance needed for project implementation. Each USAID will contract with a U.S. firm for technical assistance needed to provide field-level expertise and strengthen local administrative capabilities. The terms of reference for these contracts are provided in Volume III, Section 7.2 for Mauritania; Section 7.3 for Senegal; and Section 7.4 for Mali.

## IDP IMPLEMENTATION RESPONSIBILITY

| PROJECT COMPONENT | USAID MGMT ASSIGNMENT | HOST COUNTRY MGMT ASSIGNMENT | IMPLEMENTATION |
|---|---|---|---|
| 1. Regional Component | 1. USAID/SENEGAL | 1. OMVS Directorate of Development & Coordination | 1. N.A. |
| a. Technical Assistance | a. RBDO | a. OMVS Integrated Dev. Division (IDD) | a. RBDO Institutional Contract One |
| b. MIS | b. RBDO | b. OMVS Planning & Evaluation Unit | b. " |
| c. Financial Management | c. " | c. None | c. " |
| d. Private Enterprise | d. " | d. OMVS - IDD | d. " |
| e. Upper Basin Dev. Plan | e. " | e. OMVS - IDD | e. RBDO Institutional Contract Two |
| f. Irrigation Feasibility Studies | f. " | f. OMVS - IDD | f. RBDO Institutional Contract Three |
| g. Land Tenure Study | g. " | g. OMVS Legal Adviser's Office | g. RBDO PSC One |
| h. Participation of Women | h. " | h. OMVS - IDD | h. RBDO Institutional Contract One |
| i. Project Tracking | i. " | i. OMVS - IDD | i. " |
| j. Telecommunications | j. " | j. " | j. RBDO Institutional Contract Four |
| k. Health | k. RBDO/RHO | k. " | k. PASA + Local Institutional Contracts |
| l. Evaluation | l. RBDO | l. " | l. RBDO Institutional Contract One |
| m. Donor Coordination | m. RBDO | m. OMVS - DDC | m. N.A. |

## IDP IMPLEMENTATION RESPONSIBILITY

| PROJECT COMPONENT | USAID MGMT ASSIGNMENT | HOST COUNTRY MGMT ASSIGNMENT | IMPLEMENTATION |
|---|---|---|---|
| 2. MALI Component | 2. USAID/MALI | 2. MALI Ministry of Agriculture | 2. N.A. |
| a. Agriculture (Irrigation, T.A., Credit, Agronomy) | a. USAID/M/ADO | a. OVSTM | a. USAID/M/Institutional Contract One |
| b. Roads Feasibility Study | b. USAID/M/GDO | b. GOM Min. of Public Works | b. Consulting Engineers Contract Two |
| c. Health | c. USAID/M/GDO | c. GOM Min, of Health | c. USAID/M/Local Contract Three with OCCGE |
| d. Financial Management | d. USAID/M/Controller | d. None | d. Institutional Contract One |
| e. Training | e. USAID/M/ADO | e. OVSTM | e. Local Contract Four with IER |
| f. Evaluation | f. USAID/M/P&E | f. OVSTM | f. Institutional Contract One |
| g. MIS | g. USAID/M/ADO | g. OVSTM | g. Institutional Contract One |
| h. First Region Dev. Plan | h. USAID/M/ADO | h. Min. of Ag/ Min. of Plan | h. RBDO Institutional Contract Two |
| i. Irrigation Feasibility Studies | i. USAID/M/ADO | i. OVSTM | i. RBDO Institutional Contract Three |
| j. Donor Coordination | j. USAID/Mali | j. Ministry of Plan | j. N.A. |

## IDP IMPLEMENTATION RESPONSIBILITY

| PROJECT COMPONENT | USAID MGMT ASSIGNMENT | HOST COUNTRY MGMT ASSIGNMENT | IMPLEMENTATION |
|---|---|---|---|
| 3. MAURITANIA Component | 3. USAID/MAUR. | 3. GIRM Ministry of Finance and Plan | 3. N.A. |
| a. Agriculture (Irr., T.A., Credit, Training) | a. USAID/M/FAO | a. SONADER | a. Mauritania Institutional Contract One |
| b. Financial Management | b. USAID/M/Controller | b. None | b. " |
| c. Roads | c. USAID/M/FAO | c. Ministry Public Works | c. Maur. Local Contract Two |
| d. Health | d. USAID/M/GDO | d. Ministry of Health | d. Maur. Local Contract Three |
| e. MIS | e. USAID/M/FAO | e. SONADER | e. Institutional Contract One |
| f. Evaluation | f. USAID/M/DEO | f. SONADER | f. " |
| g. Gouraye Development Plan | g. USAID/M/FAO | g. SONADER/Min of Plan | g. RBDO Contract Two |
| h. Irrigation Feasibility Studies | h. USAID/M/FAO | h. SONADER | h. RBDO Contract Three |
| i. Donor Coordination | i. USAID/Maur. | i. Min. of Plan | i. N.A. |

## IDP IMPLEMENTATION RESPONSIBILITY

| PROJECT COMPONENT | USAID MGMT ASSIGNMENT | HOST COUNTRY MGMT ASSIGNMENT | IMPLEMENTATION |
|---|---|---|---|
| 4. SENEGAL Component | 4. USAID/Senegal | 4. Senegal Ministry of Finance | 4. N.A. |
| a. Agriculture (irrigation, T.A., Credit, Training) | a. USAID/S/ADO | a. SAED | a. Senegal Institutional Contract One |
| b. Financial Management | b. USAID/REGCON | b. SAED | b. |
| c. Health | c. USAID/RHO | c. Ministry of health | c. Senegal Local Contract Two |
| d. Telecommunications | d. RBDO/ADO | d. SERS | d. RBDO Institutional Contract Four |
| e. MIS | e. USAID/ADO | e. SAED | e. Senegal Institutional Contract One |
| f. Bakel Development Plan | f. USAID/ADO | f. SAED/Ministry of Plan | f. RBDO Institutional Contract Two |
| g. Irrigation Feasibility Study | g. USAID/ADO | g. SAED | g. RBDO Institutional Contract Three |
| h. Evaluation | h. USAID/ADO | h. SAED | h. Senegal Institutional Contract One |
| i. Donor Coordination | i. USAID/Senegal | i. Ministry of Plan | i. N.A. |

In addition, there will be an AID/Washington executed contract for technical assistance needed to implement the Telecommunications Program in Senegal. The existing AID contract with the Academy for Educational Development under the Rural Satellite Program will be amended to include this component.

(c) Contracting Procedures

For the technical assistance contracts, standard AID procedures for advertising and competitive selection of contractors will be used. USAID/RBDO will be responsible for the preparation of PIO/T's and RFP's for the regional contracts, and the USAID's in each country will be responsible for contracting actions for the country-specific constracts. The placing of notices in the Commerce Business Daily, receiving of proposals, and other mechanics of the contracting process will be expedited with the assistance of the projects office of the Africa Bureau, AID/Washington. USAID/RBDO will assist the USAID's in coordinating contract actions regionally so that firms will be encouraged to bid on technical assistance packages combining one of more of the country or regional programs. The evaluation of contract proposals and contract negotiations will be handled by the responsible USAID office in collaboration with the host country implementing agency.

The recommended form of contract will be performance contracting, requiring specific time-framed outputs from institutions providing technical assistance. Evaluation of contractor performance will be conducted annually by a committee composed of the Host Country Project Manager, USAID Project Officer, and USAID Contracts Officer. Performance contracting usually means that fees will not be fixed, but awarded on the basis of contractor performance, following yearly evaluation. Principal criteria for fee award are the delivery of pre-established outputs and the performing of services within pre-established costs.

5.3.2. Training Activities

Training under the project is mainly field-level training for village associations, technicians and farmers, in-service training for government personnel, and on-the-job training for project personnel. This training will be the responsibility of the technical assistance contractors for each country program, and is fully described in the Training Analysis, Volume III, Section 3.2. The Anthropologist/Training Specialist within the OMVS will provide the coordination and communication linkages among the national programs and will be responsible for coordinating the limited participant training funded by the project. A number of regional seminars and conferences are also planned under the project to encourage technical exchanges on project implementation in the three countries. The USAID's will be responsible for the processing of PIO/P's and undertaking other activities for training under the national programs, and RBDO will be responsible for regional training and seminars.

5.3.3. Construction Contracting

A. Office Construction

The project involves a small amount of civil construction for project offices in Kayes and Podor. These are simple cement structures which will require little expertise to design and construct. In Mali, the USAID will contract directly for the design and construction of the Kayes project office, and in Senegal the design and construction contracting will be handled by the implementing agency (SAED) under AID host-country contracting procedures.

B. Perimeter Construction

For the construction of irrigated perimeters, two types of contracts are involved.

(1) Small and medium perimeters

For the construction of small and medium perimeters, the project will contract locally for construction services. The construction firm will be responsible for major earthworks such as flood protection dikes and primary canals, and for land leveling and pump station preparation. Farmer associations will be responsible for development of the secondary and tertiary irrigation network within the irrigated perimeter. These contracts will total approximately $3.5 million for perimeters in Kaédi and Gouraye for Mauritania, $1.9 million for perimeters in Bakel for Senegal, and $3.0 million for perimeters in Kayes for Mali. Since all of these contracts will be for less than $5 million and the host countries are authorized sources for services, bids will be issued locally and services contracted with a corporation or partnership that is an integral part of the local economy. This procedure is in conformance with AID country contracting procedures, Handbook II, Section 2.2.5.2e, dated May 15, 1982.

The design, preparation of bids, contracting and contracting supervision for this construction will be handled directly by the USAID or the national implementing agency (SONADER, SAED, and OVSTM) depending on USAID policy, and will be done through AID contracting procedures. The project is financing technical assistance to each of these agencies to build their capabilities to undertake this contracting. Construction monitoring will be the responsibility of the respective USAID's, with assistance from the USAID/RBDO staff irrigation engineer.

(2) Podor perimeter

For the construction of the 1,063 hectare perimeter at Podor, the USAID/RBDO staff irrigation engineer will be responsible for preparing the final construction design plans, with some assistance from a locally contracted architectual and engineering firm, if needed, and for preparing the Invitation for Bids for the construction. This IFB will be advertised for U.S. firms in the Commerce Business Daily, in accordance with standard AID and U.S. Government procurement regulations. It is anticipated that a U.S. firm may be interested in and capable of efficiently handling this contract, which will total approximately $6.4 million. In the event that no responses are

received from U.S. source and origin firms, or that such responses are more than 50 percent higher than estimates for comparable work by firms resident in Senegal, a conditional waiver of nationality of supplier form Code 000 to Code 935 is requested, and the IFB will simultanously be issued locally in Dakar, to avoid the loss of time by the necessity of having to issue the IFB twice. A conditional waiver for Code 935 nationality of suppliers is included in Volume III, Section 7.

Contracting supervision for the construction of the Podor perimeter will be handled by an architectual and engineering firm resident in Senegal. Construction monitoring will be the responsibility of the USAID/RBDO staff irrigation engineer.

C. Road Construction

For the feeder road construction, there will be approximately $4.7 million in construction conctracting in Mauritania and $306,000 for supervision. This contracting will be handled by the national implementing agency with close USAID supervision, following AID host-country contracting procedure. The contract will be a local firm as described for perimeter construction, above. The monitoring of the construction will be the responsibility of USAID/Mauritania, with the assistance of REDSO/WA or USAID/Senegal engineers, if requested.

The project paper design team reviewed the technical and administrative capability of the implementing agency to undertake this contracting and decided that host-country contracting should be used. This decision was reviewed and supported by the USAID/Senegal engineer.

D. Waivers

A conditional waiver of nationality of supplier from Code 000 (United States) to Code 935 (Special Free World) and of U.S. advertising is included in Volume III, Section, as a contingency to permit local national advertising and contracting for construction of the Podor perimeter. Other contracts for supervision and construction are less than $5 million and will be contracted locally in conformance with Handbook 11.

5.3.4. Commodity Procurement

5.3.4.1. Responsible Agency

Procurement under this project will be conducted by the primary implementing agency for each component, or by the respective USAID on behalf of the implementing agency. For Mauritania, USAID/Mauritania or the country technical assistance contractor will handle the off-shore procurement, and the national implementing agencies (SONADER/MOH) will handle most of the local and shelf-item procurement. USAID/Senegal and/or the contractor will do the same in Senegal, and SAED and the Ministry of Health will handle local and shelf-items procurement. The same procedure will be used in Mali, with USAID/Mali or the technical assistance contractor handling offshore procurement and the national implementing agencies (Ministry of Agriculture/ OVSTM and MOH) handling local and shelf-item procurement. For the regional program, USAID/RBDO will handle offshore procurement using the services of the USAID/Senegal Supply Management Office, and the OMVS will handle local and shelf-item procurement.

Procurement planning will be finalized for the regional and each national program as part of the annual workplan development cycle. The RBDO Project Manager and each of the USAID Project Officers will be responsible for assuring that the procurement planning and the procurement are properly carried out. They will be assisted by the deputy project officers and by the project supply management offices in each USAID.

5.3.4.2. 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/C's 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 and small motorbikes as authorized by source/origin waivers.

- For shelf item procurement under the local costs portion of the project agreement, the OMVS or the national research agencies may underake local purchase on the basis of annual budgets. For this shelf-item procurement, items having their origin in Code 935 countries are normally eligible for financing if the unit cost does not exceed $5,000 and the total of such financing does not exceed 10 percent of the total 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 produced 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. Because of special procurement needs for the agricultural credit program, an increase in shelf- item procurement authority to a unit value of $15,000 and total value of 15 percent of local currency costs is being requested and is discussed under special procurement considerations, below.

5.3.4.3. Procurement Service Agent (PSA)

The procurement of commodities in the United States will be accomplished under the project through a professional procurement services agent. There are several firms who are qualified to act as PSA and who have successfully performed procurement services for AID projects in Senegal, Mauritania, Mali, for the OMVS. Each USAID will select a PSA best suited for the procurement needs of its national program.

5.3.4.4. Delivery

All imported goods will be shipped on the basis of CIF (Cost, Insurance, and Freight) to the port of entry. All imported goods will be

insured at 120 percent of the CIF cost. For surface shipments all-risk marine insurance will be used for coverage of the ocean voyage.

Air shipments will be authorized when the type of commodity and/or value warrants this method of delivery. The port of entry is Dakar for regional and Senegalese procurement; Nouakchott for Mauritanian goods; and Bamako for Malian goods. The implementing agency will be responsible for transportation of goods from the point of entry to the final destination, unless special arrangements are negotiated by the USAID.

5.3.4.5. Source of Procurement

The authorized source of procurement for this project is Geographic Code 000 (the United States) and the Cooperating Country for Senegal and Mauritania and is Code 941 (Selected Free World) and the Cooperating Country for Mali, except for the procurement of small motorbikes, vehicles, and other equipment authorized under source/origin waivers.

5.3.4.6. Special Procurement Considertions

There are three special procurement situations in the project which will be treated in a differet manner from the standard procedures just described. These are:

(1) satellite communications equipment

The telecommunication component of the Senegal national program will be implemented through a technical assistance contract with the Academy for Educational Development (AED) as an amendment to an existing AID contract under the AID Rural Satellite Program. As the technical assistance contractor under the AID Rural Satellite Program, AED has the special technical skills and knowledge to handle procurement for the activity. AED will handle procurement in the U.S. through its home office and will be responsible for reception and installation of the equipment in Senegal through a field office that is to be established under the project.

(2) micro-computers

For efficient operation of the project management information system and the analysis of data collected under the health surveillance and policy and planning activities of the project, the purchase of micro-computers for use by the OMVS and national implementing agencies is planned and budgeted in the project. Because of the important need for these computers and for specialized skills to assure that the data collection and analysis systems are properly planned and set up, the project is financing an information system specialist to work for up to two years in the OMVS. This specialist will study the data processing needs of the OMVS and the national implementing agencies and determine the specifications for computers to be purchased under the project. These specifications will be cleared through the Data Management Office of the Directorate for Program and Management Services in AID/ Washington. This process will assure that the micro-computers purchased for the project are best suited for project needs and are compatible with existing systems in the OMVS and the USAID's.

(3) credit for agricultural equipment

Under the project program for strengthening and increasing private sector activities in the Senegal river basin, a credit program will be established to finance agricultural inputs and mechanical equipment needed by farmers, farmer associations, and small businesses in the project zones. The project will help set up and capitalize credit facilities in the project zones. The farmers, farmer associations, and businesses participating in the program will use the credit to purchase certain inputs and equipment from suppliers operating in the region. All purchases, with the exception of rice hullers and irrigation pumps, will be for items with a unit price of less than $5,000 and thus come under the local currency shelf-item procurement authority of the project. For the rice hullers (the estimated cost of $7,000 each for 29 hullers totaling $203,000) and for the small irrigation pumpsets (the estimated cost is $11,000 per pumpset for approximately 150 pumpsets for a total of $1.65 million), AID will provide a total capitalization of $3.5 million for credit in the five project zones. With an estimated repayment rate of 80 percent, this capitalization will provide approximately $8.6 million worth of loans for agricultural inputs during the life of the project, and will continue to finance loans indefinitely. The objective of this credit program is to help increase the capability of farmers and local small enterprises to supply agricultural equipment and to maintain and repair agricultural equipment. Farmers and businesses must have the freedom to choose the best suppliers and the best equipment for use in the basin. Imposing U.S. manfactured equipment on private farmers and businesses in the basin would run counter to the program's objectives and mean certain failure of the credit system. Therefore, a waiver is requested to raise the shelf-item procurement unit value to $15,000 and the total amount available for shelf-item procurement from 10 percent to 15 percent of local currency costs in the project. This will permit all items under the credit program to be purchased as shelf-items and thus help assure the success of the credit system and the private sector program objectives of the project.

5.3.4.7. Commodity List

Specifications for commodities are provided in Volume III, Section 7, and will be furnished in the purchasing documents that will be issued to enact procurement.

5.3.4.8. Waivers

A waiver of source origin procurement is requested from Code 000 (United States) to Code 935 (Special Free World) to permit the purchase of 22 vehicles ($625,000), 52 small motorbikes (mobylettes) ($52,000), and medicines ($300,000). The total amount of these waivers is $977,000. The waivers are included in Volume III, Section 7.

## 5.4. Project Control Structures

In order to foster project coordination and cohesion between national and regional activities, and in order to assure recurrent management and technical monitoring of project implementation, four committees will be established. Their composition and purpose are as follows:

I. Management Committee

a. Members: Directors of USAID Mali, Mauritania, Senegal. Coordinator, River Basin Development Office.

b. Chair: USAID/Senegal Director.

c. Purpose: Set policy, review work in progress; decide changes to be undertaken; oversee preparation of work needed to assure AID/W surveillance of the Senegal Basin Program; refine strategies and tactics to assure projects success; direct major project redesign efforts.

d. Meetings: twice yearly at minimum, more frequently at the request of any member.

e. Staff Secretariat: RBDO/IDP project office.

II. Project Implementation Committee

a. Members: IDP project officers from USAIDs Mali, Mauritania, Senegal and RBDO.

b. Chair: RBDO Project Officer.

c. Purpose: Review project execution concerns, identify common problems suitable for joint resolution, minimize duplication of bureaucratic effort, define needs for technical support, recommend actions by other USAID field units, select issues requiring resolution by Management Committee.

d. Meetings: Three times yearly or more frequently as requested by any member.

III. Project Agriculture Committee

a. Members: Agriculture Development Officers of the three USAID missions; RBDO Irrigation Engineer.

b. Chair: On a rotating basis.

c. Purpose: Quality control of project's technical aspects; assure operational linkages between agricultural research and extension; specify research needs; analyse basin-wide data; resolve technical problems posed by field staff; identify agricultural policy issues.

d. Meetings: At least once a year and more frequently at the request of any one member.

e. Staff Secretariat: IDP/RBDO project office.

IV. Project Monitoring Committee (Proposed)

a. Members: Senior AID/W personnel from AFR, S&T, PPC Bureaux principally; senior representatives from REDSO/WCA, and from SDPT.

b. Ex-Officio: USAID mission directors from Senegal, Mauritania and Mali; RBDO Coordinator.

c. Chair: Deputy Assistant Administrator for Africa.

d. Purpose: Institutionalize AID/W management oversight of Senegal Basin Program; appraise work in progress especially as it concerns achievement of strategic policy objectives; review program coordination and related issues at national and regional levels; provide policy direction and/or clarification.

e. Meetings: Once yearly.

f. Staff Secretariat: At field level SDPT; at AID/W level OMVS desk, with assistance from RBDO.

## 5.5. PROJECT IMPLEMENTATION SCHEDULE

This section outlines a general strategy for the phasing-in of project activities and presents a schedule of major implementation actions. The implementation plan is based on the assumption that successful implementation of the project will require an adaptive approach which takes account of new conditions and emerging opportunities. The rationale for suggesting this flexible approach for implementation is:

1. The OMVS member states and the RDA's have, under some pressure from donors, reconsidered earlier development strategies and have committed themselves to a more decentralized approach to project management. The current programs call for increasing farmer participation and responsiblity and for strengthening nongovernmental systems for the supply of inputs, credit, and marketing. Since it is not possible to determine how quickly the RDA's will be able to implement this revised approach, the project implementation team within each RDA will have to carefully evaluate operations in each zone prior to begining any large scale training or construction.

2. The OMVS member states are currently evaluating economic and development policies and some changes are expected within the next few years which will affect local conditions.

3. New technologies are being developed to improve irrigated agriculture and other farm-level activities, and the project team will need to carefully examine these options.

The implementation stages outlined below are designed to encourage the project team within the RDA's at the sector level to systematically examine field conditions and make the necessary adjustments in project implementation. The plan calls for a deliberate, step-by-step approach which allows the project implementation team to develop strong working relationships with local officals and farmers and assures local participation in the planning of field-level activities.

The implementation of the IDP project involves a coordinated series of activities organized into three phases:

-- Phase One: Organization and Planning (year 1)
-- Phase Two: Implementation and Mid-Project Evaluation (years 2,3,4)
-- Phase Three: Implementation and Final Evaluation (years 5,6,7)

The planned timing for major project activities and outputs is summarized in Figure 5A, Schedule of Implementation Activities.

Phase One: Organization and Planning

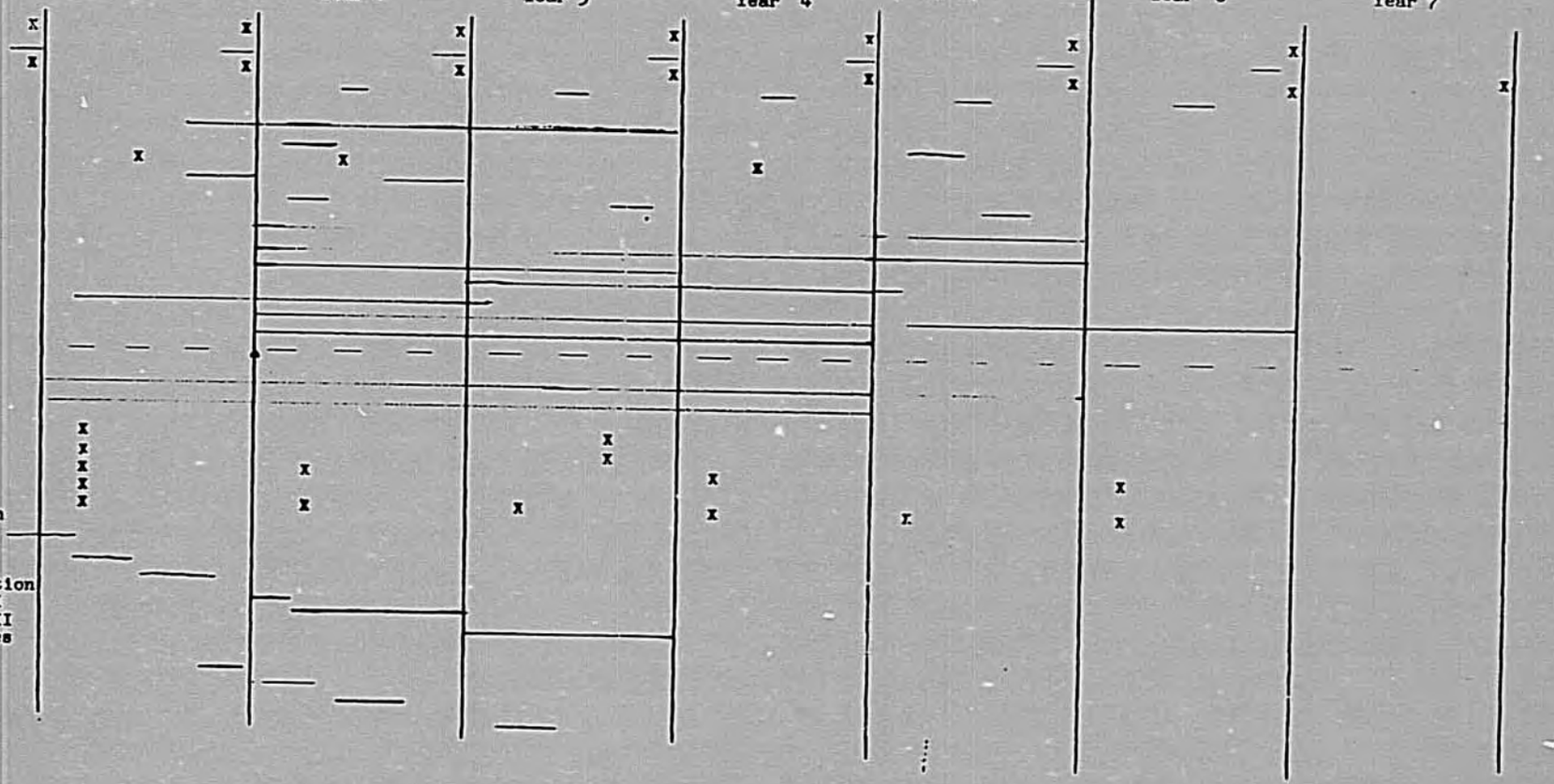
Year 1

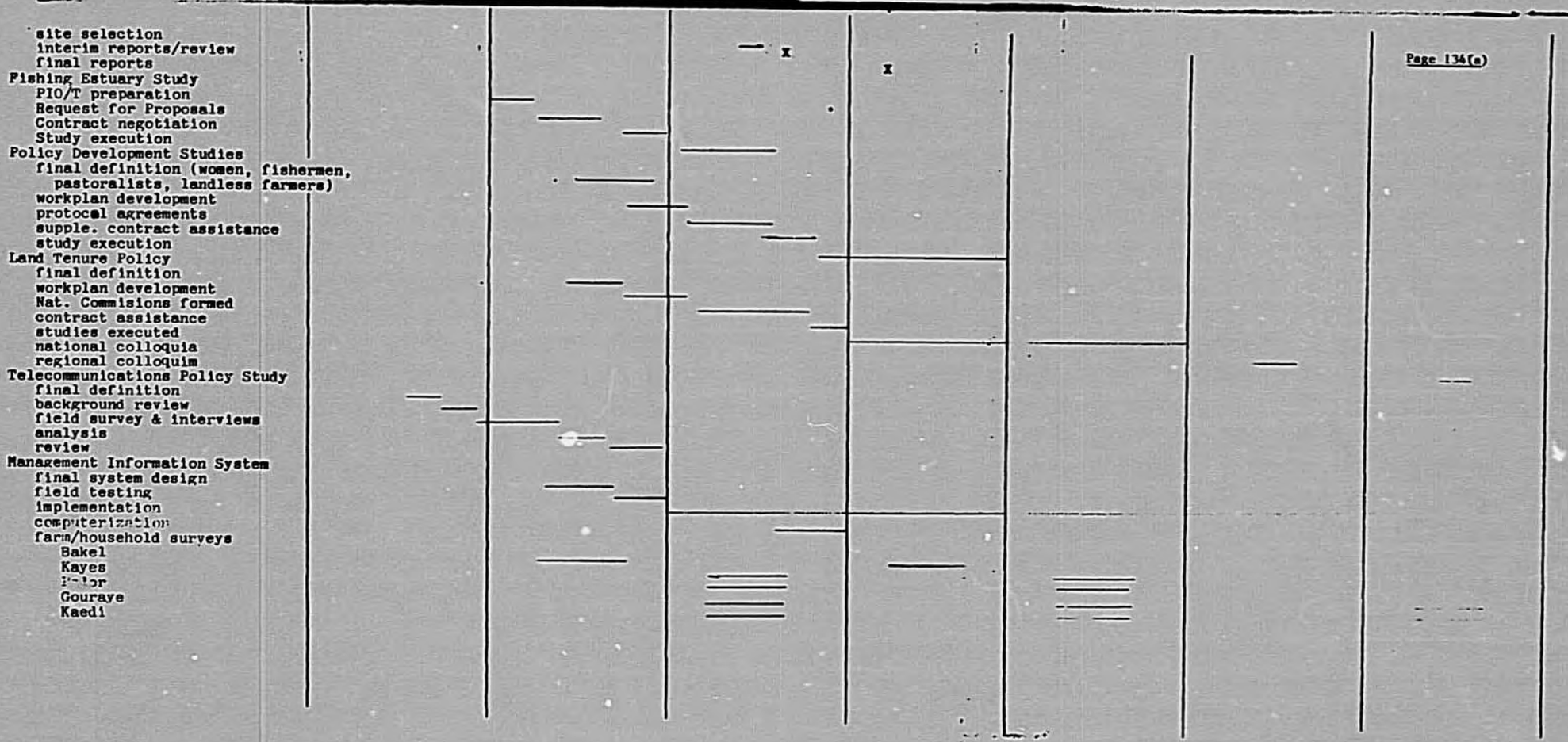
From the time the project agreements are signed by the OMVS and USAID/RBDO and by each member state and the respective USAID, approximately one year will be required to establish the implementation, management, and coordination systems for the project; to recruit and hire project support staff and technical assistants; to purchase needed commodities; to set up offices; to orient project staff; and to take other related actions. This "start-up" period is an important first step to project implementation and is needed to prepare for the large scale commitment of human and material

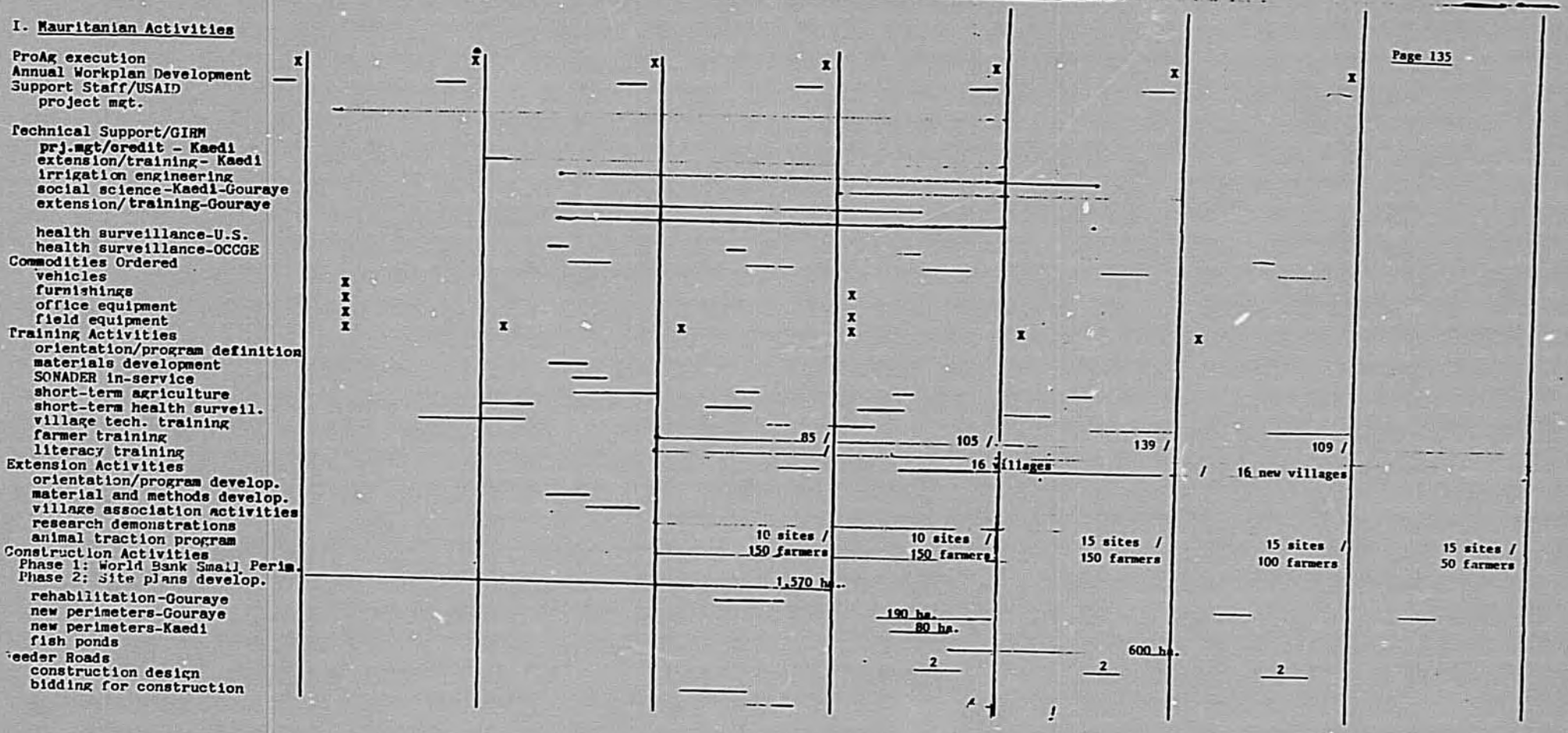
Figure 5 A

Schedule of Implementation Activities





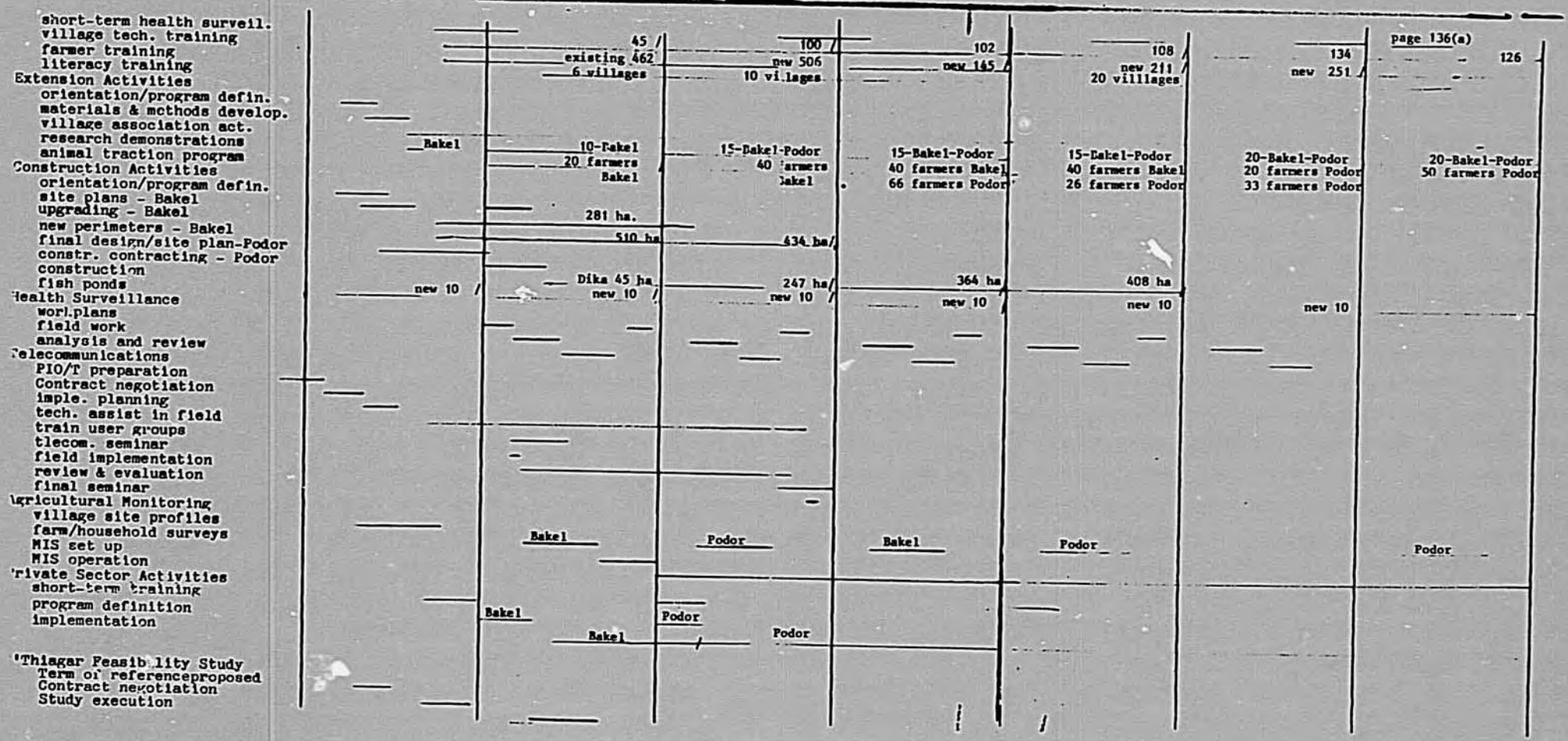

site selection
interim reports/review
final reports
Fishing Estuary Study
PIO/T preparation
Request for Proposals
Contract negotiation
Study execution
Policy Development Studies
final definition (women, fishermen, pastoralists, landless farmers)
workplan development
protocal agreements
supple. contract assistance
study execution
Land Tenure Policy
final definition
workplan development
Nat. Commisions formed
contract assistance
studies executed
national colloquia
regional colloquim
Telecommunications Policy Study
final definition
background review
field survey & interviews
analysis
review
Management Information System
final system design
field testing
implementation
computerization
farm/household surveys
Bakel
Kayes
Gouraye
Kaedi
X
X


I. Mauritanian Activities
ProAg execution
Annual Workplan Development
Support Staff/USAID
project mgt.
Technical Support/GIRM
prj.mgt/credit - Kaedi
extension/training- Kaedi
irrigation engineering
social science-Kaedi-Gouraye
extension/training-Gouraye
health surveillance-U.S.
health surveillance-OCCGE
Commodities Ordered
vehicles
furnishings
office equipment
field equipment
Training Activities
orientation/program definition
materials development
SONADER in-service
short-term agriculture
short-term health surveil.
village tech. training
farmer training
literacy training
Extension Activities
orientation/program develop.
material and methods develop.
village association activities
research demonstrations
animal traction program
Construction Activities
Phase 1: World Bank Small Perim.
Phase 2: Site plans develop.
rehabilitation-Gouraye
new perimeters-Gouraye
new perimeters-Kaedi
fish ponds
Feeder Roads
construction design
bidding for construction
85 /
105 /
139 /
109 /
16 villages
16 new villages
10 sites /
150 farmers
10 sites /
150 farmers
15 sites /
150 farmers
15 sites /
100 farmers
15 sites /
50 farmers
1,570 ha.
190 ha.
80 ha.
600 ha.
2
2
2


contract negotiations
construction
Health Surveillance
workplans
field work
analysis and review
Agricultural Monitoring
village site profiles
farm/household surveys
MIS set up
MIS implementation
Private Sector Activities
short-term training
program definition, workplan
pilot operation
full operation

III. Senegalese Activities

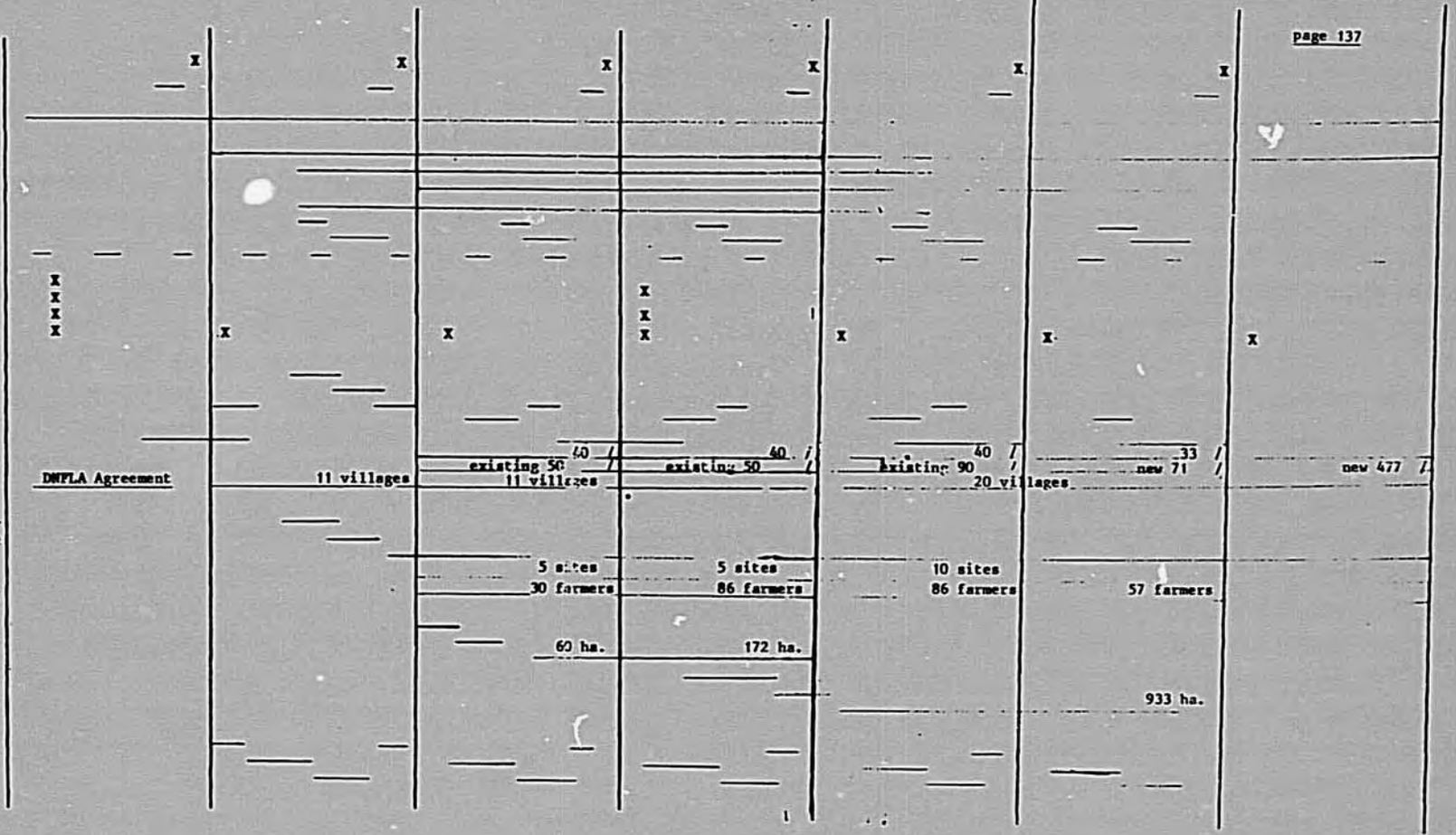
ProAg execution
Annual Workplan Development
Support Staff/USAID
project admin.
Technical Support/GOS
irrigation engineering
agronomy/extension
social science
agronomy/research liaison
credit/private sector
health surveillance-U.S.
health surveillance-OCCGE
consultants
Commodities Ordered
vehicles
furnishings
office equipment
field equipment
Training Activities
orientation/program defin.
material & methods develop.
SAED in-service
short-term agriculture
short-term telecommunications


short-term health surveil.
village tech. training
farmer training
literacy training
Extension Activities
orientation/program defin.
materials & methods develop.
village association act.
research demonstrations
animal traction program
Construction Activities
orientation/program defin.
site plans - Bakel
upgrading - Bakel
new perimeters - Bakel
final design/site plan-Podor
constr. contracting - Podor
construction
fish ponds
Health Surveillance
work plans
field work
analysis and review
Telecommunications
PIO/T preparation
Contract negotiation
imple. planning
tech. assist in field
train user groups
tlecom. seminar
field implementation
review & evaluation
final seminar
Agricultural Monitoring
village site profiles
farm/household surveys
MIS set up
MIS operation
Private Sector Activities
short-term training
program definition
implementation
Thiagar Feasib lity Study
Term of referenceproposed
Contract negotiation
Study execution
45
existing 462
6 villages
100
new 506
10 villages
102
new 145
108
new 211
20 villlages
134
new 251
126
Bakel
10-Bakel
20 farmers
Bakel
15-Bakel-Podor
40 farmers
Bakel
15-Bakel-Podor
40 farmers Bakel
66 farmers Podor
15-Bakel-Podor
40 farmers Bakel
26 farmers Podor
20-Bakel-Podor
20 farmers Podor
33 farmers Podor
20-Bakel-Podor
50 farmers Podor
281 ha.
510 ha
434 ha
new 10
Dika 45 ha
new 10
247 ha
new 10
364 ha
new 10
408 ha
new 10
new 10
Bakel
Podor
Bakel
Podor
Podor
Bakel
Podor
Bakel
Podor

1388

## I. Malian Activities





1380


Agricultural Monitoring
village site profiles
farm/household surveys
MIS set up
MIS operation
Private Sector Activities
short-term training
program definition, workplan
implementation
Kayes-Diboli; Road Feasib.study
PIO/T preparation
Request for proposals
Contract Negotiation
Implementation of Study
page 138

resources that begins in the second year. The length of this phase will vary among the regional and national programs. Senegal project activities in the Bakel zone will begin the quickest since they will continue ongoing operations of the Bakel Small Irrigated Perimeters Project. Key events during Phase 1, Organization and Planning, are:

Month 0

-- Signing of the Overall Protocol Agreement between the OMVS and USAID/RBDO. This agreement will set forth the responsibilities and obligations of the parties--AID, the OMVS, and member states of Mauritania, Senegal, and Mali. Within the Protocol Agreement will be the elements of and the instructions for the project agreements for the regional program and each national program. The agreement for the regional program will be between USAID/RBDO and the OMVS, and the agreements for the national programs will between the member state and respective USAID. the USAID direct-hire project officer is presumed to have been assigned to RBDO prior to this time. He will participate in final project negotiations and be responsible for subsequent implementation actions. Similarly, the OMVS project manager is presumed to have been appointed by the OMVS.

