OMVS/USAID Integrated Development Project No. 625-0621

Volume I: The Development Context

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INTRODUCTION

The core of USAID's development assistance strategy for the Senegal River Basin is the Integrated Development Project (IDP), combining a major agricultural component with a program to address policy and institutional constraints. This introductory volume examines the context in which the IDP will be carried out.

The focus of the IDP is on private farmers and on the institutions which are needed to make agriculture an economically viable enterprise in the Senegal River Basin. The project will engage the governments of the three riparian states in a long-term process of policy and institutional reforms aimed at streamlining state intervention in the agricultural sector, and fostering the growth of private enterprise.

Because policy reform is risky and structural reform costly, investments will be made through the IDP to strengthen the partnership between donor and beneficiary governments; to mobilize additional resources for development; and to evaluate the efficacy of the results obtained.

The project will assist 10,000 farmers to master irrigation technology and to improve yields from rainfed fields over the next seven years. The 5,663 hectares they will cultivate will, at project's end, produce an estimated 40,000 tons of cereals and vegetables each year. Improved agricultural practices will be assured through an applied farm system research effort already approved by AID for the Senegal River Basin.

The project's economic internal rate of return on investment is 9.21% including the roads component, and 10.6% excluding roads. When benefits are added to rainfed agriculture, the IRR becomes 14.8%, and when the rate is calculated to include benefits to farm income security, it becomes 17.6%.

Private enterprise will be mobilized and supported to take over from state corporations the provision of agricultural inputs, the management of credit, and the commercialization of produce. The policy reforms needed to permit this change have been developed in close consultations with other major donors operating in the Senegal River Basin and accepted in principle by the three governments involved.

The IDP's planning components will provide to the governments concerned the data and analyses necessary to carefully direct investment in the Senegal River Basin. A master plan for the Upper Basin, to be developed during the early years of project implementation, will establish the framework for rational allocation of resources.

Project staff will produce feasibility studies for 15,000 hectares of land to be brought under cultivation in the 1990's in the middle and upper valley. The dual objective of this effort is to (a) mobilize the resources of donors whose internal technical capabilities do not permit efficient preparation of project dossiers; and (b) assure consistency between project design and the policy/institutional framework established by the Senegal River Basin master plan.
USAID investments in the Senegal River Basin have been designed to respond to both bilateral and regional development objectives. Responsibility for project implementation is accordingly divided between national and regional institutions. The national components of the AID/OMVS program respond to the bi-lateral strategies of the three USAID's in the Senegal River Basin countries. The regional aspects of the program are consistent with the mandate delegated to the OMVS by its three member governments.

1. Where to Invest

1.1. The Senegal River Basin

The heads of state of Senegal, Mali and Mauritania began in 1972 to translate regional cooperation from theory to reality by revitalizing existing but long stagnant riparian cooperation agreements, for the development of the Senegal River Basin. By 1981 they had secured Arab and Western donor commitments to a long-term development plan comprising $750 million in hydraulic infrastructure and transportation, and an initial $383 million for rural development. The scale of the program proposed was unique. Only the scale of the disastrous 1970's drought and its aftermath could justify it, for either the countries concerned or donors.

Food relief and other emergency aid for the eight Sahelian countries in the 1972–76 period cost $950 million. According to the FAO, a similar effort, in the event of another drought in the 1990's, would require an investment of at least $3 billion.

The non-productive and costly nature of emergency aid, coupled with the high probability of drought recurrence in the Sahel, provided the impetus for the development of river basins in general and of the Senegal River Basin in particular. The objective was, and remains, to render at least a portion of food production dependent upon controllable factors.

From the U.S. standpoint the Senegal River Basin is an appropriate geographic focus for developmental, economic, and historic reasons. The three nations concerned are moving in policy directions favored by the U.S., (albeit from substantially different postures), local absorptive capacity for new agricultural technology is substantial, and irrigated farming in the Senegal River Basin is economically viable. This river represents the only major surface water resource available to Mauritania, the primary choice for Senegal, and the second of the major rivers of Mali (after the Niger). As of 1982, 32,270 hectares of land were under full water control, or 40% of the estimated 80,000 total in the Sahel.1/ The Senegal River Basin's full potential is evaluated at 300,000 hectares or 30% of the 1 million hectares irrigable in the Sahel. The 289,000 km² drainage area also represents a substantial, relatively neglected and under utilized portion of the rainfed agricultural potential of these countries.

1/ The figures were 28,000 SRB, 75,000 total Sahel in 1976 (Club du Sahel/CILSS, "Strategy for Drought Control and Development in the Sahel," revised draft, September 1980), updated to OMVS calculations of 32,400 in the SRB as of June 1982.
OMVS

Diama and Manantali Dams
Current Status of financial commitments by donors

<table>
<thead>
<tr>
<th>Country</th>
<th>Financial Commitments</th>
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<tbody>
<tr>
<td>Saudi Arabia</td>
<td>150,000</td>
</tr>
<tr>
<td>Kuwait</td>
<td>100,000</td>
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<tr>
<td>Abu Dhabi</td>
<td>40,000</td>
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<tr>
<td>Iraq</td>
<td>40,000</td>
</tr>
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<td>Islamic Development Bank</td>
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<td>Federal Republic of Germany</td>
<td>89,333</td>
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<tr>
<td>(Caisse Centrale de Coopération</td>
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<tr>
<td>France</td>
<td>69,972</td>
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<tr>
<td>(Fonds d'Aide et de Coopération</td>
<td>23,186</td>
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<tr>
<td>Italy</td>
<td>35,000</td>
</tr>
<tr>
<td>European Development Fund</td>
<td>92,700</td>
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<td>African Development Bank</td>
<td>33,400</td>
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<tr>
<td>African Development Fund</td>
<td>28,080</td>
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<tr>
<td>Canada (25,106 Can. $)</td>
<td>21,158</td>
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<tr>
<td>United Nations Development Programme</td>
<td>10,000</td>
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<tr>
<td>Iran</td>
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<td><strong>TOTAL</strong></td>
<td><strong>763,643</strong></td>
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<tr>
<td>COUNTRY</td>
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<tr>
<td>Senegal</td>
<td>IBRD</td>
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<td></td>
<td>Caisse Centrale</td>
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<td>FAO</td>
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<td>Netherlands</td>
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<td>Japan</td>
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<td>China (PRC)</td>
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<td>Kuwait</td>
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<td>African Rev. Bank</td>
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<td>UNDP/FAO</td>
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<td>Italy</td>
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<td></td>
<td>Other Donors</td>
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<td><strong>TOTAL</strong></td>
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<tr>
<td>Mali</td>
<td>Canada</td>
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<td><strong>TOTAL</strong></td>
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<td>Mauritania</td>
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**TOTAL** |                | 165,800        | **TOTAL**                                                                |

**COUNTRY** | **DONOR** | **AMOUNT (S 000)** | **ACTIVITY**                                                                 |