Month 1

-- Signing of the project agreements for the regional program by the OMVS and RBDO and for the national programs by the member state and respective USAID. The elements of these agreements will have been established by the Overall Protocol Agreement. An USAID direct-hire project officer for OMVS activities is presumed to have been assigned to each USAID/prior to this time. He will participate in final project negotiations and be responsible for subsequent implementation actions. Similarly, officials who will be responsible for implementation in each national implementing agency (Ministry of Agriculture/Rural Development, Ministry of Health, and Ministry of Transport)
are presumed to have been named by the member states.

Month 2

-- Fulfillment of initial conditions precedent by the OMVS and member states. Upon filling the conditions required prior to project implementation, the OMVS will officially notify USAID/RBDO and the member states will inform each USAID. The USAID's will acknowledge the fulfillment of the conditions and project implementation activities will then start.

-- Establishing of coordinating mechanisms for the project at the regional and national levels by the USAID and RBDO project managers.

-- Issuing of the first Project Implementation Letters by RBDO and the USAID's. These letters will give more detailed instructions on the procedures to be used for project implementation.

-- Project orientation seminar. A project orientation seminar will be conducted by the OMVS and USAID/RBDO in Dakar for the project management staff of each country and the respective USAID's. This seminar will orient staff of the Senegal River Basin to the history of basin development programs, to

project objectives and to activities planned under the project. The seminar will cover in detail the organization of development institutions in the SRB and establish a framework for coordination among the national agencies, the USAID's, the OMVS, and RBDO. An overall workplan will also be established for the full range of activities planned for the first year of the project.

Month 3

-- Completion of Project Implementation Orders for Technical Assistance (PIO/T's). These documents will be completed by the USAID/Project Officers and member states' project managers, in order to permit contracting for technical assistance to proceed. The PIO/T's will present a detailed job descriptions and scope of work for each technical assistance position. PIO/T's will be prepared for each program area: agriculture, health, OMVS management, telecommunications, private sector development, and for project support staff for RBDO and the USAID project offices.

-- Start of the quarterly project reporting that will be continued throughout the project. This will be the responsibility of the USAID project officers working with the OMVS and member state project managers.

-- Start of activities in the Bakel and Podor project zones that are a continuation of the Bakel Small Irrigated Perimeters (685-0208).

Month 4

-- Issuing of the Requests for Proposals (RFP's) for technical assistance contracts. These are prepared by the USAID project officers on the basis of the PIO/T's and sent to AID/Washington for advertising and distribution to interested firms.

-- Hiring of USAID deputy project officers and of technical support personnel in RBDO. These persons will work under the USAID project officer to assure that administrative needs for implementation are met.

-- Issuing of the Project Implementation Orders for Commodities (PIO/C's). The draft PIO/C's are prepared by the USAID project officer and host country project manager to establishe the detailed specifications for the project equipment and supplies that are to be purchased during the first year. Additional PIO/C's will be issued as needed for additional equipment needed during project implementation. Finalization, issuance and monitoring of PIO/C's will be in accordance with established procedures in each USAID.

Months 5-6

-- Establishing project systems and relationships. The RBDO and the USAID project officers and duputies will work with the implementing agencies to gain an understanding of the national and local development context. They will spend time in each of the agencies and travel to the project zones to learn about the ecological, sociocultural, economic, and institutional environment, and to develop an effective cooperative working relationship with the national implementing agencies, political and religious authorities, local businessmen, and farmers. They will also use their experiences to develop orientation and training materials for the technical assistance contractors.

Month 7

-- Evaluation of the proposals for the technical assistance contracts. RBDO and the USAID's evaluate, in consultation with OMVS and member states respectively, the proposals received from firms for the technical assistance contracts. The best proposals are selected and arrangements are made for contract negotiations.

Month 8 - 12

-- Signing of the contracts for technical assistance. The contracts will be negotiated and signed for RBDO and the USAID's by a Regional Contracting Officer with the authorized representative of the firms selected.

-- Preparation of Invitation for Bids (IFB) for the final planning and design of the Podor perimeter. Using the GERSAR study as a base, SAED will prepare an IFB for the final construction design and the preparation of the construction bid package by an architectual and engineering firm resident in Senegal. The same firm will be retained to provide construction supervision and monitoring. Following USAID approval, the IFB will be advertised in the U.S.

Month 13

-- Start of work by technical assistance contractors. The technical assistance contractors start operations for the project with consultancies and the arrival of the contractor project managers. The contractor project managers spend the first month or so in the capitols while gaining an understanding of the project, meeting government officials, and establishing administrative systems for contract support. Trips to the project zones are made to similarly gain an understanding of the project zones, meet local officials, and establish administrative systems.

-- Start of installation of earth stations and hardware for the telecommunications program, and of implementation of operations and maintenance programs.

-- Start of construction of project zones offices in Kayes and Podor by OVSTM and SAED following USAID approval of design plans.

-- Arrival of project commodities.

-- Planning for start-up of field activities. The contractors work with the OMVS or RDA (depending on which program) to establish the annual work plan and budget. Final plans are made for the assignment of project staff by OMVS and national implementation agencies and for project activities during the first year of field implementation.

-- Establishing the project management system. The project teams will use established management-reporting procedures to meet the requirements of USAID, the OMVS, and member state implementing agencies. In addition, the project paper outlines certain ways in which the teams will support OMVS and

RDA management functions. There are, however, a large number of options regarding the internal organization of the project teams, their relationship to OMVS, RDA staff, and other institutions which need to be addressed in detail after an assessment of the local situation. These include the clarification of authority for decision making, a modification of scopes of work for team members, and a clarification of operating procedures to coordinate project activities within the organizational context of OMVS or the relevant RDA.

A preliminary internal project management and information system needs to be established covering issues such as:

- administrative and financial procedures;
- use of vehicles and other equipment;
- development of workplans;
- meeting schedules;
- reporting forms.

-- Completion of Phase One: Organization and Planning. The second annual seminar will be held by the OMVS and USAID/RBDO for the project management staff. First year actions will be reviewed. Second-year workplans and budgets will be evaluated and an overall annual workplan and budget for the project will be developed and given to RBDO and the USAID's for approval.

Phase Two: Implementation and Mid-Project Evaluation

This phase of implementation is one of improving and extending existing irrigation systems and of initiating new activities to increase agricultural production. The major challenge is to develop effective strategies to implement policy and organizational changes which have already been proposed by the national governments and the RDA's. While the objectives of increased farmer participation and private sector involvement are accepted in principle, developing specific mechanisms and marshalling resources to put them into practice will be difficult and will involve an extended period of trial and error. Implementation will involve structural or organizational changes and a reorientation of perspectives and behavioral patterns that are only modified through training and experience. These are objectives for which it is difficult to establish fixed timetables.

The other dimension of project activities, the introduction of new skills and technologies, also requires a cautious, flexible approach. While fishponds, animal traction, fruit trees, and other components are not unknown in the SRB, their integration into the irrigated perimeter projects on even a modest scale involves a high level of uncertainty. These innovations will be introduced during this phase and the results carefully monitored and evaluated. The goal will be to learn enough about them, including implementation requirements and farmer acceptability, to allow for their expansion during the final phase (years 5 - 7) of the project.

Key events during this second phase are:

Year 2

Months 14 - 18

-- Approval of the annual workplans by USAID/RBDO and the national USAID's. The USAIDs issue Implementation Letters providing funding to the local project accounts for operating costs.

-- Arrival of other members of technical assistance teams and hiring of the national social scientists.

-- Hiring of local project staff.

-- Orientation for contract teams. The teams gain an understanding of the project context using the program developed by the OMVS and USAID project officers and deputies.

-- Opening of zone project offices. The contract teams start work in the Kaédi, Gouraye, and Kayes Project zone housing has been rented, offices are equipped, etc.

-- Orientation, program implementation planning, methodology and materials development, and in-service training for the farmer training and extension activities.

Month 18

-- Start of field activities. The mobile training units begin operation in each zone working with village associations, technicians, and farmers on existing perimeters.

-- Creating the village site profiles. A site profile will be prepared on each village and irrigated perimeters by the implementation team in each project zone. Developing these profiles will involve a review of existing data from each site (OMVS: Fiches Signalétiques, Bilan de campagne and Annual Zone Reports) and reconnaissance surveys at each site. The profiles will review production and debt repayment records, examine the physical works, and provide other information issues such as agriculture, public health, etc. The primary objective is to determine what has occurred at each site, reasons underlying problems and successes, and the identification of current difficulties which can be dealt with without a major commitment of resources. The information will also be useful for identifying problems and issues that require longer range solutions. The results of these activities will be used to develop action plans for all the villages in the project zone. The planning and survey activities will be integrated into the first year program for the Mobile Training Unit.

-- Start of farm/household surveys by the country project staff under the technical direction of the OMVS Unit for Permanent Evaluation and Planning. The surveys will be undertaken in five selected villages in each of the five project zones. The project agricultural economist, applied anthropologist, and statistician in OMVS will coordinate this activity.

-- Start of the research field trial and demonstration program. Under protocol agreements for research/extension liaison between the RDA's and the three research centers in the basin, a research field trial program will be carried out by the project jointly with the OMVS Agricultural Research Project (625-0957). A plan for this activity will be developed under each national program with the help of the project extension specialist. Regional coordination will be provided by the OMVS Integrated Research Division, and the OMVS Inter-State Committee for Agricultural Research Development (CIERDA).

-- Start of regional studies. The additional project staff for the studies arrives to assist with the planning, policy, and feasibility studies that will be directed by the OMVS project management in DCC. The nature and timing of this assistance will have been defined and agreed to within the overall project workplan developed by the annual project seminar with the OMVS and RBDO.

-- Start of disease and nutrition surveillance in the project zones and of regionally coordinated health planning and epidemiological technical assistance.

-- Start of increased information dissemination on project activities to other donors.

-- Holding of the six month project review. Progress is assessed in comparision to the annual workplan and the workplan is modified for the remaining six months, if necessary.

-- Start of project management information system. Under the direction of the management information specialist the OMVS project staff will collaborate with the national project staff in each zone to establish a format and system for six-month implementation reporting. This will become the project Management Information System (MIS).

-- Planning for the credit and artisan assistance program. The technical assistance contractor in each country will work with the National Development Banks, artisan assistance centers, and RDA's to complete detailed implementation plans for the program. These plans will present credit assessment procedures, the financial and credit management systems, the credit monitoring and collection techniques, the input supply and office management systems and the internal audit and control procedures that will be used. The plans will detail the resources needed for the program, including staff and staff training, and provide a timetable for implementation. This plan will be submitted to the USAID's for approval. Funding for implementation will be provided following USAID approval of the detailed workplan.

Months 19 - 24

-- Completion of second year implementation according to workplans. By the end of the year the project will have:

A. OMVS Regional Program

(1) started the long-range development plan for the upper valley with separate but coordinated plans for the Gouraye, Bakel, and Kayes Regions. Studies for the plans will have started with a definition of the area to be studied, an inventory of physical and human resources, and a description of the existing technological, economic, social, institutional, and policy situation.

(2) completed the final planning and contracting for technical assistance for the feasibility studies for irrigation development and for the Fishing Estuary Study.

(3) completed workplans for policy development studies; the applied anthropologist will coordinate studies to address and examine the actual and potential impact of the SRB development upon certain groups--women, fishermen, pastorialists, and landless farmers. Workplans will also be completed for the land tenure policy and telecommunications policy studies.

(4) implemented the regional systems for financial management and programmatic coordination through annual project workplans and budgets, and review and evaluation procedures; the OMVS Project Management Unit will also have started providing selected technical support to the national programs in the five project zones.

(5) completed the planning and started the training and other activities to implement the project management information system (MIS); this includes implementation monitoring system coordinated by the Project Management Unit, and the impact monitoring directed by the Unit for Permanent Evaluation and Planning. The national programs will have developed the compatible field-level information systems to monitor project activities and provide evaluation data.

(6) started the business opportunities promotion activities within the OMVS;

(7) completed the planning for technical conferences, and specialized technical support activities that will be provided under the OMVS regional program;

(8) strengthened the OMVS Consultative Committee by establishing a Secretariat and starting the dissemination of technical and policy issues through the Committee;

(9) reviewed the accomplishments for the year and established a workplan and budget for the next year;

B. Mauritanian Program

(1) started preparing village site profiles on the 14 villages in the Kaédi Sector and the 12 villages in the Gouraye Sector and undertaken some additional baseline socioeconomic surveys as needed;

(2) developed and refined training programs and training materials for use by the mobile training unit;

(3) conducted in-service training for project staff and field agents to upgrade their technical skills;

(4) established relations and started working with existing village associations in the project zone;

(5) completed plans for the research field trial program jointly with CNRADA;

(6) developed a field-level information system to monitor project activities and provide evaluation data;

(7) established the workplan for the credit program and developed the procedures and forms needed, so that the program is ready to start;

(8) completed plans for an animal traction training program;

(9) established the health monitoring system;

(10) reviewed the accomplishements for the year and established a workplan and budget for the next year;

C. Senegalese Program

(1) conducted in-service training for project staff and field agents to upgrade their technical skills and provide some special short-term training in certain areas;

(2) improved extension activities in Bakel, providing greater technical support through new training programs and materials used by the mobile training unit, and including fish pond and animal traction programs;

(3) given training to approximately 45 perimeter technicians in the Bakel area and organized a functional literacy program;

(4) implemented a joint field demonstration program with ISRA in the Bakel area, and established a farmer-oriented program for the SAED demonstration farm in Bakel; completion of assignment of agronomist/applied research specialist;

(5) developed a field-level information system to monitor project activities and provide evaluation data;

(6) received USAID approval for the site plans and upgraded 200 hectares in Bakel;

(7) received USAID approval for eight of the construction site plans in Bakel and undertaken the construction;

(8) reached general agreement on site plans, village participation, land tenure, and implementation schedule for Podor with participating farmers and SAED; received USAID approval of the plan; and started construction of protective dike and the first small perimeters.

(9) constructed the Podor office;

(10) continued the health surveillance program;

(11) completed installation of pilot communications systems between Saint Louis and Bakel;

(12) completed the planning for the credit and enterprise assistance program, developed procedures compatible with the general GOS program, and started the program in Bakel;

(13) assisted in work on the regional planning, policy, and feasibility studies, and completed the feasibility study for the N'Thiagar perimeter;

(14) reviewed the accomplishments for the year and established a workplan and budget for the next year;

D. Malian Program

(1) prepared village site profiles on the 11 villages in the Kayes Sector and undertaken some additional baseline socioeconomic surveys as needed;

(2) developed and refined training programs and training materials for use by the extension program;

(3) conducted in-service training for project staff and field agents to upgrade their technical skills;

(4) established relations and started working with existing village associations in the project zone;

(5) issued request for proposals and selected a contractor for preparation of the feasibility study of the Kayes-Diboli road;

(6) completed plans and executed an agreement for the reasearch field trial program to be implemented by OVSTM and the research station at Samé;

(7) developed a field-level information system to monitor project activities and provide evaluation data;

(8) completed the planning for the credit program and developed the procedures and forms needed, so that the program is ready to start;

(9) completed plans for an animal traction training program;

(10) established the disease and nutrition monitoring system;

(11) assisted in work on the planning, policy and feasibility studies;

(12) started a functional literacy program with DNAFLA and trained 22 village trainers;

(13) reviewed the accomplishments for the year and established a workplan and budget for the next year.

-- Hiring of the contractor irrigation engineer near the end of the second year. Following his orientation to the project and the project zone, the irrigation engineer will establish workplans for the perimeter construction and rehabilitation programs.

Month 24

-- Holding of the annual implementation review and workplan development seminar with the OMVS and USAID/RBDO. Budget allotments are determined for the next year's program and workplans developed for RBDO and USAID approval.

Year 3

-- Continuation of field implementation.

-- Completion of third year activities according to workplans. By the end of the third year the project will have:

A. OMVS Regional Program

(1) completed the upper valley development plan with an analysis and assessment of possibilities for developing the area, a presentation of a series outlining alternative ways in which development might proceed, and the identification of feasibility studies for the chosen alternatives;

(2) completed the site selections and an interim report for feasibility studies of several perimeters, also completed the Fishing Estuary Study;

(3) continued the policy studies, with the communication of interim recommendations and policy issues to the member states and donors through the OMVS Consultative Committee;

(4) continued regional financial management and programmatic coordination through project annual workplans and budgets and six month reviews;

(5) completed the plan and project proposals for primary health service development in the SRB and submitted it for donor financing through the OMVS Consultative Committee;

(6) provided additional special training to national personnel involved in project implementation; organized two technical conferences and provided technical support to project implementation in the five project zones;

(7) maintained the project implementation monitoring and impact monitoring through the management information system and the monitoring activities of the Unit for Permanent Evaluation and Planning;

(8) reviewed the accomplishments for the year and established a workplan and budget for the next year;

B. Mauritanian Program

(1) worked with all existing village associations and helped form new associations where new construction is planned;

(2) provided additional in-service training for project staff and field agents;

(3) given training to 85 village technicians;

(4) provided extension services to farmers on existing perimeters;

(5) started research field trials jointly with CNRADA at 10 sites;

(6) maintained the field-level project monitoring system;

(7) started the rural credit program and provided financial management and business development assistance to local suppliers;

(8) started the animal traction training program and trained 150 farmers;

(9) constructed new perimeters in the Kaédi and Gouraye Sectors under World Bank financing;

(10) conducted semi-annual health surveys;

(11) completed planning and design for the construction of the feeder roads in the Gouraye Sector, and selected a construction contractor;

(12) assisted in work on the regional planning, policy, and feasibility studies;

(13) reviewed the accomplishments for the year and established a workplan and budget for the next year;

C. Senegalese Program

(1) worked with the farmer associations in the project zone and helped to form new farmer associations in areas where there is new construction;

(2) provided additional in-service training for project staff and field agents, and some special training for agricultural advisors, in fish pond development, extension/research, functional literacy, and social science methodologies;

(3) given training to an additional 52 perimeter technicians in Bakel and to 48 technicians in Podor;

(4) broadened the extension services to include farmers on the extended and new perimeters in Bakel and Podor;

(5) conducted research field trials jointly with ISRA in Bakel and started the program in Podor;

(6) maintained the field-level monitoring system;

(7) completed the perimeter construction program in Bakel;

(8) constructed the irrigation network and other infrastructure for 247 hectares of the Podor perimeter;

(9) conducted animal traction training for 40 farmers in Bakel;

(10) continued the health surveillance activities;

(11) completed and evaluated the results of the pilot satellite telecommunications link between Saint Louis and Bakel;

(12) continued the rural credit and enterprise assistance program in Bakel and started activities in Podor;

(13) assisted in work on the regional planning, policy, and feasibility studies;

(14) reviewed the accomplishments for the year and established a workplan and budget for the next year.

D. Malian Program

(1) worked with all existing village associations;

(2) provided additional in-service training for project staff and field agents;

(3) given training to 40 village technicians;

(4) provided extension services to farmers on existing perimeters;

(5) conducted research field trials jointly with Samé research center at 5 sites;

(6) maintained the field-level project monitoring system;

(7) started the rural credit program and provided financial management and business development assistance to local suppliers;

(8) conducted animal traction training program for 30 farmers;

(9) upgraded perimeters of approximately 60 hectares;

(10) established literacy program in 11 villages;

(11) conducted semi-annual health surveillance;

(12) completed the feasibility study for the construction of National Highway No. 1 from Kayes to the Senegal border at Diboli;

(13) assisted in work on the regional planning, policy, and feasibility studies;

(14) reviewed the accomplishments for the year and established a workplan and budget for the next year.

Month 36

-- Holding of the annual implementation review and workplan development seminar with the OMVS implementing agencies, and USAID's. Budget allotments are determined for the next year's program and workplans developed for RBDO and USAID approval.

Year 4

-- Continuation of field implementation and of project monitoring and reporting.

-- Holding of special mid-project evaluation. An outside project evaluation team is contracted to objectively assess project implementation and recommend changes, if needed.

-- Revision of work plans and activities, if necessary as a result of project evaluation.

-- Completion of fourth year activities according to workplans, so that by the end of the year the project will have:

A. OMVS Regional Program

(1) completed the middle valley feasibility studies and found donor financing for several of the perimeters.

(2) completed several policy studies; National colloquia are held on land tenure and projets de loi are formulated. A regional telecommunications development program is adopted by the member states and donor funding sought;

(3) continued regional financial management and programmatic coordination through project annual workplans and budgets and six-month reviews;

(4) completed the special training programs; organized two additional technical conferences at the regional level; provided continued technical support to project implementation in the five zones;

(5) maintained the project implementation monitoring and impact monitoring through the MIS and monitoring activities of the Unit for Permanent Evaluation and Planning, and planned expansion of system to include new projects financed by other donors;

(6) reviewed the accomplishments for the year and established a workplan and budget for the next year;

B. Mauritanian Program

(1) helped improved the operations of all village associations in the project zone;

(2) completed the in-service training by the extension and training specialist; SONADER training specialist takes over operation of the mobile training units; the social scientists complete their assignments and leave;

(3) given training to an additional 105 village technicians;

(4) enlarged extension services to include farmers on new perimeters and trained 150 farmers in animal traction;

(5) continued research field trials with CNRDA at 10 sites;

(6) completed setting up of the rural credit and business development program, the system is operated by the loan officers in SONADER and FND/BMDC;

(7) functional literacy programs are started in 16 villages;

(8) start of assignment of contract irrigation engineer to direct phase two construction program funded by project;

(9) upgraded perimeters of 190 hectares in Gouraye sector;

(10) completed site plans and started construction of two medium perimeters in Kaédi Sector;

(11) constructed one fish pond in each sector;

(12) given special short-term training to several SONADER officers;

(13) conducted the semi-annual health surveys;

(14) constructed approximately half, or 78 kms, of feeder roads in Gouraye Sector;

(15) completed assistance to regional planning and feasibility studies;

(16) ordered replacement vehicles and other renewable project commodities;

(17) reviewed the accomplishments for the year and established a workplan and budget for the next year;

C. Senegalese Program

(1) helped to improve the operations of all village and farmer associations in the project zones;

(2) completed the in-service training for SAED staff;

(3) trained an additional 48 perimeter technicians in Bakel and 54 in Podor;

(4) enla ged extension service to include new farmers on perimeters in Bakel and Podor;

(5) conducted research field trials jointly with ISRA in Bakel and Podor;

(6) maintained the field-level monitoring system;

(7) provided animal traction training to 40 farmers in Bakel and 66 farmers in Podor;

(8) constructed the irrigation network and other infrastructure for an additional 364 hectares of the Podor perimeter;

(9) continued the health surveillance activiities;

(10) continued the rural credit and business development activities; completion of work of contract credit specialist;

(11) completed the irrigation feasibility studies;

(12) reviewed the accomplishments for the year and established a workplan and budget for the next year;

D. Malian Program

(1) helped improve the operations of all village associations in the project zone;

(2) continued the in-service training by the extension specialist;

(3) given training to an additional 40 village technicians;

(4) enlarged extension services to include farmers on rehabilitated perimeters;

(5) continued research field trials with the Samé station at 5 sites;

(6) completed setting up of the rural credit and business development program, the system is operated by the loan officer, with support from contractor project manager;

(7) continued functional literacy programs in 11 villages;

(8) several OVSTM agents given special short-term training;

(9) provided animal traction training for 86 farmers;

(10) started village visits and orientations for site selection of new perimeters;

(11) constructed two fish ponds in conjunction with perimeter rehabilitation;

(12) completed perimeter rehabilitation and upgrading with 172 additional hectares;

(13) conducted the semi-annual health surveillance;

(14) completed plans for gravity-fed irrigation systems using results of Kayes Development Plan and project evaluation;

(15) completed assistance to regional planning and feasibility studies;

(16) ordered replacement vehicles and other renewable project commodities;

(17) reviewed the accomplishments for the year and established a workplan and budget for the next year.

Month 48

-- Holding of the annual implementation review and workplan development seminar with the OMVS, implementing agencies, and USAID's. Budget allotments are determined for the next year's program and workplans are developed for RBDO and USAID approval.

Phase Three: Implementation and Final Evaluation

Activities during this phase will reflect the plans based on the mid-project evaluation. They include the completion of all construction programs, the completion of feasibility and research studies, the start of implementation of recommendations of the development plan for the upper valley, a coordinated basin-wide monitoring and evaluation system, and an increasing number of growing, economically profitable perimeters that are self-managed and increasingly supplied by non-governmental sources. A major concern will be to consolidate organizational changes within public and private institutions and have individuals within them sufficiently trained to continue the pace of development.

Year 5

-- Continuation of field implementation and project monitoring and reporting. By the end of the fifth year the project will have:

A. OMVS Regional Program

(1) found donor financing for project and feasibility studies recommended by the long-term development plan for the upper valley;

(2) found donor financing for perimeters recommended by the irrigation feasibility studies;

(3) completed policy studies on women, fisherman, pastoralists, and landless farmers and disseminated the reports for discussions among the member states;

(4) continued regional financial management and programmatic coordination through annual workplans and budgets and six-month reviews, and enlarged the activities of the Project Management Unit to include other projects in the basin;

(5) continued operation of the business promotion program by the OMVS;

(6) contination of regional technical conferences sponsored by the OMVS and of regional technical support to development activities in the basin;

(7) continued and enlarged the implementation and impact monitoring system to include other donor projects;

(8) reviewed the accomplishments for the year and established a workplan and budget for the next year;

B. Mauritanian Program

(1) established strong, well-managed village associations with on-going cooperative development, functional literacy, fish pond, animal traction, local food processing, and research demonstration activities coordinated by the associations;

(2) given training to an additional 120 village technicians;

(3) enlarged the extension service to include additional farmers on new perimeters and trained 150 farmers in animal traction;

(4) continued research field demonstrations with CNRADA at 15 sites;

(5) provided rural credit to all eligible farmers and suppliers requesting it;

(6) completed construction of the medium perimeters in the Kaédi Sector;

(7) constructed two new fish ponds;

(8) conducted the semi-annual health surveys;

(9) constructed the remaining half, or 68 kms, of feeder roads in the Gouraye Sector;

(10) completed training and supervision activities of the contract irrigation engineer and extension specialists; they complete their assignments and leave;

(11) reviewed the accomplishments for the year and established a workplan and budget for the next year;

C. Senegalese Program

(1) established strong, well-managed farmer associations with on-going cooperative development, functional literacy, fish pond, animal traction, local food processing, and research demonstration activities coordinated by the associations;

(2) trained an additional 18 perimeter technicians in Bakel and 100 in Podor;

(3) enlarged the extension service to include new farmers in Podor and Bakel, and trained 40 farmers in animal traction in Bakel and 26 in Podor;

(4) continued the research demonstration with ISRA in Podor and Bakel;

(5) maintained the field-level monitoring system;

(6) continued the health surveillance activities;

(7) completed the Podor construction with 408 additional hectares;

(8) continued rural credit and enterprise assistance activities;

(9) reviewed the accomplishments for the year and established a workplan and budget for the next year;

D. Malian Program

(1) established strong well-managed village associations with on-going cooperative development, functional literacy, animal traction, local food processing, and research demonstration activities coordinated by the associations;

(2) given training to an additional 40 village technicians;

(3) enlarged the extension activities to include farmers on new perimeters;

(4) continued research field demonstration with the Samé station at 10 sites;

(5) provided rural credit to all eligible farmers and suppliers requesting it;

(6) constructed several cuvette irrigation projects depending on Kayes Development Plan recommendations above;

(7) constructed one fish pond;

(8) provided animal traction training for 86 farmers;

(9) conducted the semi-annual health surveillance;

(10) trained 18 new functional literacy trainees in 9 villages;

(11) completed training and supervision activities of the contract extension specialist and social scientist; they complete their assignments and leave.

Month 60

-- Holding of the annual implementation review and workplan development seminar with the OMVS, the implementing agencies and the USAID's. Budget allotments are determined for the next year's program and workplans are developed for RBDO and USAID approval.

Year 6

-- Continuation of field implementation and project monitoring and reporting. By the end of the sixth year the project will have:

A. Mauritanian Program

(1) continued to support existing village associations and provided assistance for the creation of new associations;

(2) given training to an additional 139 village technicians;

(3) enlarged the extension service to include farmers on new perimeters and trained 100 farmers in animal traction;

(4) continued research field demonstration with CNRDA at 15 sites;

(5) provided rural credit to all eligible farmers and suppliers requesting it, and provided management and business development assistance to suppliers and local artisans;

(6) expanded the literacy program to include 16 new villages;

(7) constructed two new fish ponds;

(8) conducted the semi-annual health surveys;

(9) reviewed the accomplishments for the year and established the workplan and budget for the next year;

B. Senegalese Program

(1) continued to support farmer associations and provided assistance for the creation of new associations at Podor;

(2) given training to an additional 8 perimeter technicians in Bakel and 126 in Podor; technical assistance team completes work at Podor and departs;

(3) enlarged the extension service to include new farmers in Podor and to train 20 farmers in animal traction in Bakel and 33 in Podor;

(4) continued research field demonstrations at 20 sites in Bakel and Podor;

(5) provided rural credit to eligible farmers and suppliers requesting it, and provided management assistance to cooperatives, artisans, and suppliers;

(6) reviewed construction at Podor, formulated plans for improving operations, for converting the village perimeters into medium perimeters, and for adding additional area;

(7) maintained the field-level monitoring system;

(8) continued the health surveillance program, analyzed the results and formulated plans for future activities;

(9) reviewed the accomplishments for the year and established a workplan and budget for the next year;

C. Malian Progarm

(1) continued to support existing village associations and provided assistance for the creation of new associations;

(2) given training to an additional 33 village technicians;

(3) enlarged the extension service to include farmers on new perimeters;

(4) continued research field demonstrations with the Samé station at 10 sites;

(5) provided rural credit to all eligible farmers and suppliers requesting it, and provided management and business development assistance to suppliers and local artisans;

(6) constructed new cuvette perimeters based on Kayes Development Plan recommendations, above; completed the work of the irrigation engineer who departs;

(7) provided animal traction training for 57 farmers;

(8) constructed one new fish pond;

(9) conducted the semi-annual health surveillance;

(10) continued functional literacy program in 20 villages;

(11) reviewed the accomplishments for the year and established the workplan and budget for the next year.

Month 72

-- Holding the annual implementation review and workplan development seminar with the OMVS and RBDO. Budget allotments are determined for the next year's program and workplans are developed for RBDO and USAID approval. Plans are also made for the second special evaluation to be held early during the seventh year.

Year 7

-- Continuation of field implementation and project monitoring and reporting; By the end of the seventh year the project will have:

A. OMVS Regional Program

(1) been evaluated by a special outside evaluation team; following the recommendations of the evaluation, documentation will have been prepared for follow-on project activities, or plans made for project completion;

(2) established a plan and developed specific project proposals that are being funded to accelerate and integrate development in the upper valley regions;

(3) completed policy studies, held seminars and colloquia on policy issues, and member states have taken steps to implement certain policy changes;

(4) established a regional financial and management and programmatic coordination system that the OMVS is using to support regional and national development projects in the basin;

(5) established a business promotion program that has strengthened and increased private sector involvement in the SRB;

(6) established a project implementation and impact monitoring system for projects in the Senegal River Basin;

(7) improved the dissemination of technical and policy information for basin development among the member states and major donors working in the area;

(8) reviewed the accomplishments for the year and prepared the completion of project reports;

B. Mauritanian Program

(1) been evaluated by a special outside evaluation team; following the recommendations of the evaluation, documentation will have been prepared for follow-on project activities, or plans made for project completion;

(2) continued to support village associations and give assistance to the creation of new associations;

(3) given training to an additional 109 village technicians;

(4) enlarged extension services to include farmers on new perimeters, and trained 50 farmers in animal traction;

(5) continued research field demonstrations with CNRDA at 15 sites;

(6) provided rural credit to all eligible farmers and suppliers, and provided management and business development assistance to suppliers and local artisans;

(7) continued the functional literacy program in the project zones;

(8) conducted health surveys and completed analysis of results;

(9) completed the work of contract project manager/credit specialist; he completes his assignment and leaves;

(10) reviewed the accomplishments for the year and prepared the completion of project report;

C. Senegalese Program

(1) been evaluated by a special outside evaluation team; following the recommendations of the evaluation, documentation will have been prepared for follow-on project activities, or plans made for project completion;

(2) continued to support farmer associations and given assistance to the creation of new associations;

(3) trained an additional 8 perimeter technicians in Bakel and 118 in Podor;

(4) enlarged the extension service to include new farmers and trained 50 farmers in animal traction at Podor;

(5) continued research field demonstrations in Bakel and Podor;

(6) provided rural credit to all eligible farmers and suppliers;

(7) completed the health surveillance activities;

(8) completed the field-level monitoring and social studies;

(9) reviewed the accomplishments of the year by the project and prepared the completion of project report;

D. Malian Program

(1) been evaluated by a special outside evaluation team; following the recommendations of the evaluation, documentation will have been prepared for follow-on project activities, or plans made for project completion;

(2) continued to support village associations and given assistance to the creation of new associations;

(3) given training to an additional 30 village technicians;

(4) enlarged extension services to include farmers on new perimeters;

(5) continued research field demonstrations with the Samé station at 10 sites;

(6) provided rural credit to all eligible farmers and suppliers, and provided management and business development assistance to suppliers and local artisans;

(7) conducted health surveillance and completed analysis of results;

(8) completed the work of contract project manager/credit specialist; he completes his assignment and leaves;

(9) reviewed the accomplishments for the year and prepared the completion of project report.

Month 84

-- Holding of the completion of project review with the OMVS and RBDO. Plans are made for follow-on activities.

## 6.0. MONITORING PLAN

### 6.1. Project Management Information System (MIS)

A Project Management Information System (MIS) will be established under the supervision of the Project Management Unit in the OMVS Directorate of Development and Coordination. This MIS will have two principal functions: (a) implementation monitoring of project inputs and output performance in relation to workplan and budget targets; and (b) impact monitoring of changes in agricultural production, economic, social and health indicators in the project zone. Elements of the second component have already been established by the OMVS in the Unit for Permanent Evaluation and Planning. This unit will be strengthened by the project and enlarged to include the health surveillance activities. The implementation monitoring component is a new element that will be developed for IDP and serve as a model and base for a future system that will cover all donor financed agricultural development activities in the SRB.

#### 6.1.1. Implementation Monitoring

The OMVS Project Management Unit will be responsible for setting up and supervising the implementation of the MIS. With the technical guidance of the management information specialist and in accordance with the approved annual workplans and budgets for the regional and national programs, the Project Management Unit will establish a uniform reporting system for use by project staff at every level. This system will be based on standardized forms and reporting procedures for project planning, coordination and implementation monitoring. A detailed presentation of the system and examples of forms and procedures to be used is found in "Technical Analysis for Project Monitoring", Volume III, Section 3.9.

As a regional project with a decentralized implementation management structure, IDP requires a straightforward and easily understood system for planning and coordination. This system will include project monitoring forms that specify each expected input or output, and give a schedule for implementation and other information related to implementation achievement. The mechanism recommended for planning and programming coordination by the project design team is a form entitled Project Monitoring Systems Planning Document, PM-1. (See Volume III, Section 3.9 for a copy of this form.) The outputs specified on this form will be in line with the global and zone-level implementation plans developed annually and agreed upon during the annual project review and workplan development seminar organized by RBDO and the OMVS.

The PM-1 will include:

-- a description of the project output (or sub-output) to be implemented during the period covered;

-- a preliminary schedule for implementation in the form of specific indicators of progress every three months;

-- a deadline for completion and returning the PM-1 reporting form to the USAID.

The actual form PM-1 will be a refinement of the draft form presented in the technical analysis. Working from this form and the project implementation workplans, the USAID project officers will establish the reporting system with the host country governments and implementing agencies for each technical program and for each project zone. The original form PM-1 will be kept by the USAID project office responsible for the management of that project component.

Attached to each form PM-1 will be a second sheet, form PM-2. There will be a carbon sheet between the two forms, so that when the mission enters the implementation schedule and indicators on the PM-1, the PM-2 will also receive this information. The PM-2 form will be a data collection form covering the actual implementation of the output or sub-output specified. The PM-2 form will be forwarded to the implementing agency or contractor through the host country agency. It is then the responsibility of the implementing agency to see that the PM-2 is completed and submitted to the mission by the reporting deadline indicated on the form. As they are currently designed, the forms PM-1 and PM-2 cover a period of one fiscal year. The period to be monitored for each output will be decided by the USAID's. It appears best, however, to fill out the forms to cover a year. The implementation status reflected in the completed PM-2 forms should allow the project managers to plan each year's output delivery based on actual implementation status of the project components.

A great deal of time and thought must go into the testing and refinement of both the PM-1 and PM-2 forms so that:

-- they provide all information on implementation of specific outputs needed by the missions to monitor the project;

-- they contain only key indicators of implementation of specific outputs;

-- they are easy to understand, simple to fill out, and take minimum time to complete.

In refining both of these forms, every effort should be made not only to create forms that do not overwhelm the reporter, but that help him to organize his own thoughts on implementation status--a form that can indeed be useful to the reporter, as well as to the project monitors. This may sound like a formidable task but experience in similar situations shows that it can be done, if sufficient resources are devoted to design, testing, and refinement. Also, a set of procedures must be developed for encouraging or enforcing reporting, and for keeping track of all forms sent and received.

### 6.1.2. Impact Monitoring

The second component of the MIS will be the monitoring of changes in agricultural production, social, economic and health indicators in the project zones. The OMVS Unit for Permanent Evaluation and Planning has already

established a good system for impact monitoring that will be further strengthened by support from the UNDP and the German Government. The OMVS IDP management unit will assure that the MIS is compatible and integrated with the input monitoring of the Unit for Permanent Evaluation and Planning.

The design team for the IDP noted several areas in which the current input monitoring program of the OMVS is deficient. First, it concentrates heavily on irrigated cultivation and ignores rainfed agriculture, livestock, and fishing. Second, most of the work is at the perimeter rather than the farm level, making it impossible to apply techniques of farm management analysis and farm systems research. Third, the program does not include any disease or nutrition surveillance. Finally, concentration is on technical and economic considerations at the micro-level and excludes concerns like marketing and economic policy.

To remedy these deficiencies, especially in the five project zones, a number of additional efforts will be undertaken by the unit under the IDP. These are:

-- a series of farm/household surveys that will provide data for farm systems research and an evaluation of the impact of the project on the welfare of farmers;

-- continuous impact monitoring which will be coordinated with the implementation monitoring by the IDP management unit;

-- health monitoring through a series of disease and nutrition surveillance surveys to be carried out by national health services in each of the project zones;

-- coordination of the impact monitoring activities with data developed by the planning, policy and feasibility studies of IDP.

These actions are described in greater detail in the "Technical Analysis for Project Monitoring", Volume III, Section 3.9.

## 6.2. DATA COLLECTION

Much of the primary data needed for impact monitoring is already being collected by RDA field agents in their current informal surveys. RDA agents and project implementation team members have access to information currently maintained at village, market supplier, and other levels, as well as information from their own observations. So, it is entirely plausible to expect that the monitoring forms can be properly completed by the RDA in a timely and efficient manner. The RDA will have reporting responsibility, but they can rely on the above-mentioned primary data sources to complete the individual data items on the forms. Every effort should be made by the RDA to obtain actual quantitative data whenever possible and to obtain it from a respresentative cross section of the zone (when applicable), if it is not possible to gather actual data from each village in the zone for the time period established.

In actual practice, the zone may be too large an area at which to report for many of the indicators. Also, analysis of incoming data at the village level may be of greater use in the process of refining project implementation to achieve the desired purposes and goals. The form is designed to collect data for any geographic sub-division which would be of use to project monitors. As the MIS is tested and refined, it may be found useful to develop separate report forms for basic categories of indicators, so that ultimately there may be one form covering agricultural indicators such as: number of hectares irrigated; number of hectares planted by type of crop, and average yield (MT/HA), by type of crop. Another form could cover sales of agriculture inputs; seeds (MT), fertilizers (MT), pumps (number), etc. But, as it is currently designed, the form can be used for any type of indicator.

The completed forms will be sent from the RDA through the national agency to the USAID. The USAID will monitor the sending and receipt of forms from each of the project zones and develop some mechanism for noting deliquent forms, enforcing reporting, and, most importantly, storing and analyzing the data received.

It is anticipated that, as time goes by, and the operation of the system will become familiar to all the agencies involved; they will become comfortable with the system and begin to participate in the analysis of the information provided as well as in providing much of the data. It is hoped that the system can continue beyond the life of the project, and this is still another reason to devote appropriate resources to planning and testing the materials (reporting forms, etc) and procedures which make-up the MIS. It is also critical that the USAID's have specific plans in mind for editing, storage and analysis of incoming information, along with a set of procedures to encourage reporting.

Periodic validation of the incoming information is necessary so that reliability of the data can be gauged and careful reporting encouraged. Specific reporting instructions and procedures must be developed for the reporting forms. The implementation teams in the field should encourage the RDA's to follow instructions and procedures.

### 6.3. MECHANIZATION OF THE M.I.S.

For efficient operation of the project management information system and the analysis of data collected under the health surveillance and policy and planning activities of the project, the purchase of micro-computers for use by the OMVS and national implementing agencies is planned and budgeted in the project. Because of the important need for these computers and for specialized skills to assure that the data collection and analysis systems are properly planned and set up, the project is financing an information system specialist to work for up to two years in the OMVS. This specialist will study the data processing needs of the OMVS and the national implementing agencies and determine the specifications for computers to be purchased under the project. These specifications will be cleared through the Data Management Office of the Directorate for Program and Management Services in AID/ Washington. This process will assure that the micro-computers purchased for the project are best suited for project needs and are compatible with existing systems in the OMVS and the USAID's.

# 7.0. SUMMARY OF TECHNICAL ANALYSES

## 7.1. SUMMARY OF THE ECONOMIC AND FINANCIAL ANALYSIS

### 7.1.1. Introduction

With the construction of the Diama and Manantali dams on the Senegal River, it is possible to envision substantive action to increase and render more stable domestic food production in the OMVS countries. However, these dams will also place a huge debt service burden on the OMVS countries. The macroeconomic analysis of the OMVS countries shows that each country faces critical balance of payments and public financing problems and therefore each will most likely have to reschedule its debts in the future. This project, however, will not influence whether or not the dams will be constructed. The debt servicing problem resulting from loans to build the dams are therefore considered irrelevant to the downstream development proposed by this project except insofar as the project might contribute to this burden. Only recurrent costs of dam operation and maintenance must be covered by downstream developments. These costs are relatively small.

### 7.1.2. The Economic and Financial Analysis of the Project

The table on the following page provides the internal rates of return for each project zone under alternative assumptions concerning net economic benefits.

The "base case" measures benefits only to the irrigated agricultural production generated directly by the project. These rates are relatively low, especially for Podor, and to a lesser extent Kayes. The major reason for the low rate of return at Podor is that construction costs on this large perimeter are approximately $6,496 per net hectare of cultivable land developed for irrigation during the project period. This may be compared with an average construction cost of $3,507/ha on the smaller perimeters. Podor is very important, however, as a pilot medium perimeter development that could have wide replicability. There are few potential sites remaining for small perimeters so that medium perimeter development will become increasingly important in the SRB.

At Kayes, construction costs per hectare are also somewhat higher than elsewhere since they involve building retention dams for swamp cultivation that are not required in the small perimeters irrigated by pump. Furthermore, this investment permits only one crop to be grown each year in contrast to the other perimeters where two crops are possible. Finally, there are fairly high technical assistance costs associated with building up the headquarters of OVSTM in Kayes. These costs should be considerabley reduced, per hectare of cultivable land, as more hectares are brought into cultivation in the future.

Rates of return for the other agricultural components are good. The exception is the feeder road construction in Mauritania, which has an

Table 7A

ECONOMIC RATES OF RETURN

| | Base Case | Including Benefits To Farm Income Security | Including Benefits To Rainfed Agriculture | Including Benefits To Security and Rainfed Agricultur |
|---|---|---|---|---|
| Kayes | 9.64 | 19.20 | 12.36 | 22.34 |
| Bakel | 11.46 | 18.87 | 15.09 | 22.90 |
| Podor | 7.49 | 10.94 | ----- | 10.94 |
| Kaédi | 11.94 | 20.84 | 17.44 | 25.66 |
| Gouraye | 13.33 | 22.47 | 14.41 | 25.25 |

internal rate of return of -6.40 percent. This is because of the high cost of construction and the relatively low volume of freight that will be transported over these roads.

The overall "base case" rate of return for the agricultural production component of the project is 9.21 percent with the road component and 10.60 percent without it. These rates of return are in line with or above rates found in other agricultural projects in the Senegal River Basin.

In the future, it is likely that economic rates of return for irrigated agriculture will increase. Private profitability to the farmer is already high in each project zone. This is true even without subsidies on inputs. Recurrent costs to the government at the end of the project period are also low. Aside from construction, the major costs born by the project are for technical assistance and related commodities and operating expenses. As irrigation becomes more widespread, these costs should decrease rather markedly.

The project will not place a heavy burden on the governments' financial resources. In each country the increased taxes earned indirectly from the project will more than offset the additional costs for extension services. In each country, moreover, the recurrent cost burden even to the RDA's will be very low since the project calls for the elimination of all recurrent subsidies on inputs and the reduction of the density of extension agents to relatively modest levels by the time the project is completed. In addition, the project will result in a net savings in foreign exchange.

The "base case" economic analysis measures production benefits solely in terms of the value of the average level of output likely to be achieved by the project. Perhaps even more important to the farmers and to the governments will be a reduction in risk associated with the shift to irrigated cultivation. The project will directly benefit over 37,000 people on close to 5,000 farms, providing them with higher and more stable income and food supplies. While accurate measurement of these benefits is problematic, a rough quantification of their magnitude demonstrates their importance, as the rates of return in the second column in Table 7A demonstrate.

A second set of benefits not examined in the base case are the improvements in dryland cultivation that will accrue from the introduction of animal traction, seed treatment, and crop protection techniques introduced on the irrigated farms of the project. These benefits, while indirect, are likely to be very important, as the third column in Table 7A demonstrates.

Finally, and perhaps of far greater importance than any of the benefits mentioned above, the project will provide essential data and experience for the extension of irrigation in the Senegal River Basin on a much broader scale in the future. In addition, the capacity of OMVS will be strengthened to take the lead in coordinating planning and instituting policy reform designed to promote greater regional integration. These factors could have a major beneficial impact on the economies of the member states, though the magnitude of those benefits is impossible to measure at this time.

In all, the results of the economic analysis are very favorable. The project will provide a good return on investment. Farmer investments are almost equal to project contributions, and returns to farmer investments are also good. The project has low recurrent costs and introduces irrigation development methodologies that can be replicated throughout the Senegal river basin, which has over 300,000 hectares of potentially irrigable land.

### 7.1.3. Regional Economic Analysis

The economic rationale for the regional nature of OMVS's role in the development of the Senegal River Basin arises from the evolution of the region's economy. The basin historically served two economic functions: it provided water for recession agriculture, fishing and livestock grazing, and it served as an avenue of commerce between the coast and the sudanic economies of the interior. The introduction of irrigation has intensified the agricultural role of the basin, while its commercial role has diminished with the reorientation of national trade away from the river. The introduction of the Diama and Manantali dams will further intensify production and should revitalize commerce in the basin.

The chief factors inhibiting greater regional integration are lack of transportation infrastructure and public policies discouraging the flow of goods and services across national frontiers. These factors distort the efficient allocation of resources in the basin and retard development.

There are numerous measures that should be taken to promote economic integration among the three countries of the region. The following of these measures will be studied in detail by OMVS and the member countries as part of this project:

1. harmonization of producer and consumer prices and input subsidies;

2. liberalization of taxes and controls on the movement of goods and services between the three countries and harmonization of these policies with respect to other countries;

3. elimination of distortions in marketing and input delivery resulting from existing official channels of distribution, and increased emphasis on the private sector to perform these functions;

4. reduction in barriers to the movement of labor and capital between the three countries.

Further measures that need to be taken include:

5. improvement in road and river transportation;

6. coordination of efforts to build up food security stocks;

7. coordination of agricultural research and dissemination of the results;

8. management of the river flows to harmonize the interests of the three countries with respect to irrigated agriculture, river transport, generation of hydroelectrical power, flood control, and fishing;

9. joint planning and distribution of the financial burden to the three countries of the construction, operation, and maintenance of common infrastructure in the region;

10. harmonization of policies related to preventing,controlling, enhancing, or compensating for the effects of development in the basin on the environment and natural resource base.

Although not considered explicicly as part of the project, OMVS will take the lead in studying these further measures with the aim of taking appropriate action as soon as possible.

### 7.1.4. Macroeconomic Analysis

#### 7.1.4.1. Mali

The pattern of economic growth in Mali over the past decade has been one of stagnation. Despite some fluctuations, due primarily to variations in rainfall, GDP per capita has changed little since 1972, a particularly bad year of drought. Agriculture continues to account for close to one-third of total GDP, about evenly divided between cultivation and livestock. Consumption in Mali equals virtually all of GDP, with domestic savings in recent years amounting to less than 5 percent, partly because of a growing public sector deficit. As investment has increased since the early years of drought, the resource gap has grown to close to 20 percent of GDP. Mali is heavily dependent on foreign aid to fill this gap.

Government current expenditures have grown more rapidly than revenues, resulting in an ever growing need to finance recurrent expenditures. This has put an increasing strain on the domestic financial system. Mali has also accumulated a large foreign debt. While the expansion of this debt has been limited in recent years, there has been a marked increase in domestic credit and the money supply, contributing to an inflation rate of almost 15 percent. Novertheless, credit restrictions in Mali have in the last few years been tightened, resulting in a deceleration in the growth of money and credit at the end of the period.

#### 7.1.4.2. Mauritania

Mauritania has faced a macroeconomic crisis in the last half of the 1970's. Fluctuacions in output of both agriculture and mining have been considerable -- the former because of variations in rainfall and flooding and the latter because of fluctuations in world demand and disruptions of railway services by the Polisario.

Consumption as a percentage of GDP was quite modest in the mid-1970's, permitting a substantial contribution of domestic savings to domestic capital formation. The picture changed markedly with the Spanish Sahara War, as public consumption expenditures rose rapidly while private consumption was maintained at a fairly constant level. With the cessation of the war and the implementation of a stabilization program, the situation began to improve.

In 1980, measures were taken to improve the financial performance of the public enterprise sector and to strengthen the banking system. Official retail prices were raised and efforts were made to reduce operating costs. Interest rates were increased and steps were taken to upgrade the management capability of the banks. These policies were continued in 1981 and were accompanied by efforts to maintain a relatively restrictive credit policy.

Mauritania's balance of trade deficit declined steadily over the past few years until 1981, when it deteriorated with stagnation in the iron ore market and an expansion of imports associated with new investment. The improvement in the balance of trade was offset, however, by a deterioration of net services and private transfers. Large official transfers and public capital inflows have offset the current account deficit, however, averting a major balance of payments deficit. Foreign assistance was substantially reduced in 1980, but this was partially compensated for by an increase in long-term capital inflows associated with investment projects. Reflecting internal debt rescheduling, the ratio of debt service payments to exports of goods and nonfactor services declined from 29 percent in 1979 to about 17 percent in 1980. The profile of debt continued to improve in 1981.

7.1.4.3. Senegal

The macroeconomic situation in Senegal has deteriorated markedly in recent years. Gross Domestic Product in constant prices has fluctuated significantly over the past five years but has shown no discernable trend. With population growing at 2.7 percent annually, this has resulted in a significant decline in GDP per capita. Associated with this picture of stagnation has been a rise in consmption and investment and a fall in domestic savings as a percentage of GNP.

The resulting resource gap threatens to create a serious debt service burden for Senegal in future years as well as to contribute to the current financial crisis.

Prices in Senegal have increased more or less in line with world inflation, reflecting Senegal's dependence on the international economy. Government policies to maintain official prices for basic commodities and agricultural inputs have not kept up with world prices, causing a rapid deterioration of the government's financial operations. Furthering the government's financial problems, the public debt service has risen enormously. Finally, sluggish exports, growing imports, and deteriorating current account balances have contributed to a worsening balance of payments situation and a growing liquidity crisis.

As a result of its disintegrating macroeconomic situation, distorted agricultural price structure, and financially troubled parastatals, Senegal embarked in late 1980 on a Reform Plan, which committed the country to a coordinated and comprehensive program with a Structural Adjustment Loan. Initial progress in implementing the plan was good. By 1981, however, it was clear that the extent of structural reforms envisioned went beyond the capabilities of the bureaucracy to implement. The program was consequently revised in 1981 to reduce expectations somewhat and to allow more time for adjustment using an IMF Standby Arrangement. A large part of Senegal's debt was rescheduled, and the consumer price of rice was raised in February 1982, thereby virtually eliminating this subsidy.

### 7.1.5. Farm Budget Analysis

#### 7.1.5.1. Project Benefits to the Farmer

The farm level analysis demonstrates that in almost all cases, the rate of return to the farmers investments in the project perimeters is very high. Moreover, the net benefits to the farmer per person day of labor is well in excess of existing wage rates. Only manually cultivated perimeters in Bakel show a present value of net benefits per person day that is only slightly in excess of the daily wage rate.

Rates of return and net benefits per person day are higher for animal traction than for manual cultivation in nearly all cases. The relatively high profitability of animal traction farms is due partly to high yields resulting from the assumption that these farmers are more advanced and able to combine their inputs more effectively. Thus, part of this return is to management rather than to capital or labor. In Podor, the gain from animal traction is somewhat less than elsewhere because of the greater feed costs.

#### 7.1.5.2. Subsidies and Credit

Both Mauritania and Senegal have national and regional input subsidy and credit policies. With current market prices higher than official producer prices, however, these subsidies do not appear necessary. Mali currently has no input subsidies in the Kayes region since its input distribution agency, SCEAR, ceased operations in 1980.

The only subsidy proposed for the project is for the first pump on small perimeters in Mauritania and Senegal. Farmer groupements will pay for only one half the cost of their first pump as a means of encouraging their participation until they have gained some experience with irrigation. Malian farmers at Kayes, in the irrigated perimeters to be rehabilitated, are already using irrigated techniques so this subsidy is unnecessary. At Podor, the cost of construction of the perimeter and installation of the first pump will not be charged to the farmer, but all subsequent maintenance, operation, and capital recovery costs of the system will be paid for.

Credit will be extended in the form of medium-term loans to farm groupements, repayable over 5 years at a 13 percent nominal (8 percent real) rate of interest, for the purchase of small pumps. Seasonal credit will also be available at 15.5 percent interest, to be repaid at harvest, for the purchase of fertilizer, seeds, and chemicals.

The farm analysis shows that in every case there is a positive cash flow to the farmer during the first year of operation, and in most instances it is quite large. The rent recovery index is less than 0.5 (0.35 is considered quite good to assure debt repayment) in every case except manual cultivation at Bakel. In all cases, farmers should be able to repay their loans without undue difficulty. Furthermore, existing subsidies do not make a very appreciable difference in the two indexes, so that little is gained and much lost from the existing system because of interruptions in input delivery that result from financial problems posed by the subsidies.

## 7.2. SUMMARY SOCIAL ANALYSIS

### 7.2.1. The Sociocultural Context

Access to water is the key to food security in this drought-prone region where subsistence agriculture is the focus of economic activity. The introduction of large and small scale irrigation systems has therefore been welcomed by most inhabitants as an addition to existing economic strategies, including dryland and flood recession farming, pastoralism, crafts, commerce, and wage labor. In view of the ecological change, primarily the 50 percent reduction of annual floods which will occur after the dams are completed, the project addresses the farmers' vital need for increased access to the skills and technology necessary to take advantage of new opportunities and mitigate the disruptive effects of dam construction.

The project is based on reliable evidence that the majority of participants in irrigated schemes, along with many without access to irrigated land, support the objectives and strategies presented in the project paper. The key issue is not whether to expand irrigated agriculture and support services, but rather how to adapt it to the sociocultural contexts and increase the equitable distribution of benefits among the farming population.

The Senegal River Basin is the home of approximately two million people divided into seven major ethnic groups: Wolof, Moor, Tukulor, Soninké, Peul, Kassonké and Malinké. Most live in settled agricultural villages, although Moor and Peul pastoral settlements are scattered throughout the entire basin. Ethnic identity is very strong in the region, although the groups share common social and cultural features such as stratified social systems and the Islamic religion. Pulaar is spoken by the Tukulor and Peul, and each of the other groups has its own language. Many adult males are able to communicate in more than one local language and in most communities there are individuals who speak French, and/or read and write Arabic. In addition to the ethnically homogeneous villages, large commercial-administrative towns such as Podor, Boghé, Kaédi, Matam and Kayes present heterogeneous mixtures of traditional and modern values and lifestyles.

### 7.2.2. Sociocultural and Ecological Conditions in the Project Zones

The project will be implemented in five zones, which, for the purpose of ecosociological analysis, may be classified into three categories: the middle valley; the upper valley downstream, and the upper valley upstream.

| Category | Project Zones (COUNTRY) | Major Ethnic Group(s) |
|---|---|---|
| Middle Valley | PODOR (Senegal) | Tukulor |
| | KAEDI (Mauritania) | Peul |
| Upper Valley Downstream | BAKEL (Senegal) | Soninké |
| | GOURAYE (Mauritania) | |
| Upper Valley Upstream | KAYES (Mali) | Soninké |
| | | Kassonkhé |
| | | Malinké |

The middle valley is characterized by low rainfall (average: 320-420 mm/year), and the annual flooding of low walo* lands on which flood recession agriculture is practiced. Because of the low rainfall, dryland agriculture is of secondary importance in this zone. The walo fields, however, are vital to the economic life of the village, and control over them is a major feature of the hierarchical village social system. The long-range plans to eliminate flooding of these lands will radically alter the local ecology and will change existing social patterns. The largest ethnic group in the middle valley zones is the Tukulor, accounting for about two-thirds of the population, followed by the Peul, the Moors, the Soninké, and the Wolof.

The upper valley zones of Bakel and Gouraye are in an area characterized by moderate rainfall (500-700 mm/year) and a relatively narrow flood plain (approximately 2-8 kilometers) where recession agriculture is practiced. There is substantial variation in the economic importance of flood recession agriculture both between and within villages. Throughout the area, the interior djéri fields receive adequate rainfall and their cultivation is the principal agricultural activity for most of the population.

Approximately 85 percent of the population in the upper valley project zones are Soninké. Other groups represented in significant numbers are the Tukulors, the Moors, and the Peul. An important demographic characteristic of the region is the low number of adult men in Soninké villages. A large proportion of adult men migrate, mostly to France. Some leave for just a few years while others are absent for periods ranging from 10 to 20 years. They maintain strong ties to their villages, however, and send significant amounts of funds to their homes, which are used to purchase agricultural labor, food, buildings, and other goods.

*"Walo" lands -flood plains.

The Kayes region of Mali has a relatively high annual rainfall (700-900 mm). The annual floods, which are vital to the agricultural production in the Mauritanian and Senegalese portions of the river, cover only a narrow strip of land west of the city of Kayes. There is little walo land, and flood recession farming is limited to narrow bands of fondé and falo lands next to the river.

Residential settings in the Basin include large, ancient Tukular and Soninké villages; small, post-drought hamlets inhabited by Peul herdsmen who now combine farming with traditional pastoral activities; and seasonal tented camps of the tribally organized Haratin (Black Maures) and Bidan (White Maures). The urban centers range in population from about 100,000 in Saint Louis (Senegal), to 40,000 in Kayes (Mali), 30,000 in Kaédi (Mauritania), and less than 10,000 in Bakel (Senegal).

The largest villages in the project zones are inhabited by the Soninké and contain from 1500 up to 6000 residents. Tukulor villages are usually smaller -- 400 to 1800 inhabitants. Adjacent to, and scattered between the larger Soninké and Tukulor villages are clusters of smaller, less permanent settlements inhabited by Peul herders. They are grouped into hamlets that rarely exceed 300 residents. Towards the end of the dry season, from March through May, transhumant Peul and Moor families establish temporary residence in the river basin.

The density of the population within 4 to 5 kilometers along both sides of the river is often very high -- 30 to 50 persons per square kilometer. This decreases rapidly as one moves into the interior where there are some small villages but where the population density averages less than 5 persons per square kilometer.

### 7.2.3. Productive Activities

The agricultural cycle and pastoral movements in the SRB follow the annual pattern of rainfall and flooding of the fertile, walo plains. Throughout the basin but particularly in the upper valley, millet cultivation on the rainfed interior (djéri) land is important. Sandy, elevated flood plains land (fondé) are used principally for corn and vegetables. The first generation of irrigated perimeters are located on this land, and the principle crops are rice, corn, and tomatoes. The river banks (falo land) are also cultivated as the water level decreases, and the major crops are beans, corn, and vegetables. The area of greatest agricultural production, the fertile, clay soils (walo) are sown as the flood recedes; sorghum, millet corn and cowpeas are the major crops. The interior rainfed crops (on djéri land) are planted in June and July and harvested in November. Flood recession fields are sown in October-November and harvested four to six months later. Demand for labor is particularly high during the months of October and November when the djéri crops are harvested and the flood recession lands are sown and weeded. The introduction of irrigation adds to the labor demand during this peak period and is an issue which requires serious attention during project implementation.

Herding is a primary activity for about one-fifth of the population but is an important secondary activity for all those who can afford it. About 20 percent of the wealth in the SRB is generated by cattle, sheep, and goat production. Herding is not normally regarded in terms of production, but as an investment savings system. In most areas animals have a higher social value than the equivalent amount of cash invested in other goods. The drought and gradual degradation of grazing land have displaced many nomadic herders, and some have become cultivators. Some previously transhumant groups have established their own settlements along the river, but most have become part of an established agricultural village. Herders who continue the traditional transhumant lifestyle are present along the river during the hot dry season after the flood recession crops have been harvested.

### 7.2.4. Land Tenure

The land tenure system of the SRB is complex and varied in terms of ownership, usufruct, and inheritance rights (See the "Social Analysis", Volume III, Section 2.10., for details). Collective family ownership is the predominant pattern even for the most valuable walo lands. The relatively abundant djéri fields are available to all, although newcomers and low status people may find their fields distant and/or otherwise less desirable than those of the prominent families. Walo fields are scarcer, inherited and subdivided within patrilineages. Ownership is not confined to the nobility although many low status families, are obliged to rent, share-crop, or work on the fields of their patrons.

Villages also have a territoriality that no chief has the right to change. Often village lands are on both sides of the river. Some villages have little or no land, while others have more than they can use and may lend it on negotiated conditions. Inalienability of land is a very strong principle in this practice of group ownership. It operates from the bottom up; no head of family, clan, or village can cede his group's rights, nor can any higher authority expropriate them by any means other than force or fiat.

### 7.2.5. Social Stratification

The major groups in the region are all characterized by a system of stratification that divides people by birth into different castes. There are three major social categories: freeborn, artisan castes, and slaves (including resident ex-slaves), and each category is divided into several sub-groups. Members of these castes often have usufruct rights to some walo lands and all have the right to cultivate djéri land. Ruling families control villages as well as land, and their economic and political status, especially in the middle valley, will be significantly affected as flood recession agriculture is eliminated. The lowest stratum in the traditional system is made up of slaves and ex-slaves originally of ethnically diverse groups who were integrated into their master's families and inherited along with other property.

Although slavery has officially been abolished, it continues in modified form in some areas, and persons of low origin often provide a major portion of the agricultural labor force on lands controlled by land-owning

families. While educational and economic change has altered the economic relations between strata, hierarchical considerations are still important in social affairs, especially marriage.

### 7.2.6. The Social Organization of Production

Agricultural activities and herding may be practiced by any member of the community owning and having access to land (either owned, purchased, or rented). Authority over the common property of the extended family resides with the head or the senior male member. The fundamental production and consumption unit among the Tukulor and sedentary Peul is the household (foyer/gallé). Households are part of extended-family units within which immobile property and the fruits of production are distributed. Among the Soninké, extended-families (Kâ) are collective production and distribution units made up of several matrimonial households sharing a single compound. Land controlled by these groups is farmed collectively and individually. Soninké women often control their own parcels of land. In spite of similar principles of social stratification and the inalienability of village and lineage lands, there is a sharp difference between the Tukulor and Soninké with regard to the organization of agricultural production and other patterns of work. Among the Tukulors, the noble classes do not work the soil and, in general, show a disdain for any form of manual labor. In contrast, the work ethic is strong among all Soninké, regardless of age, sex, or social status. In addition to work performed by the household, there are various forms of exchange labor, share-cropping, and land rental which are closely associated with traditional social ties. Wage labor and new forms of "commercial" leasing of land are, however, now also used throughout the valley.

The women in most river basin societies are involved in both domestic and household production. Domestic activities include food preparation, child care and household maintenance. Tukulor and Peul women contribute some labor to the production of grain crops and have a secondary role in maintaining livestock. They are also involved in vegetable gardening and milk and butter production. Soninké women are cultivators and their self-esteem is derived from their agricultural skills. Soninké women rarely work in men's fields, and the sexual division of labor is complementary; men grow the cereal and grains; women grow the vegetables and spices. Women throughout the river basin often form mutual aid groups and cooperate in agricultural tasks, savings and investments.

As male outmigration from villages has increased, women and children have been forced to play a greater role in agricultural production. The introduction of irrigated agriculture has accelerated this trend and in some villages women provide over 50 percent of the labor on irrigated perimeters. Part V of the Social Analysis, "Outmigration and Rural Development in the Senegal River Basin", discusses these issues in detail.

Cross-cutting the stratified social levels are male and female age groups. While these groups have their own management structure, their internal divisions reflect the hierarchical pattern found in the larger society. They function primarily in ceremonial and ritual contexts and do not, as in other African societies, constitute cooperative work or rotating credit groups. (See Figure 7B: "Ecological-Sociocultural Features").

Fig. 7B

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ECOLOGICAL-SOCIOCULTURAL FEATURES

| SUB-REGION (Project Zone) | MIDDLE VALLEY | UPPER VALLEY DOWNSTREAM | UPPER VALLEY UPSTREAM |
|---|---|---|---|
| Project zones | .Podor (Senegal) Medium-large perimeter (1000 ha +)<br>.Kaédi (Mauritania) village perimeters | .Bakel (Senegal)<br>- Medium Perimeter (town)<br>- Village Perimeters<br>. Gouraye (Mauritania)<br>Village Perimeters. | .Kayes (Mali)<br>- Village Perimeters<br>- Rainfed depressions with development potential. |
| Ecology | .Low Rainfall (320-420 mm/year)<br>.Extensive annual flooding of good agricultural land (walo). | .Moderate Rainfall (500-700 mm/year)<br>.Annual flooding of walo lands- less walo than in Middle Valley | .Moderate to high rainfall (700-1000 mm/year)<br>.Very little flood recession land.<br>.Rainfed depressions (hollandé). |
| Agricultural Activities | .Flood recession cultivation most important<br>.Some river bank (falo) and sandy ridge (Fondé) cultivation<br>.Dryland farming (limited because of low, irregular rainfall. | .Fondé and Falo fields<br>.Dryland (Dieri) farming<br>.Flood recession farming on clay (Hollandé) soils | .Dryland agriculture<br>.Cultivation of rainfed depressions.<br>.Sandy soil (Fondé) and river bank (falo) cultivation<br>.Flood recession agriculture on hollande soils where they exist. |
| Livestock Activities | .Part time, complementary herding of cattle and small ruminants practiced by sedentary populations. Presence of full time pastoral groups (Peuls and Maures) who also take care of animals belonging to farming populations. | | |
| Other Economic Activities | .Public Sector employment (Podor)<br>.Private Sector : wage labor and commerce | .Commerce<br>.Wage labor (migrants to France and urban areas). | .Commerce<br>.Wage labor (migrants to France and urban areas).<br>.Construction specialists |
| Ethnic Groups Principal<br>Others | TUKULOR 65 % +<br>Wolof, Peuls, Maures, Soninké. | SONINKE (85 % +)<br>Tukulors, Maures, Peuls. | SONINKE (60 % +)<br>Kassonké, Mandinke, Bambara, Peuls. |
| Zone Specific project issues | .Podor : - Social Organization of irrigated system<br>- Supply of labor<br>- Land Rights of villagers and townsfolk.<br>.Podor and Kaédi -<br>- Expansion of irrigation to flood recession land<br>- Land tenure and traditional authority systems<br>- Eventual loss of flood recession (walo) land. | .Bakel : social organization of medium sized town perimeter<br>.Bakel & Gouraye<br>- Land tenure<br>- Organizational needs of expanded perimeters<br>- Labor supply<br>- Organization of farming activities to permit effective and efficient exploitation of dryland and flood recession farming. | .Developing an integrated-dryland farming strategy<br>.Adapting irrigated production activities to farmers needs and local market conditions.<br>.Labor supply.<br>.Social organization and land tenure issues on rainfed depressions to be developed. |
| Other Project Issues | .Development of a strategy to integrate pastoral populations into irrigated agriculture projects.<br>.Adapting animal traction techniques to irrigated perimeters.<br>.Developing a general approach to resolving land tenure issues<br>.Increasing farmer participation in all phases of project operations.<br>.Women's participation in development activities and their access and rights to resources. | | |

### 7.2.7. Authority and Leadership at the Village Level

Villages in the basin are relatively autonomous and are cohesive political, social, and economic units. The authority of village leaders and the system of recruitment are strongly rooted in traditional social and cultural norms and reflect principles of social hierarchy and land ownership. Village authorities negotiate for the residents in matters involving national institutions and their representatives. Village political and religious leadership is the prerogative of the free-born families. Participation in the discussion and debate of issues is usually open to heads of extended families of freeborn groups. Important village decisions are made, however, by smaller groups composed of the land-owning, noble families. Casted and ex-slave groups have their own internal organization and leadership. Leaders of the village and social groups within it are able to effectively enforce decisions once they are made.

### 7.2.8. The Administrative-Political Context

In addition to the village institutions, there are national administrative and development-oriented institutions that affect events at the local level. The principal ones are the national agencies responsible for irrigated agriculture: SAED (Senegal), SONADER (Mauritania), and OVSTM (Mali). Each country also has administrative subdivisions with overall responsibility for collecting taxes, adjudicating disputes, and coordinating development activities within a department, arrondissement, and/or cercle. While there is variation in their involvement in local affairs, these institutions are part of the overall political context within which the project will operate, and they will play an important role in the long range effort to implement land reform and other policies. Other agencies involved in specific aspects of the project include: water and forestry services; agriculture and livestock agencies; Ministries of Health and of Public Works; Ministries of Education and Social Services (promotion humaine); agencies that deal with farmers' cooperatives and functional literacy; specialized research and training institutions; and private voluntary organizations. In addition, there are private institutions involved in trade, manufacturing, construction, and transport which are crucial to the implementation and long range success of the project. Details of these institutions and how they will interact with the project at the zone and national levels are provided in the "Social Analysis", Volume III, Section 2.8., the "Institutional Analysis", Volume III, Section 4.0., and the "Private Sector Analysis", Volume III, Section 3.9.

### 7.2.9. Beneficiaries

The introduction and expansion of irrigated agriculture will directly benefit approximately 3,500 households and 37,000 people in the project zones. The entire population of over 80,000 in the project sites, which include 56 villages and two towns, will benefit from improved health surveillance, and the population of 30 villages will benefit directly and indirectly from improved transportation networks. While the irrigated agriculture component directly affects about 40 percent of the population in the project zones, the security of a reliable supply of water is a major contribution to the overall security and well-being of all members of these drought-prone riverine communities.

The key element for assuring an equitable distribution of benefits is a research-negotiation strategy in which villagers themselves will be involved in the recruitment of beneficiaries. (See "Social Analysis", Volume III, Section 2.5. for details). On the one hand, it includes working closely with traditional village authorities during all stages of project planning and implementation. On the other hand, it calls for a sociocultural analysis of village organization as a means of identifying all potential beneficiaries and social groups. This will provide the project staff with the information needed to make operational, on a site by site basis, definitions of "equitable benefit distribution". While this cannot guarantee a completely equitable recruitment of beneficiaries, it is a specific means of avoiding serious violations of this principle by local authorities, and can be used to increase the equity dimension of future interventions.

The proposed sociocultural research-negotiation strategy will also contribute to the solution of several problems identified in previous projects, including establishing access to land on the basis of actual household size and the participation of women. In first generation perimeters, plots were allocated on a one per household basis, and women, even those whose husbands were living out of the village, were excluded from ownership. This project proposes an allocation of plots on expanded perimeters based on the number of agricultural workers in a household and sets specific objectives for increased female participation (See Section 2.5.e. of the "Social Analysis", Volume III, Section 2.0., for details).

Participation in the project is open to all adult members of the community. The actual distribution of irrigated land, however, will be limited to heads of households in villages where the number of households without any access to irrigated plots remains high. As perimeters expand, additional adult members of the same household will be able to claim their own parcels. One of the positive features of the irrigation program to date is that it has made land available to those who previously had no permanent rights to good agricultural land. This allocation of land to the landless and landpoor will continue in the IDP.

As irrigation schemes expand, the value of fondé and other irrigable land increases and owners are sometimes reluctant to make their holdings available for development without compensation. Since the situation is highly variable from village to village, the proposed research-negotiation strategy will be used to deal with specific cases. Villagers, through traditional mechanisms of discussion and conflict resolution, will be encouraged to determine appropriate compensation. While this is a lengthy process, it is preferable to any general solution imposed by fiat by an outside authority. The latter approach has generally failed in the past. Pastoralists will be affected by the project in that some traditional access routes will be partially blocked, and they are subject to fines when their animals damage perimeter dikes and canals. Protective fencing of the perimeters will reduce the incidence of damage. The proposed research on pastoralists will include recommendations to improve their ability to benefit from irrigated agriculture. The increased labor demands of irrigated agriculture may put added pressure on women. The project proposes the introduction of labor-saving milling and hulling machines which will reduce

time and effort spent on these activities. The project will assure women access to training, credit, literacy programs and other activities that will facilitate the introduction of innovations to improve women's access to development benefits.

Host country commitment to the project is strong in all member states. Most of the interventions and ideas contained in the project paper represent those of officials and farmers, whose major problem to date has been one of obtaining the funds necessary for implementation. A major feature of the project is that it addresses an organizational problem that has been a point of conflict between villagers and government agencies and, in the past, has interfered with effective benefit distribution. In brief, RDA's in all countries tend to behave in an authoritarian fashion and have exercised strong control over decisions regarding the organization of perimeter activities, the supply of inputs, price levels and marketing. The proposed strategy follows guidelines, recently established by the RDA's, which call for increased involvement of private sector institutions in the full range of development activities. The IDP will thus concern itself with putting into effect recently articulated but untested policy reforms to limit government involvement.

7.2.10. Participation

Local participation is a key element in all phases of project design, implementation, and evaluation. Farmer involvement in the construction and management of perimeters has been part of the small perimeter program from the start and lessons from these efforts are now being applied to larger perimeters. In this project, the concept of local participation and decision-making is applied to a much wider range of activities, including perimeter planning, recruitment of local personnel for specialized training, higher levels of resource contributions, crop selection, marketing, and evaluation. In addition, it outlines a specific program for gradually increasing the farmers' role in project management, and a gradual reduction in the role of government agents. This is consistant with the desires of both the RDA's and representatives of farmers associations. Details of the strategy for local participation and specific mechanisms for implementing them are addressed in Section 2.6.3.: "Village Profiles, Site Selection and Construction": "An Integrated Approach", of the Social Analysis, Volume III, Section 2.0. The principal methods for achieving a high level of effective local participation are: increased attention to farmer training and a periodic upgrading of technical and managerial skills (see "Training Analysis", Section 3.3., Volume III); research, monitoring, and evaluation of local events and; and regular meetings with farmers in which findings are discussed and decisions are made. It also addresses the issue of women's participation and outlines a series of activities designed to significantly increase their role in the project.

Perhaps the most important aspect of the strategy for increased participation is that it concerns the underlying attitudinal and behavioral changes needed to accomplish the long range objectives for agricultural development in the SRB. In most early programs, incentives for participation were heavily dependent on a high level of RDA support in the form of free pumps, subsidized inputs and frequent canceling of debts. The proposed reorientation focuses on a gradual increase in the skills and responsibilities of the farmers. Increases in production and productivity should be sufficient to motivate farmers even as subsidies are withdrawn.

### 7.2.11. Sociocultural Feasibility/Implementation Constraints

The objectives, activities, and implementation strategy presented in the project paper reflect a substantial consensus of opinion regarding sociocultural and administrative factors that need to be considered in planning river basin and rural development projects.

Although the project design is generally well adapted to current sociocultural and bureaucratic contexts, obstacles exist, many of which can only be resolved during project implementation. The resolution of some issues depends on a modification of regional and national policies, as well as programs, while others can be managed at the project zone leve. Issues such as land tenure often cross-cut levels of social-political organization, and require collaborative research and regional policy reform. Other obstacles include labor supply, diffusion rates for technical innovations, and the ability of national and local bureaucracies to adjust to proposed organizational modifications and local participation.

The land tenure/land reform question is one of the most complex issues both for the immediate and long range development of the SRB. Expropriation of land for large and small perimeters has generally been poorly managed, and no satisfactory plan has yet been developed to deal with acquisition, compensation and distribution of irrigable land. The difficulty of resolving this issue stems from the close relationship between land rights and traditional values which support ownership, usufruct rights, and emerging national land policies. The project outlines a strategy for perimeter land surveys and the registration of holdings. In addition, the project paper proposes a systematic study by legal experts and social scientists to resolve long-range legislative and administrative issues (See the "Social Analysis": Volume III, Section 2.9).

The shortage of agricultural labor is a potentially serious problem in many basin communities and the intensive nature of irrigated agriculture places an added burden on local residents. Although there is no dramatic intervention which can in the immediate future overcome this situation, the project proposes a series of measures to reduce the burden and establish the basis for a long-range solution. They include: improved perimeter engineering design and farmer training; improved integration of irrigated farming into village agricultural and economic systems; small hulling and milling machines to increase labor efficiency and profit on harvested crops; and animal traction. The long range solution to labor shortages also requires policy changes to increase the profitability of farming versus nonfarm alternatives and, a general improvement in agricultural support services and marketing options. The project proposes a series of studies to deal with these issues and make recommendations for economic policy reform.

### 7.2.12. Project Impact: Spread Effects, Sustainability, Replicability

The potential for large scale diffusion of pump irrigation systems independent of outside support is limited by the relatively high costs and the technical details of construction. There are, however, examples

of successful private perimeters.* Groups of farmers interested in developing perimeters are found throughout the basin and some ask only for credit and technical assistance. While private, spontaneous perimeter expansion is likely to be minimal in the immediate future, the project's emphasis on credit institutions and high quality farmer training should accelerate any latent trends towards private expansion. Spread effects beyond the target population will include information, technical and managerial skills, and technologies such as animal traction. This diffusion will occur through informal contacts among farmers and through project-trained extension personnel whose responsibilities extend to villages not designated as project sites. Furthermore, increases in farmers' financial and managerial responsibilities, and greater private sector participation, should make it possible to use scarce outside resources more efficiently; the public cost of perimeter development should decrease if the proposed measures, including policy reform, are effectively implemented.

Benefits will continue beyond the life of the project. Well designed and managed perimeters already have a proven track record and are accepted by the traditional economic and sociocultural system. The technical and organizational problems of perimeters with poor performance records are directly addressed in the implementation programs. The major challenge in sustaining benefits is to develop effective farmer training and institutionalize a high level of private sector participation, primarily in the supply of resources and marketing. The implementation of national price and policy reforms will also be crucial to benefit continuation as well as project replicability.

If the project is able to achieve its stated goals, there is a very high probability that its content and strategy will be replicated throughout the SRB. In many ways, the justification of the project rests on its ability to effectively overcome obstacles which have impeded the efficient use and rapid expansion of irrigated agriculture. Presently, less than 15 percent of the potentially irrigable land has been developed, and only about half of this has been effectively exploited. The OMVS, as well as national programs for research, monitoring, and evaluation which will receive project support, will assure the diffusion of project results to all administrative levels, and will facilitate the rapid replication of methods and innovations that prove successful.

## 7.3 Summary of the Technical Analyses

For the preparation of the project paper for IDP, eight technical feasibility studies were undertaken. These concern: agriculture, irrigation, training, feeder roads, health surveillance, cooperative development, telecommunications, and private sector development. Each analysis focuses on an area of particular importance to the project, but because of the nature of the technical problems of river basin development the studies overlap and are

* Currently, less than four percent of the irrigated land in the SRB operates without government or agro-industry support and many of these perimeters had outside financial assistance to help them get started.

closely interrelated with one another. The regional and national programs of IDP have drawn from and synthesized these analyses to establish the activities and implementation plan proposed for the project. The analyses demonstrate that all interventions proposed for the project are technically sound and feasible.

### 7.3.1. Agriculture

#### 7.3.1.1. Introduction

The major objective of the governments of the three countries involved in IDP is to achieve food self-sufficiency by increasing agricultural and particularly cereals production in the Senegal River Basin. Present yields for rainfed dryland crops (including maize, millet, and sorghum) average one-half ton per hectare, and irrigated rice yields average 4 to 4.5 tons per hectare. In contrast, experimental station trials in the basin have yielded 2.5 to 3.0 tons per hectare for dryland crops and 8 to 10 tons per hectare for rice. Furthermore, during the last two cropping seasons, only 60 percent of the area in the irrigated perimeters was cultivated in the Gouraye and Bakel regions and 25 percent in the Kayes region. Farmers are not realizing the potential benefits of irrigated agriculture, nor of improved dryland farming. A lack of support structures such as credit systems, pump repair and maintenance services, and quality extension services contribute significantly to the production and productivity failures. Introducing irrigation infrastructures can lead to substantial production increases, but only if adequate supply and distribution systems, marketing organizations, credit, and technical services can be set up to support irrigation efforts.

#### 7.3.1.2. Farm-Level Technology and Proposed Interventions

The level of technology practiced by farmers in the project area is generally low. Farmers use animal traction, fertilizers and plant protection techniques sporadically; there have been no sustained and concentrated efforts to upgrade traditional techniques. For example, research institutions have been slow in identifying suitable varieties of seeds for major crops and making recommendations.

Introducing certain "intermediate" crop production technologies with proven track records and requiring minimum risk interventions and limited investment could increase farmers' yields by up to 30 percent. One advantage of these intermediate technologies over high-technology seed-based packages is that they can be adapted easily to a wide range of farming.

The IDP will promote a range of yield-increasing and labor-saving technologies in the project area. These include the following:

1. Irrigation techniques: bed and furrow irrigation (depending on the types of crops);

2. Land preparation techniques: optimum size of plots, furrows, ploughing against the slope, etc.

3. Seed selection, improvement and use;

4. Systematic crop rotation;

5. Optimal fertilization: economical use of fertilizers; composting (using harvest residues); and green manuring rice fields with nitrogen fixing leguminous plants.

6. Preventive crop protection measures (including seed treatment);

7. Improved cultural practices: raising nurseries (rice; vegetables); optimum plant density, planting depth; optimum time of planting; and optimum weeding/interculture (line sowing).

8. Diversification of rural enterprises to include poultry farming and small scale animal husbandry to supplement incomes of farmers and productivity of perimeters.

9. Introduction of animal traction;

10. Introduction of labor-saving equipment, such as the following:

- mechanized weeders for rice cultivation;
- mechanized rice threshers (manual or diesel operated);
- mechanized corn and millet threshers (diesel or manual);
- peanut decorticators;
- animal drawn weeding equipment.

11. Establishment of windbreaks around perimeters using eucalyptus or other suitable species to reduce evaporation and wind damage to crops.

7.3.1.3. Feasibility of Proposed Interventions

The proposed interventions are technically sound and economically feasible. Certain of the interventions, specifically an animal traction program supported by an adequate credit system as well as improved extension services, have a high potential for acceptance by farmers. Animal traction leads to more timely sowing and weeding operations and enables farmers to overcome the constraint of labor shortages at critical periods. It can also promote better tillage and weed control and produce barn-yard manure for fertilizer.

1. Animal Traction

Herding is a traditional occupation in the SRB. According to the latest cattle census taken in 1977, the cattle herd in the three countries totaled 645,000 heads in Mali; 645,485 in Senegal and approximately

500,000 in Mauritania. Since more than three-fourths of the herds go through seasonal transhumance, they are absent from the river regions for long periods during the year.

The herds of that region are primarily of the Zebu-Cobra breed. In regions infested by the sleeping sickness fly, they are crossed with the native N'Dama breed which is trypano-resistant. The Zebu-Cobra is a large animal measuring 1.25 to 1.45 m and weighing between 350 and 450 kg (adult males) and 250 to 350 kg (adult females). It is the work oxen best adapted to the Sahelian environment.* The trypano-resistant hybrid of the Zebu-Cobra and the N'Dama is called "Diakoré", an averaged sized animal which has the strength of the Zebu-Cobra and the resistance of the N'Dama. The Diakoré is much in demand for animal traction and will be used within the context of the IDP to introduce it to the farmers participating in the project. In addition to cattle, horses and donkeys which are abundant in the river valley, particularly in Mauritania, should be considered as other resources for animal traction.

The success of introducing animal traction on a large scale in the SRB would depend a great deal on the infrastructure available to support it. Therefore, an animal health care system should be incorporated into the animal traction program of the IDP with local agencies already working in the area. The health system should include regular internal and external disinfestation; immunizations against bovine plague, rinder pest and hoof and mouth disease as well as veterinary follow-up of diseases and accidents they may handicap the animals or threaten their lives. The Agricultural Analysis, Volume III, Section 3.1. presents the animal traction training program of IDP, including the establishment of training centers, staffing the centers, training of blacksmiths, and costs for the program.

2. Rice

The most commonly used rice varieties are:

- Jaya: A 130 to 140 days long-grain variety with good yield and organoleptic qualities. It has no serious disease problems.

- I King-Pao: A short duration (110-120 days) short grain variety with lesser organoleptic quality and vulnerable to piriculariosis and helmintosporiasis but resistant to drought.

- KSS short cycle, short grain variety believed to have low resistance to fungus diseases and insects.

At present, WARDA is carrying out research to identify new and temperature resistant varieties that would have high ratooning and resistance to stem borers. Their on-farm trials have given the following results:

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* "Mémento de l'Agronomie - Techniques Rurales en Afrique", Ministère de la Coopération, France.

| Variety | Cycle/days | Yields Kg/ha |
|---|---|---|
| SRIMALAYSIS | 110 | 7/84 |
| IR 1820-210-3 | 125 | 7220 |
| IR 2823-399-6-6 | 103 | 6380 |
| KN-1 - 351 | 130 | 8890 |
| IR 3941-86-2 | 122 | 10630 |
| KH-998 | 124 | 7663 |
| FM-109 | 119 | 7340 |
| BG-90-2 | 122 | 5980 |
| IR 2061-628-1-6-4-3 | 105 | 6410 |
| C-168 | 121 | 6930 |
| SORACHI | 116 | 4912 |
| TATSUMI MOCHI | 116 | 4378 |

### 3. Corn

A corn market is beginning to develop in the SRB, as consumption of corn served either fresh or as farina or semolina continues to increase. While corn yields have been excellent in light of the level of cropping techniques, the future of this crop in the SRB region will depend on the rapid introduction of high yielding varieties such as composites and hybrids. A climatic constraint of corn is that it does not tolerate temperatures of over 35 degrees centigrade at flowering time. However, corn does have certain advantages over rice in terms of its low labor and limited water requirements. Up to now, the only high yield potential of rice puts it ahead of corn. For the future, however, research is likely to lead to the identification of high yielding varieties well adapted to local conditions.

Crops can be cultivated in both rainy and off seasons, but those grown in the latter period will achieve better results. During the rainy season, crops of 75 to 90 days should be sowed from June 15 to July 1 and harvested from September 15-30. During the off season, crops of 120 to 140 days should be sowed from October 15 to November 15 and harvested from February 15 to March 15. November 15 should be considered the deadline for planting.

The varieties include C.J. Bouaké; Early thai composite, yielding 5.4 tons per hectare; Penjalinen at 5 tons per hectare; Kisan; Hunis; SC1-2-3; Diara; and A-51-53, and 53-54, at 4.3. tons per hectare.

The main hybrid varieties tested by ISRA include HBV1 and HBV2. SAED is planning to introduce these hybrids following training in hybrid see production.

### 4. Sorghum

Sorghum has traditionally been grown in the Fleuve Region as a recessive flood crop in the middle and lower valley and as a dryland crop in the upper valley. It is widely consumed in the area.

Low yielding local varieties are remarkably well adapted to low and high temperatures, heavy soils, and drought. Compared to corn, sorghum allows a 20 percent water savings at similar production levels. Varieties introduced with higher yield potential are more vulnerable to temperature and drought; they do not have the same taste quality as local varieties. Sorghum is vulnerable to attacks by birds (especially off-season) and has relative immunity to soil salinity (tolerance levels 5 mmhos/cm).

This crop grows in all seasons, with particularly good potential for high yields in the off season from October-February, in spite of exposure to birds. During the rainy season, seeding should be done at the beginning of June, and the crop should be harvested from September-October. During the cold period of the off season, seeding should occur at the beginning of October and harvesting from February to March. During the warm period of this season, seeding should be in mid-February and harvesting from May to June.

Varieties recommended by ISRA include:

- 90-110 days cycle: Hybrid 6 12 A x 68 29
  612 A x 73208
  lines 73 0 185

- 110--115 days Cycle: Line 73-13 (disseminated in Bakel).