**Senegal** | **IBRD** | **51,000** | Irrigation IV Project, Delta Region, Large Perimeters, Institutional Development |
**         | **Caisse Centrale** | **40,000** | Small Irrigation, Credit, Agriculture, Institutional Development         |
**         | **FAO** | **10,700** | Small Perimeters in Delta and Middle Valley                             |
**         | **Netherlands** | **6,400** | Small Perimeters, Delta and Middle Valley                               |
**         | **Japan** | **4,900** | SAED Institutional Development, Small Perimeters Middle Valley           |
**         | **China (PRC)** | **4,000** | Fisheries Development, Large Delta Perimeters                             |
**         | **Kuwait** | **3,100** | Large Perimeter, Middle Valley                                          |
**         | **African Rev. Bank** | **2,500** | Large and Small Perimeters, Delta Region, SAED Institutional Dev.         |
**         | **UNDP/FAO** | **2,000** | Small Perimeters, Middle Valley                                         |
**         | **Italy** | **1,500** | Agriculture Research on Mechanization                                    |
**         | **Other Donors** | **1,000** | Land Use Planning, Delta Region, SAED, Planning                          |
**         | **TOTAL** | **111,600** | **TOTAL**                                                                |
**Mali** | **Canada** | **25,600** | Integrated Rural Development                                            |
**         | **IBRD** | **19,000** | Primary Health Care and Rural Literacy                                  |
**         | **FAO** | **5,400** | Agriculture Research and Livestock                                       |
**         | **Germany** | **3,200** | Reforestation and Land Use Planning                                     |
**         | **Kuwait** | **2,000** | Rural Water Supply                                                       |
**         | **UNDP/FAO** | **2,000** | Feasibility Studies of Medium Perimeters                                |
**         | ****TOTAL** | **55,200** | Seed Farm at Ag Research Station                                        |
**         | **Mauritania** | | Small Agricultural Projects                                             |
1.2. **Irrigated Versus Rainfed Agriculture**

Farmers, governments, regional organizations and donors each perceive different factors and priorities. At each level, people in the Sahel and donors have weighed the relative merits of investment in irrigation as opposed to rainfed farming. Their arguments are presented here to clarify the debate concerning the role and viability of each type. Except for the middle valley and delta, where farmers have lost their rainfed fields to desertification, both rainfed and irrigated investments are being made, but for different reasons. Because all parties concur in the value of irrigation, the number and size of perimeters are expanding rapidly. Where viewpoints diverge is in the relative roles to be played by governments and the private sector in the development of an efficient and self-sustaining agricultural sector. The speed with which irrigated agriculture is to be introduced in the Sahel is also a point of debate, with donors correctly insisting upon rehabilitation and increased productivity of farming systems already built, before new investments are made.

The Club du Sahel/CILSS commissioned a Sahel Development strategy in the wake of the 1968 to 1973 drought, balancing food need projections against the capacity of Sahelian agricultural systems \(^2\). Their study concluded that if the Sahel population continues to increase at current rates through year 2000, an estimated 11.5 million tons of cereals will be required to feed it at 1980 consumption rates. If rainfed production can be improved at an average 2% per year for the next twenty years, rainfed cereals output will be 9 million tons in 2000 (from 5.6 million tons in 1980). To realize self-sufficiency in cereals, the 2.5 million ton gap would have to be closed through irrigated production. \(^3\)

The Club du Sahel/CILSS strategy identified the unique characteristics of irrigated agriculture, and underscored the contribution that a farming systems which is independent of rainfall patterns can make to the food production objectives of the Sahel. What irrigation can provide is drought security; offsetting imports of rice, wheat, and sugar; diversification of crops; and production of high value produce including high quality fruits and vegetable for export.

The strategy called for regional river basin development as an important factor in national rural development planning. This approach was further reinforced when incorporated in the Lagos Plan and endorsed by the assembled African heads of state. The important elements in the Club du Sahel/CILSS irrigation strategy are decentralization of farm management, a coherent cereals policy (secure land tenure, dependable inputs supply, incentive level producer prices, efficient marketing) and related training and research to prepare for future expansion.

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\(^2\) Club du Sahel/CILSS "Strategy for Drought Control and Development in the Sahel".

\(^3\) SDP/RDSS, November 1981.
For the governments of the Senegal River Basin countries the decision to move rapidly into irrigation rested on three overriding concerns: (1) the fact that only irrigation could produce rice, wheat, and sugar, imports of which have become as great a factor as petroleum in their escalating balance of payments crisis; (2) the determination to master water technology, an essential element in intensified modern farming; and (3) the need to secure at least a portion of their food production from climatic vagaries.

In the 1970s Mali was the closest to food self-sufficiency, importing only 13% of its food supply; but it was also particularly hard pressed for foreign exchange. Over 40% of the imports on average came as food aid, and 60% was purchased. In Senegal in the same period 39% of the total food supply was imported, and 88% of the total imports were purchased with precious foreign exchange. Mauritania was able to produce on average only 23% of its food supply, and had to purchase 69% of the deficit.²⁴ All three countries face rising consumer demand for rice, primarily from the urban population but also increasingly from rural areas. Thus the government-sponsored projects for rice production have emphasized the need to produce a marketable surplus.

The viewpoint of farmers in the Senegal River Basin on irrigation versus dryland farming is much more concrete. It depends on the conditions of the lands in their immediate area, the crops that can be grown under either condition, and the rainfall pattern each year. In the middle valley, rainfall is low (200 to 300 mm per year on average) and highly irregular. There the wide flood plain lands have for a long time provided the bulk of the cereals through flood recession agriculture. The drought was disastrous for all types of crops in this area, and agriculture has not recovered. The rainfed farming on the river banks has been minimal since the drought because the combination of heavy grazing and dry conditions destroyed the ground cover and created a strip of desert on either side of the river.

Since rainfed agriculture on the river banks is not a practical alternative, the tradeoff that farmers are faced with is between flood recession and full water control irrigation. The flood plain has also suffered losses that people are assuming to be permanent. The floods, since the drought, have averaged only half the typical volume in the first part of the century, consequently a much smaller area is flooded. So farmers are turning to pumped irrigation, which is feasible on large areas of the higher flood plain. The individual family's decision to participate depends mainly on its ability to cope with the much higher cash flow and labor supply needed for pumped irrigation. The potentially large size of irrigation projects on the vast floodplain in this area also raises questions of landowners' rights, complex organization, and ultimate control and management of projects. Villages and families want to retain control of their lands, organize themselves without governmental directives, and choose which crops to grow.

Government RDAs have traditionally wanted to grow rice in this area, but farmers prefer staple crops such as millet, sorghum and corn. In the past, in the delta, RDAs simply retained control of all factors of production so that rice had to be cultivated. In the middle valley, the RDAs agree that farmers will now have greater control over the factors of production, and recognize that they will have to make it in the farmers' interest to produce rice.

In the upper valley, conditions are different. The floodplain is small and in some places non existent, whereas rainfed farming on the river banks is viable most years. Small village-initiated and managed perimeters have sprung up in over 300 villages in the past seven years. RDA involvement has been limited to provision of initial pumping equipment, construction advice, and occasional extension or maintenance assistance. This is an area of heavy outmigration to Europe and capital cities in West Africa. Returned migrants have brought much of the entrepreneurial initiative and know-how that launched these village irrigation projects.