5. Niébé (Cowpeas)

Niébé or cowpeas is a leguminous plant and a staple in the diet of most people in the SRB. The beans and leaves are eaten by people and the stems, after harvesting, are used as fodder.

Niébé is resistent to drought and high temperatures. It can be cultivated during the rainy as well as during the off-season; particularly local varieties, which are not very sensitive to photoperiodism. Rainy season crop should be planted the first fortnight in July and harvested from September 15-October 15. The off-season crop should be planted from October 15 to November 15 and harvested from January to February.

Local varieties include crops of 90 to 100 day duration, while improved varieties are of less than 90 day duration. Varieties TV x 1841 OIE, TV x 1576 OIE and TV x 7-5 have achieved good results at the Guédé station in Senegal.

6. Vegetables

Tomatoes

In 1980-81, canned tomatoes accounted for 30 percent of national consumption. Two processing plants for tomato paste have been established in the Fleuve Region of Senegal, one at Savogne (SOCAS) and one at Dagana (SNTI). These plants are operating at only 50 percent of capacity due to the low level of tomato production.

Bacterial proliferation and other diseases prohibit the cultivation of this crop during the rainy season with existing varieties. Temperatures over 35 degrees centigrade inhibit pollination, and the dry north-east winds aggravate this situation further.

Seeds should be planted in nursery in September. Transplanting should take place in October, and harvesting from January to the end of April.

Recommended varieties include Roma V.F. and Super Roma for processing and Indiana for fresh tomato consumption.

Onions

Senegal consumes annually nearly 50,000 tons of onions of which some 25,000 tons are imported. Current production in the Fleuve region is about 20,000 tons per year.

Sowing and transplanting can be done from October to January, while harvesting should be from March to June. Immature bulbs can be planted in October for a January-February harvest. We suggested that nursery seedings be cultivated from the end of October to early December and harvested in April.

The Galnit Purple and Golden Creole varieties have been selected for good taste and preservation quality.

Okra

This vegetable is grown for local consumption and for neighboring markets after drying.

Rainy season okra can be sowed in July and harvested beginning at the end of September, with continuous picking until the end of November. Okra can also be grown during the dry season under irrigation.

Recommended early varieties include: USO (from CDH/ISRA), clemson spineless, green velvet, long green, and long foded.

Sweet Potatoes

Sweet potatoes are grown for local marketing and can also be sun dried in slices, transported, and sold in neighboring markets.

Sweet potatoes can only be grown in the rainy season only in Bakel and Kayes because of high water requirements. Planting should take place from June-July and harvesting from October-November.

Recommended varieties include Ndargu (from CHD/ISRA and local varieties.

### 7.3.1.4. Agricultural Research

#### 1. Linking the Agricultural Research II Project and the IDP

Agricultural research results that will be applied by the IDP will be produced under a separate USAID financed project, Agricultural Research II (Project No. 625-0957). The goal of coordinating these two projects is to encourage the IDP staff and research personnel to work together to integrate research and development efforts within each country and among the three countries.

#### 2. Agricultural Research Agencies in the Senegal River Basin

Agricultural research in the Senegal River Basin is conducted by the following organizations:

- In Senegal:
  - ISRA (Senegalese Institute of Agricultural Research) in three stations, at Richard Toll and Fanaye and Guede;
  - WARDA (West African Rice Development Association) at 2 stations, at Richard Toll and Fanaye.
- In Mauritania - CNRADA (National Agricultural Research and Development Center) at Kaédi.
- In Mali - I.E.R. (Institute of Rural Economy) at the Samé station near Kayes.

#### 3. Regional Problem in the Integration of Research Efforts

Agricultural research in the SRB has been characterized by a failure to coordinate research efforts, a lack of clearcut procedures for selecting research topics, a weak management structure, and an isolation from actual farm conditions. Each of these deficiencies is examined in the Agricultural Analysis, Volume III, Section 3.1.

#### 4. The Research Program of the OMVS/USAID Agricultural Research II Project

The current research program adopted by the OMVS is designed to achieve four main objectives:

1. Selection and development of farming systems appropriate to each region of the basin; these systems will be used to intensify the production of cereals and fodder and increase economic returns from irrigated agriculture.

2. Introduction of selected varieties of seeds and farming techniques to improve farm productivity and stimulate crop diversification.

3. Improvement of irrigation and farming techniques in order to achieve a combination of human, animal, and mechanical labor systems necessary to speed up rural development.

4. Development of techniques for integrating animal husbandry with irrigated agricultural production.

A. Senegal

The research program implemented at the Fanaye Station will focus on the development and upgrading of farming or production systems, which means identifying and evaluating technical, social and economic problems in the present production systems; testing technological innovations on site for technical soundness, economical profitability and social acceptability; and providing technical assistance in desseminating the upgraded technological packages.

B. Mauritania

The program includes on farm trials to increase cereals production; experiments focused on correlations between soils, irrigation, and plant growth; experiments in the integration of new crop varieties and farming practices adapted to local conditions; supervision of technological diffusion among farmers; and the development of a system for the selection of research projects.

C. Mali

The research program in Mali is similar to that in Mauritania, although more limited. It will also be focused on rainfed crops such as sorghum, millet, cowpeas and certain vegetables. The focus will be on adaptive research on cereals and grain legumes including varietal testing and on farm trials of technological package.

5. The Research Program of the Integrated Development Project

Farming Techniques and Irrigation will include the following:

- Experiments in the use of animal traction on heavy clay soils;

- Irrigated rice farming techniques for relatively porous soils: semi-periment strips of water;

- Crop rotation;

- Integration of farming and animal husbandry using organic manure, planting of fodder crops and recyclage of harvest wastes.

Fertilization Techniques will involve the use of locally produced tricalcium phosphate to supply phosphates; a comparative evaluation of

superphosphate inputs and development of phosphate-use techniques tailored to the physical and chemical properties of tricalcium phosphate; and the continuation of fertilizer experiments on rice (WARDA-FANAYE) and other cereals to reduce chemical fertilizing to a minimum with resultant savings in foreign exchange.

Crops will be introduced as follows:

A. Maize and Sorghum - Varieties adapted to river basin climate and soils will be introduced, and work on the development of palatable, high yielding hybrids will continue.

B. Tomatoes - Varieties will be tested for high yields and disease and insect resistance to lower the cost of plant protection. These varieties will be introduced for cultivation during the rainy season.

C. Cowpeas - Research will be done on high yielding varieties resistant to insects (Aphids, borers).

D. Onions - High-yield, mild tasting varieties will be selected and storage techniques will be developed. Onion production will take place during the rainy season to supply the November to March market.

E. Sweet Potatoes - Varieties will be tested and planted; storage techniques will be developed.

### 7.3.2. Irrigation

#### 7.3.2.1. Introduction

The Senegal River is the second largest river in West Africa. It is over 1,800 kilometers long and drains a watershed of more than 300,000 km2. forty-five percent of the river's length forms the border between the countries of Mauritania and Senegal. fifty-five percent of its drainage area is in Mali. About 50 percent of the water in the Senegal River originates in Guinea, outside the boundaries of the OMVS member states (Gannett et al. 1979). Several tributaries empty into the Senegal River, including the Bakoye, Bafing, and Falémé Rivers.

The Senegal River Basin is typically subdivided into three regions: the Delta, the middle valley, and the upper valley. The Delta begins at a poorly defined point between Mbagam and N'Thiagar and ends at Saint Louis, where the river enters the Atlantic Ocean. The middle valley begins at Bakel, Senegal, where the shape of the valley changes from a narrow, well-defined channel with steep banks to a flatter profile characterized by alluvial flood plains 10 to 25 km wide. The middle valley ends where the extremely flat Delta begins, about 100 km from the ocean at Richard Toll. The upper valley includes all the basin upstream from Bakel and thus lies mainly in the country of Mali. Senegal and Mauritania share opposite sides of the middle valley and Delta regions.

The Senegal River Basin has a very large, and so far mostly untapped, irrigation potential. With the completion of the upstream reservoir

at Manantali and the low barrage near the mouth of the river at Diama to prevent salt water intrusion, there will be an estimated 300,000 hectares of irrigable land in the Senegal River Valley. Both of these dams are now under construction and scheduled to be completed in 1987 (Diama) and 1988 (Manantali). Currently, there are about 28,000 hectares under irrigation in the valley. This is only about half of the irrigation target of 60,000 hectares set for 1982 by the OMVS and member states in 1974. The major thrust of irrigation development so far has been on large irrigation schemes, or "perimeters" as they are known locally. These large perimeters have been plagued by high costs, poor yields, and low farmer participation, and the national development agencies charged with developing them have suffered from growing pains, mismanagement, and financial difficulties that have hindered their effectiveness.

Out of this experience has come a growing knowledge of the requirements for successful irrigation development in the Senegal River Basin. Each of the countries has acknowledged the inadequacies of the earlier top-down strategies and is seeking ways of reducing the dominant role of the Regional Development Agencies (RDA's) and increasing farmer participation and motivation. The positive experience of small perimeters with lower per hectare development costs and higher average yields have demonstrated the advantages of irrigated agriculture. The experience of the small perimeters also suggests that an agricultural strategy based on greater farmer participation in control and management of irrigation schemes is likely to produce much better results than highly centralized top-down approaches of the past.

7.3.2.2. The Proposed Sites

The project includes irrigated perimeter development in five sectors: Kaédi and Gouraye, in Mauritania; Bakel and Podor, in Senegal; and Kayes in Mali. There are many existing perimeters in these zones, so that irrigation is not a new farming system to many villages. Irrigation has already been tested and a strong demand for expansion has been voiced in many areas. At the same time there is a need to upgrade and improve operation of existing perimeters to improve their productivity and assure their economic viability.

The project will finance the upgrading of approximately 703 hectares of existing perimeters and the construction of 2,120 hectares of new small village perimeters, 1,907 hectares of medium-sized perimeters, and 933 hectares of gravity-fed irrigation. Existing perimeters and those to be upgraded and constructed in each sector are presented in Volume III, Section 3.2. Additional information on characteristics of each site was developed by the project design team, but is not presented in this report. This information is on file and will be used in the development of individual site plans, which USAID will have to approve before funds can be released for rehabilitation or construction.

The three Regional Development Agencies in the project zones identified sites for possible assistance/intervention by the IDP. All of these sites were visited by members of the project design team and appraised according to pre-established site selection criteria. In general, these sites can be categorized either as being appropriate for development as small perimeters or requiring larger-scale development.

The selection of most small perimeter sites initially stemmed from a request by interested farmers. Some are existing perimeters in need of improvement or desiring expansion. Some have been evaluated by RDA technical personnel. All sites will be closely reexamined by the RDA's with the IDP technical assistants to develop optimum designs for the systems. Final selection for financing by the IDP will first of all depend on the level of farmer interest and participation.

The principal technical criteria for selection was regular topography (slopes, and microrelief), suitable pedology (permeability and salinazation), adequate accessibility (roadways and watercourses), acceptable hydrology (water supply, drainage and flooding) and favorable sociology (land tenure, labor and conflicts).

### 7.3.2.3. Characteristics of the Proposed Irrigation Systems

The majority of the systems will use water pumped directly from the river for irrigation. In sites where it is feasible, impounded water from adjacent small watersheds will be pumped or fed by gravity to the irrigated area, or a combination of these methods will be used. Each perimeter or site design will be synthesized and analyzed as a complete system, rather than viewed as separate and unrelated components. All the pertinent components between the water source and drainage outlet and the interrelationships of these components should be considered. Analysis of efficiencies and cost effectiveness of components, such as pumps, engines channels, and water management and distribution techniques, will be related to the system as a whole.

#### 1. Pumping Units

Diesel driven centrifugal pumps will be used for lifting water from the river to small perimeters, unless a reliable source of electricity is available. Experience to date has shown that small, low-speed, air cooled manual start engines such as the two cylinder Lister HR-2 are the most suitable. This unit is long lasting, easy to maintain, can be repaired in the project countries, is efficient, and light enough to be moved by six to eight men when mounted with the pump on a steel skid. Spare parts are available on the local market. Pumps and engines should be standarized to the greatest degree possible, allowing for a certain flexibility to accomodate variations in lift.

One pump of this size has the capacity to irrigate about 20 hectares, and more units can be added for larger perimeters. This system is more practical than the larger pumps because of the security provided by additional units, the minimization of spare parts and the reduction maintenance problems.

Pumps will be chosen to match the engine speed, power, and head requirements, with attention to efficiency, durability, and maintainability. Because the river level fluctuates considerably, it is particularly important to select and match units with acceptable characteristics over the entire range.

Pump/engine units may be mounted on the river bank or adequate floating rafts, whichever is more desireable bank-mounted units are considerably cheaper, but must be moved up and down to accomodate the rise and fall of river stages. From an economic and operational standpoint, both

systems have been used successfully, but could be improved.

Suction for the raft-mounted pumps occurs through a permanently mounted steel flange pipe with appropriate screen and foot valve. Sunction pipes on the bank-mounted pumps must be partially flexible to accomodate movement and variations in bank slope. A disadvantage of the bank-mounted units is that they have a tendency to leak air in the flexible suction pipe joints. Care must be taken to assure the vertical lift and friction loss in the suction pipe and flood valve do not exceed required net positive suction head of the pump.

Discharge pipes between pump outlets and the distribution system are currently made up of heavy PVC pipe with flexible quick-couples. Bolted steel flange pipe with one or two flexible joints and elbows should be considered as an option for discharge and suction pipes. Pipes lines should be sized to assure that friction loss and velocities are not excessive.

Pumping units for the medium-sized perimeters will be considerably larger stationary units, either diesel or electric driven. Electrified units may draw power from a national grid if one is available and reliable--or from a generating plant especially built for one or more perimeters. The units will include necessary housing, sumps and inlets adequately protected from floods, erosion, and sedimentation. In determining the optimum size of the units, the efficiency and economy of scale of the larger units should be weighed against the security and control of a larger number of smaller units. These issues will be addressed in the project design phase.

2. Irrigation Blocks

Both the small and medium perimeters will be divided into irrigation blocks of suitable size and shape for irrigation rotation and scheduling. Experience with existing perimeters indicates that square blocks of approximately three hectares are adequate for the type of farming and land tenure and cultivation being used. Flooding of the level basin is considered the most appropriate method of distribution within the blocks in light of the small land holding and labor-intensive practices.

For the small perimeters, land leveling and grading will normally be limited to manual preparation of individual basins. For the medium perimeters, some land leveling with power equipment may be feasible and will be necessary.

3. Water Distribution Systems:

Each perimeter will include an appropriate conveyance and distribution system for delivering the required quantities of water to respective blocks at scheduled times. Possible considerations for conveyance are compacted and properly graded earth channels, surface channels with appropriate lining, low-pressure buried pipe with controlled riser outlets for each block, or any combination of the above. In choosing systems for small perimeters, the emphasis should be on using labor-intensive construction and maintenance techniques with locally available materials.

Any recommendations for conveyance systems other than compacted earth channels should be based on hard proven evidence of cost effectiveness in terms of saved water, maintenance, or durability.

4. Water Control and Measurement

In large perimeters, where more than one block is irrigated at a time, systems will contain adequate structures for controlling and measuring water to each block, water appropriate flumes, wiers, or in-line meters. In systems with branched flows, the branching structures will be hydraulically designed to give proportional flows, or the flow in each branch can be regulated and measured.

Each block will have an adequately controlled turnout from the irrigation channel, with properly designed stilling basins and aprons where needed. Check structures will be placed at necessary locations for maintaining required water surface elevations in distribution channels. Adequate energy dissipators and stilling will be basin installed on necessary drop structures and pump discharge outlets. For small perimeters where one pump is used to irrigated the entire area, the pump should run continuously at optimum speed to ensure that it operates at top efficiency. In doing so, the discharge of the pump will be constant at a certain water level in the river and cannot be easily altered to match the water demand of a specific crop. Irrigation should be carefully scheduled so that one block is irrigated at a time to ensure that the maximum discharge of the pump is utilized in one block. This will eliminate the need to use more sophisticated water measuring devices and help keep construction costs low. The proposed scheduling for water application on a small perimeter is presented in Appendix A of the Irrigation Analysis.

5. System Operation and Water Scheduling:

Each system design will include a complete plan for operation and water scheduling, including required depths (or inflow times) and frequencies for the specific soils and crops particular to the site and respective blocks. The operation plan will account for seasonal and crop growth stage variations in water requirement as well as rainfall.

6. Flood Control and Drainage:

A complete assessment of flood control and drainage requirements will be made for each site. Perimeter designs will include necessary dikes, channelization inside and outside the perimeter, gravity or pumped drainage structures, and subsurface drains if required. Many small perimeters will require little or no flood control and drainage, and site selection will screen out areas requiring extensive work. Some flood control and drainage works will be required on most of the medium perimeters if full economic benefits are to be gained and adequate security provided. However, areas requiring extensive works will be avoided.

7.3.2.4. Program for Upgrading Existing Small Perimeters

The project design team examined existing small perimeters in the Bakel, Gouraye, and Kayes sectors in order to estimate the work and

cost requirements for bringing the entire developed area of the perimeter into production. Perimeters in the Kaédi sector were not included, as they are being rehabilitated in a separate project funded by the FED. The following items were examined:

- irrigable surfaces;
- condition of the main canals: slope, section, seepage losses, elevation differences, condition of banks;
- condition of the concrete works: basins, gates, intakes, turnouts, etc.;
- condition of the secondary and tertiary canals;
- need for plot leveling;
- condition of the drainage system and the drain canals;
- protection against runoff and drainage of rain water;
- condition of the pumping system: engine, hourly consumption of fuel and oil floats, platform, discharge piping, intake valve, stilling basin;
- pumping rates and total volumes;
- supply and stocking of motor fuel.

Using these items, the team developed estimates of the work required to upgrade small perimeters in the three sectors. The analysis was undertaken at the feasibility level, and firm costs have been established for the overall rehabilitation to be carried out in each sector. Before any rehabilitation begins, a final design study for each individual perimeter should be prepared. This rehabilitation design site plan should be prepared under contract through the RDA and technical assistant irrigation engineer in each sector. The proposed program for upgrading perimeters includes 703 hectares and will cost the project approximately $590 per hectare. Farmers will purchase replacement equipment costing $300 per hectare with loans provided by the credit program, and they will also contribute labor for manual construction works.

#### 7.3.2.5. Construction of Small Perimeters

As outlined earlier, the project will include the construction of 23 new perimeters in the Bakel sector, 41 in the Gouraye sector, and 38 in the Kaédi sector. Because of the large number of sites involved and the similarity of construction design in most sites, the design team has developed a model of a small perimeter to use for cost estimations. While there are variations to this model in all sectors, the design team feels that it is representative of the perimeter areas, topography, irrigation systems, and construction costs. The development of this model and the costs

derived from it are also consistent with the presentation of the irrigation master plans prepared by GERSAR 1/ and the small perimeter project identification document prepared for the Kaédi and Gouraye sectors by the FAO 2/.

The general model for a small perimeter involves an irrigation scheme located on the banks of the river with a group of sixty farmers, providing each with approximately one quarter of a hectare. The perimeter covers a 20 hectare area and has a farmed (net) area of 15 hectares. The perimeter is served by a motor pump, a network of canals, a system for drainage, dikes for protection against river flooding, as necessary.

In order to derive cost estimates from the application of this model, the design team used data from the agricultural analysis on cropping patterns, soil textures, rainfall and evapotranspiration. The review of agricultural data led to refinements of the model for each zone. Water requirements for the Bakel and Gouraye zones are identical, although allocation of land to different types of cultivation changes water requirements. Thus, the following three models were developed.

1. The Bakel Model: 7.5 hectares of rice and 7.5 hectares of mixed crops.

2. The Gouraye Model: 3 hectares of rice and 12 hectares of mixed crops.

3. The Kaédi Model: 10.5 hectares of rice and 4.5 hectares of mixed crops.

With these refined models costs were calculated for pumping, and for infrastructure development including land preparation, drainage and related developments. For the perimeters in Bakel the estimated cost is $1,840 per geographic hectare developed. In Mauritania, the cost is $2,000 for manually constructed perimeters and $2,870 where earthmoving equipment is required.

7.3.2.6. Construction of Medium Perimeters

The project will include the construction of medium perimeters at Podor and Collenga in Senegal, and at two sites in the Kaoedi zone in Mauritania. For these sites, the design team used existing and ongoing studies, plus additional field work to develop construction plans and costs. A plan was developed for each site. The plans were carefully developed and reviewed since they will be test sites for new design and implementation concepts based on the success of farmer controlled small perimeters in the SRB.

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1/ "Schema Directeur des Amenagements Hydro-Agricoles de la Valee du Sénégal Rive Droite en Mauritanie, "GERSAR, for SONADER, June 1980. "Etudes de Réhabilitation, de Factibilite et d'Avant Projets Détaillés de Périmètres d'Irrigation sur la Rive Gauche du Fleuve Sénégal," GERSAR, for SAED, 1981.

2/ "Projet de Périmètres Irrigués Villageois, Rapport de Préparation," FAO/World Bank Cooperative Programme, Report No. 41/81 MAU.5, December 3, 1981.

1. Podor

Podor is one of vast silting basins situated in the middle valley of the Senegal River 267 kilometers upstream from Saint Louis. It is surrounded by a series of riparian strips. Its boundaries are the Senegal River, Doué Creek, town of Podor, and a forest reserve. Every year the site is partially flooded through an opening created by the Moussa Wagnari Creek. The extent of flooding depends on the Senegal River's own flood levels. The annual cycles of flood and ebb have left substantial deposits of clayish soil in layers at the bottom of the basin.

Various programs have been proposed over the past few years for development of the basin. For the IDP the design team studied the GERSAR "Master Plan for Improvement," dated March 1981, and the manuscript addendum to the GERSAR Master Plan entitled, "The Podor Pilot Scheme, " dated March 1982. The team also did substantial field work and gathered data on site and from SAED.

The project will gradually bring the targeted 1,063 hectares into production over five years. Development will start with the small village perimeters in the southern part of the basin, and then develop the larger tracts on the western side next to the town of Podor. In this way, two-thirds of the irrigable land within the dike will be developed at a rate corresponding to the ability of farmers to effectively prepare and exploit the land. The remaining land will be put into production in later years. This program is based on discussions with farmers and farmer associations in the area. A particular strength of the design is that it allows for small perimeters to be developed first by villages along the Doué Creek who hold traditional land rights to the area. This should help to minimize tensions resulting from the transfer of part of this area for development by Podor villagers.

The perimeter will be built under contract, with construction monitoring provided by SAED and USAID/Senegal. Initially SAED will be responsible for flood protection, water supply, drainage, and other overall functions of the perimeter. Farmer associations will be fully responsible for operation and maintenance within the autonomous irrigated units of approximately 15 hectares each. As these associations grow and obtain greater organizational and management capabilities, they will take on more responsibilities for operation and maintenance of the overall system, with a corresponding reduction in the role of SAED.

USAID funding for construction of each phase of perimeter construction will be contingent upon the organization of farmer associations and the execution of satisfactory protocols by these groups with SAED spelling out mutual responsibilities for the system. The payments to be made to SAED by farmers should cover both the fixed costs for maintenance, administration, and the constitution of a fund for equipment renewal, as well as, variable costs dependent on water use and on energy costs for pumping.

2. Collenga

The Collenga plain lies immediately upstream from Bakel and covers an area of about 250 hectares. Its boundaries are the Senegal River; a group of

hills including the catchment basin outlet, covering an estimated total of 600 km2; and a creek bordering the southern and eastern extremities. The normal bed of this creek is only enclosed in the downstream stretch leading to its confluence with the Senegal River. Provision has been made elsewhere, within the upper valley regional development plan, for the study of the catchments basin whose runoff floods the site every year. The topography of this area is quite flat, and vegetation cover is sparse. The characteristics of the soils in the area are summarized in the Agricultural Analysis, Volume III, Section 3.2.

A total of 244 hectares can be developed at this site into a medium-sized perimeter. More detailed study of flood data and the watershed for Collenga will determine the height and length of the flood protection dike. For the purposes of budget estimations, a dike 4 km long is proposed. The whole scheme is divided into two sections. The existing section, covering 92 hectares, is fed by four secondary canals. Water is taken from the main canal by calibrated divisors. The new section will consist of a second primary canal and as well as the extension of the original primary canal.

The perimeter will be made up of 10 autonomous small perimeters of about 25 hectares each. (Four are existing and six more will be created.) Because of the topography of the area, the development plan calls for only one main canal and pumping station. Water delivered to each of the small perimeter units will be measured and the farmer association charged accordingly. A farmer association will be responsible for the development of the internal irrigation network and for cultivation within each small perimeter, and a federation of these groups will be responsible for the pumping station. The main canals and flood protection dikes will be constructed by a contractor using heavy equipment. All other construction will be done by hand by the farmers.

3. Kaédi Perimeters

As described above, a total of 600 hectares of medium-sized perimeters are planned in the Kaédi Sector during phase two. These will be composed of approximately 300 hectares each and be located near the villages of Winding and Dirol. Small dams will be constructed at both sites to establish seasonal reservoirs in low-lying basins from which water for perimeter irrigation can be pumped. SONADER will be responsible for contracting for the final design and construction of these perimeters, for supervising farmer participation in the construction, and for monitoring the construction contractor. The irrigated area will be divided into sections of approximately 15 hectares each, so that independent farmers associations will be responsible for tertiary canal construction and agricultural production activities as with the small perimeters. AID will finance the construction costs and provide engineering technical assistance and operating support to SONADER for this medium-sized perimeter construction program. Because of the additional earthworks involved, including the small dam, the per hectare cost of the medium-sized perimeters is $4,500. This is considerably above that of the small perimeters but still economically justifiable, particularly with the animal traction program and other labor-saving and productivity-increasing measures that will have been introduced by the project during phase one.

### 7.3.2.7. Construction of Small Irrigated Basins - Mali

The project will include up to 933 hectares of gravity-fed irrigation systems in the Kayes region of Mali. This development will be in small basins that are in low-lying, relatively level areas situated at some distance from the river bank. They collect rainfall runoff from surrounding high land and occasionally overflow from river flooding or from marshes. The water in these areas is usually stagnant, although occasionally flowing. The project design team analyzed studies of these basins and developed costs for their development. The decision on whether or not to proceed with this development will be made in the fourth year of the project following the results of the Kayes Regional Development Plan and the first special evaluation.

For the collection of water for irrigating these small basins, the project proposes to use one or a combination of three alternatives:

1. Construction of a retention dam with a reservoir situated upstream to supply all or a part of the perimeter and equipped with a valve for gravity flow irrigation. The capacity of the reservoir will be based on the volume required to compensate for prolonged deficiencies in rainfall.

2. Construction of a dike protecting the flood plain and equipped with an intake gate and controlled outlet and a security overflow to avoid flooding by water from the adjacent watershed.

3. Pumping from the river and gravity flow by canal to the distribution network.

In alternatives (1) and (3) (retention dam and pumping), the water for irrigation will be pumped to the highest level of the perimeter. A collective distribution system will transport it up to each intake for use by the farmer group for each subperimeter. If there are two complementary systems of water supply, the systems should be interconnected to avoid dividing distribution into two separate canals. Junctions would most often be distribution basins as well. The types of canals and gates and drains and other works should be similar to those used on the medium perimeters described earlier.

The drainage system will collect the excess water generally at only one point from which it will be drained out by gravity through drain piping. If the perimeter is subject to river flooding and is to be protected by a dike, the drainage area will pass under the dike and be fitted with a one-way valve designed to avoid backflow into the perimeter from the river or marshes. This system must take into account the risks involved in prolonged flooding if the level of the river does not allow draining by gravity. It should be noted that in the upper valley, flood peaks are generally of short duration. In certain cases where the risk of prolonged flooding is greater, a pumping system should be installed for drainage, which would be the same as the irrigation pump.

## 7.3.3. Training

### 7.3.3.1. Introduction

A multitude of problems face all levels of agricultural development in the SRB, from inadequate training to lack of expertise and lack of institutional support. The problems are critical and common to all three RDA's of the OMVS member states and will need to be immediately addressed by the project training staff. At the field level, farmer training provided by the RDA's has generally pursued a top-down approach directed by the headquarters office. This type of training can be summarized as follows:

1. priority is given to technological transfer without understanding of socioeconomic constraints;

2. extension services are staffed by insufficiently trained civil servants, those with advanced training being appointed to managerial positions having little contact with farmers;

3. there is a lack of motivation among both farmers and extension agents; the former are given no role in decision-making while the latter often provide overly-directive rather than explicatory advise;

4. there is limited operational contact between research, training and extension services.

This training is a reflection of the institutional and implementation problems pervasive to all RDAs. Their work is hindered by a lack of financial and human resouces and a lack of a clear methodlogy and plan for applying what resources do exist in the most effective and efficient manner. The project will help the RDA's to improve their staff training, to reshape and decentralize farmer training activities, and to link field training more closely with research so that the continued testing and adaptation of new technologies is encouraged.

The project will try to overcome past problems and obstacles through the following five actions:

1. Creating a farmers' training program in perimeter development;

2. Defining the roles and responsibilities of the RDA's, the IDP staff and the farmers with regard to training and extension;

3. Establishing a working relationship between research institutions, the RDA's and the farmers;

4. Supporting functional literacy programs in each of the project zones; and;

5. Identifying and designing training modules for extension staff, village technicians, farmers' associations and farmers.

### 7.3.3.2. Strategy for Training

In the past two years, all three RDAs (OVSTM, SAED and SONADER) have taken the first step to remedy their extension and training approach. Though their respective new strategies have not yet been implemented, the IDP training staff and their counterparts will be able to use these new strategies as springboards for change. The components of these strategies are closely interrelated and require a great deal of staff interaction to succeed: training and development of fewer but better-trained agents with simultaneous training of village technicians and managers of farmers' associations; setting up of experimental plots for greater and more direct technical diffusion; and gradually increasing the farmers' role in perimeter management. By allowing greater decision-making responsibilities by farmers and greater community involvement, this strategy also aims at reducing the centralized role of the RDA's.

The training strategy of the IDP will be directed at two levels and at their various possibilities of interaction: the village and the national institutions.

A. The village-level strategy deals with the farmers' associations and the farmers themselves. The farmers' associations are the coordinators of production activities in the community and the vital liaison between RDA agents, marketing and credit outlets and the farmers. Special care however, will have to be taken in the organization and support of farmers' associations to assure that they continue to be based on equity and communal consensus of decision-making. In view of the varied levels of strictness in the social hierachies of the different ethnic groups as well as the differences among villages, farmer training will be organized so as to be sensitive to important social nuances. Orientation sessions and training of village technicians chosen by the community (to be trained as manager, bookkeeper, pump operator, water manager) are to be undertaken through the farmers' associations. A significant component--to be implemented later as organizational skills increase--will be the setting up of an internal monitoring system in order to enable the association to evaluate its production, management and training activities.

An important element in the training strategy of farmers is to provide training in the field under prevailing conditions. This will require agents to make longer field trips and will heighten their awareness and understanding of the farmers' predominant concerns.

B. The RDA-level strategy aims at streamlining extension operations, and turning them into service-oriented organizations. The strategy involves three phases: strengthening present services; increasing technical skill for a fewer number of agents; and creating a core of agricultural advisors with multi-disciplinary skills to serve as a liaison between RDA's, researchers and farmers associations. According to their level, agents will be in each of the region's specialized training institutions or in a third country. Project funding for short-term participant training will be complemented by training under other projects such as the Agricultural Research II Project. The latter project will work closely with the IDP regional managers to create greater operational linkages between research, extension and farmers.

### 7.3.3.3. Training Personnel and Activities

In each of the project zones a Technical Assistance Extension Specialist and his/her counterpart will be in charge of the training component. They will be assisted by other project personnel having specifically required expertise, whether nationals or expatriates. The extension specialists will work closely with the training institutions, RDA's and farmers' associations of their respective zone. The training group will be assigned a four-wheel drive vehicle equipped with audio visual aides. Thus staffed and equipped, and flexibly organized as the Mobile Training Unit (MTU), IDP staff will undertake orientation campaigns as well as organization design and delivery of most field training activities.

Three levels of RDA personnel are to be trained: field extension agents; middle-level extension agents; and higher level personnel. While the latter two levels of personnel may go on study tours of varied lengths to a third country and/or to another OMVS country, training for all three levels is based on practical field experience. A major attempt will be made to revise the characteristically threoretical training provided currently by all three member states, and to introduce a more extensive knowledge of field conditions.

The content and implementation of the various training components will vary from one project zone to another as well as within each project zone, depending on existing conditions, resources and expertise. These are described in the Training Analysis, Volume III, Section 3.3.

Much of the farmers' training will be done in small groups or through individual interactions. The farmers' training component will deal with nine major topics:

1. Perimeter development and management, including site selection, as the first phase;
2. Organization of Farmers' Associations, and management training (managers);
3. Credit, accounting, inventory control (accountants);
4. Repair and maintenance of pumps (pump operators);
5. Crop production;
6. Animal traction techniques;
7. Animal traction equipment repair and maintenance;
8. Functional literacy;
9. Fishfarming.

Details of each are discussed in the Training Analysis, Volume III; a brief summary of each is presented below.

### 1. Site selection and Perimeter Development

Farmers will be consulted and involved in all decisions related to the establishment of a perimeter (site selection, analysis and solution of possible land tenure problems). This phase is expected to last between 13 and 20 weeks. The Mobile Training Unit (MTU) will be responsible for the organization of this phase, and for the orientation and mobilization of the farmers to participate in site selection. The Sociologist and the construction brigade engineers will work with the MTU on questions related to land tenure and technical criteria for site selection.

Farmers are expected to participate in the construction of their perimeters and to maintain them. Maintenance of the main civil works is one of most frequently encountered problem. Better maintenance will help eliminate water waste and cut costs.

The training will take place in two phases. The first phase, organized by the Construction Brigade and the field extension agent will be provided in the field at the same time construction work takes place (3 to 4 months). A follow-up training will be provided by field extension agents and occasional contributions from the construction brigade and sociologist before each agricultural season when the irrigation system is being repaired.

### 2. Organization and Management of Farmers' Associations

The analysis of the present situation reveals that the most neglected area of perimeter development has been the organization and management of producer associations. In the context of the project, a special effort will therefore be made to fill this gap. In time, producers' associations will be expected to take over tasks presently performed by the RDA's, such as maintenance of irrigation structures and of pumps; purchase and use of diesel oil; selection of village technicians; planning of agricultural seasons; purchasing of inputs and marketing of produce.

Before the start of each agricultural season, producers associations should elaborate a work schedule for each irrigated perimeter with the assistance of the extension and training staff and possibly the credit agent. The work schedule will include the number of planting seasons, the choice of crops, the agricultural calendar, and production objectives.

### 3. Credit Accounting, Inventory Control

Consistent with the functions to be assumed by Associations, cooperative managers will be trained in setting up membership and treasury registers, schedules of dues payments, stock inventories, etc. They will also be trained in basic credit management and accounting systems. Literacy training will be simultaneously given to all association managers.

### 4. Repair and Maintenance of Pumps

Practical training for village pump operators will aim at providing basic instruction in routine maintenance work at pumping stations and repairing of motor pumps and pumping stations.

The supplier of the motor pumps will conduct, under the terms of the purchase agreement, a five-day course on pump operation and maintenance. This will be followed by more advanced training from an RDA mechanic.

5. Crop Production Training

The aim is to provide farmers with a range of technological packages adapted to the physical and socioeconomic conditions prevalent in the different zones of the project. Topics to be covered are: agricultural calendar, soil preparation, cultivation techniques for various crops, irrigation and drainage, chemical and organic fertilization, production storage, etc. The training will be provided on-site by the field extension agents, and through village meetings organized by the extension and training staff. These meetings will cover specific technical topics as ,well as organizational aspects of irrigation.

6. Animal Traction

Topics to be explored in this area are animal training, ploughing and soil preparation for irrigated and dry farming, and equipment maintenance and management. Training will be scheduled over several sessions, at several sites specially equiped for the training. The training will be done by private firms or specialized government agencies with local support from the RDA's. There is a strong demand for animal traction from farmers in the project zones, so that this program is expected to move forward rapidly.

7. Animal Traction Equipment Repair

Village blacksmiths, a specific social caste in each of the ethnic groups, will be offered a course in fabrication of certain equipment parts and in repair and maintenance.

8. Functional Literacy

This component will be conducted through the national literacy services of each country. Country specific programs are presented in the Implementation Plan of the Training Analysis. Literacy will be provided in Pulaar, Wolof, Soninké and Bambara. Programs will be designed in collaboration with the extension and training staff, and will be linked to topics related to all aspects of the farmers' training.

9. Fish Farming

Training in fish farming is presently being given in Senegal by the Peace Corps and the Water and Forestry Service. Under the project, the start of similar programs in Mauritania and Mali will be considered. Consideration of these programs will be coordinated with the regional study of the effects of irrigation development on traditional river fishing and will consider how these fishermen can best be integrated into future fish pond development programs.

For each of the above programs, a zone specific implementation plan is detailed in the Training Analysis, Volume III. The plan covers personnel, number of trainees, phases of training, and linkages with national institutions.

### 7.3.4. Feeder Roads

#### 7.3.4.1. Introduction

The IDP roads program includes (1) the construction of 136 kilometers of feeder roads in Mauritania to link the perimeters in the Gouraye Sector to the main road running from Gouraye to Seleibaby and (2) the execution of a feasibility study for the construction of a 96 kilometer section of National Route Number 1 in Mali, running from Kayes to the Senegal border at Diboli. The technical analysis for the project reviewed the transport needs derived primarily from the movement of agricultural produce and inputs in and between the five zones identified by the project. Feeder roads were identified in each zone, laid out on the basis of aerial photo maps and site surveys, and construction costs and implementation plans were formulated. During project deliberations with the host countries, it was decided that only the Mauritania feeder roads would be financed by the project. The 51 kilometers of roads identified for the Bakel zone in Senegal will be financed under separate AID bilateral assistance, and, at the request of the Government of Mali, financing for the 26 kilometers of roads identified for Mali will be used instead for the Kayes-Diboli road feasibility study.

#### 7.3.4.2. Feeder Roads - Mauritania

IDP will finance the construction of 136 kilometers of feeder roads in the Gouraye project zone. The locations and hectares served are presented below. See the Feeder Roads Analysis, Volume III, Section 3.4. and the attached maps for more detail.

| GOURAYE | | LENGTH (km) | PERIMETERS SERVICED(ha) |
|---|---|---|---|
| RN5 | Diaguila-Moulessimon<br>Diogountourou-Solou<br>Khabou | 74 | 713 |
| | Wompou-Lougère-Sagné<br>Bedinké | 62 | 459 |
| | Total | 136 | 1,172 |

#### 7.3.4.3. Design Standards

The level of construction chosen for the feeder roads is an improved track, with good alignments, drainage and stream crossing structures, and with wearing course of selected material.

Current road traffic is very low; maximum projected traffic is small, less than 25 vehicles per day, most of them light cars. However, the roads will need to easily handle trucks with a 13 ton axle load. Climatic factors,

wind, rain, drought are the most important factor in road design. There is little relief in the area. The terrain is relatively flat, so that the wearing surface will generally be at natural ground level and runoff will flow over it.

Where there are signs of surface water concentration and gullying, 300 mm culverts will be built. For the proposed roads an average of one 300 mm culvert per kilometer is planned. For areas of even greater water concentration, 600 mm culverts are planned at an average of 1 per 2 kms. Inverts will be at the level of the ground, or bottom of the gully. To protect the pipes from heavy traffic and to insure that runoff does not detour the culverts, at lease 0.50 m of fill will be bulldozed into place and compacted. Width of the road will be 6 m to allow trucks to pass without damaging the culverts.

Fill for the roads will largely be gravel and sandy loams. Since these are erodible and construction is in an area where erosion from surface runoff is active, the fill will require a protective wearing course, as will some portions of the roadbed at ground level. This laterite or quartzite wearing course is estimated to be required for 60 percent of the total length, 4 m wide by 0.15 m thick. The materials for fill and wearing coarse can be found within a radius of 5 km. Since they are located in areas where mean annual rainfall is low, around 700 mm, their plasticity index could reach 20 and CBR will be 60 to 95 percent of the O.P.M. Embankment slopes are planned to be 5 horizontal for 2 vertical.

Life expectancy of such roads should be 10 years, with light but regular maintenance.

7.3.4.4. Final Design and Implementation

The Public Works Service within the Ministry of Equipment and Transport will be the implementing agency for the Mauritanian feeder roads program. This is the same agency which will be responsible for implementation of the Rural Roads Improvement Project (682-0214) that will upgrade 206 kilometers of roads to all-weather status, including the Seleibaby-Gouraye section of National Route Number 5. Implementation capabilities and personnel assigned for implementation of the project will also be available for the feeder roads program of IDP. USAID/Mauritania feels that the Public Works Service has the institutional capability to undertake this activity. Appropriate conditions precedent and covenants are included in the project to assure that the required human and financial resources are provided by the government, and that contracting and construction procedures are properly followed.

7.3.4.5. Maintenance

The proposed roads will require a minimum of maintenance if their anticipated useful life of 10 years is to be realized. Before the beginning of rain, in June, culverts must be inspected and cleaned of any obstructions to flow, and lateral drainage ditches cleaned. This operation should be repeated after any particularly heavy rain. At the end of the rains, in November, any damage should be repaired, particularly erosion of the laterite

or compacted sub-base before potholes are enlarged, which can be expected to happen rapidly under even light traffic. This maintenance should begin the year after completion of construction, and be continuous thereafter. With the design chosen for the feeder roads, this work can be done manually, although compaction with hand compactors will be less effective than properly supervised mechanical compaction with controlled water use.

The technical feasibility analysis examined several alternative ways of providing for road maintenance, including giving responsibility to villages, to the RDA's and to the Public Works Services. The most viable option was decided to be that of using the Public Works Service regional office in Selibaby. This office will be strengthened by the Mauritania Rural Roads Project and will also have the responsibility of maintaining the roads built under that project. To assure proper maintenance, IDP will provide operating costs to this office for two years following construction of the feeder roads. Annual maintenance costs are estimated to be $200 per kilometer, or $27,200 for 136 kilometers constructed by the project.

7.3.4.6. The Kayes-Diboli Road Feasibility Study

A. Introduction

Originally, USAID designed a feeder roads program for 26 kilometers of low volume feeder roads in Mali to connect village perimeters to National Highway Number 1 (RN 1). After reviewing this program, however, the Government of Mali requested, and USAID concurred, that financing for these feeder roads should be used instead to complete the feasibility studies for RN 1 from Kayes to the Senegal border at Diboli, approximately 96 km. The existing RN 1 runs along the left bank of the river close to all the perimeters upstream from Ambidedi. It is little more than a track battered by heavy trucks and seldom repaired or maintained by the Public Works subdivision in Kayes.

Upgrading this road is the number one transportation development priority for the Kayes region. The feeder roads identified for the project will be of little value unless RN 1 is suitably upgraded. In light of this fact, USAID has recommended that the project finance the feasibility study for upgrading the wertermost section of RN 1. The Mission has already funded and carried out the feasibility study for the eastern section from Kayes to Nioro du Sahel (250 km).

The feasibility study for the Kayes-Diboli road can be presented to potential donors for funding through the OMVS Consultative Committee, or by the GOvernment of Mali directly to its bilateral donors. The project's objectives are as follows:

1. To provide a reliable, all-weather transport link in the north-western part of the First Region of the Republic of Mali to render the area more accessible to rural development programs and social services.

2. To encourage commerce and overall development of the project region by reducing the cost of transporting people and goods.

3. To improve the construction and maintenance capacity of the Malian Ministry of Transport and Public Works with respect to the project road.

B. Project Description

The Kayes-Diboli Road Feasibility Study will include the following components:

1. Design and blueprints for the construction of 96 km of all-weather road from the city of Kayes to the town of Diboli on the Senegalese border, for the construction of several small bridges in the vicinity of Kayes, and one larger bridge at the border over the Falémé River.

2. Presentation of the Study and Plans as a package to secure financing.

3. Development and implementation of a program to ensure the maintenance of the road, in conjunction with existing and planned national road maintenance programs supported by the World Bank.

4. Development of a strategy for financing road maintenance.

5. Provision of equipment, training for both equipment and road maintenance, and construction of required shops and facilities for the upkeep of roadway maintenance equipment (in conjunction with existing and planned national maintenance programs).

C. Scope of Work

The Contractor designated by USAID will carry out the study and submit a detailed report to USAID and the Government of the Republic of Mali (GRM) on the technical, economic, financial, social and environmental feasibility of the project. GRM personnel should cooperate and assist the consultant in preparing the report, but the contractor will be solely responsible for its contents.

It is estimated that 24 person months of professional services will be required for the study. Areas of expertise needed are: project management, civil engineering, structural engineering, soils and materials engineering, equipment, financial planning, transportation economics, rural development economics, social anthropology, and environmental science. The study will be conducted during the third year of the project. USAID/Mali will be responsible for implementation with technical expertise and monitoring being provided by the USAID engineering office.

7.3.5. Disease Surveillance and Control

7.3.5.1. Rationale for a Health Component

Ample evidence from West Africa, including very recent information regarding increases in Schistosomiasis prevalence among people living on the reservoir created by the Selingué Dam in Mali, indicates that development projects emphasizing dam construction and an increased dependence on irrigated agriculture risk compromising the health of the involved population. Such

deleterious health effects may or may not be counterbalanced by improvements in the population's nutritional status due to increased consumption of the local food production.

USAID believes that all practical measures should be taken to assure that IDP activities do not impact adversely on these people's health and that food production is translated into an improved nutritional status of the population involved in project activities. To this end the IDP health component (IDP/HC) will institute surveillance for selected diseases--principally Malaria, Schistosomiasis and nutritional status--among the populations participating or directly involved in USAID funded activities. The IDP/HC will undertake control of those diseases which are likely to be, or are demonstrated by the surveillance program to have been, worsened by AID funded activities.

Although populations to be resettled because of the construction of the Manantali Dam will not be affected by IDP funded activities, AID has agreed to help finance their resettlement under a separate project. Their health status thus becomes an immediate concern to AID and will be monitored in a fashion similar to that of people living in villages where irrigated perimeters be constructed or renovated by the IDP.

Principally because of budgetary limitations, many highly desirable health sector activities in the SRB will not be funded through the IDP. The IDP will finance the construction or renovation of only a relatively small percent of all the irrigated perimeters which are now planned for the SRB. Other donors or the OMVS member states will assume responsibility for the others. IDP funds will not be available, except in exceptional circumstances, to finance disease surveillance and control activities in villages not affected by AID funded activities. AID does, however, recognize the necessity to create an appropriate comprehensive primary health care (PHC) system throughout the SRB. This will be essential if those approaches to disease surveillance and control tested and perfected as part of the IDP/HC are to be institutionalized and paid for by a combination of the involved national governments and local communities.

To expedite the installation of an appropriate PHC system in the SRB, the IDP will finance a health planner for two years who will work with colleagues in the member state governments, regional organizations, as well as multilateral and bilateral donor organizations to define a system which will evolve over many years and meet the needs of the involved states and will appeal to potential donors. This master plan or "plan directeur" will then form the basis for multidonor collaboration in the development of a PHC system which will require initial investments of more than 50 million dollars.

#### 7.3.5.2. The Goals of the IDP Health Component

The goals of the IDP/HC are twofold. First, in the short term the IDP/HC will prevent a deterioration of health status in the involved population due to diseases which can resonably be expected to be aggravated by other IDP activities. Second, the project will contribute to an improvement in people's health care in the SRB by preparing a master plan which will elicit multidonor support for the development of a comprehensive PHC system in the SRB.

7.3.5.3. The Objectives of the IDP/HC

The IDP/HC has six objectives; they are to:

1. Create surveillance units within the member state Ministries of Health (MOH) that will use low-cost surveillance techniques to monitor the selected diseases discussed in this summary; in addition, senior, mid-level, and field staff will receive training in the techniques of disease surveillance and control.

2. Strengthen regional disease surveillance and control activities by providing support to the Organisation de Coordination et de Coopération pour la Lutte contre les Grandes Endémies (OCCGE) - A Regional Tropical Disease Control Center based in Bobo Dioulasso which serves the three OMVS member states.

3. Maintain prevalence of Schistosomiasis and Malaria at levels no greater than 20 percent above those determined by baseline surveys of target populations.

4. Prevent excessive morbidity and mortality due to vector borne and other diseases such as Yellow Fever or Rift Valley Fever which are now rare in the SRB but might become problematic with the increase in number or type of mosquitoe vectors.

5. Promote an improvement of the nutritional status in the SRB, by providing river basin planners early warning signs of adverse changes in consumption patterns or anthropometric status which could follow an increased emphasis on the marketing of agricultural production.

6. Convince the donor community acting individually or together to finance the first phase (1985-1990) of a long term PHC system for the SRB. Partially as a result of the project's planning activities total donor investments in the health sector in the SRB should surpass 25 million dollars during the period 1984 until 1990.

7.3.5.4. The Means of Verification of the Objectives

1. Control of Target Diseases and Creation of a Disease Surveillance Capacity

Verification will require the presence, at the national or regional level of each member state, of personnel trained by the project who have actual field experience with the surveillance and control of the target diseases. These individuals must be assigned to disease control units and be capable of conducting appropriate disease surveillance and control activities. Three African scientists--a parasitologist, a vector control specialist and a nutritionist will have been actively engaged in project activities through a regional organization such as the OMVS or the OCCGE during five years of the project.

A series of epidemiologic surveys will be conducted annually in all target villages during the implementation of the project's field work. These surveys, which will include vector studies, will provide baseline information on the prevalance of target diseases and will allow the interested health authorities to follow the evolution of the prevalence of these diseases. In the case of each target disease, the different member states will establish tolerable upper limits of prevalence. When the limits are surpassed the project will begin disease control activities designed to reduce the prevalance to the agreed upon levels. The aforementioned surveys are the means of verification.

2. Prevention of Excessive Morbidity and Mortality Caused by Diseases "new" to the Area

The project will train health service personnel at the level of the dispensary and the health center to report suspicious disease outbreaks which will then be investigated by project staff. Verification will be achieved by means of the passive disease surveillance system in use in the fixed centers staffed by government personnel.

3. Promotion of Improved Nutritional Status

This will follow naturally if food production is increased, the additional food is consumed locally and excessive disease does not prevent proper biological utilization of those additional calories. The periodic epidemiologic surveys will measure food consumption and anthropometric status so that a lack of improvement can be signaled early to those in a position to modify policies to favor improved local consumption of products grown locally. Verification that the IDP/HC has contributed to the improvement of nutritional status would therefore require that the surveillance reports indicate a declining nutritional situation and evidence that SRB planners acted on that information to modify nutrition related policies.

4. Financing of a PHC System

The IDP/HC Health Planner will work in close collaboration with representatives of all organizations interested in the development of PHC services in the region. This includes the CILSS and the Club du Sahel. The CILSS and the Club du Sahel currently monitor donor participation by sector into the three OMVS member states. The same mechanism will be used to monitor increased donor assistance to the health sector in the SRB, and to verify that the objective is achieved.

7.3.5.5. Project Outputs

1. Trained Personnel

The project will train:

a. 2 medical epidemologists from each member state for 2 years.

b. A parasitologist, a vector control expert, and a nutritionist for one year.

c. At least 5 or 6 nurses and laboratory technicians from each member state for 6-12 months.

The trainees will be selected among the OMVS member states nationals. The long term training will include work in an American academic institution and or a recognized disease control institution such as the Center for Disease Control (CDC) in Atlanta, Georgia.

2. Epidemiological Surveys

The project will conduct dry season and wet season disease prevalance and nutritional status surveys during all seasonal cycles in villages affected by IDP activities. The wet season surveys may be done twice--once early in the wet season and once shortly after the rains have stopped. Less frequent surveys will be conducted to determine food consumption patterns.

3. Epidemic Disease Investigations

All suspicious major disease outbreaks will be studied by project personnel who will then participate, with the appropriate national authorities, in the control of those outbreaks.

4. Field tested protocols for the control of Shistosomiasis, Malaria and other diseases, as necessary

These protocols must stress cost effective approaches that will represent the least costly alternatives which are consistent with good public health practice.

5. A "Project Identification Document" defining a five year project for PHC development in the SRB

By year three of the IDP, the health planner will have prepared a document consistent with AID/W requirements for a PID and conforming to the CILSS/Club du Sahel PID format for a project which will be funded by several donors.

6. A Medium Range Plan for PHC Development from 1990-2000

This plan will be a general assessment of medium range needs in terms of personnel, infrastructure, etc. with an estimate of the financial resources which will be required to meet those needs.

7.3.6. Cooperative Development

7.3.6.1. Introduction

The technical analysis of cooperative development examined the legal and organizational structure for cooperatives and pre-cooperatives (groupements) in the project zones to determine how these statutory guidelines and structures can be best used within the IDP. The analysis regards the role of existing village cooperatives vis-à-vis the RDA's, particularly the existing contractual relationships, and discusses the legislative authority of RDA's and how the governments perceive their role in development. While the

legal and organizational bases for cooperative development differ in the three countries, there exists an important foundation in the project zones for increasing the authority of local farmer associations to guide and to control their own development activities.

7.3.6.2. Senegal Statutory Scheme

Senegal is in the process of instituting a new statutory framework for the structure and operation of cooperatives. The new laws, although fully developed and in print, have neither been passed by the legislative authority nor signed into law as of yet. They are presently being reviewed by the various interested governmental bodies. Indications are that they will be passed within the next six months with only minor modification. Once the new laws are approved, signed, and dated, existing cooperatives will have one year's time in which to conform to the new framework.

The overall scheme consists of two statutes. The first relates to general structural considerations "Loi Numéro 1, Portant statut général des Coopératives" (hereinafter referred to as Coop Law No.1), while the second defines specific operational aspects of cooperatives "Décret fixant les conditions d'application de la Loi Numéro 1, Portant statut général des Coopératives" (hereinafter referred to as Coop Law No.2).

The primary purpose of the law is to create a universal framework to apply to all cooperatives in the country with special considerations for "rural cooperatives". The cooperative analysis concentrates on these rural coops, since the coops which concern the project fall into the rural category. Rural cooperatives are defined as those whose members live in rural communities and derive their primary resources from any of the following or from related activities:

- agriculture
- animal husbandry
- fishing
- forestry
- handicrafts

(Art. 62 - Coop Law No.1)

Rural coops, as envisioned by the statutory scheme, will be composed of several village sections, hereinafter called groupements. The cooperative unit should cover a geographical area defined in the articles of incorporation, and should include all villages or households within that area. Each village within the defined geographical area will be organized into its own groupement. The cooperative unit will have its own decision making and managerial bodies (the General Assembly and Council of Administrators, respectively). Each groupement will have a General Assembly as a decision making organ. Individual groupements will not have a Council of Administrators.

The General Assembly of the coop, the primary decision making body, will be composed of representatives from each groupement. These representatives will be chosen at the local level by the General Assembly of the groupements.

The cooperative unit is a recognized legal entity with financial independence (Art. 9 Coop. Law No.1). As such, it has all the powers granted to any individual or private organization, provided it confines its activities to areas defined in its articles of incorporation and charter and consistent with the statutory scheme. Among the powers granted the coop is the right to borrow money.

The flexibility of this scheme lies in the area of division of rights and responsibilities between the groupements, the cooperative unit, and the government.

#### 7.3.6.3. Present contractual relationships between SAED and Cooperatives

Legal relationships relating to the rights and responsibilities of both SAED and the groupements are defined by a written contract between SAED and the cooperative or the groupement.

SAED uses two different model contracts, one for the Delta region and one for the upper valley region. Since this project concerns primarily the middle and upper valley, the analysis focuses on the contract used in that area.

All the members of the groupement or the cooperative are listed in an appendix to the contract. Each member is individually liable for all debts contracted by the groupement through this contract (Art. 1 & 12), which is for a term of one year (Art. 4).

The contract covers the rights and responsibilities of the groupement and SAED for (1) perimeter management, (2) pump purchase, (3) functioning of the pump, (4) agricultural production, (5) marketing, (6) payment for services and supplies, and (7) dispute resolution. The existing contract is quite comprehensive, covering most aspects of the SAED/coop relationship. It is recommended, however, that several issues concerning this agreement be examined during project implementation. These concern pump repair, seed provision, technical assistance, local processing, and cooperative development services. The details are provided in Volume III, Section 3.6. of the Project Paper.

#### 7.3.6.4. Mauritania Statutory Scheme

The statutory scheme in Mauritania is quite different from Senegal's new laws but is similar to the old law under which Senegal has been operating.

The overall scheme consists of only one statute, entitled "Loi No. 67-17 du 18 Juillet 1967 portant statut de la Coopération"(hereinafter referred to as the "Coop Law"). This law creates the authority for two spearate kinds of cooperative organizations. The first is a true cooperative recognized and certified by the government and possessing separate legal identity with full authority to:

1. enter into contracts;
2. borrow money; and,
3. engage in all commercial activities, including receiving grants and loans.

The second type of organization is the pre-cooperative which, although recognized by the government, has no legal independence and is subject to tight government supervision (Art. 25-36 Coop Law). All organizations must serve at least two years in a pre-cooperative status before they become eligible to apply for true cooperative status.

At present, the only true cooperatives in Mauritania are located in the lower valley. Most perimeters in the upper valley are owned and managed by pre-cooperatives; only one village applied for and was granted cooperative status just recently.

The Mauritanian statute actually provides more options than does the Senegalese one, since it does not require that a cooperative be made up of village units. In principle, each pre-cooperative could graduate to full cooperative status, thus achieving at the village level the legal independence so important in obtaining the control and decision making authority promoted by this project.

The Mauritanian statute also allows for cooperatives to join together and form cooperative unions that would function in a similar manner to those in the Senegal statutory scheme. The union of cooperatives would take on responsibilities that could be most efficiently accomplished through economies of scale. Individual cooperative would serve as the "base unit" of the union of cooperatives, maintaining their own specific rights and responsibilities.

Such a union of cooperatives appears to provide the best opportunity for the village groupements to apportion the rights and responsibilities between the union and its cooperative parts as they are divided in Senegal's cooperative groupement system. Unlike Senegal, however, Mauritania does not require any special apportionment of powers between the union and its cooperative parts. Further, in a union cooperative structure in Mauritania, each cooperative has a complete and separate legal identity. Therefore, its activities and ability to deal with the private sector are restricted only by the statute and the terms of the charter establishing the union cooperative's organizational structure. The most important consideration in the organizational process of going from pre-coop to coop status in Mauritania will be making the farmers aware of their rights under the law. As in Senegal, once villagers organize themselves into a cooperative structure of some sort, they will have to obtain government certification and approval for that organization.

#### 7.3.6.5. Present Contractual Relationship between SONADER and Cooperatives

Presently SONADER uses a document called "Contract de Campagne d'Hivernage" to define its relationship with both cooperatives and pre-

cooperatives. Unfortunately, this document does not clearly define the relationship, but only states the items SONADER is expected to supply to the cooperative, the quantity and cost of each item, and the terms of payment by the cooperative. Because of this ambiguity, it is difficult at present to examine the relationship between the two groups. As a covenent to the project, it is recommended that a new contract document be drafted for use by SONADER in defining its relationships with cooperatives and pre-cooperatives.

The terms of this contract should be similar to the terms of the contract presently used by SAED, with the proposed revisions outlined above. In addition, the contract to be used by the pre-cooperatives should have a section clearly resolving the enforceability issue. In that section, SONADER should agree to submit itself to the dispute resolution mechanism with the full understanding that the pre-cooperative has no legal capacity.

#### 7.3.6.6. Mali Statutory Scheme

The only document available on Mali was the statute relating to cooperatives, Law No. 6321 dated January 1963. According to the terms of this statute, the Malian scheme is, for most intents and purposes the same as Mauritania's, except that it lacks any provision for pre-cooperative organization.

### 7.3.7. Telecommunications

#### 7.3.7.1. Introduction

The proposed telecommunication support project of the IDP is designed on the premise that the effectiveness of development programs and institutions can be greatly augmented with telecommunication support that allows for regular communication for administration, training, and commerical information. Evidence is emerging that for many rural areas, satellite communictions may be significantly more economic and technologically feasible than terrestrial alternatives. In many cases, the least-cost solution to communication problems is to combine satellite and terrestrial technology, such as the rural radio telephone. Telecommunication infrastructure is also essential for the growth of commerical activities in rural areas. Though communication itself does not cause economic development, the interaction of communication with ongoing development activities can help overcome bottlenecks and lead to general improvements in rural well-being. Satellite communications permit telephone usage to provide supervision and guidance to field staff, coordinate logistics in the field, and gather feedback from development projects in rural areas.

#### 7.3.7.2. Recommendations

Using the requirements presented by the RDA's and private businesses and an analysis of the existing communications system, the design team recommended a series of actions to be undertaken by USAID and OMVS for telecommunications. The objective of these overall recommendations is to provide reliable telecommunication service to support the river region development and to guide the development of a long-term overall donor investment portfolio. Three sets of action are recommended; they are to:

1. Encourage telephone and telegraph services of Mauritania, Mali, and Senegal to find ways to upgrade the existing telecommunication systems to satisfactory working condition. Donor support may be required. Action in this area should be initiated as soon as possible.

2. Conduct a pilot project serving one of the five zones of the Integrated Development Project (IDP) in the Senegal River Basin (SRB) sponsored by USAID. The pilot project should demonstrate and test the benefits of telecommunication support for program management, planning, and implementation; for in-service training; for data collection and monitoring; for technical information dissemination; and for private and commerical sector activities. In the proposed pilot project two satellite earth stations will link Bakel to Saint Louis. The VHF links will extend the network to surrounding sites. The project will introduce photovoltaic power sources, an intensive on-the-job training program, the design of simple modular and easy-to-maintain system components, and provide an initial institutional back-up service contract. The pilot project should be designed to overcome presently recognized problems and test an appropriate rural communication systems model which can be replicated throughout the region, or at a minimum to the other four projects areas. This could include the networking requirements for rural radio broadcasting to ensure coverage of the SRB area.

3. Undertake a telecommunication policy study which would result in a system design supporting the SRB development objectives of the OMVS and its member states, and which would help to define a regional telecommunication plan for serving Mauritania, Mali, and Senegal. The policy study should analyze the telecommunication requirements of the region; identify economic, institutional, and social development benefits; develop a regional system design (with inputs from the pilot project); identify funding and revenue-sharing procedures; and outline action items and milestones necessary to implement such an SRB-wide telecommunication program.

### 7.3.7.3. Telecommunication Needs

The recommendations for the proposed project activities are based on review and analysis of AID plans and activities in the Fleuve region. Interviews were conducted with USAID/RBDO, with members of the Integrated Development Project (IDP) design team, and with SAED, as well as OPT, Telesenegal, ORTS, and SERST. The findings on the communication requirements of the development projects in the Fleuve region can be summarized in the following way.

1. The Telephone: Reliable and basic telephone service among the OMVS main offices, its country offices, the locations of the Regional Development Agencies, and with the principal cities in the five project areas was deemed highly desirable by virtually all of the interviewees. In addition, telephone connection with the national capitals and among the three agricultural research centers in Mauritania, Mali, and Senegal is considered critical as are linkages between the main data collection sites of the Groundwater Monitoring project. Telephone service was acknowledged to be a significant asset to carrying out the tasks outlined.

There also appears to be significant interest in exploring technologies which would allow the transmission over telephone lines of hardcopy of printed materials, order forms, and the like. In addition, teleconferencing emerged as a potentially valuable management support tool.

2. Radio Broadcasting: In addition to the need for telephone technologies, the desire for radio broadcasting support was voiced almost unanimously, particularly in the following applications:

- Support to agricultural extension activities by imparting new techniques, technologies, and specific agricultural information to farmers, determined by the work and schedule of agricultural and credit extension in the field.

- Dissemination of information on public health measures and preventive health care action in close cooperation with the public health activities (such as supporting major campaigns against malaria), and raising public knowledge of the goals and activities of OMVS.

A discussion of the radio broadcast applications and requirements can be found in the training section of the Project Paper.

7.3.7.4. Existing Infrastructure

A relatively recently established, high-capacity microwave system (completed in 1978) exists on the Senegal side of the Senegal River from Dakar via Saint Louis and Richard Toll to Bakel. Unfortunately, unreliable power sources and shortage of funds and spare parts have prevented the system from being operational all the way to Bakel. The Panaftel system soon will link Dakar via Kidira to Kayes to Bamako. An older telephone network exists from Richard Toll to Nouakchott. Internal telephone communications in Mauritania and Mali are more limited than in Senegal, but both have approached INTELSAT for future lease of satellite capacity for the internal domestic telecommunication system. Mauritania is also a member of the ARABSAT satellite consortium which will launch its first satellite in 1984.

In response to the unsatisfactory telephone system, private telecommunication networks have been established or are being planned by diverse programs and projects in the region. Among these are SAED, a Canadian-funded study on "ports et escales", an agricultural lifestock project in Bakel, a Dutch-financed project outside Podor, the AGHRYMET program, and similar developments in Mali and Mauritania. These projects use HF radio technology which inexpensively provides a flexible means of meeting the immediate demand for the delivery of short messages. As these systems are private, limited access networks, however, and as they are neither reliable, nor of good quality, nor easily interconnected with the national telephone network, they are of limited use in the long-term. Investments in such systems by many different organizations are costly in terms of capital and operating expense. More importantly, however, diverting revenues and demand is detrimental to the expansion and operation of the national telephone service. Thus, relatively costly private systems flourish while a more reliable, and ultimately less expensive, public system is underdeveloped.

This development of private systems is also detrimental to the private sector, particularly to smaller firms, which must either finance their own radio systems or suffer the major inefficiencies attendent to isolation from markets and suppliers.

#### 7.3.7.5. Institutional Arrangements

For the design, implementation, operation, and evaluation of the pilot project, the Secretariat d'Etat pour la Recherche Scientifique et Technique (SERST) will have primary responsibility on the Senegalese side under the 1980 U.S.-Senegal Science and Technology Agreement. SERST has access and responsibility to coordinate all necessary inputs and internal agreements with other Senegalese technical institutions, such as OPT, Telesenegal, and ORTS.

The policy study will be administered under OMVS auspices, with participation from appropriate organizations in the member states and donor organizations.

### 7.3.8. Private Sector and Rural Credit

#### 7.3.8.1. Introduction

The private sector analysis delineates several major problems that impede or prohibit the private sector from assuming a major role in supplying or servicing agricultural production in the Senegal River Basin. These can be summarized as follows:

1. Publicly-financed RDA's in all three countries have been given extensive mandates to operate in roles that otherwise might be filled by the private sector. These functions include supplying inputs, servicing machinery, and processing and marketing produce. By providing certain advantages in terms of subsidies, tax exonerations, economies of scale, and legal status available only through the RDA's, the public sector has largely stifled competition from the private sector.

2. Transportation and communications infrastructure within the basin is poor, resulting in exorbitant collection and distribution costs. In Mauritania and Mali, especially, access to many riverine villages is cut off for all vehicles except boats during the rainy season. Servicing and supply operations require advance planning and coordination that so far only public agencies have been able to undertake, albeit inefficiently.

3. The dearth of credit available for financing supplier and small farmers purchases on the private market has served to reinforce farmers' reliance on public supply schemes for which credit arrangements at favorable terms are provided.

4. Entrepreneurs' general inexperience in the river basin vis à vis the requirements of intensive agriculture, as well as their lack of training in business management, accounting, or mechanical skills have retarded their ability to compete with the trained cadre of public organizations in the support activities required by irrigated agriculture.

The project will attempt to alleviate the problems summarized above through the following measures:

1. As a condition of the project in each country, farmers will be permitted to grow whatever products they wish and to sell them to whomever they wish. Moreover, the project will encourage the removal of all input subsidies. These policy changes will improve the competitiveness of private supply and marketing operations. Justification for these changes is presented in detail in the Economic Analysis. (See Volume III, Section 3.0.).

2. The project will seek to improve the local transport and communications infrastructure in the valley by constructing feeder roads and testing a telecommunication system to service the upper Senegal River Valley. (See the technical reports for Roads and Telecommunications, Volume III, Sections 3.4.).

3. The project will set up credit schemes in each of the project zones to alleviate the constraint on capital available to farmers and small businesses for agricultural investments. (A detailed explanation of the credit schemes and their implementation plans the Private Sector Analysis, Volume III, Section 3.10.)

4. Several project components will include training programs for target groups to increase their ability to act independently within the private sector. Farmers will benefit from programs operated out of mobile training units and can turn to extension agents for help in establishing and managing their credit accounts. Small businesses will have access to advisory services sponsored by the project.

7.3.8.2. Program for Private Sector Promotion

At the regional level, the "Private Sector Program" component of the IDP will strengthen OMVS initiatives to promote policy changes that liberate markets for agricultural inputs and produce. At the national level, the Private Sector Program will design two activities in each country: (1) a credit scheme to provide capital to farmers, artisans, and input suppliers for investments in agriculture-related activities, and (2) a small business promotion program to provide skills and management training to the same groups and assist them in coordinating and linking their activities.

The outputs of these activities are described briefly below, followed by a discussion of project inputs required to achieve these objectives for each country. These descriptions are intended as guidelines for the establishment of project activities in each area, and may require significant alterations as the program is implemented. Moreover, many details will not be elaborated until the project implementing staff is in place in each area to make more specific assessments of the needs and priorities of the local participants.

7.3.8.2.1. The Regional Program

At the regional level, various OMVS units will sponsor initiatives in policy change and harmonization, feasibility and research

studies, and the expansion of public and private capital investments in the basin. The OMVS Directorate of Development Coordination, acting in concert with national institutions in member states, will oversee aspects of private sector development. It will define key policy issues of major importance to the private sector, such as input and output pricing, harmonization of tariff levels, and loosening of state monopolies in agricultural markets. It will also work closely with national institutions to bring these issues before the appropriate national legislative or policy bodies.

The Industrial Development Division (IDD) of the Directorate of Development Coordination will be responsible for promoting the development of agribusiness credit systems and business assistance programs, the term "agribusiness" in this sense signifying the entire agricultural system, including input suppliers, agricultural producers (individuals and groups), and businesses that provide services such as equipment maintenance, storage, processing, or marketing. This unit will also be responsible for identifying capital requirements and sources of financing for these programs, as they are designed at the national levels.

The IDD will also have a substantial role, along with the OMVS Investment Directorate and Industrial and Finance Ministries at the national levels, in identifying business opportunities suitable for private sector investment, particularly from within the capital markets of the three member states. The IDD will become a focal point for investment inquiries and will serve to prepare and promote attractive projects at the same time. This unit should also become the liaison office between the private sector investment funds of the Communauté Economique de l'Afrique de l'Ouest (CEAO), the Development Fund of the Economic Community of West African States (ECOWAS), the African Development Fund of the African Development Bank, the International Finance Corporation of the IBRD, and other regional and subregional funds.

The OMVS Consultative Committee, in which USAID participates, will be active in mobilizing financial resources for feasibility studies and project investments. Because it is directly linked with the OMVS Council of Ministers, it will also serve as a central forum for periodically reviewing the progress made by member states in adjusting policies that constrain market-oriented agricultural development.

7.3.8.2.2. The National Programs

In all of the OMVS countries, the Private Sector Program will involve two components to encourage development of private initiative.

1. First, a financial system will be developed in each country to provide agricultural production credit, savings facilities, and small and medium scale business credit. The project will do the following:

a. Make capital available to finance seasonal and longer term investments for farmers and cooperatives engaged in agricultural production. In all three countries, the bank or combination of banks responsible for the agricultural sector will have the legal and operational capacity to make loans directly to these borrowers, without using RDA's or other public agencies as intermediairies.

b. Include a credit and loan guarantee program for local artisans and small businesses involved in activities that support the agricultural sector through improved supply and servicing of farmer needs.

c. Heighten the regional populations understanding of and participation in formal lending institutions. Additional funds will be mobilized for investment by establishing savings facilities offering rates of return sufficient to encourage local deposits.

d. Improve the operations and long term viability of banking institutions in each project region by improving the compentence of their staff and the financial soundness of their operations.

In Mali, the program for agricultural production credit will be carried out via a credit window using the capital and services of the Banque Nationale de Développement Agricole (BNDA) but located in the existing facilities of the Banque de Développement du Mali (BDM) in Kayes. The BDM itself will provide savings facilities and extend commercial business credit to suppliers of agricultural inputs, agroservice business, and manufacturing enterprises.

The proposed credit system in Mauritania will be based on a similar relationship between the Banque Mauritanienne pour le Développement et le Commerce (BMDC) and the newly established Fonds National pour le Développement (FND) created to provide rural credit and credit guarantees. As it is now in an embryonic state, it is impossible to determine how effective the FND will become. Judging by its mandate however, it appears the most favorable institution for establishing the IDP credit scheme.

In Senegal, the entire rural financial system is undergoing major revisions. All of the credit and savings activities described above are expected to fall within the new mandate of the Banque Nationale du Développement Sénégalais (BNDS).

2. Secondly, programs will be established to assist small enterprises. Institutions with mandates to encourage small scale industrial development already exist in each country: the Centre d'Etude et de Promotion Industrielle (CEPI) in Mali and Mauritania, and the Société Nationale d'Etude et de Promotion Industrielle (SONEPI) in Senegal. Supported by the IDP, these institutions will extend their current activities to include the provision of a variety of business advisory services in the Senegal River Basin. These services will be available to assist small commercial suppliers, manufacturers of light agricultural equipment, and businesses providing services such as mechanical repair, processing, and marketing. They will also provide training in areas such as accounting, purchasing, and inventory control. All of these programs will be designed to complement the capital programs available to businesses from local credit sources. The small enterprise promotion institutions will also work with Peace Corps Volunteers and RDA extension agents to identify new agriculturally-based needs and appropriate technologies which can be supplied by these small- and medium-scale enterprises.

## 7.4. Institutional Analysis Summary

### 7.4.1. OMVS

The mechanisms for the implementation of this project already exist and are functioning within the OMVS. The only change required will be to upgrade the General Studies Division within the Directorate of Development and Coordination to make it the Project Management Unit and to give it clear authority for coordination of project activities within the OMVS. The OMVS has the legal mandate and administrative capability to direct regional project implementation and to coordinate overall project programming, monitoring, and evaluation.

#### 7.4.1.1. Organization of OMVS

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 objectives 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.

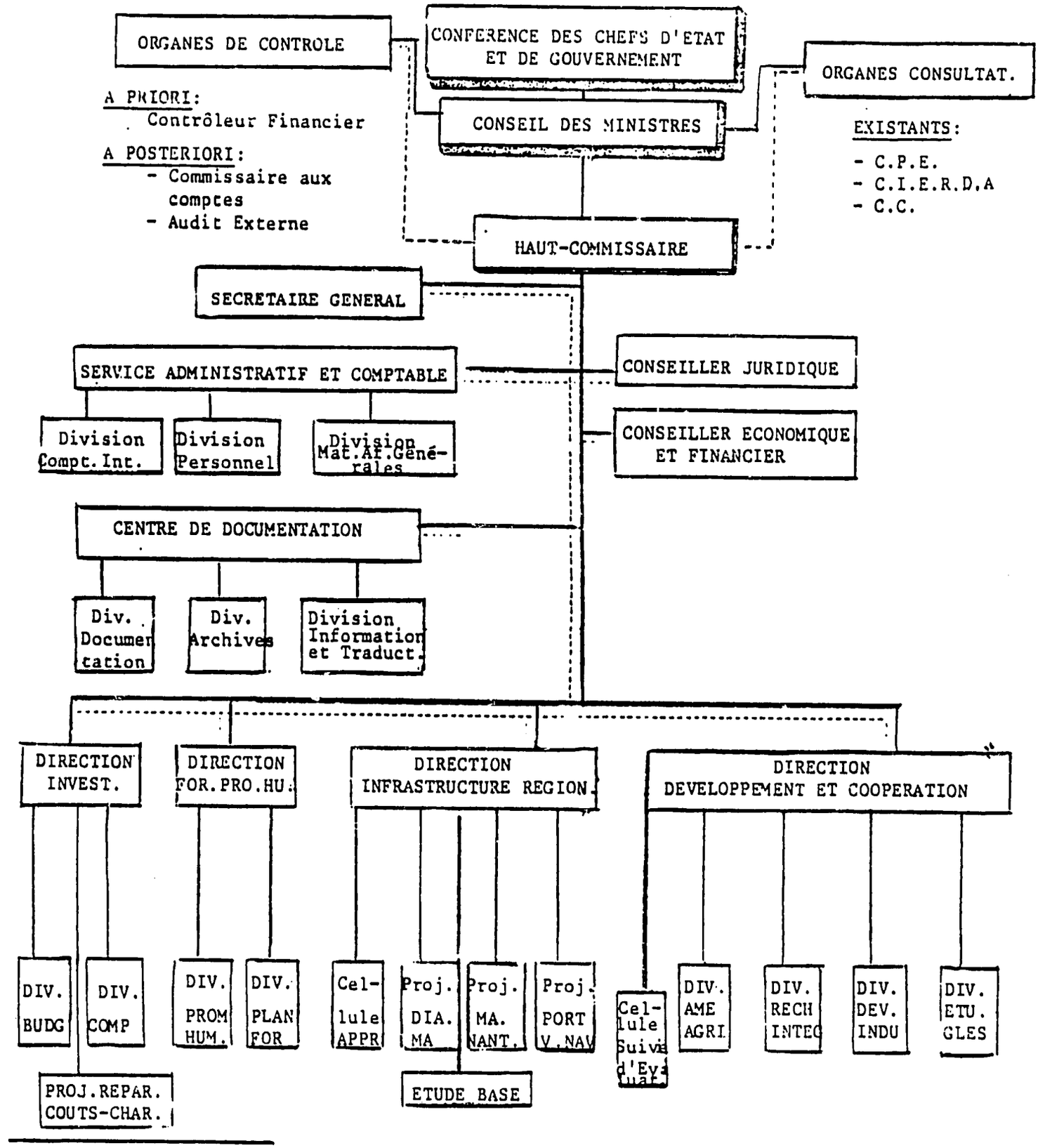
As shown by the OMVS Organization chart (figure 7A), the OMVS is governed by the Conference of Chiefs of States. This conference is the final decision-making body which rules on questions of general policy. Such decisions must be unanimous and are binding obligations of the respective States. The Chair 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 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:

FIGURE 7.A

## ORGANIGRAMME DE L'O.M.V.S.




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

(1) Development and Coordination. 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 Infrastructure. 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.

7.4.1.2. Project Management

For IDP, the OMVS will have the dual role of implementing the regional project activities for which it will have direct authority, and of coordinating the implementation of national project activites by the Member States. In order to accomplish these functions, a Project Management Unit (PMU) will be established in the Directorate of Development and Coordination. RBDO has proposed to

the OMVS that the General Studies Division be transformed into the Project Management Unit and that it be renamed the Division of Integrated Development. The Project Management Unit will be responsible for the supervision and management of regional project activities, for programmatic coordination, monitoring and evaluation of the entire project, and for technical and training support to the national programs.

The General Studies Division has had responsibility for developing a master plan for the integrated development of the basin. This plan is to contain proposals for the long-term integration of the economies of Senegal, Mauritania and Mali. The division is further charged with studies of the tariff and tax structures of the OMVS Member States; of commercial and trade policy; communications and transport integration; and of economic interaction in general. The studies are intended to lead to recommendations to the OMVS Heads of State that will remove constraints to the free flow of people and trade across national borders.

Under IDP, this division will become the focal point of USAID/OMVS collaboration. The division's mandate encompasses the scope of work designed as the regional component of the IDP. The technical assistance team proposed by the IDP for the division will permit the OMVS to launch the economic integration strategy agreed upon by the three Member States.

In the immediate future, technical assistance staff will outnumber OMVS personnel in the division. Increases in permanent staff are being examined by the High Commission within the context of overall institutional development planning. Ca. is being taken to contain staff expansion of the OMVS within the limits of the recurrent costs load that can be reasonably assumed by OMVS over the long run.

The active involvement of national (Member-State) personnel and institutions in the conduct of the policy and development studies proposed by the IDP will reduce the need to significantly increase the division's resources. Once the studies are completed it will be possible to determine what the future size and scope of the division will be.

#### 7.4.1.3. Project Staffing

The Chief of the Division of General Studies is the only permanent employee of his division, although he is supported administratively by the secretary pool of the Development and Coordination Directorate, and by an accountant and procurement specialists in the Administrative Service. At the present level of activity, the chief is able to carry out his responsibilities, but with increased responsibilities and the development of previously inactive program areas (such as health surveillance) he will need greater resources. To assure proper operation of the Division which will become the Project Management Unit for IDP, a technical assistance team will be financed by IDP.

The proposed staffing plan for OMVS under IDP is presented in Section 3.3.1., Table 1. A technical support and project management team will consist of a project management specialist, a management information specialist, and a business/promotion specialist. An epidemiologist, health planner, and support staff from OCCGE will be provided for the health surveillance activities, and other staff will be contracted for the policy, planning, and feasibility studies to be financed by the IDP. This staff will be located in the Project Management Unit, but several members will have dual assignments and counterparts located within another division of the DDC in order to supervise specific project activities and to assure inter-divisional coordination.

The project design team feels that this combination of long-term technical assistance supplemented by short-term assistance, and the use as much as possible of existing personnel and resources in the OMVS and national institutions, best addresses the technical and managerial needs of the project while keeping recurrent costs to the OMVS and Member States at a minimum.

### 7.4.2. Mauritania

For the implementation of the Mauritanian national program of IDP, there will be three national implementing agencies. SONADER for the agricultural program, the Ministry of Health for the health surveillance activities, and the Ministry of Equipment and Transport for the feeder roads program. SONADER will also act as the overall coordinator for the national program, although this coordination will be handled in collaboration with the Ministry of Plan, particularly for the policy and planning studies financed under the regional program with the OMVS. The role of SONADER, is further summarized below, while information on the others is found in Volume III, Section 4.2.

#### 7.4.2.1. Organization of SONADER

SONADER (Société Nationale pour le Développement Rural) was created in 1975 under the aegis of the Ministry of Rural Development. It has financial and administrative autonomy and is administered by two bodies, the Administrative Council, a deliberative organ, and a general Directorate, its executive body. While it has a broad mandate for overseeing rural development in Mauritania, SONADER's activities have concentrated on irrigated agriculture along the Senegal River. Indeed, SONADER's name has become synonymous to irrigation, and little has been done to integrate irrigation programs with rainfed agriculture or livestock.

SONADER relies almost entirely on donor assistance for funding its activities. This greatly hampers its capacity for long term planning because of financial uncertainties and fluctuations in incoming funds. Moreover, SONADER is plagued by chronic cashflow problems which affect regular disbursement of staff salaries and expenses for overall maintenance of buildings, vehicles, perimeters, machinery, etc. Until now, SONADER has been responsible for all aspects of project implementation, from studies, to construction of perimeters,

to extension coordination, to supply of inputs and credit. All these activities have added both administrative and logistics burdens on the institution. With a recent change in the directorship, SONADER has reorganized and decentralized in order to alleviate the financial burden, both in the staffing and in the number of activities for which it is responsible. SONADER hopes to gradually turn over more general development support functions, like agricultural credit and input supply to specialized national agencies or private firms and concentrate on extension services. Because of the lack of local public or private institutions in rural Mauritania, this will be a gradual process. It is a process that will be encouraged and supported by the IDP.

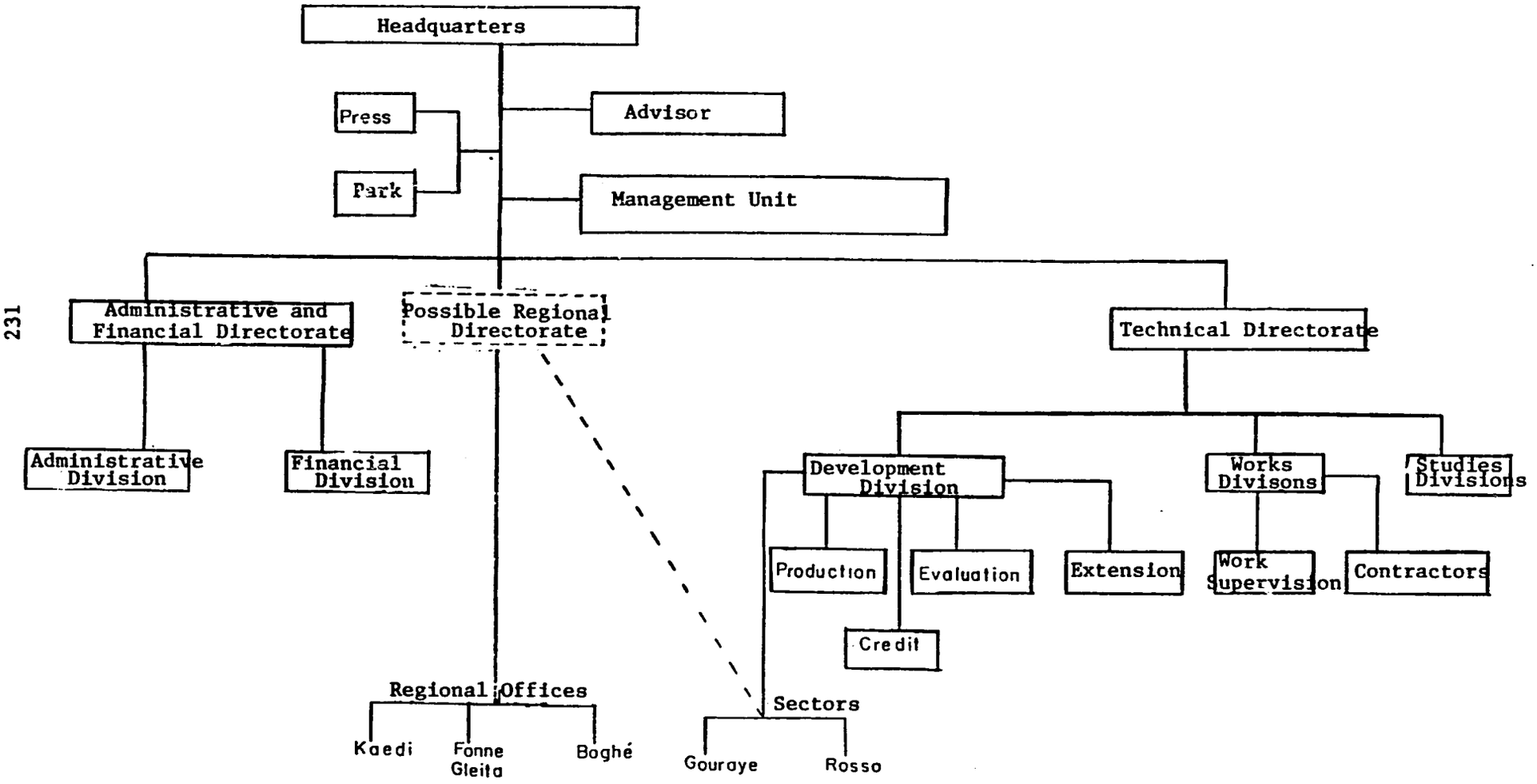
In the past year, SONADER has gone through three different organizational structures, each aiming towards greater decentralization. The impact at the local level has yet to be seen since most of the changes were in the headquarters in Nouakchott. One of the major problems of SONADER has been its overstaffing and the high number of expatriate technical assistants who function mainly as advisors. In the most recent reorganization, 70 out of the 170 professional staff members in Nouakchott were dismissed. The IDP will attempt to encourage further streamlining of personnel and administrative decentralization. IDP will also place technical assistants in SONADER in line management positions so as to allow them to fully participate in the decision-making process along with their counterparts.

With the recent reorganization of SONADER, divisions and directorates have been compressed or shifted to other sections. The present organization is presented in Figure 7B. SONADER's staff is concentrated in the Technical Directorate which has three divisions: Works, Development and Monitoring, and Studies. Although this directorate is supported by several expatriate technicians funded by the World Bank, Caisse Centrale, and the German Government, it is not yet clear how much direct field support they will provide. The IDP will encourage field support from the central office by providing travel expenses for national-level technicians when they work in support of project activities. The major thrust of the project, however, will be to strengthen the regional management and technical capabilities of SONADER in the Kaedi and Gouraye Sectors.

Three Regional Directorates (in Boghe, Kaedi, and Fonne Geleita) have been established within the new organization of SONADER. The Regional Directors are in charge of all regional field activities and report directly to the Director General in Nouakchott. Each directorate has four services: administrative, agronomic, supply and credit management, and mechanical support. The directorates are largely supported by projects in each region -- Holland in the Delta area, the Caisse Centrale and FED in the Middle Valley, and the World Bank and USAID in the Upper Valley. All directorates suffer from a lack of well trained technicians, especially in extension agronomy and irrigation and mechanical engineering.

Figure 7B.

ORGANIZATIONAL CHART OF SONADER



#### 7.4.2.2. Project Management

The project will directly increase the technical and administrative capabilities of SONADER in the project zone by providing: (1) in service training for SONADER staff, (2) technical assistance, (3) vehicles and equipment, and (4) operating support for temporary and non professional project staff in the project zones, vehicle operation and maintenance, office operations, and local travel and technical operations. The project will provide a technical assistance team to SONADER to assure proper management and technical implementation of the project and to train and upgrade SONADER staff in the Kaedi and Gouraye Sectors. The technical assistance team will include a project management and credit specialist who will be a deputy to and share project management responsibilities with the SONADER Regional Director in Kaedi, and specialists in agronomy and extension, irrigation engineering, and social science. A senior agronomist/extension specialist, irrigation engineer, and Mauritanian sociologist will be assigned to Kaedi to direct technical operations and train Mauritanian counterparts. Similarly, a senior agronomist/extension specialist and Mauritanian sociologist will be assigned to the SONADER sector office in Gouraye. The project staffing plan for the agricultural program in Mauritania is presented in Section 3.3.2., Table 3. SONADER will provide sector project managers in Kaedi and Gouraye, a senior agronomist/extension specialist in Kaedi and Gouraye and an irrigation engineer based in Kaedi to cover both sectors. The staffing and management plan are presented in greater detail in Volume III, Section 4.2.

### 7.4.3. Senegal

For the implementation of the Senegalese national program of IDP, there will be three national implementing agencies: SAED for the agricultural program, the Ministry of Health for the health surveillance activities, and SERST for the telecommunication program. SONADER will also coordinate the participation of several other agencies such as BNDS for credit activities, the Water and Forestry Service for fish pond development, and SONEPI for small business and artisan training. Senegal has a secretariat for coordinating national agency participation in OMVS activities that is located in the Service Hydraulique of the Ministry of Equipment. The role of SAED is further summarized below, while information on the other agencies is found in Volume III, Section 4.3.