Geographic factors continue to impose a relatively slow rate of change. The long period of isolation, the continuing problem of distance from the major markets, and outmigration of a large part of the active labor force, all mean that this area is in a transitional phase in the use of irrigation. The village perimeters, typically 15 to 40 ha, have brought a much appreciated new flexibility to local cropping and diet. Producers welcome the cash income in the dry season and the secure grain crop. These villages no longer need to import food, but irrigation production is essentially for local consumption and has as yet no impact on urban food supply. Transportation, preservation, local labor supply and marketing opportunities will continue to improve during the life of the IDP. Some villagers are prepared to move to medium-sized perimeters (200 to 500 ha) level, and begin producing for external markets. These same improvements in local factors will increase the viability of dryland production for market, and IDP personnel in the upper river zones will devote correspondingly more attention to dryland extension work.

AID has worked closely with the Club/CTILSS in weighing dryland versus irrigated investments. Programs to improve rainfed agriculture are limited. The best efforts have been directed to upgrading agricultural research institutions and forging strong linkages between researchers and extension agents. Further efforts have been devoted to diversify food and commercial crops and discover drought resistant and more productive varieties. Other possibilities AID has not pursued, either because other donors became involved or because the options appeared less cost-effective, include resettlement to extend dryland production to new lands, and national emergency storage systems. Programs to mechanize farms have been postponed. Given cost, the labor-intensive small peasant holdings, and the slow growth of off-farm employment in the region, this option is for the short term considered an inappropriate form of agricultural intensification.

Expansion to new lands through organized projects, which was recommended by the Club/CILSS study, was attempted in the Senegalese Terres Neuves project. Mali also attempted it through Opération Arachides et Cultures Vivrières in
**SENEGAL RIVER: CROSS SECTION: AGRICULTURE AND LAND TENURE**

**DIERI**
- Rainfed Agriculture
- Red dune more or less sandy

**HOLLALDE**
- Heavy black soils (clay: 50-60%)

**FONDE**
- Underwater hydromorphic soil (clay < 30%)

**HOLLALDE**
- Heavy black soils (clay: 50-60%)

**FONDE**
- Underwater hydromorphic soil (clay < 30%)

**WALO**
- Cultivated

**SOILS**
- DIERI
  - Red dune more or less sandy

- Flood recession farming
  - Millet, peanuts
  - Sorghum

- Flood recession farming
  - Sorghum (flood recession)

- New perimeters

- Irrigated rice (after construction of small perimeters)

- Traditional irrigated areas:
  - Vegetables, corn, niébé, spices

- Irrigated areas:
  - Vegetables, corn, niébé, spices

**Land Tenure**
- Few land tenure problems
- Zone of rigid land tenure system (high-water bed)
- Few land tenure problems
- Overall

**Areas under flood recession farming (left and right banks):** 110,000 ha (1970-71), 15,000 ha (1971-73)
the Kayes region, to stop seasonal client farmers (Nawetanes) from migrating down to the Senegalese and Gambian peanut basin. AID financed a study of these and wider population movements in the area and concluded that efforts to move people against the current were costly and not very effective, while in any case spontaneous in-migration from Guinea and neighboring districts was rapidly bringing the targeted area under production.

1.3. The U.S. Role vis à vis other Donors

Since 1974, in Nouakchott, at the first OMVS donor coordinating meeting, the United States has been repeatedly asked to provide capital investment in the two dams planned for control of the river regime—one a salt intrusion barrier at Diama (Senegal), the second, a hydroelectric/water control barrage at Manantali (Mali). The agency's Congressional mandate directed U.S. efforts instead toward agricultural development. The AID Special Report to Congress in 1975 stressed the importance of river basins development to long-term food self-sufficiency in the Sahel. Congress encouraged AID to explore the viability of investments in irrigation. In the Senegal River Basin this led to the design and implementation of the Bakel small perimeters project, and to extensive consultations between AID, host governments, and other donors for the design of the IDP.

Other donors have defined and pursued a variety of investment options in the SRB. The Arab funds play a major role in the financing of the dams and an increasingly important one in the agricultural sector. European EEC governments, and Canada are deeply involved in both the infrastructure and downstream development program. Furthermore, a French firm is constructing Diama dam while a second provides supervisory Consulting Engineering services. German firms have been awarded the Manantali construction contract, and the German government is financing improvements to the Dakar-Bamako railroad to accommodate transport of materials to the Manantali dam site. Roads and bridges construction and repairs are being financed either through bilateral programs or through the UNDP. The World Bank, like AID, has focused its interventions on irrigated agriculture development and research and on health.

Supporting the institutional development of the OMVS are the Kuwaiti fund, the KFW, FAO, UNDP, and AID. Longer term assistance to OMVS, especially in the area of infrastructure management, is planned by the French and German governments and the Arab funds.

A total of fifteen major donors have made long-term commitments to SRB development. The infrastructure, and master plans resulting from these investments are expected to produce the environment necessary to attract private sector participation in the development of the basin's mineral, and agro-industrial resources.

2. When to Invest and at What Scale

In the 1970s, irrigation farming in the Senegal River Basin was a state planned, heavily subsidized, resettlement effort. Governmental attention was focused on large scale, mechanized farming systems cultivated by people brought into the low lying, empty areas of the delta from more densely populated regions of Senegal. The economic viability of the scheme appears not to have been considered, nor the tremendous effort that would be required to maintain fields and equipment.

Elsewhere in the Senegal River Basin, a multiplicity of public and private donors intervened with discrete projects. The development perspective was limited to a village, a town, at most a zone to which individual donors, with government encouragement, would develop adoptive ties. Each donor was fully absorbed in the implementation of its own projects, having neither the resources nor the mechanism to judge the accumulated impact of the different interventions on both local and national institutions.

Planning activities were extremely limited in scope. Governments, with inexistent capacity to assess the cost and effectiveness of their interventions, plus strong commitments to state direction of development efforts, were not ready to question the policy directions taken.

Planning and coordination are sophisticated (and initially costly) concepts forced upon nascent organizations by critical events. The drought, the low productivity of tenant farming, the high deficits of the parastatals, the negative returns on investment, the increasing food imports, the higher energy costs, the unrepayable debts incurred by farmers on state-run perimeters, the insistance of donors on better management of projects—all these factors contributed to the crisis of the late 1970's and the consequent willingness of the governments involved to open the policy dialogue.

AID, in this period, determined that the river basin should be examined in its totality, as both a socioeconomic and environmental system. The agency invested $17.5 million between 1971 and 1981 to lay the groundwork for basin-wide planning and for all donors and governments involved.

A series of projects produced maps from aerial photography, analyzed a discrete portion of the hydroagricultural potential, contributed to a major socio-economic study, evaluated the environmental impact of proposed developments, and assisted the OMVS to plan the fiscal responsibility of each country vis à vis development costs. The pursuit of these efforts cemented technical cooperation between the three riparian states and assisted donor organizations in defining the nature and scope of their investments.