### 7.4.3.1. Organization of SAED

In order to develop the Senegal River Basin, where farmers had historically relied upon flood irrigation, the French colonial administration formed a regional development agency (RDA) nearly fifty years ago. It was called the Mission pour l'Aménagement du Sénégal. This agency initiated mechanized rice-cultivation experiments at Richard-Toll and Lake Guiers. With independence in 1960, that organization was replaced by the Autonomous Organization of the Delta, which (among other things) carried out the construction of the salt-water intrusion barrier just west of Rosso.

In 1965, the Senegalese National Assembly created the Society for the Development and Exploitation of the Lands of the Delta and Valley of the Senegal River Basin (SAED), which replaced both the Autonomous Organization of the Delta, and the Autonomous Organization of the Valley. From the time of its creation to 1980, SAED developed approximately 11,000 hectares of land. This rapid expansion, shortages of both funding and qualified personnel, and problems that SAED's highly centralized organization had working with local farmer associations hindered the effectiveness and efficiency of the RDA. In 1980 a searching internal analysis led to a program for far-reaching changes in the organization and character of SAED. This reorganization has entailed the gradual decentralization of SAED, and will in time reconcile the demands of tertiary water management with autonomous farmer groups. By enphasizing farmer-managed perimeters, restricting its interventions to water management and extension support, and promoting the growth of the private sector, SAED can resolve the political friction that had developed with some villages.

The changes included a re-statement of SAED's objectives, which was set out in a "Lettre de Mission" on 30 July, 1981, declaring the responsibilities and obligations of the GOS and SAED for the following three years. SAED's new objectives are:

- to plan, authorize and control rural enterprise management carried out by cooperatives, public or private organizations, or on its own;

- to supervise the use and maintenance of all equipment in its area of operation;

- to coordinate development activities, in both irrigated and traditional agriculture, among socio-professional organizations operating in its zone of action;

- most particularly, to support and counsel village organizations (farmers, artisans, etc.) in order to give them eventual control of the dynamics of development;

- to coordinate distribution of production inputs and marketing of agricultural production and to assume these services directly for other products;

- to collect, process and market part of the paddy production turned over by socio-professional organizations;

- Generally, to execute all assigned tasks facilitating economic and social development in its zone of operation, notably the management of water resources, the promotion and coordination of agricultural research, and the functional training of farmers and personnel of the agency.

The new objectives clearly give SAED the role of coordinator, adviser and manager. In principle, if not in practice, SAED has become a technical support organization and "safety net" for the private sector. To give SAED the ability to fulfill this role, it became a Société Nationale on 31 October, 1981 (formerly it had been an Etablissement Public). The major impact of this change was to free the agency from the a-priori control of the Ministry of Finance, and to increase the powers of the General Manager.

The major purpose of SAED's reorganization was decentralization and better, more effective interactions with the farmers in the SRB. SAED is to accomplish this by reorganizing its finances and responsibilities, cutting back unnecessary staff, putting the remaining personnel into a more efficient institutional framework, and increasing the training and sensitivity of its field workers. SAED has come a long way in carrying out its intentions. It has reorganized its staff, partially alleviated budgetary problems and improved relations with farmers in irrigated perimeters. There still remains, however, a need for further improvement.

Five directorates form the core of SAED. Above them is the President Director General who has at his disposal a Deputy Director General and an accounting office. Accounting has been separated from the Financial Directorate to insure its independence. In practice, however, accounting is primarily done by the Financial Directorate, but the accountant is responsible directly to the Director General. SAED's organization is presented in Figure 7C.

Aside from the Financial Directorate, there are the Directorates for Production, Industry, Administration, and Planning and Development. The Directorate for Production is directed by a French technical assistant, who is assisted by a French-trained Deputy Director. Under them are four divisions, which take care of Economic Studies, Agronomy, Rural Cooperation and Community Development, and Commercialization. Presently, the Production Directorate is undergoing a reorganization of divisions. By the time that IDP starts, there will be new division for extension.

Figure 7C

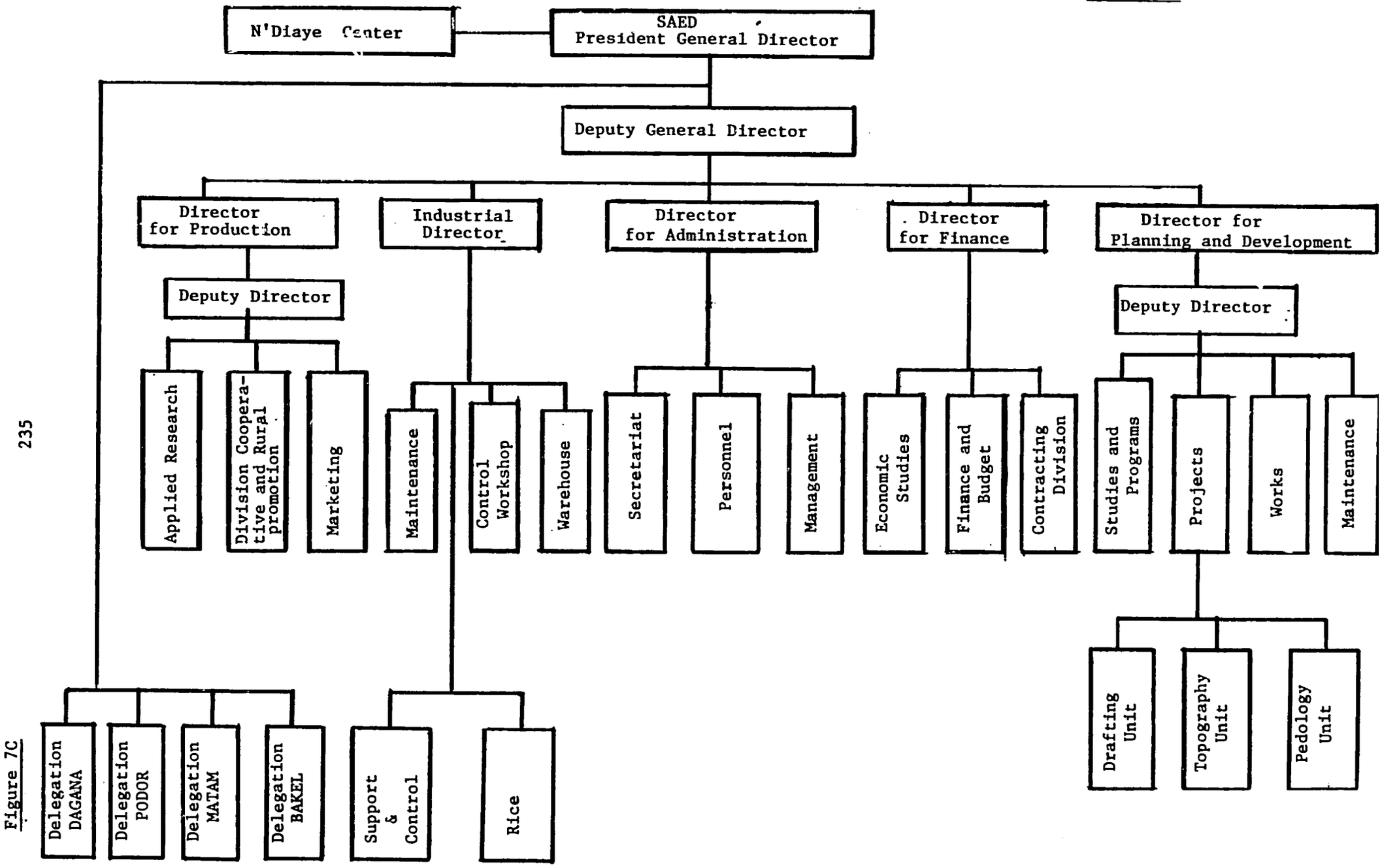





Figure 7C

The Directorate of Production now has the expert assisstance of a USAID agronomic extension specialist funded under the Bakel project. This individual will probably serve as the IDP Applied Research Agronomist in St. Louis, once the project begins. The Production Directorate is staffed with more than 100 employees, many of whom are in managerial positions. The Directorate is overstaffed. As with other directorates, the Director General has stated his intent to cut down on the excess of personnel in the Direction de la Production, but action has not yet been taken.

For planning, directing and maintaining irrigated agriculture, another important directorate in SAED is the Direction de la Planification et des Aménagements. It is this directorate which is responsible for water management, direction of perimeters, supervision of projects and project construction, and administration of general studies for future projects. The directorate has a staff of 150. Of that number, half are in the Division Travaux and live in the field near the perimeters for which they are responsible. The rest of the personnel are divided among the Divisions of General Studies, Projects, and Maintenance.

SAED Regional Delegations are divided into sections that roughly correspond to the directorates of the central offices in Saint-Louis. The Ingénieur Délégué in each Regional Delegation is directly responsible to the Director General, but does not enjoy total autonomous control over the perimeters. Decisions affecting each section are made by the corresponding directorate in Saint-Louis. Thus, for example, the section in a regional delegation that deals with mechanical repair and maintenance (the workshop) is run by the Industrial Directorate in Saint Louis. In fact, the division of responsibility between the Director of Industry and the Ingénieurs Délégués is not entirely clear. When questions arise as to who has authority over a regional section, it is normally the director in Saint-Louis who is given the benefit of the doubt. This is one reason why IDP will require SAED to appoint an overall project coordinator in Saint Louis, as well as a zone-level director in Bakel and in Podor. The national coordinator will regulate and assure national-level support to the project.

### 7.4.3.2. Project Management

In February 1982, the organizational structure of SAED perimeters was unified so that each perimeter would be roughly the same. The organization of perimeters still varies, but tailoring the staffing structure of each perimeter to individual needs is required. SAED has divided the area under its jurisdiction into regional delegations, with each delegation administering one or more perimeter. Whithin the perimeters there are zones for each village participating in the perimeter.

The IDP will develop and rehabilitate perimeters in the Regional Delegations of Bakel and Podor. Because the small irrigated perimeters in Bakel are contiguous and evenly distributed along the river bank, the

Bakel Regional Delegation is not divided up into perimeters. Thus, the Ingénieur Délégué for Bakel also serves as the Directeur de Périmètre, and the two offices are synonymous. Within the Directorate, there is a Deputy Director for Extension, and Administrative Agent, a Cashier, an Accountant, a Supply Manager, and support staff. The Director has under him Sections for a Mechanical Worshop, Management, and Extension. Within the Extension Section there are three zones (Goye Supérieur, Goye Inférieur, and Falémé, each of which has a Chef de Zone, two extension agents and a pump mechanic.

In the Bakel region, the IDP will contribute to the rehabilitation of 281 ha, and the construction of 714 new hectares. This represents an increase in hectarage of 200% for the Goye Supérieur Zone, and the new hectares will be very unevenly distributed under the present organization of zones. For this reason IDP recommends the creation of a new zone near the town of Bakel. Within the new zone will be the new perimeter of Collenga-Bakel, which is 244 ha. This will require extra staffing by SAED. One mechanic, a Chef de Zone, and two extension agents will be the minimum requirement for the new zone. It is estimated that, except for the mechanic, the transformation of extension agents to more highly trained personnel (as planned for by the IDP) will make staff available to work in the new perimeter. The mechanic will have to be added to the SAED payroll, and trained. The advantage of this is that hectarage will be evenly distributed among the zones, and the increased work load on extension agents will be shared among the zones.

The two expatriate technical assistants in Bakel will serve as deputy directors for extension and engineering to the Ingénieur Délégué, who will be the Bakel project manager for SAED. Each technical assistant will have a SAED employee assigned as a deputy. These deputies will receive on-the-job training from the technical assistants and special short-term participant training and will take over the deputy director positions when the expatriates leave.

Podor is the second region in which the IDP will participate. In Podor, a medium-sized perimeter of 1063 ha. will be constructed. Because SAED has management plans for small and large perimeters, but not for medium ones, the organization of the IDP Podor perimeter will be new. Near Podor there are already two large perimeters and several small perimeters. The IDP will construct and develop a medium-sized perimeter at Podor, which will be managed by an autonomous Perimeter Chief, but will depend somewhat upon mechanical services from the large perimeter at Nianga. Ordinarily, the large perimeters are managed by a Perimeter Director, who has at his disposal a branch for extension work, and a branch for water management and mechanical support. Because water management is very centralized in large perimeters, the organization of the large perimeter is also quite centralised. Medium perimeters, with several pumping stations and room for decision making by farmers, do not face the same constraints.

The following organizational chart (Figure 7D) shows the IDP plan for the new perimeter. An office will be constructed next to the perimeter during the first year of the project, and its staff will be gradually phased in as the perimeter is built and developed. The organizational plan is a cross between SAED's present structures for large and small perimeters. There will be fewer extension agents, but they will be more highly trained. Water management will be as decentralized as possible. The technical services branch will be supported by the Directorate of Management and Planning in Saint-Louis. A civil engineer and topographer will be placed at the disposal of the Perimeter Chief in Podor. These specialists will assist in supervision of construction, and contribute to the OMVS feasibility studies.

Construction of a mechanical workshop is not planned for the Podor Perimeter. Two mechanics will be assigned to Podor, and will be responsible to the Perimeter Chief, but they will need to use the facilities at nearby Nianga. Since the new Podor organization will not be fully established for a couple of years, it is expected that the Nianga Perimeter will be able to provide tactical support for start-up activities. The mechanics will be trained during the first year at the Podor center near Richard Toll.

All of the project personnel must be provided by SAED. This will not present a problem at Bakel, where most of the personnel are already in place, and the number of personnel to be dismissed will more than make up for new funding requirements. However, in Podor all of the positions are new. There is no organization at present in Podor, and using the staff at Nianga would defeat the purpose of the new perimeter, which is to serve as a pilot medium perimeter. USAID must make sure that SAED assigns the required personnel.

The project will provide two technical assistants to Podor--an irrigation engineer for three years and an extension/training specialist for two years. The irrigation engineer will head the water management and technical services divisions of the perimeter and have a SAED engineer assigned as a deputy. The extension/training specialist will head the extension division and have a SAED extension specialist as his deputy. The deputies will receive on-the-job technical training from the technical assistants and be given some special short-term training. They will take over as division heads, when the expatriates leave. The staffing and management plan are presented in greater detail in Volume III, Section 4.3.

Figure 7.D

Plan for Podor Perimeter

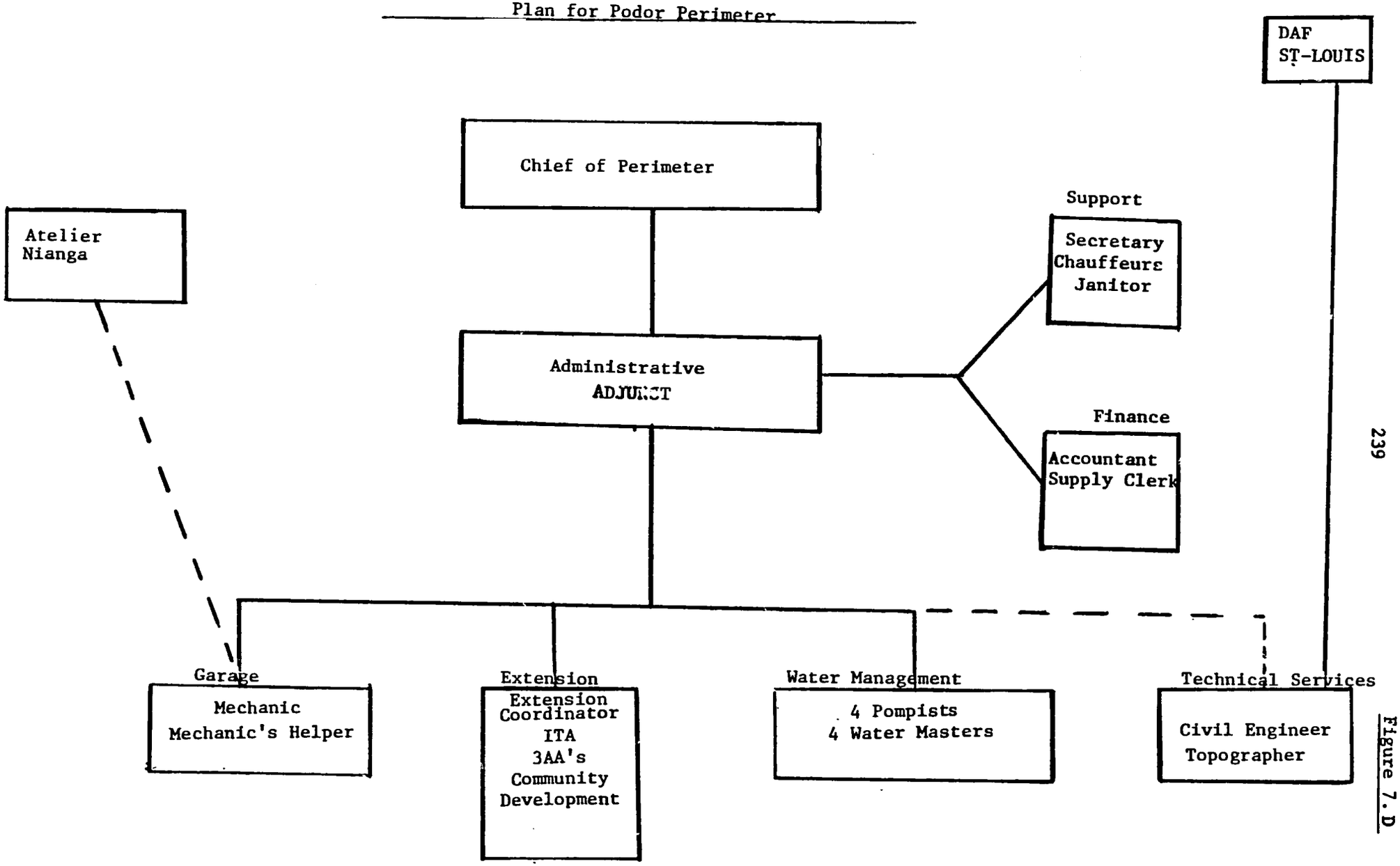





Figure 7.D

### 7.4.4. Mali

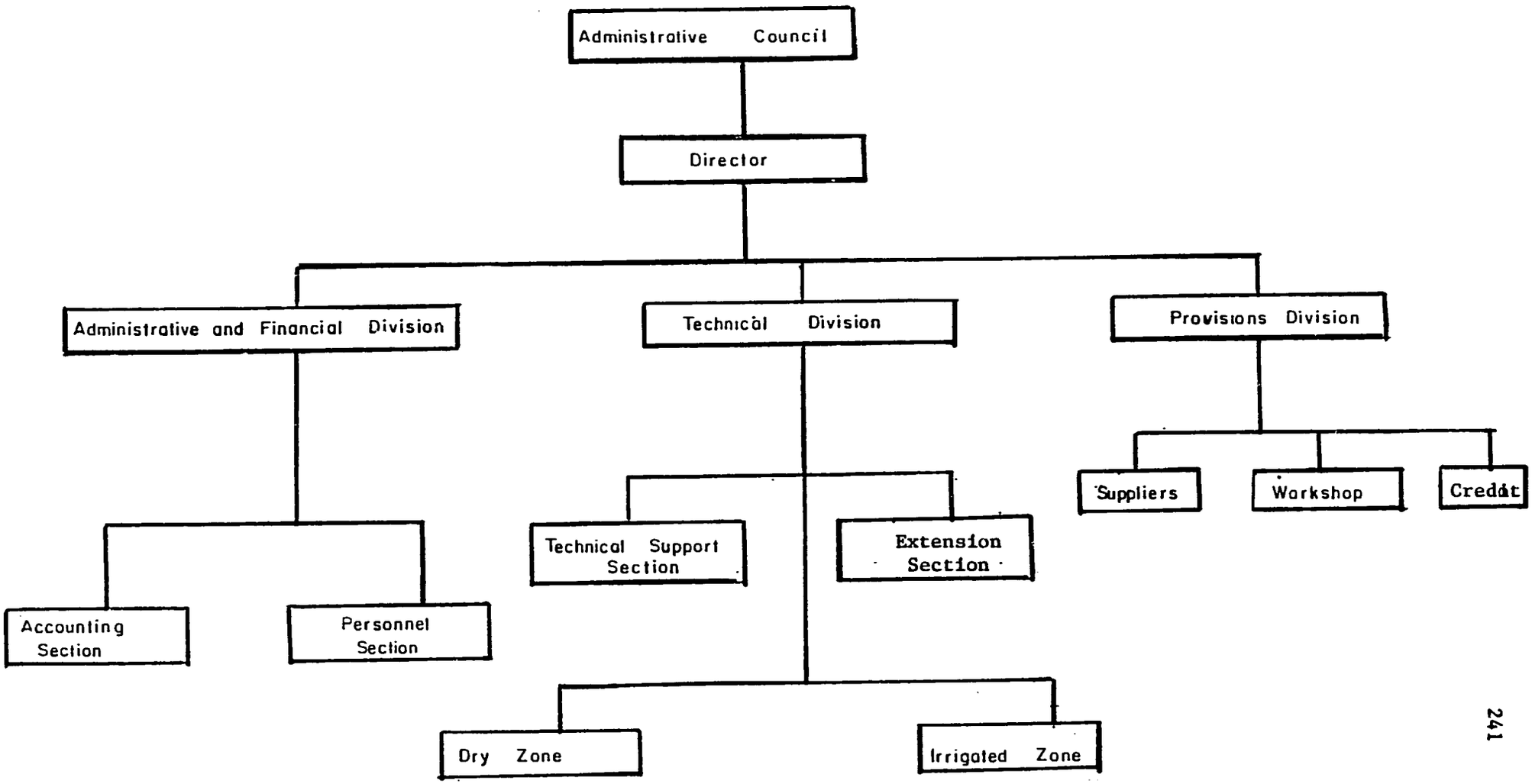
For the implementation of the Malian national program of IDP, there will be five major implementing agencies: OVSTM for the agricultural program, DNAFLA for the literacy program, BNDA for the rural credit program, Ministry of Health for the Health surveillance program, and the Public Works Service for the road feasibility study. Since the major part of the project concerns irrigated perimeter development and agricultural extension, OVSTM will have the greatest project implementation responsibilities. The project technical assistance team will be located at OVSTM in Kayes, and OVSTM will coordinate the participation of other agencies and private organizations for special training in management and accounting, equipment maintenance, business operation, and animal traction. Mali also has a secretariat for coordinating national participation in OMVS sponsored activities that is located in the Ministry of Mines and Energy. The role of OVSTM is further summarized below, while information on the other agencies is found in Volume III, Section 4.4.

#### 7.4.4.1. Organization of OVSTM

The OVSTM was created in 1981, but it is, in effect, the most recent name for the RDA that was first created in the Kayes Region in 1971. With the creation of OVSTM, the responsibilities for dryland as well as irrigated agricultural production and for organizing marketing and credit activities were merged into one institution. Organizationally, the OVSTM fits within the West Mali Division of the Directorate of Agriculture of the Ministry of Agriculture (which has 4 major directorates). Unlike its predecessor or SONADER and SAED, its budget is administered by the Ministry of Agriculture and its employees are civil servants of the Ministry. Indeed, approval of important expenditures needs the signature of the Minister of Agriculture and final approval by the controller's office of the Ministry of Finance. Decision-making on all levels is highly centralized within the top hierarchies of the Ministry, leaving little authority to the management of the OVSTM.

OVSTM has three divisions under the Director. These are the Administrative and Financial, Technical, and Provisions Divisions; each is subdivided into two or three sections. (The organizational chart is presented in Figure 7E.) Lack of decision-making responsibilities and lack of funds have rendered these divisions weak. The Accounting Section in the Administrative and Financial Division is not adequate for IDP, so that the technical assistance contractor will control local disbursement until accountants can be trained and a financial system developed and certified by USAID/Mali. The Provisions Divisions is hampered by lack of funds and lack of staff and its credit section is non-functional. It will not be revived since IDP will provide funds and technical assistance for credit to the BNDA (National Bank for Agricultural Development) rather than to OVSTM.

Figure 7E. ORGANIZATIONAL CHART OF OVSTM



The Technical Division, which is in charge of extension and irrigated perimeter development, has 45 agents. It has a section for extension work and another for extension training. Though it is well staffed, it is weak in technical expertise and its agents are not well trained. Yet, because 34 of its 45 agents are based in villages and not at headquarters, relationships between agents and farmers are far more congenial than is the case with either SONADER's or SAED's agents.

At the local level, the organization of perimeter extension work and management is broken down into zones (irrigated and rainfed agriculture), sectors, centers for rural development (CPR - Centre de Promotion Rurale), production units, and perimeters. The IDP will be involved essentially with the Irrigated Agriculture Zone.

### 7.4.4.2. Project Management

The project will provide a technical assistance team to OVSTM to assure proper management and technical implementation of the project and to train and upgrade OVSTM staff. The technical assistance team will include a project management and credit specialist, who will share project management responsibilities with the Director General of OVSTM, and specialists in agricultural extension and training, irrigation engineering, and social science. They will direct technical operations at Headquarters for the project and train Malian counterparts. The agricultural extension specialist will direct the technical division of OVSTM. The irrigation engineer will work as a deputy to the head of the technical support section and the sociologist will work as a deputy to the head of the extension and training division. The technical assistance team will also provide on-the-job technical training to counterpart OVSTM staff in project management, agronomy, extension pedagogy, audio-visual techniques, irrigation engineering contracting, contract supervision, and data collection as well as monitoring. The team will also organize annual in-service training programs for all the sector staff of OVSTM, and provide additional special training seminars in certain topics.

Initially, the technical assistance team will be responsible for local disbursements for operating costs of project. The project management/credit specialist will be the contractor chief of party and will be in charge of managing project resources in accordance with the project agreement. In later years of the project, after OVSTM personnel are trained and financial management systems are set-up and certified by USAID/Mali, OVSTM will gradually take over responsibility for project management. The staffing and management plan for OVSTM are further described in Volume III, Section 4.4.

## 7.5. ENVIRONMENTAL ANALYSIS SUMMARY

### 7.5.1. Approach

The PID review correctly anticipated the probability of a large number of separate irrigation projects and the resulting impracticality of a single environmental review. Thus, it was stipulated that Initial Environmental Examinations would be done at such time as distinct "subprojects" were prepared for funding approval during the life of the project.

Since the date of the PID review cable, modifications in AID environmental procedures have been effected. One such modification is proposed for application in the irrigation and feeder roads, development component of the IDP. Specifically it is proposed to make use of the Environmental Guidelines for Irrigation Projects(1) distributed worldwide in 1981 for trial use by AID missions, in lieu of the environmental review procedures set forth in Regulation No. 216. The Assistant Administrator for the Africa Bureau encouraged African missions to use these guidelines in a cover letter distributing these guidelines. Six copies of these guidelines were made available to the project paper design team at the onset of the IDP design work in October, 1981. They were used as a reference tool and checklist by the leader of the technical team in charge of designing the irrigation development, and by members of the social, economic and health teams(2).

Specifically, the checklist of environmental considerations for different stages of irrigation development would be used to determine the scopes of work for the specific irrigation development projects as they are prepared for funding. The advantage of this checklist in the IDP is conferred by its flexibility; checklists are set forth for the different stages of development -- pre-feasibility, feasibility and design, implementation and construction, and operation and maintenance.

This phasing of environmental considerations according to the state of development of the irrigation project presents a very workable solution for the implementation of this project, one which will be more meaningful, useful and therefore more effective than the application of the IEE review.

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(1) Environmental Guidelines for Irrigation, United States Man and the Biosphere Program and United States Agency for International Development; Robert E. Tillman; Millbrook, New York; June, 1981.

(2) During the course of the IDP design, the Mission's environmental advisor kept in touch with the design team members, and queried them upon the usefulness of the checklist and other orientation in the Environmental Guidelines for irrigation Development. They were unanimous in the expression of approval, and all noted taht the comprehensiveness of the checklist was unique in their experience and provided a good general frame of reference for all aspects of irrigation development.

It should be recalled that one of the most important environmental impacts of irrigation development concerns human health. The human health consequences of the irrigation development to be undertaken were anticipated in the PID and will be the object of the health component of the IDP. Thus, future environmental analysis can be focussed on the physical environmental changes that will be generated and upon the avoidance or reduction of associated, negative impacts.

The "Technical Analysis for Irrigation", Volume III, Section 3.2. contains the checklists to be used in preparing the scopes of work for planning and design of specific irrigation developments, at the various stages of development. It is proposed that compliance with the use of these guidelines be achieved through an approval or signing off process. Thus, in addition to approvals by project directors, the AID Environmental Officer in the mission concerned would review all site plans and would have to approve them as a condition subproject funding. It is estimated that this task could take up at least 10 % of the time of the mission environmental officers. A second important approval will be that of the IDP project's chief epidemiologist, who will review the site plans for feasibility and design, construction, operation and maintenance to ensure that development of irrigation and related roads and works does not neglect engineering solutions for reducing the risk of water related diseases.

### 7.5.2. Pesticides

Pesticides recommended to be used in the project are initially the same ones as those recommended for use in the Agronomic Research Project (625-0957). Given that the registration status and restrictions, if any, currently established for pesticides, or the choice of pesticide, may change between the time of project paper preparation and the implementation of the project's pest control activities, it is not prudent to request approval for pesticides now. It is proposed, therefore, that the present Project Paper employ the same procedure as that to be used in the Agronomic Research Project, (and the one in use in the Casamance Regional Development Project). Specifically, an IEE would be undertaken at such time as the project has identified and is ready to purchase specific pesticides for use in plant protection (or disease vector control). This requirement will be included as a convenant in the project agreement and project implementation plan. IEE's would be prepared by mission environmental officers, if qualified, or by IQC contractors.

## 8.0. CONDITIONS AND COVENANTS

### 8.1. Regional Conditions

As conditions precedent to the disbursement of funds under the project, the OMVS will take certain actions to assure efficient project implementation and the achievement of the results desired from the project. As conditions precedent to the first disbursement the OMVS will provide to RBDO:

1. An opinion of counsel for OMVS that the Project Agreement has been duly authorized and/or ratified by and executed on behalf of the OMVS and that it constitutes a valid and legally binding obligation of the OMVS in accordance with all of its terms;

2. A statement of the name of the person holding or acting in the office of the OMVS representative for the Project Agreement and any additional representatives, together with a speciment signature of each person specified in such statement.

3. Evidence that a Project Manager acceptable to AID has been appointed in the OMVS Directorate of Development and Coordination, and has been invested with the rank and authorities necessary to assure coordination and direction of divisional level staff.

4. Evidence that a Project Management Unit has been established under the direction of the Project Manager to direct and coordinate Project activities.

This is necessary since the project will require that implementation actions be taken and coordinated among the five divisions of the OMVS Directorate of Development and Coordination (DDC). Under the OMVS project manager a project management unit with national and expatriate technical staff will be established to direct and coordinate project activities.

During the initial years of project implementation local currencies will be disbursed directly by AID or by a U.S. technical assistance contractor, and the OMVS will gradually be given responsibility for local disbursement. Prior to disbursement under the Grant of local currencies to be controlled by the OMVS, or to the issuance by AID of any documentation pursuant to which such disbursements will be made, the OMVS will furnish to ADI, in form and substance satisfactory to AID, evidence that independent project-specific financial management and administrative systems have been set up under the direction of the Project Management Unit and such systems shall have been certified by AID as providing adequate identification of and control over the receipt and expenditure of AID funds under the requirements of Section 121 (d) of the Foreign Assistance Act of 1961, as amended.

### 8.2. National Conditions

There will be several additional conditions precedent to the disbursement of funds under the project agreements between USAID and each member state. The Member State Government will provide the respective USAID:

1. Evidence that a national program, with yearly targets acceptable to AID, has been established to reduce and eventually eliminate subsidies on credit, fertilizer, seeds and other agricultural production inputs.

2. An opinion of counsel for the member state acceptable to AID that the Project Agreement has been duly authorized and/or ratified by, and executed on behalf of the member state and that it constitutes a valid and legally binding obligation of the member state in accordance with all of its terms.

3. A statement of the name of the person holding or acting in the office of the member state representative for the Project Agreement, and of any additional representatives, together with a speciment signature of each person specified in such statements; and,

4. Evidence that a project manager has been appointed within each national entity responsible for project execution and has been accorded sufficient authority to direct the activities of his agency for project implementation.

As condition precedent to additional disbursements under the national grants with each member state the following will be required:

1. During the initial years of project implementation local currencies will be disbursed directly by AID or a U.S. contractor and member state implementing agency project managers will be trained in project and financial management. Prior to turning over disbursement responsibilities to the control of the member state implementing agencies, or to the issuance by AID of any documentation pursuant to which such disbursements will be made, the member state will furnish to AID in form and substance satisfactory to AID evidence that independent project--specific financial management and administrative systems have been set up under the direction of the Project Manager in each national entity and that such systems shall have been certified by AID as providing adequate identification of and control over the receipt and expenditure of AID funds under the requirements of Section 121 (d) of the Foreign Assistance Act of 1961, as amended.

2. Prior to the disbursement of funds under the Grant, or the issuance by AID of documentation pursuant to which disbursement will be made for the construction of irrigated perimeters or other irrigation works, the Parties shall, except as the parties may otherwise agree in writing, prepare or have prepared for such irrigation work, a site plan in accordance with the Envoronmental Guidelines for Irrigation Projects of AID, and such site plan shall have been approved by the Project Officer and AID environmental officer in the relevant AID mission.

3. Prior to the disbursement of funds under the Grant, or to the issuance by AID of documentation pursuant to which disbursement will be made for the construction of feeder roads or the procurement of pesticides, AID shall, except as the parties may otherwise agree in writing, prepare or have prepared an Initial Environmental Examination (IEE), an Environmental Impact Statement (EIS), or an Environmental Assessment (EA), as appropriate, and

approval shall have been received from the relevant AID mission and AID/ Washington, in accordance with AID environmental procedures, to proceed with such construction or procurement activity.

4. Prior to disbursement under the Grant, or to the issuance by AID of documentation pursuant to which disbursement would be made for the procurement of goods or services under contract with the member state, except as the parties may otherwise agree in writing, the member states shall furnish to AID, in form and substance satisfactory to AID:

i. invitations for bid or requests for proposals for the procurement of services or commodities estimated to exceed $100,000 including any local currency portion, prior to their issuance, and

ii. contracts financed under the Grant in excess of $100,000 including any local currency portion prior to their execution by the member states.

8.3. Special Covenants

8.3.1. Project Evaluation

The Parties agree to establish an information management system and an evaluation program as part of the project. Except as the Parties otherwise agree in writing, the program will include, during the implementation of the project and at one or more points thereafter:

(a) monitoring on a national and regional basis--of project inputs and outputs; of management objectives; and of socioeconomic data generated by the project implementation systems.

(b) evaluation of progress toward attainment of the objectives of the Project.

(c) identification and evaluation of problem areas or constraints which may inhibit such attainment.

(d) assessment of how such information may be used to help overcome such problems; and

(e) evaluation, to the degree feasible, of the overall development impact of the Project.

8.3.2. Secretariat for the OMVS Consultative Committee

The OMVS agrees to designate a secretariat for the Consultative Committee, and to delegate to it responsibility for preparation of reports, studies, evaluations related to the socioeconomic development of the River Basin.

### 8.3.3. National Project Coordination

Each member state agrees to establish a national interministerial mechanism mandated to assure policy and management coordination of project activities, and of other socioeconomic development activities in the Senegal River Basin. It is further agreed that strong linkages will be established between national technical services and the OMVS Development and Coordination Directorate.

### 8.3.4. Market Liberalization

The member states agree not to restrict marketing in the Senegal River Basin and to collaborate with the OMVS Policy Making Structure to study and develop programs for liberalizing agricultural and related markets and trade and for harmonizing pertinent national policies to the extent that they impact upon the Senegal River Basin. As part of this program, the member states agree: (1) to actively encourage through policy and administrative actions the participation of the private sector in the development of the River Basin and particularly in the areas of agricultural input supply and produce marketing; and (2) to permit farmer and farmers associations to control the purchasing of agricultural inputs and marketing of their produce.

### 8.3.5. Tax-Free Importation of Project Commodities

The member states agree to assure tax-free importation, and expedited entry to the project zones by the shortest route, of all commodities funded by AID under the Project, destined for activities in any of the member states. Shelf items and other commodities procured locally as provided by waivers will be exempt from local taxes and import duties.

### 8.3.6. Participant Training

The member states agree to assign personnel who have received training under the Project, to positions within the implementing agencies, suitable to the type and level of training that they have received.

# 9.0. EVALUATION PLAN

## 9.1. Description of Overall Plan

Two comprehensive evaluations are planned during the seven-year life of this project. The first evaluation will occur after three years and the second after six years of project implementation. Both evaluations will focus on the implementation of the major project components: (1) technical assistance, (2) training, (3) construction, (4) commodities, (5) rural credit, (6) 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.

### 9.1.1. Issues for the Evaluations

The foremost question in the evaluator's mind will be whether the project is progressing toward its goal and purposes. The IDP goal is to increase and secure agricultural production in the Senegal River Basin (SRB) through multi-donor financed integrated agricultural development. This issue should be addressed at the SRB regional level as well as the national levels. Key goal achievement variables are:

- total production of agricultural goods in the five project zones, by year;
- measures of productivity in agricultural production, by crop, in irrigated and rainfed areas of the five zones, by year;
- productivity and economic viability of the irrigted perimeters established through the project;
- measures of OMVS and member state institutional capabilities to foster development in the basin.

The secondary, but equally important question of project purpose attainment must also be addressed. The project's purposes include increasing food production to keep pace with population growth, promoting policy reforms that remove constraints to agricultural production, and improving the capability of private and public institutions in the SRB to manage the transition from traditional to irrigated agriculture.

The following is a list of key variables for purpose attainment verification:

- participation of farmer groups in planning of development of irrigated perimeters in their villages;

- irrigated perimeters (number, area, constructed or rehabilitated);
- roads constructed;
- extension agents trained;
- farmers trained by extension agents in production and processing techniques;
- amount of credit made available to farmers;
- OMVS monitoring system in place;
- studies done by OMVS;
- health monitoring units and surveillance systems established and equipment provided;
- training of epidemiologists, nurses, and field technicians;
- literacy training programs and training materials;
- training for staff of RDA's and other agencies;
- establishment and training in use of fish ponds, animal traction, woodlots, etc.
- establishment of farmer associations;
- studies conducted by RDA's;
- telecommunications system established in the Senegal zone.

The question of whether project inputs (funds) were actually used as scheduled must also be addressed. The key variable is actual spending, and each Mission uses established procedures to monitor this.

### 9.1.2. Analysis of the Information

Verification of project goals and purposes will be done primarily using a before-after comparison of information on the key goal and purpose variables. Information on the key variables will be collected before and after to show if there has been a change in the key variables. This type of analysis will be done at the regional level and for individual zones. The project evaluators may also choose to take some interim measures of key variables during project implementation to provide a preliminary indication of whether the project is moving in the direction of goal and purpose achievement. The preliminary design of the Management Information System focuses on these interim indicators.

Of course, changes in key variables cannot be attributed directly to the project. To build some case for a link between the project and observed changes, measures of possible intervening variables (such as: weather conditions; political positions of national governments; and fixed and shadow prices of agricultural inputs and production) should also be taken before, during and after project implementation.

To further test for an actual link between the project and observed changes, a control group consisting of similar areas, which are not receiving project outputs, will also be measured for key variables before and after project implementation. The changes in the project areas will then be compared to the changes observed in the control areas; in order to get an indication of which changes can be attributed to the project.

Analysis of output usage and output provision information should be done on an on-going basis as a major feature of the project monitoring system. This analysis would involve a comparison of planned to actual expenditures and output delivery.

### 9.1.3. Data Collection Methodology

A monitoring system is planned to collect data on actual provision of inputs and short-term project effects (purpose and goal-level achievement indicators). Each USAID will implement a monitoring system covering inputs and outputs and impact within their respective country. The RBDO office will also monitor regional level inputs, outputs and effects in similar fashion. The section on the preliminary design of the Management Information System (MIS) describes in detail how the information will be gathered. It is sufficient to say here, that the MIS will provide the necessary data of Inputs and Outputs as well as data on selected impact purpose and goal-level key indicators to the USAID project managers for project implementation and evaluation.

There is a great deal of impact-level information for the project zones already available from the OMVS. This data has been collectd annually for at least the last 2 years. Data collection is done by RDA field agents and the data flows upwards through a level of supervision to the Unit for Permanent Evaluation and Planning in the Directorate of Development and Coordination (DDC) of OMVS, where it is stored and analyzed. Of particular interest here, is the data on hectares under irrigation, hectares cultivated, harvested, unused, etc., along with the data on types of seeds used, amount of credit extended, and production figures.

This data will provide much of the information needed to evaluate project impacts as well as project outputs. In order to be useful, however, it must be validated by means of a scientifically designed sample survey of villages. This survey will be performed at the start of project implementation. If these data are shown to be valid and reliable, they can be used for project evaluation and monitoring. IDP will add this to the types of data that are regularly collected in this way, by working through OMVS and the RDA's to develop more comprehensive data collection forms. Data collection,

editing and tabulation procedures will be standardized and documented to improve the quality of these data. If the existing data is shown to be unreliable, a larger-scale farm survey may be needed to provide baselines information.

A large body of data has also been collected by the project design team and by the Agricultural Research II Project. This will contribute to the body of baseline information on some of the goal and purpose level variables.

9.2. First Evaluation (during year 4)

The first comprehensive evaluation will be conducted after 3 years of implementation of the 7-year project. As a minimum, the evaluation team will consist of 5 persons: an AID evaluation officer, an OMVS representative, an agronomist, an irrigation engineer and an agricultural economist. The agronomist, irrigtion engineer, and the agricultural economist will be contracted for two months 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. This evaluation team will concentrate on the evaluation of the overall regional project and the agricultural program; additional specialist will be required to evaluate health surveillance, feeder roads, telecommunications, and other technical project components.

At the time of the first evaluation: (1) the technical assistance will have been in place for about two years; (2) project field activities will have been underway for over a year; (3) most of the regional studies will have been completed; (4) substantial field level and special short-term training will have occurred; and (5) most commodities procured. The "Project Logical Framework", Section 10.2, provides the magnitude of outputs expected after three years of project implementation. The project should have progressed far enough to permit a compreshensive evaluation of all aspects of project implementation. However, there will be relatively fewer indicators for purpose and goal achievement, so that the first evaluation will look primarily at project input delivery and at financial and project management. Of particular importance will be:

(1) the operation of the annual workplan development and approval process involving the national agencies, USAID's, OMVS and RBDO;

(2) national agency project implementation under the sub-project agreements and under the annual workplans approved by RBDO and the USAID's;

(3) implementation of the field demonstration program for new technologies by the RDA's jointly with national research stations under protocol agreements;

(4) operation of all project activities to increase farmer and farmer association skills and management capabilities for irrigated agriculture;

(5) RDA performance in establishing the irrigation site development plans, construction contracting and construction supervision activities;

(6) regional and national financial management;

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

9.3. Second Evaluation (during year 7)

The second comprehensive evaluation will be conducted after the sixth year of project implementation. The five member team for the second evaluation would preferably consist of some of the same individuals who were on the first evaluation mission. In addition to evaluating all the elements considered during the first evaluation, the team will look closely at the established program and the production outputs in each project zone. The Project Logical Framework, Section 10.2, presents the magitude of outputs expected to be achieved by the time of the second evaluation.

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 certain aspects of the project. Alternatively, the recommendations of the evaluation team will be to close out AID actions in the River Basin and concentrate U.S. investments elsewhere.

9.4. Schedule of Evaluation and Monitoring Activities

| Activity | Timing | T/A Needed | Other Costs |
|---|---|---|---|
| 1. Comprehensive Design of Evaluation Plan | ASAP | 6 P/M | Mission |
| - Specify variables | | | Project |
| - Specify hypotheses | | | Staff time |
| - Experimental design and plan for analysis | | | |
| - Design data table formats | | | |
| - Outline of evaluation report(s) | | | |
| - Define data collection methodology | | | |
| - Design data processing system | | | |
| - Schedule all evaluation activities | | | |
| 2. Preliminary Design of MIS | 6/82 | --- | --- |

| | | | |
|---|---|---|---|
| 3. Comprehensive Design of MIS | | | |
| - Secure cooperation of all groups | ASAP | 8 P/M | Mission |
| - List information needs at all levels | | | Project |
| - Develop plans for analysis of data | | | Staff |
| - Design data table plans | | | Time |
| - Develop formats and timing for reports on results | | | |
| - Define data sources | | | |
| - Develop planning and reporting forms | | | |
| - Test forms and procedures | | | |
| - Refine forms and procedures, as needed | | | |
| - Arrange for editing, processing and storage of data | | | |
| 4. Baseline Data validation survey | YR-1 | 12 P/M | Interviewers |
| - Design of survey and sampling | | | Supervisors |
| - Methods | | | |
| - Implement survey | | | |
| - Process results (manually) | | | |
| - Analyze results | | | |
| - Procedure report on reliability of existing data | | | |
| 5. Large-scale Baseline survey, if indicated | YR-1 | 30-36 P/M (includes data processing time) | " " |
| 6. Produce annual/semi-annual reports on MIS information | YR-1 | ------ | Mission Staff Time |
| 7. Distribute relevant MIS information all levels, for project implementation planning. Conduct Seminars in use of information | YR1-7 | 2 P/M | Mission Staff Time-Host-Country Time |

| | | | | |
|---|---|---|---|---|
| 8. | Conduct mid-term analysis of INPUTS, OUTPUTS, GOAL, PURPOSE level indicators: Baseline vs. mid-point | YR-4 | 0-2 P/M | " " |
| 9. | Conduct large-scale after-project survey, if necessary | YR-7 | 15-20 P/M | Interviewers Supervisors |
| 10. | Conduct Final Before-mid point-After analysis and write final report for regional and national levels | YR-7+ | 4-8 P/M | Mission Staff Time |

ANNEX 10.1.