For itself, AID reconfirmed the appropriateness of its field of intervention—agriculture and rural development. But the studies, and additional analyses by other donors, underscored the inherent weakness of investing limited resources on projects of limited scope. The reorientation of economic policies and reform of institutions require coordinated action of a magnitude equal to the risks involved in carrying them out.
The comprehensiveness of the IDP lies in the attention paid to development actions that permit the agricultural production component to be viable. Even so, the scale of the investment would not be equal to the task of supporting the reforms called for, were it not for parallel and closely coordinated interventions by other donors.

The IDP has a high probability of success because the openness of the policy dialogue with host institutions has permitted a rational division of labor between donors and governments. The World Bank's involvement in the reorganization of the RDAs in Senegal and Mauritania, and the Caisse Centrale's central role in rural credit reform, permits AID to concentrate its efforts on improvement of the extension services and on farmer training. Cereals policy harmonization in the three riparian states, a significant element of the IDP, is supported by the Arab Funds conditioning their loans for the dams on this issue.

The knowledge that no great gaps exist in the Senegal River Basin development program, that other donors will intervene where one cannot, has helped to create a mutually reinforcing level of commitment. The level of U.S. assistance over the next seven years is proportionate to the role AID proposes to play in maximizing economic returns to agricultural investments in the river basin. Furthermore, because the IDP is both a bi-lateral and a regional project, its national and regional components must be credible enough to affect reform at each level. The investments are $21.7 million for Mauritania—$21 million for Senegal; $11 million for Mali; and $9.3 million for OMVS.

The investment choices retained in the IDP after a two year process of analysis, consultations, and negotiations, required selecting out other interventions deemed useful but not yet fully feasible. Principal among the latter were livestock and fishing projects; rehabilitation of large perimeters in the delta region; mechanized farms; industry projects, and non-productive amenities such as rural water supply, and housing.

The investment climate in the Senegal River Basin is propitious because the policy apparatus is receptive and because 'donors' commitment to coordinated action is a reality. These conditions did not exist before 1979. In USAID's view the policy dialogue can be sustained to the extent that the partnership is deemed reliable, in the long term, by the governments concerned.

2.1. Ramifications of dam construction

While construction of the dams was not a pre-condition of river basin development, the fact that financing is now assured and construction begun has a number of implications for development. Over all it has made agricultural projects more viable economically. It provides flood control, without which dikes would protect perimeters only from 10-year-level floods. Within a decade the dams will assure year-round water flow in the main channel, permitting river transport from just above Kayes to the river mouth. This will provide an alternative to massive road construction projects. Returned migrants are already investing in barges and passenger boats along seasonally practicable routes.
The more regular levels of the river will also facilitate pumping and assure dry season water supply in some areas in the Middle Valley that currently lack it. The planned move from diesel to electric pumps will substantially reduce costs. Use of the electricity generated at Manantali, originally intended for mineral exploitation and for Malian cities, is being reassessed, in light of emerging agricultural priorities. Road and market improvements incidental to dam construction can be anticipated.

The dams force the pace of change, making it potentially costly to delay socio-economic adaptation downstream. Starting in the late 1980s the Manantali dam will retain up to 50 percent of the flood, reducing alluvial deposits which have renewed the fertility of flood recession plains each year. An artificial flood will be continued for ten years to cushion the transition, but will provide only moisture not nutrients.

Low season fording of the river will no longer be possible when there is a year-round channel. People, vehicles, and animals will have to ferry across; there will surely be a demand for bridge construction.

Over the long term there will be substantial distortion in the socio-economic situation of individuals, families, and villagers in the river basin. Those with irrigable lands will be in a favorable position. Those who rely on flood recession lands will lose much of their current assets unless they convert to pumped irrigation. Those living near the new roads and river ports can be expected to benefit from the increased activity and greater opportunity for off-farm employment.

Three groups with distinctive traditional occupations will be particularly affected: pastoralists, fishing families, and women. Those who adapt to the new opportunities may be substantially better off than through traditional activities, but those who do not will have their traditional pursuits disrupted.

Pastoralists are affected, as their movement is restricted by expanding farms, and as their flood plain pastures are lost due to reduced flooding. Already there is frequent conflict over perimeters built across watering paths for animals, and fines for animal damage to unprotected farms. Former pastoralists in increasing numbers want to join irrigated farming schemes, but the land is often owned by villagers of other ethnic groups.

Fishing families, who are a special caste in the Middle Valley, have already lost much of their livelihood due to reduced flooding. They will have expanded opportunities in the Diama reservoir if they move there, and the IDP also offers some of them an opportunity to go into fish farming. The Manantali reservoir may one day be a viable fishing ground, but for the present it is too isolated.

Women are particularly affected because their traditional cash-earning activities, vegetables and rice, are being commercialized and taken over by men. In some perimeters women are being successfully incorporated into producer groups using new irrigated technology. In others the men refuse their participation or RDAs neglect to recruit them. The IDP provides funding to address these special needs of women.
The dams make regional cooperation an irreversible necessity. The effort to mobilize resources has led to joint commitments by the three countries, entailing additional ties with donors on three continents. Any breakdown in collaboration would have major international repercussions. Secondly, the SRB is now such a major component in the overall economic program of each country that the national economies could not withstand a failure. Thirdly, the OMVS has established severe penalties for withdrawal. Any internal conflict is likely to provoke an immediate and serious effort at mediation rather than withdrawal. Finally the indirect imperatives to regional cooperation are even greater than the direct sanctions. As river basin development is proceeding even now disparities in prices, policies and regulations are becoming more widely known. Pressure to harmonize them emerges, and the basis is created on which the future economic union envisioned in the OMVS charter could be built.

3. The Policy Context in OMVS Countries

In the first two decades of independence, the governments of all three countries tried to organize development through centralized planning and administration. Price policies were oriented towards consumers rather than producers. Elaborate tariffs and restrictions on movements of agricultural inputs and outputs were instituted. The RDAs charged by Mauritania and Senegal with developing the river basin quickly became inefficient monopolies, with heavy personnel budgets and weak operating ones.

3.1. Senegal

Policy reform began on Senegal's own initiative early in the 1970s with a major administrative decentralization program and the introduction of multi-party democracy. Producer prices were increased gradually throughout the 1970s, and consumer subsidies allowed to shrink. The major agricultural program launched in the aftermath of the drought has been hampered by ineffective management and an escalating balance of payments crisis. The balance of payments was adversely affected by rising petroleum prices, deteriorating terms of trade for its major exports (peanuts and phosphate), and escalating food imports unintentionally stimulated by consumer subsidies.

Then, in 1979, budgetary and balance of payments crises led to a structural reform negotiated with the IMF and the World Bank. Special assistance in 1980 included a three-year extended fund facility from the IMF totalling SDR 184.8 million ($243 million), a $60 million World Bank structural adjustment loan, a total of $50 million in concessionary and non-concessionary loans from the Caisse Centrale, and $21 million U.S. Title III program. These were all conditional on the reform of public finances involving personnel retrenchment, tax increases, realistic pricing, and progressive disengagement from the parapublic and public sector. The balance of payments problem was to be addressed by a rescheduling of the external debt (accomplished in 1981), strict limits on both government and financial institutions' borrowing, an increasing customs duty on imports, and selected export subsidies.
The aspects of the agricultural reform plan affecting the SRB centered on re-organization of SAED. It operates as of 1981 under a performance contract that narrows its role to planning, construction, and extension. Under the plan SAED's former credit and input distribution functions are to be taken over by the private sector, and as many perimeter management functions as possible are to rest with farmers. A new national system of private agricultural credit (SONAGA) and a new Cooperative Law allows legal recognition for credit purposes only at the multi-village cooperative level. This provision conflicts with the SONAGA Charter, which indicates that it will provide credit to village sections. If applied in the SRB, the cooperative law would complicate the credit provisions in the IDP, which allows loans directly to the still smaller groupements de producteurs (producer groups). This issue will be raised immediately with the GOS.

The IDP will help SAED reduce its role by encouraging private systems of inputs supply, credit, and marketing. In the area of marketing for example, the Government had previously not allowed foodstuffs to move across even departmental lines, unless in the hands of government monopolies. Yet, in negotiations for the IDP, it has agreed to free movement of goods across both local and international borders.

3.2. Mauritania

Despite the fact that half of the land area of Mauritania is desert and its rural population is amongst the poorest in the world, it was able to draw on its iron and copper mining resources to achieve a 10% rate of economic growth in the 1960s. In the 1970s it was struck a triple blow: the major drought, which is still unremitting in the Mauritanian Sahel, the collapse of the mineral market, and an ultimately costly involvement in the war for Western Sahara.

The combination of war and drought caused the traditional socio-economic systems to collapse. Reciprocity broke down between noble families and their client labor as two thirds of the herds and much of the cropland were lost. The official end of slavery was announced in 1974 and again in 1978, but the government was unable to provide compensation to owners or new economic opportunities for former slaves. Many fled to the cities in the West and South, but there was no work to be found.

However, the GIRM's economic management policies have improved significantly since 1978, improving at the same time Mauritania's long-term development prospects. Restraint on overall spending has become so effective that current expenditures have been held essentially unchanged in nominal terms through 1982. The budgetary mix is also being gradually improved as military equipment purchases have been scaled back and the previous emphasis on infrastructure projects has been reduced. The proposed public investments are now concentrated in the productive sectors and donor involvement is

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6/ By the physical quality of the life index it ranks 6th from the bottom among the 150 poorest states (Morris, Measuring the Conditions of the World's Poor, p. 96).
designed to encourage the GIRM's shift in spending toward such development areas as agriculture, health, and education.

The GIRM raised producer prices for millet and sorghum late in 1981 in a major move to increase incentives for agricultural production. Prices were raised for millet and sorghum from 8 to 13 Ouguiyas (UMs) per kilogram and for rice from 10 to 12.5 UM per kilogram. The GIRM committed itself, during negotiations in connection with the proposed PL 480 section 206 agreement, to additional, more gradual rises in the producer price until import parity is reached.

The GIRM has been gradually devoting more of its resources to preventive aspects of public health care as opposed to the curative aspects and has been increasing expenditures in the rural areas. The GIRM has been increasingly calling for greater assumption of the costs of medicines and local health workers by the villagers themselves as a way of stretching scarce central government funds and also to elicit more private responsibility for good health.

The GIRM stated during the recent recurrent cost seminar in Nouakchott that it intended to press herders to assume a greater share of the cost of veterinary programs; and parents, private groups and communities to cover a much higher proportion of schooling fees, especially scholarships at the secondary and higher levels, and to gradually reduce input subsidies in agriculture.

The GIRM has made progress in reducing its historical tendency toward capital-intensity through concentrating more on the development of small enterprises and on the revival of the dryland interior where a significant portion of the population lives and potential job opportunities exist. The most promising avenues to be pursued to sustain the development momentum and make progress in food self-sufficiency comprise a suitable mix of activities in dryland and irrigated agriculture, the promotion of fisheries; and measures to assure ecological balance while permitting maximum rational exploitation.

Total GIRM spending rose from $95 million in 1973 to a peak of $343 million in 1976. Spending was restrained to a level close to $300 million per year for the 1977-'81 period. Sharp rises in military spending and in infrastructure and heavy industry investments, financed almost entirely by increases in foreign assistance, contributed to the jump in the percentage of foreign assistance to total GIRM expenditures from 32 percent for 1973 to 65 percent for 1976; foreign assistance was a more manageable 50 percent of expenditures for 1982. The Government is continuing austerity spending levels and expanding vigilance in the collection of customs, taxes and fishing royalties. These measures, plus policy guidance favoring GIRM projects with rapid pay-out periods, have the objective of permitting domestic revenues to cover all central government expenditures, excepting only foreign project support expenditures.
The National Corporation for Rural Development (SONADER) was created in 1975 to provide agricultural inputs, extension, and marketing for irrigated farming on the oases, around Wadi dams, and in the SRB. Given a critical and increasing burden on foreign exchange for rice imports, SONADER focused its attention on rice production in large perimeters in the middle and lower valley. In recent years it also worked out a system of contracting for pump supply and amortization by village groups that wished to organize small perimeters. Such perimeters now dot the entire length of the valley.

Since Senegal's and Mauritania's perimeters face one another directly across the river, the different pricing policies have become well-known to local farmers and used to their advantage. This poses problems for the governments. Mauritania subsidizes diesel fuel for the pumps while Senegal subsidizes fertilizer. Farmers on one bank inflate their purchases of subsidized inputs and trade with family members or neighbours on the other bank. Mauritania's producer price for rice has consistently been slightly lower than that in Senegal. Where such differences are substantial farmers simply market their produce to the higher paying side. The governments of the three countries have already agreed in principle to operate on the basis of realistic prices, direct distribution routes, and harmonized agricultural policies. For such practical reasons local circumstances will very soon oblige them to implement the harmonization.

The GIRM came to terms with SONADER's historically poor performance in early 1982 through the appointment of new leadership. Since then, a major internal reorganization has been underway with assistance from the World Bank. Internal reform has including auditing of SONADER's accounts by an independent international firm, reduction of staff, limitations on the organization's scope of intervention, and decentralization of project implementation authority (so far untested) to its field based regional offices. SONADER continues to be handicapped by insufficient government voted operating funds. Resolution of this issue is a key precondition to planned IBRD project interventions in the SRB.

3.3. Mali

Mali is a non-aligned socialist government. It receives military assistance from the Eastern bloc, but its economic ties are primarily with France and neighboring francophone countries. Since the drought U.S. assistance has increased, reflecting Mali's key role as an agricultural producer of potentially important dimensions in the Sahel region, as well as improved bi-lateral relations.