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RUTAIJ/AMEMBASSY ABIDJAN 3871
INFO RUFNPS/AMEMBASSY PARIS 3738
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TAGS:

SUBJECT: PID REVIEW CABLE - OMVS INTEGRATED DEVELOPMENT PROJECT (625-0621)

REF: (A) AULT MEMO OF 9/26; (B) AULT/FLEURET/BLOOM MEMO OF 10/30; (C) MOORE TO COKER MEMO OF 11/4; (D) PARIS 34192

1. PID REVIEW HELD OCTOBER 31 AND WAS ATTENDED BY AA/AFR, DAA/AFR AND REPRESENTATIVES OF AFR (SWA, DR, DP), PPC, DSB, AF (STATE) AND CONSULTANTS DRS. STRYKER, SACKS AND DOWNS.

ACTION
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PML
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2. UPON RECOMMENDATION OF THE REVIEW COMMITTEE, AA/AFR HEREBY DEFERS APPROVAL OF PID PENDING RECEIPT AND APPROVAL OF PID ADDENDUM DISCUSSED BELOW. HOWEVER, IN COURSE OF CLEARING THIS MESSAGE, THE RELEVANT OFFICES WANTED TO MAKE QUITE CLEAR THAT AID IS FULLY SUPPORTIVE OF THE OVERALL OBJECTIVE OF RIVER BASIN DEVELOPMENT AS PRESENTED BY THIS PID, AND FULLY EXPECTS TO SEE SOME PROGRAM OF THIS NATURE TAKE PLACE IN THE SENEGAL RIVER BASIN. THIS IS CONSISTENT WITH THE AGENCY'S LONG-TERM INTERESTS IN THE SAHEL, FOR, AS NOTED IN THE AFRICA PROGRAM PORTION OF THE FY 1980 CONGRESSIONAL PRESENTATION, QUOTE THE DEVELOPMENT OF THE WATER BASINS IS A SIGNIFICANT WAY TO REDUCE THE REGION'S ENDEMIC

VULNERABDLN
TO RECURRENT DROUGHT. IN ORDER TO PREVENT THE DISASTROUS CONSEQUENCES OF MISMANAGEMENT OF THIS ONE GREAT NATURAL RESOURCE, AS WELL AS MAXIMIZE THE AGRICULTURAL POTENTIAL FOR THE SAHEL, AID ENCOURAGES COMPREHENSIVE AND INTEGRATED PLANNING FOR THE WATER BASINS UNQUOTE.

A. CERTAIN ISSUES MUST BE CLARIFIED BEFORE PID APPROVAL IS POSSIBLE. THIS WILL BE DONE BY MEANS OF A REPORT (OUTLINED BELOW) TO BE SUBMITTED AS SOON AS POSSIBLE, BUT IN ANY CASE NO LATER THAN JANUARY 15, 1981, FOR AID/W REVIEW AND APPROVAL AND WHICH WILL BECOME ADDENDUM TO PID.

B. OTHER ISSUES MUST BE CLARIFIED IN THE PP. THESE ARE



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LISTED IN PARA 4.

C. IN THE INTERIM, MISSION IS AUTHORIZED TO RECRUIT AND FIELD PP DESIGN TEAM.

D. AN INTERIM MEETING IS TO BE HELD IN DAKAR IN MARCH/APRIL TO ASSIST IN MISSION REVIEW OF PROGRESS ON PROJECT DESIGN AND PROVIDE GUIDANCE AS NEEDED ON RESOLUTION OF OUTSTANDING ISSUES.

3. FOLLOWING ARE TWO CRITICAL ISSUES TO BE ADDRESSED IN PID ADDENDUM. AID/W WANTS THE RATIONALE FOR THE MANNER AND METHOD SELECTED TO ADDRESS POTENTIALLY NEGATIVE CONSEQUENCES OF THE PROJECT. WE DO NOT SEEK FULL DETAILS ON DESIGN, IMPLEMENTATION OR IMPACT AT THE PID LEVEL. ADDITIONAL DETAILS ON THE NATURE OF PPC'S CONCERNS ARE INDICATED IN THE REFERENCES CARRIED TO DAKAR BY PAUL FUSBY.

A. SOCIAL IMPACT - THE PID PREDICTS MASSIVE SOCIAL DISJUNCTION AS A CONSEQUENCE OF BASIN DEVELOPMENT BUT DOES NOT INDICATE HOW THESE EFFECTS MAY BE MITIGATED OR AVOIDED. THEY DERIVE FROM THE PHYSICAL DISPLACEMENT OF PEOPLE AS THE DAM WATERS RISE; THE INTERDICTION OF GRAZING PATTERNS THAT SUPPORT LARGE NUMBER OF PASTORALISTS; THE RESTRUCTURING OF LAND TENURE, UTILIZATION AND TRADITIONAL (RECESSION) AGRICULTURE PATTERNS AMONG AGRICULTURALISTS IN THE PROJECT AREA; THE CLOSURE OF DOWNSTREAM FISHERIES THAT SUPPORT UNSPECIFIED NUMBERS OF PEOPLE.

(1) THE PID ADDENDUM MUST OUTLINE REPEAT OUTLINE THE APPROACHES TO BE TAKEN TO ENSURE THE PARTICIPATION OF THE FOUR AFFECTED POPULATIONS MENTIONED ABOVE IN DEVELOPMENT DECISIONS REGARDING THE RIVER BASIN, SO AS TO MAXIMIZE BENEFICIAL AND SOCIALLY ACCEPTABLE CONSEQUENCES OF THOSE DECISIONS. THIS MEANS THAT DEVELOPMENT IN THE BASIN SHOULD BE PLANNED SO AS TO MINIMIZE NEGATIVE SOCIAL IMPACTS

AND TO CREATE OPPORTUNITIES FOR AS MUCH OF THE POPULATION AS POSSIBLE. DESCRIPTION SHOULD BE PROVIDED OF THE PROPOSED METHODS FOR THE FOLLOWING:

(A) DETERMINING AND MITIGATING ANY LIKELY ADVERSE EFFECTS OF PROPOSED INTERVENTIONS ON PASTORAL POPULATION.

(B) IDENTIFICATION OF SOCIAL CONSIDERATIONS IN DETERMINING OPTIMAL SIZE AND MANAGEMENT OF IRRIGATED PERIMETERS.

(C) CALCULATION AND RECOGNITION OF ACTUAL SOCIO-ECONOMIC COST/BENEFIT OF PROPOSED INTERVENTIONS.

(D) ENHANCING THE ROLE OF RURAL POPULATION PARTICIPATION IN PLANNING AND DECISION MAKING.

(2) THERE APPEARS TO BE ALREADY IN EXISTENCE A LARGE BODY
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OF WORK ON THE SOCIOLOGY OF THE AREA - INCLUDING A COMPREHENSIVE AND CONTINUING UNDP SOCIO-ECONOMIC STUDY WHICH AID HAS HELPED FINANCE. THE PID ADDENDUM SHOULD INCLUDE A SURVEY OF THE EXISTING INFORMATION, SUCH AS STUDIES OF MIGRATION, THE ROLE OF WOMEN, EFFECTS OF CHANGE ON LAND TENURE AND RELATIONSHIPS OF THE DIFFERENT ETHNIC GROUPS, AND SHOW HOW THE PROPOSED PROJECT IS CONSISTENT WITH AND WOULD UTILIZE THE KNOWLEDGE CONTAINED IN THESE STUDIES. (REF (B) AND (D), PARA 3, 5, 6).

B. HEALTH - GIVEN EXPERIENCE ELSEWHERE IN AFRICA, IT IS BELIEVED THAT MAJOR NEGATIVE HUMAN AND ANIMAL HEALTH IMPACTS COULD ENSUE FROM CHANGES IN ANIMAL HUSBANDRY PATTERNS; CHANGES IN WATER CONTROL AND AGRICULTURAL CYCLES INCLUDING THEIR CONTRIBUTION TO DISEASE TRANSMISSION; CHANGES IN THE RELATIONSHIP BETWEEN HUMAN AND ANIMAL MOVEMENTS; AND CHANGES IN THE ARRAY OF FOODS AVAILABLE TO PEOPLE IN THE PROJECT AREA. THE PID PROPOSES QUOTE THREE HEALTH SURVEILLANCE/MONITORING/CARE POSTS UNQUOTE IN THE NEAR-TERM PROGRAM PLUS PLANNING AND DESIGN QUOTE TO READY FOR MULTI-DONOR FINANCING A HEALTH CARE SYSTEM TO BE ESTABLISHED TO OFFSET THE NEGATIVE HEALTH ASPECTS OF IRRIGATION AND TO IMPROVE THE GENERAL LEVEL OF HEALTH IN THE BASIN UNQUOTE. BASED ON THE OMVS ENVIRONMENTAL ASSESSMENT (SECTION ON HEALTH), THE YALE BASIN HEALTH TEAM'S RECENT REPORT TO USAID AND OMVS AND ANY OTHER APPROPRIATE MATERIAL, THE PID ADDENDUM SHOULD INCLUDE THE FOLLOWING (PREFERABLY IN A SEPARATE HEALTH SECTION):

(1) A DISCUSSION OF LIKELY DISEASE PROBLEMS FORESEEN AS A RESULT OF IRRIGATION, ANIMAL MOVEMENTS, AND RELATED MATTERS, AND THE PROPOSED APPROACH FOR DEALING WITH SUCH

PROBLEMS ON BOTH THE REGIONAL AND NATIONAL LEVELS. (SEE REF (A) AND (B). PID IS NOT CLEAR, FOR EXAMPLE, HOW AIDS IRRIGATED PERIMETER PROJECTS, INCLUDING EXPERIMENTAL LIVESTOCK PERIMETERS, MIGHT ADDRESS POSSIBLE HEALTH CONSEQUENCES OF THEIR IMPLEMENTATION; HOW CONSTRUCTION OF THE DAMS WILL IMPACT ON THESE CONCERNS; WHETHER AND HOW THE PROPOSED HEALTH SURVEILLANCE POSTS COULD PLAY A MORE ACTIVE PART IN PROTECTING
WHE HEALTH OC POPULATIONS AFFECTED BY
DAM AND IRRIGATION DEVELOPMENT (SUCH AS BEING LOCATED ON AID FUNDED IRRIGATED PERIMETERS).

(2) A DISCUSSION OF PLANS TO UNDERTAKE DESIGN, WITH OTHER DONORS AND THE RELEVANT HOST COUNTRY ORGANIZATIONS, OF AN EFFECTIVE PRIMARY HEALTH CARE (PHC) SYSTEM UNDER A SEPARATE PROJECT, AS NOTED IN PARAGRAPH 5B ABOVE, WITH APPROPRIATE PREVENTIVE MEASURES. SUCH A SYSTEM SHOULD BE GEARED TO ADDRESS DISEASE PROBLEMS ARISING FROM CONSTRUCTION OF THE DAMS AND SUBSEQUENT INFRASTRUCTURE, AS WELL AS CARRY OUT THE MORE USUAL FUNCTIONS OF SUCH A SYSTEM (MATERNAL AND CHILD HEALTH, IMMUNIZATIONS, ETC.). THE TIMING OF PHC SYSTEMS DESIGN SHOULD BE RELATED TO SCHEDULES FOR DAM AND IRRIGATION CONSTRUCTION, TO AVOID SUBSTANTIAL LAG BETWEEN

THE APPEARANCE OF MAJOR HEALTH PROBLEMS AND MEMBER STATES' CAPACITY TO ADDRESS THEM.

4. FOLLOWING ARE ISSUES TO BE ADDRESSED DURING PP DESIGN:

A. HEALTH

(1) SPECIFY HOW THE PROJECT WILL MINIMIZE ANY ADVERSE EFFECTS OF DISEASE WHICH CAN REASONABLY BE EXPECTED TO RESULT FROM THIS ACTIVITY, INCLUDING THROUGH CIVIL ENGINEERING (E.G. PERIMETER DESIGN; PROVISION OF PIPED WATER) AND COMMUNITY DEVELOPMENT (E.G. HEALTH EDUCATION AND ACTION PROGRAMS), AND DISCUSS THE MERITS OF VARIOUS ALTERNATIVES, INCLUDING IF ONE OR MORE DAMS ARE BUILT AS WELL AS IF NO DAMS ARE BUILT. DISCUSSION SHOULD INCLUDE SPECIFIC RECOMMENDED RESPONSES BY OMVS AND/OR MEMBER STATES TO EXPECTED CHANGES IN THE PATTERNS OF ZOONOTIC DISEASES AS ANIMAL MOVEMENTS AND HUSBANDRY PATTERNS CHANGE.

(2) PROVIDE SOME INDICATION OF WHAT IS NEEDED TO STRENGTHEN BILATERAL AND REGIONAL HEALTH ORGANIZATIONS TO DEAL WITH DISEASE PROBLEMS AS THEY ARISE. POINTS SHOULD TAKE INTO ACCOUNT CURRENT CAPACITY OF THE INDIGENOUS HEALTH INSTITUTIONS, RELATIVE PRIORITIES OF REGIONAL AND NATIONAL ORGANIZATIONS SUPPORTING THESE INSTITUTIONS AND CAPACITY TO SUPPORT RECURRENT COSTS OF HEALTH PROGRAMS. PP SHOULD ALSO

NOTE WITH REGARD TO PRIMARY HEALTH CARE SYSTEM REFERRED TO IN PARAGRAPH 3B ABOVE THAT WHEN THE SYSTEM IS PREPARED FOR MULTI-DONOR FINANCING, THE PROPOSAL SHOULD CONTAIN DATA ON THE COST/EFFECTIVENESS OF ESTABLISHING VARIOUS LEVELS OF DISEASE PREVENTION/RESPONSE CAPABILITY.

B. INSTITUTIONAL CAPACITY - OMVS IS AN UMBRELLA ORGANIZATION RESPONSIBLE CHIEFLY FOR DAM CONSTRUCTION, NAVIGATION AND WATER FLOW CONTROL, AND PORTS MANAGEMENT. OTHER DEVELOPMENT INFRASTRUCTURE IS SEEN AS PRIMARILY THE RESPONSIBILITY OF MEMBER STATES. THE OMVS IS CHARGED WITH OVERALL QUOTE COORDINATION UNQUOTE OF BASIN DEVELOPMENT EFFORTS. IN ADDITION TO SPELLING OUT HOW IMPROVED OMVS
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PLANNING CAPACITY WILL SUPPORT THIS COORDINATION ROLE, THE PP SHOULD STATE HOW OMVS-MEMBER STATE INSTITUTIONAL LINKAGES WILL BE CREATED AND MANAGEMENT AUTHORITIES SORTED OUT. IN ADDITION, PP SHOULD DESCRIBE MECHANISMS FOR COORDINATION BETWEEN OMVS AND NATIONAL GOVERNMENTS TO ENSURE THAT THERE IS NO CONFLICT IN THE ROLE OF THE REGIONAL DEVELOPMENT AGENCIES (RDA) AS SEEN BY THEIR NATIONAL GOVERNMENTS AND BY THE OMVS.

C. SEQUENCING OF PROJECT ELEMENTS - THE SEQUENCING OF VARIOUS PHASES OF PROGRAM ACTIVITY TO COINCIDE WITH OTHER DONOR'S PLANNED CONTRIBUTIONS AND ACTUAL DAM AND PERIMETER CONSTRUCTION WOULD APPEAR ESSENTIAL. THEREFORE, THE PP IMPLEMENTATION PLAN SHOULD RELATE PROJECT EVENTS TO EXTERNAL PROGRESS AS MUCH AS POSSIBLE. THE PP SHOULD ALSO SPELL OUT EXPECTATIONS AS TO WHAT WILL HAPPEN TO THE AGRICULTURALISTS, PASTORAL-NOMADS, FISHERMEN, ETC. DURING THE EXTENDED TRANSITION PERIOD TO NEW AGRICULTURAL PATTERNS AND WHAT AID, OMVS AND OTHER DONORS MAY DO TO FACILITATE THE TRANSITION.

D. LIVESTOCK EXPERIMENTATION - HOW WILL THE CHANGES IN LIVESTOCK PRODUCTION PATTERNS AFFECT USE OF MANURE, USE OF MILK, AND TRANSMISSION OF ZOONOTIC DISEASES AMONG THE VARIOUS ETHNIC GROUPS AFFECTED? (SEE REF (A)). THE PP IS TO EXAMINE FULLY APPROPRIATE ALTERNATIVE LIVESTOCK STRATEGIES IN LIGHT OF EXPERIENCE TO DATE WITH EXPERIMENTAL LIVESTOCK PROGRAMS IN AFRICA. USAID AND OMVS SHOULD CONSIDER WHETHER LIVESTOCK EXPERIMENTATION WOULD BE MORE APPROPRIATE UNDER THIS PROJECT OR DEFERRED FOR ANOTHER OPPORTUNITY.

E. ECONOMIC AND FINANCIAL ANALYSIS - ALL COSTS ATTRIBUTABLE TO THE PROJECT OVER ITS ECONOMIC LIFE, INCLUDING RECURRENT COSTS, SHOULD BE INCLUDED IN THE PP ECONOMIC

ANALYSIS. THE ECONOMIC ANALYSIS WILL CONSIDER THE ATTRIBUTABLE BENEFITS AND COSTS (CAPITAL AND RECURRENT) OF POSSIBLE SCENARIOS: (1) PERIMETERS ONLY, (2) PERIMETERS PLUS ONE DAM AND (3) PERIMETERS PLUS 2 DAMS. ESTIMATES OF BENEFITS AND COSTS SHOULD ALSO BE IDENTIFIED SEPARATELY FOR IRRIGATED PERIMETERS, LIVESTOCK PERIMETERS, ROAD REHABBILIATION AND HEALTH ACTIVITIES AND QUANTIFIED TO EXTENT POSSIBLE OR AT LEAST ORDERS OF MAGNITUDE AND DIRECTION OF IMPACT ON OVERALL IRR. CALCULATION OF IRR SHOULD INCLUDE ESTIMATION OF BOTH SOCIAL AND ENVIRONMENTAL COSTS/BENEFITS. ASSUMPTIONS USED FOR CALCULATIONS SHOULD BE CLEARLY SPELLED OUT IN PP.

F. POPULAR PARTICIPATION - INTENDED BENEFICIARIES, BOTH MEN AND WOMEN, SHOULD BE CONSULTED IN THE DESIGN PHASE AND THE PP SHOULD DISCUSS HOW THIS WAS ACCOMPLISHED.

G. LABOR/LAND RATIOS - THE PLANNED LABOR/LAND RATIOS SHOULD BE RE-EXAMINED FOR THEIR FEASIBILITY AND DESIRABILITY AND IF NECESSARY ALTERNATIVE CROP MIXES EXPLORED

FROM THIS POINT OF VIEW. (SEE REF (C)). ALSO, WANT TO REAFFIRM THAT PP SHOULD CONSIDER POTENTIAL LABOR CONSTRAINT AS DISCUSSED IN ISSUE SIX, PAGE A-5 OF PID.

H. RELATIONSHP WITH OTHER DONORS - THE USAID WAS REQUESTED TO CONTINUE CLOSE COORDINATION WITH OTHER DONORS AND CLUB/CILSS. OTHER DONORS HAVE MADE SUBSTANTIAL CONTRIBUTIONS FAR IN EXCESS OF THIS PROJECT, INCLUDING DAM FINANCING, STUDIES, PERIMETERS CONSTRUCTION, ROADS, PORTS, AND INSTITUTION BUILDING. U.S. WILL BE A STRONG PARTNER WITH OTHER DONORS, WITH THE U.S. EMPHASIS ON PLANNING AND IMPLEMENTATION OF DOWNSTREAM DEVELOPMENT. THE PP SHOULD ALSO DISCUSS THE PRESENT AND PLANNED ACTIONS OF OTHER DONORS (WORLD BANK, CANADA, FRANCE, OPEC STATES, ETC.); THE NATURE OF OMVS AND AID'S INTERACTIONS WITH OTHER DONORS; THE POSSIBILITY OF OTHER DONORS NOT FULLY MEETING THEIR COMMITMENTS TO BASIN DEVELOPMENT AND THE EFFECT OF THAT ON BOTH CURRENT AID-FUNDED ACTIVITIES AND PROPOSED FUTURE AID-FINANCING OF BASIN DEVELOPMENT ACTIVITIES. PARTICULAR ATTENTION SHOULD BE GIVEN TO THE POSSIBLE EFFECTS OF INCOMPLETE OR DELAYED CONSTRUCTION OF DAMS AND INCOMPLETE DEVELOPMENT OF MARKETING INFRASTRUCTURE. GIVEN IMPORTANCE OF POLICY CHANGES ON PART OF OMVS AND ITS MEMBER STATES (E.G., PRICE POLICY) PP SHOULD DISCUSS ROLE OTHER DONORS AS WELL AS USAID WILL PLAY IN ORDER TO EFFECT EQUITABLE POLICY CHANGES.

I. IRRIGATED PERIMETERS - INTRODUCTION OF A PUMP TO IRRIGATION INTRODUCES COMPLEX MECHANICAL AND ELECTRICAL

TECHNOLOGY AT THE FARM COMMUNITY LEVEL WHERE LITTLE OR NONE HAS EXISTED BEFORE. THIS IS A QUANTUM JUMP IN TECHNOLOGY AND HAS A SIGNIFICANT IMPACT ON THE TRAINING REQUIREMENTS AT THE FARM LEVEL IN TERMS OF PUMPED IRRIGATION OPERATION AND SYSTEM MANAGEMENT. THE HIGHER INVESTMENTS IN TECHNOLOGY REQUIRE CORRESPONDINGLY HIGHER INVESTMENTS IN PURELY AGRICULTURAL INPUTS IN ORDER TO REALIZE SUFFICIENT INCREASES IN AGRICULTURE PRODUCTION TO PAY FOR THESE INCREASED COSTS. THIS MORE THAN ANYTHING ELSE REQUIRES A
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THOROUGH ANALYSIS OF THE DEVELOPMENT OF THE FARMER ORGANIZATIONS IN A PUMPED IRRIGATION PROGRAM.

(1) DUE TO SPECIALIZED NATURE OF PUMP IRRIGATION, PP SHOULD SPELL OUT IN DETAIL HOW PERIMETER MANAGEMENT WILL OPERATE INCLUDING INVOLVEMENT OF FARMERS AS INDIVIDUALS OR THROUGH THEIR GROUPS IN POLICY MAKING, MECHANICAL AND LOGISTICS SUPPORT, TECHNICAL AGRICULTURAL PACKAGES TO BE USED, AND WATER MANAGEMENT.

(2) PP SHOULD EXAMINE VARIOUS ASPECTS REGARDING WATER FOR IRRIGATION INCLUDING GROUNDWATER, SURFACE WATER AND RELATED PUMPING SYSTEMS. THEREFORE SUGGEST PP TEAM INCLUDE IRRIGATION ENGINEER WHO IS CAPABLE OF COVERING THESE CONCERNS, OR WILL BE ALLOWED TO DRAW ON NECESSARY EXPERTS AS NEEDED WHETHER THROUGH VISITS BY THEM TO THE SENEGAL RIVER BASIN OR BY PROVIDING SUFFICIENT TECHNICAL INFORMATION TO THEM SO THAT THEY CAN PERFORM THEIR CALCULATIONS IN THE U.S. THE PUMP SELECTION AS WELL AS ENERGY AND OPERATION COSTS INCLUDING INSTITUTIONS AND TRAINING REQUIRED FOR PUMPING AND PRIME MOVER SYSTEMS ARE OF PARTICULAR CONCERN.

(3) IN EXPANDED DISCUSSION OF ADVANTAGES OF SMALL VS. LARGE PERIMETERS, PP SHOULD EXPLAIN IF USAID IS USING BAKEL MODEL OR POSSIBLE MIX OF APPROACHES, THUS DEFINING ADEQUATELY THE TECHNICAL PACKAGE TO BE USED.

(4) THE REVIEW CONCLUDED THAT IT MAY NOT BE NECESSARY TO IDENTIFY IN THE PP EVERY PERIMETER WHICH U.S. WILL HELP DEVELOP PROVIDED THE PP SETS FORTH SUFFICIENTLY DETAILED CRITERIA FOR PERIMETER SELECTION AND PLANS/COST ESTIMATES FOR CONSTRUCTION. IN THIS CASE, SEPARATE DOCUMENTATION WOULD BE PROVIDED FOR INDIVIDUAL PERIMETERS FOR USAID APPROVAL PRIOR TO OBLIGATION OF FUNDS FOR CONSTRUCTION, CONSISTENT WITH FAA SECTION 611 REQUIREMENTS. PP SHOULD PROVIDE ANALYSES OF SEVERAL INDIVIDUAL PERIMETER SUBPROJECTS REPRESENTING THE ECONOMIC RANGE WHICH WILL BE ENCOUNTERED AS WELL AS THE IDEALIZED AVERAGE CASE. USAID MAY WANT TO BEGIN THINKING ABOUT THE 611(A), 611(B), AND 611 (E) QUESTIONS NOW, IF IT HAS NOT YET DONE SO. DESK

IS POUCHING GC/AFR MEMO (BARRINGTON TO MCDONALD) OF NOVEMBER 20 FOR USAID REFERENCE RE FAA SECTION 611 CONSIDERATIONS.

J. RURAL ROADS - THE REVIEW DID NOT RAISE ANY CONCERNS. USAID MAY FIND THE RESULTS OF PPC CONFERENCE THIS SUBJECT NOVEMBER 12-14 USEFUL. AID/W WILL POUCH REPORT WHEN AVAILABLE. GC/AFR MEMO MENTIONED IN PARA 4I(4) ABOVE, ALSO PERTAINS TO 611 REQUIREMENTS FOR ROAD REHABILITATION, ETC.

K. RESETTLEMENT CRITERIA - IT WAS NOTED THAT MAJOR SOCIAL DISRUPTION IS ALREADY OCCURRING IN THE BASIN AS THE RESULT OF DROUGHT, OUT-MIGRATION, LIVESTOCK LOSSES, FARMING CHANGES, ETC. ONE OF THE PRIMARY PROJECT OBJECTIVES IS THE



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AMELIORATION OF THE ONGOING EFFECTS OF THESE CHANGES IN THE BASIN ENVIRONMENT AND, WHERE POSSIBLE, THE UTILIZATION AND STRENGTHENING OF LOCAL INSTITUTIONS. IN THIS REGARD, AN EQUITABLE SELECTION CRITERIA DEALING WITH PEOPLE RESETTLING AS A RESULT OF BASIN DEVELOPMENT ACTIVITIES SHOULD BE DEVISED AND REVIEWED IN THE PP.

L. ENERGY - PP SHOULD CONTAIN DISCUSSION OF ENERGY INCLUDING AN ANALYSIS OF ENERGY COSTS (E.G., IMPORTED FUEL FOR PUMPS) FOR DIFFERENT ASPECTS OF THE PROJECT, THE POSSIBILITIES OF ALTERNATIVE ENERGY SOURCES, AND THE EFFECT OF BASIN DEVELOPMENT GENERALLY ON FUEL SOURCES AS THEY RELATE TO THIS PROJECT (E.G. CHANGE IN WATER AVAILABILITY TO FOREST RESOURCES, WHICH AFFECTS FUELWOOD).

M. SAHEL ABSORPTIVE CAPACITY

(1) THIS IS ONE OF THE MAJOR ISSUES THAT MUST BE DEALT WITH BY THE PP-DESIGN TEAM, BECAUSE THE DEVELOPMENT OF LOCAL CAPABILITY IS CRUCIAL TO THE PROJECT'S SUCCESS. THE CURRENT CAPACITY OF THE OMVS WILL BE REVIEWED. DISCUSSION OF THIS ISSUE SHOULD INCLUDE THE STRENGTHENING OF THE OMVS ITSELF AS WELL AS THE RELEVANT MEMBER STATE ORGANIZATIONS (SAED, SONADER AND OVSTM). PP SHOULD MAKE VERY CLEAR THE RATIONALE AND RESOURCES FOR INVOLVING THESE ENTITIES IN IMMEDIATE INFRASTRUCTURE WORK RATHER THAN STRENGTHENING MANAGEMENT, ETC. FIRST. AS MALI HAS ATTACHED LESS IMPORTANCE TO DOWNSTREAM DEVELOPMENT IN THE SENEGAL BASIN THAN HAVE SENEGAL AND MAURITANIA, EXTENSIVE DISCUSSION ON MALI'S ROLE WILL HAVE TO BE HELD WITH USAID/MALI AND THE GRM.

(2) IT IS ACKNOWLEDGED THAT THE MEMBER STATES' RURAL DEVELOPMENT ORGANIZATIONS DO NOT SUFFICIENTLY INVOLVE THE LOCAL POPULATION IN DEVELOPMENT, AND THE PP SHOULD DESCRIBE WAYS

IN WHICH AID WILL ASSIST AN AMELIORATION OF THIS PROBLEM. PP SHOULD ALSO INCLUDE A DETAILED DISCUSSION OF THE TRAINING OF THE LOCAL POPULATION INCLUDING TRAINING TO BE PROVIDED WOMEN. PURPOSE OF TRAINING SHOULD BE TO EQUIP PEO-
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PLE TO ASSUME INCREASING RESPONSIBILITY FOR THEIR OWN DEVELOPMENT. EDUCATION AND TRAINING AT THE LOCAL LEVEL FOR ALL AGES SHOULD BE AN INTEGRATED PART OF RESETTLEMENT REGARDING THE INTRODUCTION OF NEW CROPS AND/OR TECHNOLOGY.

(3) THE PP SHOULD ALSO DISCUSS THE PROBLEM OF RECURRENT COSTS, DRAWING UPON THE INFORMATION IN THE HARVARD-UNIVERSITY OF MONTREAL STUDIES.

(4) AID/W IS CONCERNED ABOUT CAPACITY OF BASIN'S REGIONAL AND BILATERAL GOVERNMENT ORGANIZATIONS ALONE TO DEAL MOST EFFECTIVELY WITH BASIN DEVELOPMENT, AND WE THEREFORE REQUEST THAT PP SUGGEST WAYS OF CREATING OPPORTUNITIES FOR INVOLVING PRIVATE SECTOR IN BASIN DEVELOPMENT PREFERABLY FROM THE START, E.G., IN AID'S PROPOSED IMMEDIATE AGRICULTURE PRODUCTION PROGRAM.

N. USAID MANAGEMENT CAPABILITY. - THE USAID DIRECTOR NOTED THAT USAID/DAKAR WOULD SHORTLY HAVE A MANAGEMENT CONSULTANT WORKING WITH THEM ON THIS. THE NEED FOR ANY AUGMENTATION OF USAID STAFF AND/OR MODIFICATION OF USAID ADMINISTRATIVE PROCEDURES WILL BE DISCUSSED IN THE PP. ALTERNATIVES FOR MAKING THE PROJECT MORE MANAGEABLE SHOULD BE CONSIDERED, E.G., SPINNING OFF NATIONAL PORTIONS TO THE RESPECTIVE BILATERAL USAIDS.

O. ENVIRONMENT

(1) IEE - IN LIGHT OF THE GANNETT-FLEMING (GF) ENVIRONMENTAL ASSESSMENT (FINAL REPORT STILL TO BE REVIEWED AID/W), BELIEVE ADDITIONAL INFORMATION FOR PID'S IEE NOT NEEDED. HOWEVER, PP SHOULD REFLECT CAREFUL AWARENESS OF GF REPORT, IDENTIFY OPPORTUNITIES TO MITIGATE POTENTIAL ADVERSE IMPACTS, AND FULLY INCORPORATE THESE MITIGATIVE MEASURES INTO THE PROJECT. USAID SHOULD NOTE THAT SUBPROJECT IEE'S MUST BE PERFORMED FOR EACH SUBPROJECT BEFORE SUBPROJECT APPROVAL (NOT AS EACH SUBPROJECT IS APPROVED, AS STATED ON PAGE E-1 OF USAID-SUBMITTED PID). AS SPECIFIC PROJECT ACTIVITY SITES ARE IDENTIFIED, USAID SHOULD ENSURE IEE PREPARATION THAT TAKES GF REPORT INTO ACCOUNT. ALSO, OBLIGATING DOCUMENTS SHOULD CONTAIN CONDITION PRECEDENT THAT NEGATIVE DETERMINATIONS BASED ON SUB-ACTIVITY IEE'S BE MADE, AND THAT THEY BE CONCURRED IN BY AFR/DR/SDP ENVIRONMENTAL OFFICER (PER NEW REGULATIONS) BEFORE SUB-OBLIGATION OR EXPENDITURE OF FUNDS FOR SUBACTIVITIES.

(2) WHILE WE RECOGNIZE THAT AID IS NOT LEGALLY RESPONSIBLE FOR ADVERSE ENVIRONMENTAL CONSEQUENCES OF OTHER DONOR-FUNDED ACTIVITIES, THERE IS A BELIEF IN AID/W THAT DUE TO THE ROLE WE PROPOSE TO PLAY IN PLANNING FOR THE BASIN'S DEVELOPMENT, WE SHOULD BE ACTIVE IN ENCOURAGING THE OMVS TO DEAL EFFECTIVELY IN MINIMIZING ANY ADVERSE EFFECTS OF EVEN NON-U.S. FUNDED ACTIVITIES. WE WOULD APPRECIATE A DISCUSSION IN PP ON THIS TOPIC.

P. OTHER AID PROJECTS - THE INTERRELATIONSHIP BETWEEN THIS

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AND OTHER AID-FINANCED PROJECTS (BOTH BILATERAL AND WITH CMVS) SHOULD BE SPELLED OUT IN THE PP. FOR EXAMPLE, EXPLANATION IS NEEDED AS TO HOW CMVS AGRONOMIC RESEARCH II RESULTS WILL BE INCORPORATED INTO CMVS' PLANNING PROCESS, AS IS A LIST AND SCHEDULE FOR COMPLETING CERTAIN STUDIES REQUIRED FOR REFINEMENT OF THE COST ALLOCATION MODEL UNDER THE FISCAL ALLOCATION RESPONSIBILITY PROJECT. THE PP SHOULD MAKE CLEAR HOW RESULTS FROM PAST OR TERMINATING PROJECTS WILL BE BUILT INTO CMVS' PLANNING DECISION-MAKING PROCESS. OF PARTICULAR INTEREST WOULD BE PLANS FOR ESTABLISHING ENVIRONMENTAL AND SOCIAL IMPACT DATA GATHERING/IMPACT MONITORING WITHIN THE CMVS AS LOGICAL FOLLOW-ONS TO THE ENVIRONMENTAL ASSESSMENT AND UNDP SOCIO-ECONOMIC STUDY.
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E.O. 12065: N/A

TAGS:

SUBJECT: OMVS INTEGRATED DEVELOPMENT PROJECT (625-0621)
PID ADDENDUM REVIEW RESULTS

REF: (A) STATE 316122; (B) (RM) STATE 330550 (NOTAL);
(C) GRAY/MERLIN-SHEAR TELCON 1/2./81; (D) PID OF
10/24/80; (E) PID ADDENDUM OF 1/2/81

1. REVIEW OF PID ADDENDUM ON HEALTH AND SOCIO-ECONOMIC ASPECTS HELD JANUARY [illegible] AND ATTENDED BY ACTING AA/AFR AND REPRESENTATIVES OF AFR/SWA, AFR/TR, AFR/DP, PPC, DS/HE AND USAID CONTRACT DESIGN OFFICER MICHAEL MAU.

2. UPON RECOMMENDATION OF REVIEW COMMITTEE, ACTING AA/AFR HENRY APPROVES THE PID WITH THE UNDERSTANDING THAT THE PP MUST CONTAIN APPROPRIATE MEASURES TO DEAL WITH ANY HEALTH PROBLEMS ARISING FROM A.I.D.'S PROPOSED IMMEDIATE INTERVENTIONS (REF (D) PAGES 19-20). THIS IS TO ENSURE THAT SPECIFICALLY IN TERMS OF HEALTH OUR PROJECT DOES NOT LEAVE PEOPLE WORSE OFF THAN BEFORE A.I.D. ACTIVITIES BEGAN. ALSO, THE FIRST SENTENCE IN SECTION III ON PAGE 6 OF PID ADDENDUM ON HEALTH SEEMED TO BE SAYING THAT THERE WOULD BE NO HEALTH PROBLEMS RESULTING FROM THE OMVS DEVELOPMENT PROGRAM. MIKE MAU STATED THE SENTENCE MEANT THAT THROUGH FOOD PRODUCTION AND BETTER NUTRITION, BASIN INHABITANTS WILL BE BETTER OFF DESPITE ANY INCREASE IN DISEASES RESULTING FROM DEVELOPMENT PROGRAM. SENTENCE SHOULD THEREFORE BE CHANGED TO READ QUOTE IT IS ANTICIPATED BY THE GANNETT FLEMING STUDY THAT THROUGH INCREASED FOOD PRODUCTION AND THUS BETTER NUTRITION THE OVERALL IMPACTS OF THE OMVS DEVELOPMENT PROGRAM ON HEALTH WILL BE FAVORABLE UNQUOTE.

ACTION OMVS
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3. THE REVIEWERS ALSO MADE THE FOLLOWING SUGGESTIONS (ADDITIONAL TO REFS (A) AND (B)) FOR PP DESIGN TEAM.

A. HEALTH - CONCERN WAS EXPRESSED THAT THE GANNET-FLEMING (G-F) REPORT, ON WHICH THE HEALTH ADDENDUM RELIED HEAVILY,



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TENDED TO MINIMIZE THE POSSIBLE ADVERSE HEALTH EFFECTS OF BASIN DEVELOPMENT. OTHER EXPERTS IN THIS SUBJECT HAVE EXPRESSED THEIR DISAGREEMENT WITH THE PP REPORT IN LIGHT OF EXPERIENCE ELSEWHERE IN AFRICA. IN PARTICULAR, THEY CITED AKOSOMBO DAM, KARIBA DAM AND ASWAN DAM AS INSTANCES IN WHICH ENGINEERING SOLUTIONS AND OTHER PLANNING WERE INSUFFICIENT TO PREVENT MASSIVE ADVERSE HEALTH CONSEQUENCES SUCH AS CHOLERA EXPLOSIONS UNCHOTH OF SCHISTOSOMIASIS, MALARIA, ETC.

(1) THE PP DESIGN TEAM HEALTH EXPERTS SHOULD SPELL OUT HOW HEALTH CONDITIONS ASSOCIATED WITH OUR IMMEDIATE INTERVENTIONS WOULD BE MONITORED.

(2) PP SHOULD EXPLAIN HOW THE PROJECT'S PROPOSED MONITORING/SURVEILLANCE SYSTEM WOULD RESPOND, INCLUDING THE RANGE OF REMEDIAL ACTIONS WHICH COULD BE TAKEN THROUGH THIS SYSTEM, RUNNING FROM MINOR TO POSSIBLE MAJOR HEALTH CONSEQUENCES OF A.I.D.-FINANCED INTERVENTIONS.

(3) PP SHOULD ALSO DESCRIBE PREVENTIVE MEASURES TO BE TAKEN TO TRY TO AVOID/MITIGATE ANY ADVERSE HEALTH EFFECTS FROM OUR IMMEDIATE INTERVENTIONS. BESIDES OTHER IDEAS, WE SUPPORT YOUR SUGGESTION (ITEMS 5 AND 7 PAGE 10 REF (E)) THAT PROJECT PROVIDE ALTERNATE WATER SUPPLY AND SANITATION FACILITIES IN THE VILLAGE, WELL APART FROM THE IRRIGATION SYSTEM, IN ORDER TO MINIMIZE INFECTION OF IRRIGATION WATER WITH SCHISTOSOMES.

DISCUSSION OF PRECEDING POINTS SHOULD COVER EXISTING NATIONAL AND REGIONAL HEALTH SYSTEMS AND THEIR CAPABILITY TO MEET OUR CONCERNS. DISCUSSION SHOULD THEN COVER WHATEVER WE, OTHER DONORS AND THE OMVS AND ITS MEMBER STATES MUST DO TO ENSURE OUR CONCERNS ARE MET. THE PP SHOULD ALSO DESCRIBE HOW THIS HEALTH CARE WILL BE INSTITUTIONALIZED IN ORDER TO MEET ADVERSE RESULTS OF OUR IMMEDIATE INTERVENTIONS AFTER OUR DIRECT ASSISTANCE HAS TERMINATED. WHILE THE USAID OBVIOUSLY CANNOT GUARANTEE EVENTUAL OTHER-DONOR PARTICIPATION, THE REVIEW COMMITTEE STRESSED THE IMPORTANCE OF COORDINATING WITH OTHER DONORS, AND EMPHASIZING THE IMPORTANCE OF TAKING INTO ACCOUNT THE HEALTH EFFECTS OF THEIR PROJECTS. THIS COULD BE AN ADDITIONAL POINT TO THAT POSED BY PARA 4.B(2) OF REF (A). IN ANY CASE, THE PP SHOULD EXPLAIN HOW WE WILL ASSIST THE OMVS TO MEET RELEVANT HEALTH CONCERNS.

B. SOCIO-ECONOMIC -

(1) ROLE OF WOMEN - THIS SHOULD BE ADDRESSED IN THE PP. THE MATERIAL BEING COLLECTED BY USAID SOCIOLOGIST MILLER ON HAND SHOULD BE USEFUL. THE PP TEAM SHOULD MAKE USE OF MATERIAL DEVELOPED BOTH IN THE UNITED STATES AND AFRICA.

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AID/W WILL FOUGH PERTINENT MATERIAL ON [illegible] PARTICIPATION.

(2) AGRICULTURAL PERIMETER MODELS - [illegible] STATED THAT A FOURTH PERIMETER MANAGEMENT MODEL WAS BEING DEVELOPED - SMALL GROUP ORGANIZATIONS MANAGING LARGE-SCALE WORKS - AND SUGGESTED THAT THIS MODEL BE USED FOR THIS PROJECT. PARTICULARLY SINCE THE RECOMMENDED MODEL APPEARS TO BE A NEW ONE IN THE SENEGAL BASIN (AND SOME DOUBT EXISTS ON THE ECONOMIES OF SCALE POSSIBLE WITH LARGER PERIMETERS). THE PP TEAM SHOULD CAREFULLY EXAMINE THIS AND OTHER MODELS, TAKING SOCIO-ECONOMIC CONSIDERATIONS INTO ACCOUNT IN MAKING ITS RECOMMENDATIONS.

(3) SOCIO-ECONOMIC UNIT - THE ADDENDUM NOTES THAT A.I.D. HAS RECEIVED AN OFFICIAL REQUEST FROM OMVS TO ASSIST IN FUNDING THE OMVS SOCIO-ECONOMIC UNIT. THE PP SHOULD INCLUDE SUPPORT FOR SUCH A UNIT, POSSIBLY INCLUDING U.S. ADVISORS TO HELP ASSIST THE UNIT'S ACTIVITIES IN CERTAIN AREAS OF SPECIFIC INTEREST TO A.I.D.

4. IT WAS AGREED THAT THE MARCH/APRIL INTERIM MEETING TO REVIEW THE PROGRESS OF PP DESIGN (PARA 3D REF (A)) WOULD PROBABLY BE PREMATURE AND THAT THE MEETING SHOULD BE POSTPONED UNTIL THERE WAS ENOUGH INFORMATION TO MAKE IT FEASIBLE. HAIG

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PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

ANNEX 10.2.