With its interior landlocked location, Mali has one of the least developed modern economic sectors in Africa. But its food situation is better than that of Senegal or Mauritania, as it produces an average of 87% of its own food supply and occasionally enough to export. It has a large southern area of rainfed agriculture with a considerably better rain supply than Senegal or Mauritania. It also exploits the vast Niger River Basin with major rice irrigation schemes at Segou and the interior delta (Office du Niger). The
Kayes region, which encompasses the SRB, is relatively well-watered, but so difficult of access that modern agricultural and a cash economy have penetrated very little. The Malian economy has relied heavily on agriculture. Cotton, groundnuts and livestock exports provide scarce foreign exchange. Agro­industries account for over 40% of industrial production and commerce likewise centers on agriculture. State enterprises have been the core of the government's development strategy, but have proved costly, inefficient and over-staffed. The GIRM announced in late 1981 a wide range of economic reforms which include (a) liberalization of the cereals marked and (b) reform of the state enterprises. The carrying out of these reforms is important to the success of the IDP.

Cereals Marketing. The longstanding cereals marketing system is universally recognized by donors and the GRM as a major constraint to achieving national food self-sufficiency. The basic flaws in the system have been official and consumer prices that are much lower than free market prices and the inability of the state cereals marketing board, OPAM, to perform its assigned monopoly. OPAM was created to control the cereal markets by maintaining prices at reasonable levels to producers and consumers, thereby eliminating commercial speculation that takes advantage of producer and consumer alike and, from the GRM viewpoint, "distorts" the market. The approach has not been successful. Only an estimated one-third of cereals marketed move through official channels; farmers understandably sell the remainder on a parallel market at about twice the official price. OPAM customers, except for the military and some civil servants, receive no more than 25% of their total needs from the official source. OPAM has failed to perform its major function satisfactorily and, in addition, has required subsidies in recent years of $5 to $10 million annually.

The GRM recognize that market control has not achieved desirable results. Several food donor organizations support the position elaborated by an FAO report 7/ which calls for reducing OPAM's control of the market to a function that would chiefly come into play during very poor or very good crops years which would otherwise cause untenable swings in market prices. The legislation for this action has been passed with some modification from the donor proposal. Rice grown in project areas of heavy government investment has been excepted from decontrol. The law provides for wholesale merchants to be licensed by the state and requires these merchants to respect consumer prices established by the government.

State Enterprises. Mali's state sector dates from the immediate post-independence period when a few key companies were nationalized and others created. With independence many French investors and businessmen who had occupied key positions in the economy withdrew, leaving a void which private Malians and other foreign investors were not able or prepared to fill. To ensure the provision of basic necessities and the promotion of economic development, the government stepped into this void.

The state enterprises in Mali dominate the modern sector of the economy, accounting for more than 70% of industrial output, two-thirds of the country's business turnover, and more than half of its exports. The sector's total deficit reached MFr 25.6 billion ($45 million) in 1979, equivalent to 45% of the year's tax receipts. Along with these yearly deficits, the sector's indebtedness soared to MFr 120 billion ($214 million) in 1979, equivalent to 28% of the national external debt. In addition, the past few years have been characterized by declining values of sales and declining value added for the major companies, as well as real disinvestment in plant and equipment.

The GRM has announced an extensive reform of the state enterprise sector. Only those enterprises which are determined to be "strategic" to the national economy will be kept under government control and measures will be taken to make them financially self-supporting. Others will be opened to private entrepreneurs and converted to mixed (state/private) or private enterprises or closed down. The World Bank has since early 1982 been assisting the GRM in elaboration of the reform plan. To the extent the GRM succeeds in carrying out the reform plan, the economy will be freed for expanded private enterprise activity.

The weak modern economy in Mali has meant small government budgets. This in turn has limited the ability of the recently organized government corporation, the OVSTM, to implement its small perimeter development program in the Kayes region. Although OVSTM was to have had a monopoly of input, credit, and marketing, it has in fact been obliged to leave all except extension services largely to farmers and private suppliers. In most cases, this meant farmers supplied their own seeds, and used little or nor fertilizer. Farmers have not been growing rice due to low local demand, high labor requirements, low official prices, and inability to evacuate it. They grow corn, vegetables and fruits, which bring a welcome cash income. As transportation and communications in this area improve, and producer prices for cereals rise, the marketing situation should improve. When the question of private sector vis-à-vis OVSTM roles was raised, farmers said that they want to keep control over the purchase of inputs and their own marketing. The government, already faced with a major drain on domestic finances from the existing public enterprises, agreed readily that OVSTM should focus on extension.

4. The Approach of the IDP

Integrated rural development projects in Africa, and irrigation in particular, have had a familiar litany of problems: poor management, low rates of return, poor maintenance, weak integration, inability to overcome policy constraints and institutional, infrastructural weaknesses. How will the IDP be different? How are these matters addressed in the design?

4.1. Coherent Development

This project will fund some 5,600 ha of small and medium perimeters in 160 villages in five contiguous geographic zones. Until now, the small individual projects started by different donors side by side required a total overlapping of design effort. The tendency was to focus on the irrigated
perimeter itself, without taking into account rainfed agriculture, livestock, traditional off-farm activities of the local population, or fishing. The wide scope of the IDP obliged the design team to look at the full range of traditional economic activities and develop models for the modernization of each.

The fact that several other donors were developing programs on a similar scale led to collaboration in the conception of the program and allocation of roles. For example, initial village socio-economic surveys to be used in IDP perimeter development draw heavily on those used by the French in the Matam area, a sample of which was provided to the team. In turn, the project will make available to other donors model design aspects, including fish ponds attached to perimeters, the land tenure monitoring system, and the overall design and management of the medium perimeter at Podor.

4.2. Generating Additional Resources

The IDP team will identify and do prefeasibility studies for 15,000 ha of irrigable land. Donors who lack the technical capability for a project design are looking to the IDP to identify these investment possibilities for immediate funding and to develop a replicable organizational/management model.

The SRB countries have already made substantial progress in evolving a workable model of small village perimeters, and it is spreading rapidly. The IDP plan incorporates improvement in technical design, allowing water measurement, better extension work, local training and cooperative management, making them even more readily replicable. At the same time both host countries and donors recognize that small perimeter development is inherently limiting as a production unit, and that it is time to move to larger units. Here the Podor perimeter will be a potential model, combining RDA administration at central water distribution with liberalized conditions of farmer organization.

4.3. Donor Coordination

Collaboration that began as an exchange of information has become more structured and substantive, for the major donors now have regular working relationships and inter-related personnel. Mutually reinforcing commitments to long term participation create a secure investment climate. A consensus has emerged on policy issues and on monitoring of the impact of change.

The OMVS countries have agreed to implement policy changes which will not only make the IDP function more smoothly, but pave the way for full regional cooperation. Major recent studies, including OMVS Socio-economic Study, ORSTOM's geographical survey and the AID-funded Environmental Impact Study revealed the tight interweaving of the traditional economy in the area. Planning cooperatively with donors, government officials have recognized that many existing national policies, if applied on a wide scale in the river basin, would be dysfunctional. Policies that are already in effect have been modified substantially, and those not yet implemented are being reassessed.
A selected group of donors has participated in the policy analysis, including USAID, the World Bank, and the Caisse Centrale. Strong dialogue in the process has produced common conclusions, and contingency on donor conditionality and scale of investment packages.