Life of Project : 7 yrs.
From FY 83 to FY 89
Total U.S. Funding $63 million
Date Prepared August 1982

Project Title & Number OMVS Integrated Development Project (625-0625)

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| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Program or Sector Goal : The broader objective to which this project contributes : | Measures of Goal Achievement | | Assumptions for achieving goal targets : |
| 1.0. To increase and secure agricultural production in the Senegal River Basin through multi-donor financed integrated agricultural development. | 1.1. Food production to 375,000 mt per year in 1990, and 510,000 mt per year in 2000.<br><br>1.2. Control of major epidemiological diseases and improved nutrition.<br><br>1.3. Donor financing for regional integrated agriculture reaches $ 50 million per year by 1990.<br><br>1.4. Establishment of economically viable small and large village perimeters.<br><br>1.5. Donor coordination on policy and investments.<br><br>1.6. Increased direct foreign investment. | 1.1. Regional production and marketing statistics.<br><br>1.2. Regional health statistics.<br>Health surveillance surveys.<br><br>1.3. OMVS Records. | 1.0. Based on project model donor community will increase financial support for development of river basin agricultural sector.<br><br>- Senegal, Mali and Mauritania establish common policies favorable to regional agricultural development. |

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Life of Project :
From FY ____ to FY ____
Total US Funding ____
Date Prepared ____

Project Title & Number : OMVS INTEGRATED DEVELOPMENT PROJECT (625-0621)



| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS. | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Project Purpose :<br><br>1.0. To increase food production in the SRB to keep pace with population growth. | Conditions that will indicate purpose has been achieved : End of project status :<br><br>1.1. Approximately 700 hectares of small perimeters are rehabilitated, and 2,120 hectares of new small perimeters, 1,907 hectares of new medium-sized perimeters and 933 hectares of rainfed irrigation are developed during the life of project.<br><br>1.2. Productivity of irrigated agriculture increased with use of better technical packages and cultivation practices. Average per hectare production by end of project is 6 tons for rice and 3.5 tons for corn and sorghum.<br><br>1.3. Farmers profit from increased productivity and farm size (increases from .25 to .5 hectares) as perimeters become financially viable. Demand for irrigation continues to grow.<br><br>1.4. Health monitoring reveals less disease and nutrition deficiencies. | 1.0. Project evaluation and monitoring supported by farm system surveys.<br><br>Special project evaluations.<br><br>Health surveillance surveys. | Assumptions for achieving purpose :<br><br>1.0. Governments agreed to and fulfill project conditions to end input and credit subsidies and marketing restrictions and to asure equity in participation and regulation of ownership and land tenure questions for irrigated agriculture. |

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project :
From FY ____ to FY ____
Total US Funding ____
Date Prepared ____

Project Title & Number OMVS INTEGRATED DEVELOPMENT PROJECT (625-0621)

PAGE 3

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Outputs : | Magnitude of Outputs | | Assumptions for achieving Outputs : |
| 1.0. Regional Outputs: OMVS | | | 1.0. OMVS monitoring and evaluation unit data needs and recommendations accepted and supported by antional RDA's: |
| 1.1. A regional system of financial management, programmatic coordination and training and technical support for agricultural development in the SRB. | 1.1. Effective operation of the Project Management Unit (PMU) in the Directorate of Development and Coordination of the OMVS and expansion of unit to support other projects. | 1.0. OMVS and project reports. | - Other donors in SRB cooperate with OMVS in providing data on the programs. |
| 1.2. Policy, planning and feasibility sutides. | 1.2. Studies for Long-Range Development Plan for the Upper Valley for Irrigation Feasibility of 15,000 has in the Middle Valley, and for policy recommendations concerning women, pasturalists, firshermen, land tenure, regional trade, and telecommunications. | Project evaluation<br>Other donor evaluations. | - Policy studies can be undertaken jointly by OMVS and national agencies. |
| 1.3. A model project amangement information and effects monitoring and periodic evaluation. | 1.3. MIS operated successfully for project by PMU and expanded to included other projects. | | |
| 1.4. A business promotion program and information on pilot rural credit and artisan development activities in five project zones. | 1.4. OMVS information package and orientation program for potential investors in the SRB.<br>Technical assistance, training and administrative support provided to bank, artisan training centers, and RDAs for rural credit and artisan assistance activities. | | |
| 1.5. Effective donor financing and coordination mechanism for agricultural development in the SRB. | 1.5. OMVS Consultative Committee meeting semi-annually to review and coordinate donor financing. | | |
| 1.6. Disease Surveillance Unit in the OMVS Secretariate | 1.6. Unit diffuses information regarding disease prevalence regularly to member state and international organizations. | | |

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| 2.0. To promote policy reforms that remove constraints to agricultural production. | 2.1. Harmonization of producer and consumer prices and input subsidies.<br><br>2.2. Elimination of distortions in marketing and input delivery, resulting from official channels of distribution.<br><br>2.3. Incentives to the private sector to play a substantive role in SRB development -with immediate attention given to indigenous entrepreneurs.<br><br>2.4. Elimination of taxes and controls on the movement of goods, services, currencies, livestock and people between the three countries. | 2.0. Project evaluation and monitoring.<br><br>Studies and policy conferences held by the OMVS.<br><br>Special project evaluations. | 2.0. Governments agree to and fulfill project conditions.<br><br>Governments accept and implement recommendations of Upper Valley Regional Development Plan and other planning and policy studies. |
| 3.0. To improve the capability of private and public institutions in the SRB to manage the transition from traditional to irrigated agriculture. | 3.1. Strengthened farmer associations capable of managing irrigated perimeters and housing formal legal recognition for the Governments.<br><br>3.2. Streamlined and upgraded RDA's, providing technical support to farmer associations.<br><br>3.3. Greater private sector activity particularly for input supply, credit and marketing of agricultural production.<br><br>3.4. Policy formulation and donor coordination performed by the OMVS for SRB agricultural development. | 3.0. Project evaluation and monitoring.<br><br>RDA and OMVS records and reports.<br><br>Special project evaluations. | 3.0. RDA's gradually and willingly divest themselves of input and marketing fonctions.<br><br>Demand for credit, agricultural inputs and services and marketing operations continues to grow.<br><br>Member States agree to continuing policy formulating and program coordinating role of the OMVS for SRB agricultural development. |

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| 2.0. National Outputs: Mali | | | |
| 2.1. Producer and Village Level Outputs | | | |
| 2.1.1. Effective Producer Associations established to:<br>- construct and manage irrigated perimeters.<br>- obtain and manage production inputs and market outputs. | 2.1.1. 11 established after 3 yrs.<br>17 established after 6 yrs. | 2.1. Project monitoring system.<br><br>Project evaluation.<br><br>Annual and quarterly reports of OVSTM. | 2.1.1. - Irrigated agriculture continues to be a viable economic option and of interest to villagers.<br>- The government continues a policy of increasing the role and responsibilities of producer associations. |
| 2.1.2. Producers Trained in<br>- specific production skills<br>- special technical skills and services. | 2.1.2. for each producer association, farmers will be instructed in production skills and 2 producers per association trained in:<br><br>- pump operation<br>- water distribution<br>- maintenance of civil works<br>- management of village associations;<br>- animal traction | | 2.1.2. - Effective training structures for both government agents and farmers are provided.<br>- Producer associations can work out acceptable arrangements to compensate village "technical specialists". |
| 2.1.3. Improved Production and Processing Techniques and Activities.<br>- animal traction<br>- alternative water use technology<br>- fish ponds<br>- new crops<br>- selected agricultural equipment and improved crop storage and processing techniques. | 2.1.3.<br><br>- 30 farmers trained in 3 yrs.<br><br>- 259 farmers trained in 6 yrs.<br><br>- alternative technologies tested in 3 perimeters during 6 yrs.<br>- 2 fish ponds in 6 yrs.<br><br>- annual field trials with research station conducted in 10 locations.<br>- credit available for agricultural equipment. | | 2.1.3. -<br><br>- An effective system is developed linking research to farmer needs and assuring research dissemination.<br>- Technical assistance, credit, training and regular supply of needed inputs are available for these innovations desired by farmers. |

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| 2.2. Production Outputs | | 2.2. Annual and quarterly reports of OVSTM. | |
| 2.2.1. Perimeters rehabilitated. | 2.2.1. 10 rehabilitated in 3 yrs. (232 ha) | Project monitoring system. | 2.2.1. - farmers willing to participate. |
| | | Project Evaluation. | |
| 2.2.2. New perimeters constructed, including prototype rainfed irrigation system. | 2.2.2. 0 constructed first 3 yrs. 9 constructed in 6 yrs. (933 ha). | | 2.2.2. Any remaining land tenure, farmer participation, or technical problems can be resolved for each site. |
| 2.2.3. More intensive use of land. | 2.2.3. After 6 yrs: Crop intensity of 1.75 for pump irrigation and of .8 for rainfed. | | 2.2.3. |
| 2.2.4. Productivity per hectare increased. | 2.2.4. After 6 yrs: | | 2.2.4. All productivity indicators assume that production inputs are properly used and that improvements in farm management occur concurrently with introduction of animal traction. |
| | Manual / Animal Traction | | |
| | Irrigated rice 4.5 T/h / 5.5 T/h | | |
| | Sorghum & corn 2.5 T/h / 3.5 T/h | | |
| | Cowpeas 1.8 T/h / 2.5 T/h | | |
| | Vegetables 20 T/h / 25 T/h | | |
| 2.3. Feeder Roads Constructed | 2.3. Kayes-Diboli road feasibility study completed in 3 yrs. | 2.3. Project monitoring and evaluation. | |
| 2.4. Disease Surveillance and Control System Established. | 2.4. - 1 health surveillance unit and 2 labs equipped in 5 yrs.<br>- 2 doctors, and 4 nurses trained in surveillance techniques.<br>- 6 studies completed.<br>- Prevelance of schistosomiasis malaria maintained at pre agreed upon levels. | 2.4. Reportd on health activity. | 2.4. - Necessary staff provided by the government.<br>- World Bank finances a Research and Training Center at Mahina. |
| 2.4.1. Health unit and labs staffed and equipped.<br>2.4.2. Retrained nurses, and field and lab technicians.<br>2.4.3. Medical record system established.<br>2.4.4. Village health monitoring system established.<br>2.4.5. Studies of snail, mosquito, and other vectors within the irrigated zone.<br>2.4.6. Appropriate disease control interventions undertaken. | | | |

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| 2.5. Long-Range Development Plan for Kayes Region. | 2.5. Plan completed after 3 yrs. | 2.5. OVSTM and contractor reports.<br><br>Project evaluation. | 2.5. - Suitable land is available. |
| 2.6. Institutional Capacity: OVSTM<br><br>2.6.1. Increased institutional capacity to provide appropriate levels of support and assistance to local development activities in project sites.<br><br>- technical assistance to develop and improve effectiveness of village associations.<br>- material and technical assistance for perimeter rehabilitation and construction.<br>- on-farm extension education services.<br><br>2.6.2. Effective administrative and financial management system established.<br><br>2.6.3. Information system to monitor project activities and evaluate impact. | 2.6. 6 OVSTM agents upgraded in 3 yrs and 12 agents in 6 yrs.<br><br>- 1 agricultural counselor in 3 yrs; 2 in 6 yrs. | 2.6. Annual and quarterly reports of OVSTM.<br>Project evaluation. | 2.6. - Mali provides and supports OVSTM staff. |
| 2.7. Institutional Capacity: Other<br><br>2.7.1. DNAFLA: Literacy training<br>- Literacy program conducted in project zone.<br>- Development of literacy training materials appropriate to project activities.<br><br>2.7.2. Special account in BNDA to provide credit for project activities. | 2.7.1. Literacy program ongoing in 11 villages after 3 yrs, and 17 villages in 6 yrs.<br>- 10 technical items developed in 6 yrs.<br><br>2.7.2.<br>- 1 loan officer and loans of $400,000 in 3 yrs and $ 1 million in 6 yrs. | 2.7. Reports of DNFLA, BNDA, CEPI, Eaux et Forêts and Cooperative Service.<br><br>Project evaluation. | 2.7. - Effective working relationships can be established between OVSTM and other agencies at the regional level. |

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| 2.7.3. CEPI. Increased capacity of CEPI to provide technical assistance to local artisans. | 2.7.3.<br>- 1 agent providing services in Kayes area in 6 yrs; | 2.7.3. -<br>- 1 agent providing services in Kayes area in 3 yrs; 2 agents in 6 yrs. | |

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| 3.0. National Outputs: Senegal | | | |
| 3.1. Producer and Village Level Outputs | | | |
| 3.1.1. Effective Producer Associations established to:<br>- construct, maintain and manage irrigated perimeters.<br>- obtain and manage production imputs and outputs. | 3.1.1. Podor: 12 established in 3 yrs.<br>50 established in 6 yrs.<br>Bakel: 26 now existing, expanded and strengthened.<br>24 new associations established. | Project monitoring system.<br>Project evaluation<br>Annual and quarterly reports of SAED. | 3.1.1. Irrigated agriculture continues to be a viable economic option and of interest to villagers.<br>The government continues a policy of increasing the role and responsibility of producer associations. |
| 3.1.2. Producers Trained in:<br>- specific production skills<br>- special technical skills and services. | 3.1.2. Farmers trained in production skills and in 6 yrs.<br>2 producers per association trained in:<br>- pump operation<br>- water discribution<br>- maintenance of civil works<br>- management. | | 3.1.2. Effective training strategies are provided for both government agents and farmers.<br>Producer associations can work out acceptable arrangements to compensate village "technical specialists". |
| 3.1.3. Improved Production and Processing Techniques and Activities<br>- animal traction<br>- alternative water use technology<br>- fish ponds<br>- new crops<br>- selected agricultural equipment and improved storage and processing techniques. | 3.1.3. - 60 farmers in 3 yrs. and 335 farmers in 6 yrs.<br>- alternative technologies tested in 3 perimeters in 6 yrs.<br>-30 fish ponds in 3 yrs. and 60 in 6 yrs.<br>- annual field trials conducted with ISRA in 10 Locations.<br>- credit available for agricultural equipment. | | 3.1.3. An effective system is developed linking research to farmer needs and assuring research dissemination.<br>Technical assistance, credit, training and regular supply of needed inputs are available for new technologies. |
| 3.2. Production Outputs | | 3.2. Annual and quarterly reports of SAED<br>Project monitoring system.<br>Project evaluation | 3.2. Any remaining land tenure, farmer participation, or technical problems can be resolved for each site. |

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| 3.2.1. Perimeters rehabilitated | 3.2.1. 281 ha. rehabilitated in Bakel region in 3 yrs. | | |
| 3.2.2. New perimeters constructed | 3.2.2. Podor perimeter of 1,063 ha. in 6 yrs.<br>11 new perimeters in Bakel region with 470 ha. in 3 yrs, and Collenga medium perimeter with 244ha. | | |
| 3.2.3. More intensive use of land. | 3.2.3. After 6 yrs:<br>- crop intensity of 1.75 for pump irrigation on small perimeters and 1.5 on large perimeters. | | |
| 3.2.4. Productivity of farmers increased. | 3.2.4. After 6 yrs:<br>Irrigated rice: Manual 4.5T/h; Animal Traction 5.5T/h<br>Sorghum + corn: 2.5T/h; 3.5T/h<br>Cowpeas: 1.8T/h; 2.5T/h<br>Vegetables: 20 T/h; 25 T/h | | 3.2.4. Production inputs are properly used and improvements in farm management occur concurrently with introduction of new technologies. |
| 3.3. Feeder Roads Constructed | 3.3. 56 miles of feeder roads completed in 6 yrs under separate project. | 3.3. Project monitoring and evaluation. | |
| 3.4. Disease, Surveillance, and Control System Established | 3.4.- 2 health monitoring laboratories equipped.<br>- 2 doctors, and 6 nurses trained.<br>- semi-annual surveys.<br>- Schistosomiasis and malaria prevelance maintained at pre agreed upon level. | 3.4. Reports on health activity. | 3.4. Necessary staff is provided by the government. |
| 3.4.1. Health posts staffed and equipped. | | | |
| 3.4.2. Retrained nurses, and field and lab technicians. | | | |
| 3.4.3. Medical record system installed. | | | |
| 3.4.4. Village health monitoring system installed. | | | |
| 3.4.5. Appropriate disease control interventions undertaken. | | | |

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| 3.4.5. Studies of snail, mosquito and other vectors within the irrgiated zone. | | | |
| 3.5. Medium Term Development Plan for Bakel Region. | 3.5. Plan complete for Bakel Region in 3 yrs. | 3.5. SAED and contractor reports - P. evaluat. | 3.5. Suitable land is available. |
| 3.6. Institutional Capacity: SAED | 3.6.- 6 SAED agents upgraded in 3 yrs. and 12 in 6 yrs. | 3.6. Annual and quarterly reports | 3.6.- Senegal provides and supports SAED staff |
| | - 1 agricultural counselor in 3 yrs; 2 in 6 yrs. | Project evaluation. | - Protocol agreements are executed and effective working relationships between SAED and other agencies established at regional level. |
| 3.6.1. Increased institutional capacity of SAED to provide appropriate levels of support and assistance to local development activities in project sites.<br>- technical assistance to develop and improve effectiveness of village associations;<br>- material and technical assistance for perimeter rehabilitation and construction;<br>- on-farm extension education services. | | | |
| 3.6.2. Effective administrative and financial management system established. | | | |
| 3.6.3. Information system to monitor project activities and evaluate impact. | | | |
| 3.7. Institutional Capacity: Other | | 3.7. Reports of SAED, BNDS, SISMA, Eaux et Forêts and Cooperative Service.<br>Project evaluation | |

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| 3.7.1. Functional literacy training<br>- literacy program conducted in project zone;<br>- literacy material relevant to project development. | 3.7.1. - literacy program ongoing in 6 villages after 3 yrs; and 12 villages in 6 yrs:<br>- 10 technical items developed in 6 yrs; | |
| 3.7.2. Special BNDS account to provide credit for project activities. | 3.7.2. - 1 loan officer in Bakel and loans of $200,000 in 3 yrs, and $600,000 in 6 yrs and $550,000 in Podor in 6 yrs. | |
| 3.7.3. Increased capacity of SONEPI to provide technical assistance to local artisans. | 3.7.3. - 1 agent providing services in Bakel area in 3 yrs and 1 in Podor in 6 yrs. | |
| 3.7.4. Water and Forestry service. Increased capacity of Eaux et Forêts to support:<br>- fish ponds<br>- wind breaks and village forestry. | 3.7.4. - 2 Eaux et Forêts agents active in village fish pond and forestry activities in 3 yrs. | |
| 3.7.5. Cooperatives. Increased capacity of cooperative extension services to provide technical assistance to producers associations. | 3.7.5. - 1 cooperative agent, trained and attached to SAED in Bakel in 3 yrs. | |
| 3.7.6. Effective telecommunications system operated by Senegal in project zone. | 3.7.6. Installation of pilot satellite communication system from St. Louis to Bakel. | |
| 4.0. National Outputs: Mauritania | | |
| 4.1. Producer and Village Level Outputs. | | 4.1. Annual and quarterly reports of SAED<br>Project monitoring system<br>project evaluation |

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| 4.1.1. Effective Producer Associations Established to:<br>- construct, maintain and manage irrigated perimeters.<br>- obtain and manage production inputs and outputs. | 4.1.1. Gouraye: 20 improved in 6 yrs.<br>Kaédi: 23 improved in 6 yrs. | | 4.1.1. Irrigated agriculture continues to be a viable economic option and of interest to villagers.<br>The government continues a policy of increasing the role and responsibility of producer associations. |
| 4.1.2. Producers trained in:<br>- specific production skills<br>- special technical skills and services. | 4.1.2. Farmers trained in production skills and in 6 yrs.<br>2 producers per association trained in:<br>- pump operation<br>- water distribution<br>- maintenance of civil works<br>- management. | | 4.1.2. Effective training strategies are provided for both government agents and farmers.<br>Producer associations work out acceptable arrangements to compensate village "technical specialists". |
| 4.1.3. Improved Production and Processing Techniques and Activities<br>- animal traction<br>- alternative water use technology<br>- fish ponds<br>- new crops<br>- selected agricultural equipment and improved storage and processing techniques. | 4.1.3. - 85 farmers in 3 yrs. and 558 in 6 yrs.<br>- alternative technologies tested in 3 perimeters in 6 yrs.<br>- 2 fish ponds in 3 yrs. and 6 in 6 yrs.<br>- annual field trials conducted with CNRADA in 10 Locations<br>- credit available for agricultural equipment. | | 4.1.3. An effective system is developed linking research to farmer needs and assuring research dissemination.<br>Technical assistance, credit, training and regular supply of needed impacts are available for new technologies. |
| 4.2. Production Outputs | | 4.2. Annual and quaterly reports of SAED<br>Project monitoring system<br>Project evaluation | 4.2. Any remaining land tenure, farmer participation or technical problems can be resolved for each site. |
| 4.2.1. Perimeters rehabilitated | 4.2.1. 190 has rehabilitated in Gouraye region in 6 yrs. | | |
| 4.2.2. New perimeters constructed | 4.2.2 New perimeters in Gouraye of 870 ha. in 6 yrs.<br>New perimeters in Kaédi region with 1,380 ha. in 6 yrs. | | |
| 4.2.3. More intensive use of land | 4.2.3. After 6 yrs:<br>- crop intensity of 1.75 for pump irrigation for small perimeters and 1.5 for medium and large perims. | | |

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| 4.2.4. Productivity of farmers increased | 4.2.4. After 6 yrs:<br>Irrigated rice: Manual 4.5T/h; Animal Traction 5.5T/h<br>Sorghum + corn: 2.5T/h; 3.5T/h<br>Cowpeas: 1.8T/h; 2.55/h<br>Vegetables: 20 T/h; 25 T/h | | 4.2.4. Production inputs are properly used and improvements in farm management occur concurrently with installation of new technologies. |
| 4.3. Feeder Roads Constructed | 4.3. 130 miles of feeder roads completed in 6 yrs. | 4.3. Project monitoring and evaluation | 4.3. Selibabi-Gouraye Route Nationale RN-1 is built to all-weather capacity. |
| 4.4. Disease Surveillance and Control System Established. | 4.4. - 2 health centers and 1 laboratory in 6 yrs.<br>- 2 doctors and 6 nurses trained in 6 yrs.<br>- semi-annual surveys.<br>- schistosomiasis and malaria prevelance maintained at pre agreed upon levels. | 4.4. Reports on health activity<br>Project evaluation | 4.4. Necessary staff and support is provided by the Mauritanian government. |
| 4.4.1. Health monitoring centers staffed and equipped.<br>4.4.2. Retrained nurses, and field and lab technicians.<br>4.4.3. Medical record system installed.<br>4.4.4. Village health monitoring system installed.<br>4.4.5. Studies of snail, mosquito and other vectors within the irrgated zone<br>4.4.6. Appropriate disease control interventions undertaken. | | | |
| 4.5. Institutional Capacity: SONADER | 4.5. -6 SONADER agents upgraded in 3 yrs and 12 in 6 yrs.<br>-1 agricultural counselor in 3 yrs; 2 in 6 yrs. | 4.5. Annual and quarterly reports.<br>Project evaluation | 4.5. Mauritania provides and supports SONADER staff. |

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| 4.5.1. Increased institutional capacity of SONADER to provide appropriate levels of support and assistance to local development activities in project sites.<br>- Technical assistance to develop and improve effectiveness of village associations.<br>- Material and technical assistance for perimeter rehabilitation and construction.<br>- On-farm extension education services.<br><br>4.5.2. Effective administrative and financial management system established.<br><br>4.5.3. Information system to monitor project activities and evaluate impact. | | 4.5. Reports of SONADER BNDS, Eaux et Forêts<br>Project evaluation | |
| 4.6. Institutional Capacity: Other | | | 4.6. Effective working relationships are established between SONADER and other agencies at the local and regional level. |
| 4.6.1. Functional literacy training:<br>- literacy program started in project zone by ILN<br>- literacy materials relevant to project developed. | 4.6.1. - literacy program ongoing in 16 villages in 6 yrs.<br><br>- 10 technical items developed in 6 yrs. | | |
| 4.6.2. Special FND accounts to provide credit for project activities | 4.6.2. - 1 loan officer in Kaédi and Gouraye and loans of $500,000 in 3 yrs, and $ 1.4 million in 6 yrs. | | |

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Life of Project :
From FY _____ to FY _____
Total US Funding _____
Date Prepared : _____

Project Title & Number OMVS Integrated Development Project (625-0621)

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| OUTPUTS: | Magnitude of Outputs | | Assumptions for achieving Outputs: |
| A.I.D. | | | |
| 1.0. Regional - OMVS | 1.0. $ 9.3 million | | |
| 1.1. Technical assistance | 1.1. $ 3.0. million | Project Records | All inputs provided as planned. |
| 1.2. Studies | 1.2. $ 2.3.million | | |
| - Long-term policy studies<br>- Feasibility & engineering studies. | | | Institutional capacity developed to absorb and properly use project inputs. |
| 1.3. Training | 1.3. $ .4 million | | |
| 1.4. Commodities | 1.4. $ .5 million | | |
| 1.5. Operating costs | 1.5. $ 1.5 million | | |
| 1.6. Health surveillance | 1.6. $ 1.1 million | | |
| 1.7. Contingency | 1.7. $ .5 million | | |
| 2.0. National inputs - Mali | 2.0. $11.0 million | | |
| 2.1. Technical assistance | 2.1. $ 3.0 million | | |
| 2.2. Construction | 2.2. $ 3.5 million | | |
| 2.3. Commodities | 2.3. $ 0.6 million | | |
| 2.4. Agricultural credit | 2.4. $ 0.8 million | | |
| 2.5. Operating costs | 2.5. $ 0.8 million | | |
| 2.6. Health surveillance | 2.6. $ 1.1 million | | |
| 2.7. Training | 2.7. $ 0.3 million | | |
| 2.8. Road Feasibility | 2.8. $ 0.3 million | | |
| 2.9. Contingency | 2.9. $ 0.6 million | | |

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project :
From FY _____ to FY _____
Total US Funding _____
Date Prepared : _____

Project Title & Number OMVS Integrated Development Project (625-0621)

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Inputs : | Implementation Target (Type and Quantity) : | | Assumptions providing inputs |
| 3.0. National inputs - Senegal | 3.0. $ 21.0 million | | |
| 3.1. Technical assistance | 3.1. $ 3.0 million | | |
| 3.2. Construction | 3.2. $ 8.4 million | | |
| 3.3. Commodities | 3.3. $ 2.2 million | | |
| 3.4. Agricultural Credit | 3.4. $ 1.2 million | | |
| 3.5. Operating Support and Training | 3.5. $ 2.5 million | | |
| 3.6. Health Surveillance | 3.6. $ 1.1 million | | |
| 3.7. Telecommunications | 3.7. $ 1.5 million | | |
| 3.8. Contingency | 3.8. $ 1.1 million | | |
| 4.0. National inputs - Mauritania | 4.0. $ 21.7 million | | |
| 4.1. Technical assistance | 4.1. $ 3.3 million | | |
| 4.2. Construction | 4.2. $ 3.5 million | | |
| 4.3. Commodities | 4.3. $ 1.8 million | | |
| 4.4. Agricultural Credit | 4.4. $ 1.5 million | | |
| 4.5. Operating Support & Training | 4.5. $ 3.1 million | | |
| 4.6. Health Surveillance | 4.6. $ 1.7 million | | |
| 4.7. Feeder Road | 4.7. $ 5.0. million | | |
| 4.8. Contingency | 4.8. $ 1.8. million | | |
| 5.0. Total | 5.0. $ 63.0 million | | |

## 5C(2) PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A. includes criteria applicable to all projects. Part B. applies to projects funded from specific sources only: B.1. applies to all projects funded with Development Assistance Funds, B.2. applies to projects funded with Development Assistance loans, and B.3. applies to projects funded from ESF.

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

### A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

   (a) Describe how authorizing and appropriations committees 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 amount)?

   Notification was supplied with the FY 1981 Sahel Development Program Annual Budget Submission.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,00, will there be

   Yes.

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| | (a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance? | Yes, a certification is attached as Section 10-6 of the Project Paper. |
| 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 actions are required. |
| 4. | FAA Sec. 611(b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973? (See AID Handbook 3 for new guidelines.) | Yes. Issues are dealt with in the Initial Environmental Analysis. A negative determination has been approved with the PIO, and special procedures have been established by environmental review of irrigation subprojects. |
| 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, the 611(e) determination is included in Section 10.5, Volume II of the Project Paper. |

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| 6. | FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. | The Project is designed as a regional program under the direction of the Organization for the Development of the Senegal River Basin (OMVS). |
| 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; and (c) encourage development and use of cooperatives, and 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. | One of the specific objectives of the OMVS is to rationalize and monitor interstate trade flows between Senegal, Mauritania and Mali. The SRB development program is designed to include increased opportunities for private initiative and competition. The credit program of the IDP is essential to the develoopement and adoption of viable irrigated agriculture. There are no specific elements of this project specifically targeted to reduce monopolistic practices in the Basin. The IDP aims at encouraging technical efficiency in agriculture, and commerce is essential to successful agriculture development in the Senegal River Basin. |
| 8. | FAA Sec. 601(b). Information and conclusions 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). | Project implementation will be through private contractors. All possible equipment and supplies will be advertized for U.S. private contractor participation. |

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| 9. | FAA Sec. 612(b), 636(h); FY 1982 Appropriation Act Sec. 507. 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 in lieu of dollars. | Host country contributions will be monitored through a management information system established by the project. |
| 10. | FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release? | There are no U.S. owned foreign currencies for use in this project. |
| 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. |
| 12. | FY 1982 Appropriation Act Sec. 521. 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? | N/A |
| 13. | FAA 118(c) and (d). Does the project comply with the environmental procedures set forth in AID Regulation 16? Does | Yes. |

the project or program take into consideration the problem of the destruction of tropical forests?

14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)?

All local currencies will initially be disbursed by U.S. contractors or directly by USAID. The project will provide technical assistance to establish adequate host government accounting and control systems. The host governments will be given financial responsibilities gradually in the later parts of the project, only after FAA 121(d) certifications are made.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b), 111, 113, 281(a). 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 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

The project will involve the participation of over 5,000 small farms that will benefit from increased productivity and farm size. Through the activities of this project, increased rural investment, cooperative development and increased agricultural productivity will have a direct impact upon the rural poor of the Senegal River Basin.

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| 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? | Project activities will sponsor and encourage the participation of women in all production and training aspects. |
| b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used? | N/A. Project is funded under the Sahel Program. |
| c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)? | Yes. |
| d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activitiy with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)? | The requirement has been waived for Senegal, Mali and Mauritania as they are within the context of the special Sahel Development Group of eight countries. |

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| e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than $100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character. | The grant assistance under the project will be disbursed over a seven-year period. Adequate justification to the Congress has been made in the context of the special Sahel Development Program. |
| f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth? | Yes. |
| g. 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 | All project elements were articulated by local representatives of the member states, the local organizations and farmers during a two-year planning process sponsored by USAID, the World Bank and other multilateral aid donors prior to the writing of this project paper. |

institutional development; and supports civil education and training in skills required for effective participation in governmental processes esential to self-government.

2. Development Assistance Project Criteria (Loans Only)

The project entails grant funding only.

None of the questions in this section are applicable.

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest.

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, 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?

c. ISDCA of 1981, Sec. 724 (c) and (d). If for Nicaragua, does the loan agreement require that the funds be used to the maximum extent possible for the private sector? Does the project provide for monitoring under FAA Sec. 624(g)?

3. Economic Support Fund Project Criteria

N/A.

a. FAA Sec. 531(a). Will this assistance promote economic or political

stability? To the extent possible, does it reflect the policy directions of FAA Section 102?

b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?

c. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives?

d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

## 5C(3) - STANDARD ITEM CHECKLIST

Listed below are the 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

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| 1. | FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed? | U.S. small businesses will be able to participate in furnishing commodities and services financed by the project. |
| 2. | FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him? | Yes, except for the specific waivers requested in the project paper. |
| 3. | FAA Sec. 604(d). If the cooperating country discriminates against marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company? | None of the member states discriminates against U.S. marine insurance companies. All U.S. commodities purchased under the project will be insured by U.S. insurance companies. |
| 4. | FAA Sec. 604(e); ISDCA of 1980 Sec. 705(a). If offshore procurement of agricultural commodity or product is to be | Yes. |

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| | financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.) | |
| 5. | FAA Sec. 604(g). Will construction or engineering services be procured from firms of countries otherwise eligible under Code 941, but which have attained a competitive capability in international markets in one or these areas? | Yes. |
| 6. | FAA Sec. 603. Is the shipping excluded from 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? | Ocean transport by U.S. flag carriers will be used to the maximum extent possible consistent with carrier availability, fair and reasonable rates. |
| 7. | FAA Sec. 621. If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? If the facilities of other | Yes. |

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 U.S. carriers be used to the extent such service is available? — Yes.

9. FY 1982 Appropriation Act Sec. 504. If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States? — Yes.

B. Construction

1. FAA Sec. 601(d). If capital (e.g., construction) project, will U.S. engineering and professional services to be used? — Yes, as much as is possible.

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.

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| 3. FAA Sec. 620(k). If for construction of productive enterprise, will agggregate value of assistance to be furnished by the U.S. not exceed $100 million (except for productive enterprises in Egypt that were described in the CP)? | Yes. |
| C. Other Restrictions | |
| 1. FAA Sec. 122(b). 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 administed by an internatioal organization, does Comptroller General have audit rights? | All funding under the project is subject to full audit privileges by the Comptroller General. |
| 3. FAA Sec. 620(h). Do arrangements exist to insure that Dnited States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries? | Yes. |
| 4. Will arrangements preclude use of financing: | |
| a. FAA Sec. 104(f); FY 1982 Appropriation Act Sec. 525: (1) To pay for performance of abortions as a method of family | |

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| planning or to motivate or coerce persons to practice abortions; (2) to pay for performance of involuntary sterilization as method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization; (3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of family planning; (4) to lobby for abortion? | Yes, is precluded. |
| b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property? | Yes, is precluded. |
| c. FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs? | Yes, is precluded. |
| d. FAA Sec. 662. For CIA activities? | Yes, is precluded. |
| e. FAA Sec. 636(i). For purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained? | Yes, is precluded. |
| f. FY 1982 Appropriation Act, Sec. 503. To pay pensions, annuities, retirement pay, or | Yes, is precluded. |

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| adjusted service compensation for military personnel? | |
| g. FY 1982 Appropriation Act, Sec. 505. To pay U.N. assessments, arrearages or dues? | Yes, is precluded. |
| h. FY 1982 Appropriation Act, Sec. 506. To carry out provisions of FAA section 209(d) (Transfer of FAA funds to multilateral organizations for lending)? | Yes, is precluded. |
| i. FY 1982 Appropriation Act, Sec. 510. To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields? | Yes, is precluded. |
| j. FY 1982 Appropriation Act, Sec. 511. Will assistance be provided for the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights? | Is precluded. |
| k. FY 1982 Appropriation Act, Sec. 515. To be used for publicity or propaganda purposes within U.S. not authorized by Congress? | Is precluded. |

**ORGANISATION POUR LA MISE EN VALEUR DU FLEUVE SENEGAL**

No ..... OMVS/HC

DAKAR, le .....

*Le Haut Commissaire*

A Monsieur le Directeur
de l'USAID

OBJET : Requête de financement pour le Projet de Développement intégré (625-0621)

Monsieur le Directeur,

Comme vous le savez, l'OMVS collabore depuis quelques années déjà avec vos services, dans le but d'élaborer le Projet de Développement Intégré (625-0621). Le Haut-Commissariat de l'OMVS a, en premier lieu élaboré le Document d'Identification du Projet avec l'USAID en 1980, puis a participé à la conception du Document de Projet en 1981 et 1982. L'OMVS ainsi que les organismes de développement des Etats-Membres du Sénégal, de la Mauritanie et du Mali ont investi beaucoup de temps et d'énergie dans le cadre de l'élaboration du projet en question. Ce programme exhaustif et global sera un facteur essentiel pour l'aménagement de la vallée et constitue de ce fait une partie intégrante de l'infrastructure nécessaire dans la mesure où les travaux de construction des barrages de Diama et de Manantali sont déjà très avancés.

A l'échelon régional et au niveau de l'OMVS, il est prévu que le projet finance :

1/ Un système de gestion financière, de coordination programmatique, de formation et de logistique pour le développement agricole du Bassin du Fleuve Sénégal.

2/ Des études de factibilité, de politique et de planification, y compris un plan de développement régional pour la Haute Vallée (régions de Gouraye, Bakel et Kayes) ; des études de factibilité pour l'irrigation d'environ 15.000 hectares ; des recommandations pour la prise de mesures concernant les femmes, les éleveurs, les pêcheurs, le cadastre, le commerce régional et les télécommunications.

3/ Un système d'informatique de gestion pour fournir des données fiables permettant de contrôler l'incidence du projet et d'en évaluer les résultats.

4/ Un programme de promotion commerciale et l'élaboration d'informations à l'adresse d'éventuels investisseurs intéressés par la région du Bassin du Fleuve Sénégal.

5/ Un mécanisme efficace pour intéresser et informer les bailleurs de fonds intéressés au développement agricole du Bassin du Fleuve Sénégal.

40, Rue Carnot DAKAR — Téléphone 22-58-67 et 22-36-79 — Télex 670 ORMIVAF — Boîte Postale 3152 DAKAR (Sénégal)

Au niveau national, le projet concerne les régions de Kayes, de Gourayes, de Kaédi, de Bakel et de Podor. Il en résultera que :

1/ Environ 160 associations villageoises seront capables de construire et de gérer les périmètres irrigués, de gérer le flux des facteurs de production et de l'échange commercial.

2/ Environ 1,500 paysans seront formés aux techniques d'entretien/fonctionnement des pompes; de maîtrise de l'eau; de l'entretien des structures; de la gestion des associations villageoises; de la traction animale et de l'alphabétisation fonctionnelle.

3/ Les pratiques d'agriculture irriguée seront considérablement mieux vulgarisées surtout dans les domaines de la traction animale; l'utilisation rationnelle de l'eau; la pisciculture; l'usage des engins aratoires; l'amélioration de technique de stockage et de transformation de récoltes y compris l'utilisation plus rationnelle des données de recherches.

4/ 32 périmètres, soit quelques 703 hectares dans les zones de Bakel, de Kayes et de Gouraye seront réhabilités.

5/ 2.120 hectares de petits périmètres irrigués; 1.907 hectares de moyens périmètres et 933 hectares de cuvette irriguée seront aménagés dans les zones du projet.

6/ Un système d'appui technique, de suivi continu et d'évaluation du développement de l'agriculture irriguée sera instaurée au sein des ADR.

7/ Des systèmes de distribution de facteurs de production et de facilités de crédit.

8/ 136 kilomètres de pistes agricoles seront aménagées en Mauritanie et une étude de factibilité mené sur l'aménagement de la route de Kayes à Diboli au Mali.

9/ Le cordon de surveillance épidémiologique, de soins de santé primaire, et les capacités de collecte de données sanitaires seront renforcées dans les cinq zone du projet.

10/ Un réseau de télécommunications sera installé au Sénégal et un plan d'expansion à travers le Bassin du Fleuve Sénégal sera élaboré.

Dans le but de financer les activités sus-décrites, nous avons l'honneur de demander l'assistance financière de l'AID pour l'octroi d'une sbvention de 63 millions de dollars, à l'OMVS et à ses Etats-Membres. De ce montant, 21,7 millions seront accordées à la Mauritanie, 21 millions au Sénégal, 11 millions au Mali et 9,3 millions aux activités régionales de l'OMVS.

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Afin de mettre en place cet important programme de développement intégré, 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'atteindre l'autosuffisance alimentaire de la sous-région.

Veuillez agréer, Monsieur Le Directeur, l'expression de ma considération distinguée.

POUR LE HAUT-COMMISSAIRE ABSENT

LE SECRETAIRE GENERAL

FOUNEKE KEITA

## 10.5. 611(e) Certification of Capacity to Maintain and Utilize

I. Project Data:

A. Country : OMVS - Senegal, Mauritania, Mali

B. Project : OMVS Integrated Development (625-0621)

C. Funding : $63 million

D. Life of Project: 7 years

II. Description:

This project provides support to the OMVS and its Member States of Senegal, Mauritania and Mali for a program in the Senegal River Basin to increase food production, promote policies that remove constraints to agricultural production, and improve the capability of farmers and private and public institutions to manage the transition from traditional to irrigated agriculture.

The project consists of both a regional component, which will be funded and managed through the OMVS, and national components which will be managed by entities of the three Member States and funded through separate sub-project agreements. The regional component will finance the preparation of a long-range development plan for the Upper Senegal River Valley; prepare feasibility studies for the development of 15,000 ha. of irrigated agriculture in the Basin; undertake policy studies and development studies concerning land tenure, pastoralists, fishermen and fisheries, and telecommunications in the Basin; establish a regional management information system for monitoring and evaluating project activities; and, provide training and technical support to national project activities.

The national project components will work in five project zones (Kayes in Mali, Kaedi and Gouraye in Mauritania, and Bakel and Podor in Senegal) and will provide for the upgrading of existing irrigated agriculture; the construction of new irrigation; the improvement of agricultural extension, rural credit and production input systems; the construction of 136 kms. of feeder roads; and the strengthened capabilities of local health services for disease and nutrition monitoring. In addition, a pilot telecommunications system will be tested on the left bank of the River for later possible extension throughout the Basin.

The project paper administrative, economic and financial analyses examined the financial and human resource capabilities of each country to maintain and utilize this project, and project inputs were designed with respect to these capabilities. The project will be implemented by existing institutions in each country. These institutions have considerable experience in the type of activities funded by the project. AID has already funded irrigation development activities with each of the national rural development agencies that will be the primary implementing agencies and thus, is well aware of the resources and capabilities of these agencies. The project proposes systems whereby initial project and financial management will be directly controlled by AID and U.S. institutional contractors and then gradually turned over to host-country institutions as they develop the necessary capabilities.

## 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 judgment, 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 Integrated Development Project (625-0621).

David Shear
Director,
USAID/Senegal

Signature: David Shear

Date: Jan. 3, 1983

### B. Mauritania

As the principal officer of the Agency for International Development in Mauritania, I affirm that, in my judgment, Mauritania has both the financial capability and the human resources to effectively maintain and utilize the goods and services being provided by the OMVS Integrated Development Project (625-0621).

Peter Benedict
Director,
USAID/Mauritania

Signature: [signature]

Date: 29 October 1982

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C. Mali

As the principal officer of the Agency for International Development in Mali, I affirm that, in my judgment, Mali has both the financial capability and human resources to effectively maintain and utilize the goods and services being provided by the OMVS Integrated Development Project (625-0621).

David Wilson
Director,
USAID/Mali

Signature: _____

Date: _____

Section 10.6

UNITED STATES GOVERNMENT

# memorandum

DATE: 12/2/1982

REPLY TO ATTN OF: Bar[illegible]as Mosley, PE, PDO/ENG

SUBJECT: OMVS-IDP 611A Certification

TO: David Shear, Director

Under General Criteria for Projects, FAA Section 611(a)(1), a determination must be made by a USAID Engineer prior to an obligation in excess of $100,000 that there are:

a) engineering, financial and other plans necessary to carry out the assistance and,

b) a reasonably firm estimate of the cost.

To this end I have examined the work done by the design team engineers, the background material, the technical calculations, and the preliminary cost estimates for the proposed construction.

In addition, I have visited the proposed construction sites in Senegal, Mali and Mauritania. Based upon the above, I submit the following:

1) Roads: The only feeder road construction financed by the IDP will be in Mauritania. In Senegal the roads in the Bakel area will not be financed by the IDP project. However, because there has been appreciably more rural construction recently in Senegal than in Mali or Mauritania, the costs of the proposed roads were developed utilizing the prices available for Senegal. This was done to provide the best cost estimates for not only Senegal but also for Mali and Mauritania.

Given the remoteness of the project areas and the absence of good local road maintenance capability, it was decided to construct improved tracks in areas above the flood levels land running parallel to the river. Perpendicular access roads will be constructed from these improved tracks to villages along the river.

In Mauritania, there will be 136 km of roads constructed. I recognize the fact that the cost estimates for the above roads are based on aerial photography and site visits and not final designs. However, a factor of 70% above the Senegal base cost has been allowed for the Mauritanian construction which should more than offset any unforseen difficulties found during the final designs. This will be especially true if one construction contractor does all the work. Equally important, instructions will be given to the A & E firm doing the final designs to stay within the project budget. This is not unusual for the type of improved track

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(REV. 1-80)
GSA FPMR (41 CFR) 101-11.6
5010-114
☆ U. S. GPO: 1980—311-193/5526

construction envisioned for the project.

2) Small Perimeters Construction and Upgrading : Under the IDP a total of 714 hectares will be built and 281 hectares will be upgraded in the Bakel area. Notwithstanding the fact that final designs must be prepared for all construction, the experience gained over the past three year with the USAID financed Bakel Irrigated Perimeters Project provides excellent cost estimates for any additional construction in Bakel.

3) Medium Perimeters : The medium perimeters to be constructed under the IDP are the most inovative effort to be undertaken by the project. It is generally considered that the medium perimeters must succeed if the Senegal River Basin is going to reach its potential. To this end the project will construct some 1,063 hectares at Podor, Senegal. While a comprehensive design for Podor was recently completed for SAED by GERSAR, a French A&E firm, these plans were found to be too costly to serve as a model medium perimeter. Utilizing cost estimates prepared by GERSAR, the IDP project design engineers have made substantial reductions in the design standards in an effort to propose a medium perimeter that will prove to be economically viable for the basin. It is now planned to hire a US A&E design firm to work within the new design for the perimeters to prepare the final design. A review of the GERSAR plans clearly shows that there are obvious major cost reductions possible in the canal and road plans. For this reason it is my professional opinion that the Podor perimeter can be constructed within the estimated cost.

The other medium perimeters will be undertaken in Mali and Mauritania during the later years of the project. I suggest that certification as to the validity of their cost be done prior to any obligation for the Phase 2 Malian and Mauritanian programs. The experience gained from phase 1, will enable the project planners to make far better cost estimates than possible at this time.

4) Building Construction : Under the project,two relatively small office buildings will be constructed at Podor and Gouraye with a combined estimated cost of less than $200,000. Given the extensive construction experience we have had in the River Basin for similar construction, firm cost estimates are assured.

Based on the above, I have determined that the preliminary plans for the proposed construction are adequate and that reasonable construction cost estimates for U.S. Assistance have been made.