By working on policy at both bilateral and regional levels, we have stimulated interest in policy issues by previously uninvolved donors. For example, several Arab investors in the dams have made their commitments conditional on elimination of government subsidies, incentive level producer prices, environmental and forest protection, and upgrading of agricultural extension.

A unique forum for policy issues has evolved in the OMVS Consulatative Committee. The Committee consists of senior representatives from both donors and recipient governments, meeting twice a year. The main directions of change have already been debated and decided by the Committee. As they are implemented, progress reports will allow the Committee to monitor and adapt development strategy.

Commitments have been written into the covenants for the IDP, after detailed discussions with the three governments involved, that would have been unthinkable a few years ago, including:

-- market liberalization throughout the basin;
-- farmer control of input purchases and crop marketing;
-- abandonment of official monopoly channels of distribution for inputs (through national capitals and RDA headquarters), in favor of entry and movement by the most direct routes.

The IDP design team singled out several areas where river basin development will have impacts that are not adequately dealt with by existing program models and policies, including land law administration, fishing, women activities and pastoralists. Funding is provided for both OMVS and government study of the issues, the results of which will be brought for action to governments and donors involved in the SRB.

4.4. Private Sector Involvement

There was not, and is not, a simple choice of monopolistic versus private sector approaches to developing the SRB. Except for the delta area around St-Louis and Rosso, the private sector was virtually extinct in the river basin when the governments in the 1970s first began trying to develop the middle and upper valley. The cash economy had been introduced to the whole western Sahel via Dakar and spread along the rail lines to St-Louis and Bamako, rapidly sapping off the pre-colonial trade along the river. Moreover, experience with private colonial corporations had left a legacy of distrust of capitalism's economic stability and fairness. Thus when Senegal initiated river basin development, it chartered SAED in 1965 with the full range of responsibilities for inputs, extension, and marketing. Mauritania likewise created SONADER with a similar monopoly in 1975. The sweeping mandate and pressures for production quickly created a heavy-handed, directive approach in both organizations. Conflict surfaced with farmers, who had few other alternatives in modern irrigation, but could at least turn to traditional economic activities.
Then the economic reverses of the 1970s and the prospects for much wider development in the 1980s led both countries to radical institutional redefinition. Both institutions are now mandated to move towards a technical advisory role, and encourage the development of private sector options for farmers. In the Kayes region of Mali the theoretical monopoly mandate of OVSTM is not a problem, because the region has been so isolated that government programs have had little impact. There is little private sector activity, but both farmers and governments prefer to see it developed rather than government agencies. Complex construction, provisioning, credit and marketing tasks still cannot simply be turned over to the private sector in the river basin because the necessary institutions do not exist.

The IDP's focal point is farmers, their independence and productivity. Farmers will participate in site selection and perimeter design, so that these can take account of other local economic activities. They will have a choice of crop packages and fertilizer procurement, as well as marketing either through the RDAs or through channels of their own choosing. Credit will be provided independently, so that farmers are not obliged by debt to market through official channels. When farmers contract with RDAs for services, it will be a two-way contract, with RDAs responsible to them as well as vice-versa.

Private purveyors of farm equipment and supplies have been contacted by the IDP design team, and will continue to be actively recruited by project staff to open branches in the river basin. The new scale of development interests them.

Private and cooperative initiative are also emerging. There is a strong tradition of private enterprise and extended family cooperation among the Soninké and Toucouleur of the project zones, and emigrants who have returned from long years of working abroad are modernizing them. Some local entrepreneurs have invested in barge or truck transport, others in commerce. Communities have organized to construct mosques, markets, and improve rural water supply.

Banking facilities have been lacking in most areas, making very difficult the amortization of pumps and other capital costs of irrigation, conversion of migrant remittances, cross border trade and credit access for farmers and small enterprises. The new credit windows to be opened up by banks to manage the credit components of AID, IBRD, and CCCE programs fill a great gap.

Credit/private sector specialists in each country will be key members of the IDP staff, exploring new ways of stimulating the private sector. Options in which the design team found interest include agricultural fairs, recruitment of suppliers, marketing programs, and improved storage and transport.

4.5. Mastery of New Technology

The opportunity for farmers to master intensive irrigation technology and adapt it to their geography and lifestyle is an important aspect of this proposal for SRB governments. If management and legal and administrative systems are currently inadequate, these too they see as challenges to be met.
Efficient provisioning and marketing are recognized as steps towards modern agriculture adapted to the needs of the region.

American experience with arid land agriculture and private sector management are particularly useful. The IDP addresses itself not only to irrigation techniques per se, but also to improved agronomic practices, diversified crop packages, fertilization with local products, livestock integration, animal traction, and fish farming in ponds fed by the irrigation canals. The Agricultural Research Project, Phase II, provides direct feedback and new research results for use in the IDP extension program.

4.6. Management

At all levels, both in the IDP and in host country governments the question of clearer, more effective management is being addressed. Considerable progress has been made in the last two years, with the reorganization of SAED, SONADER, and the OMVS High Commission.

The IDP will be funded and administered in four components, one regional under the OMVS, and one through each bilateral AID mission and national Ministry of Planning or Finance. The management plan for the IDP relies on clarification of roles, performance contracting throughout, and clear lines of authority. There will be regional responsibility for studies, planning, evaluation, and policy negotiation versus national responsibility for program implementation. This reflects the charter of the OMVS. It will strengthen the evaluation and policy role of the OMVS, which has until now been primarily absorbed with building the dams.

Within AID, direct responsibility for the regional component and coordination of the entire project will come under the River Basin Development Office. Under the RBDO Coordinator and his deputy are three direct-hire project officers, one of whom is responsible for the IDP. He in turn has a deputy and an irrigation engineer hired under contract (see figure 1, Organizational Chart).

Within the OMVS, the regional component of the IDP will be administered by the Directorate of Development and Coordination (DDC) one of four Directorates in the High Commission. The director of the DDC will name a project manager for the IDP under his immediate authority (see Figure 2, Organizational Chart of the OMVS). He will head the management consulting team contracted by AID/RBDO for the project. The team will comprise a financial management expert, a private enterprise development specialist, an information specialist, and a sociologist/training officer, plus part time consultants. The OMVS project manager will also coordinate work between this team and the divisions of Agricultural Development, Integrated Research, Industrial Development, and Planning and Evaluation.
Figure 1

ORGANIZATIONAL CHART

USAID River Basin Development Office (RBDO)

DIRECTOR
USAID/Senegal

RBDO
COORDINATOR

PROGRAM OFFICER
and
DEPUTY COORDINATOR

PROJECT OFFICER (DH)
IDP 625-0621

DEPUTY
(Contractor)

IRRIGATION
ENGINEER
(Contractor)

PROJECT OFFICER (DH)
Gambia RBDP 625-0012

DEPUTY
(Contractor)

PROJECT OFFICER (DH)
Ag Research: 625-0957
Fiscal All.: 625-0620
Groundwater Mon.: 625-0958

DEPUTY
(Contractor)
Figure 2
OMVS ORGANIZATIONAL STRUCTURE

CONTROLLER GENERAL

CONFERENCE OF HEADS OF STATE

PERMANENT WATER COMMISSION

COUNCIL OF MINISTERS

AGRICULTURAL DEVELOPMENT AND RESEARCH COMMITTEE

HIGH COMMISSIONER

CONSULTATIVE COMMITTEE

SECRETARY GENERAL

BUREAU FOR ADMINISTRATION

DOCUMENTATION CENTER

GENERAL COUNSEL

ECONOMICS + FINANCIAL COUNSEL

INVESTMENTS DIRECTORATE

HUMAN RESOURCES DIRECTORATE

INFRASTRUCTURE DIRECTORATE

DEVELOPMENT + COORDINATION DIRECTORATE
National project agreements will be signed by one Ministry (Finance or Planning, depending on the country) having overall project authority. It will oversee implementation by the different ministries concerned, and assure interministerial coordination. In Mauritania SONADER will administer the agricultural program, the Ministry of Health will have the health surveillance program, the Ministry of Public Works (Equipment) the feeder roads program. In Senegal, SAED will be in charge of the agricultural program, the Ministry of Public Health, the Health Surveillance Program, and SERST, the telecommunication program. In Mali, there will be the Ministry of Agriculture/OVSTM for the Agricultural component, the Ministry of Health for Health Surveillance, and the Ministry of Transportation and Public Works for the Feasibility Study on the Kayes - Diboli road, and DNAFLA for the functional literacy program. Formal interministerial cooperation will be established in each country.

The USAIDs in Mauritania, Senegal and Mali will each assign a direct-hire AID project officer to oversee project implementation. They will assure liaison with national implementing agencies and with RBDO; will prepare project documentation including agreements, implementation orders and letters, and national project reports. They will also supervise national technical assistance contracts and monitor all national project implementation actions. Each will be assisted by a contract deputy project officer and the various officers of the USAID.

There will be five teams of field staff, headquartered in each of the five zones. Staffing is by host country national personnel wherever possible, supplemented by IDP contract technicians. They will report to the implementing agency which employs them.

Fixed price performance contracting is to be used at all levels. It has a local precedent in the contract-plan established for SAED, and is widely used in the U.S. Government. In areas where RDA contracting has been a bottleneck in the past, model contracts and streamlined procedures (e.g. for relations with farmer groups, and for shelf item purchases) are being worked out, or contracts will be let directly by AID (e.g. for perimeter construction).

Management has also been a problem at the lowest levels in perimeter organization. Extension workers and the Mobile Training Unit will conduct programs to improve the functioning of village cooperatives and provide accounting and management training. Technical improvements in the design of irrigation projects, allowing water measurement, will facilitate farmer management of pumping costs. Banking facilities will give them a secure system for their pump amortization, and land record systems will facilitate land administration.

Nevertheless institutional constraints will remain. Many government procedures are complex and slow, including customs clearance, contracting, purchasing, and accounting. Unreliable communications and transportation systems make it difficult to overcome blockages when they occur. And at the local level it will take time to evolve a legal and administrative structure adequate to create a secure environment for rapid growth.
4.7. Costs

The overall investment of $750 million for dams and the currently committed $383 million in downstream development makes the Senegal River Basin one of Africa's largest public works project. The costs are high, but so are the returns. For AID, even though it decided not to invest in the dams, the total SRB investment, from the environmental impact assessment through the IDP, will approach $85 million. To capitalize on this, economies of scale and multiplier effects have been built into the IDP.

Construction costs have been substantially reduced, through a design where the per hectares cost is considerably lower than elsewhere in Africa. IDP estimates of $3,507 per hectare on small perimeters, and even the relatively costly $6,496 per net hectare of cultivable land in Podor, compare favorably to costs of $5,000 to $10,000 per hectare on individualized SRB projects. The recent World Bank report referred to costs elsewhere in Africa of $10,000 to $20,000 per hectare. This is an opportunity to test a low cost model, which will in turn be available not only for the SRB, but for the other Sahelian river basins.

A package consisting of construction and technical/management specifications has been requested by other donors in the SRB. Perfected small and medium perimeter models will lower costs on the 15,000 ha for which the IDP will produce feasibility studies.

A model is also needed for the transition from small perimeter to medium and larger ones. The IDP attempts this from two different directions:

1. the phased construction of a medium-size perimeter in Podor, one of the largest towns in the middle valley, and

2. the expansion of small perimeters in the middle and upper valley by the addition of new areas, e.g. at Bakel. The medium and large perimeters require centralized pumping management, but have been designed to maximize producer group autonomy.

The economic and financial analysis of the project shows generally good rates of return for the irrigation components in the project.

They are only fair for Podor (because of high construction costs) andKayes (due to the need for retention dams, single cropping, and start-up cost for OVSTM).

## Economic Rates of Return

<table>
<thead>
<tr>
<th></th>
<th>Base Case</th>
<th>Including Benefits to Farm Income</th>
<th>Including Benefits to Rainfed Agriculture</th>
<th>Including Benefits to Security and Rainfed Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kayes</strong></td>
<td>9.64</td>
<td>19.20</td>
<td>12.36</td>
<td>22.34</td>
</tr>
<tr>
<td><strong>Bakel</strong></td>
<td>11.46</td>
<td>18.87</td>
<td>15.09</td>
<td>22.90</td>
</tr>
<tr>
<td><strong>Podor</strong></td>
<td>7.49</td>
<td>10.94</td>
<td>-</td>
<td>10.94</td>
</tr>
<tr>
<td><strong>Kaedi</strong></td>
<td>11.94</td>
<td>20.84</td>
<td>17.44</td>
<td>25.66</td>
</tr>
<tr>
<td><strong>Gouraye</strong></td>
<td>13.33</td>
<td>22.47</td>
<td>14.41</td>
<td>25.55</td>
</tr>
</tbody>
</table>

The project will not place a heavy burden on the governments' financial resources. Increased taxes earned indirectly from the project will more than offset the additional costs for extension services. The recurrent cost burden even to the RDAs will be very low since the project calls for the elimination of all recurrent subsidies on inputs and the reductions of the density of extension agents. In addition, the project will result in a net savings in foreign exchange. These analyses show the viability of downstream development, and are in fact why AID chose to invest in this productive program.

For farmers the costs of irrigation seem very high. A quantum leap in cash flow is required to go into irrigated agriculture. Dryland agriculture in the river basin has typically taken as its sole inputs 15 kgs of seeds per hectare and occasionally some fertilizer. The initial labor for clearing and hoeing is minimal compared to the diking and leveling required for irrigation. Flood recession agriculture requires a slightly higher density of seeding than dryland and is fertilized, weeded, and watered naturally. The average $12,000 for a pump set sufficient to irrigate 20 hectares is more than any villagers have ever accumulated for any purpose. With commercialized agriculture just getting started in the river valley, the main sources of funds are emigrant workers' remittances and government/donor assistance. But the incomes from irrigation are also extraordinarily high, and the food security and flexibility it offers are widely appreciated. The proliferation of projects in the last seven years bears witness to this. In these first years, farmers are learning the accounting, cooperative, and management skills necessary to amortize capital and develop a commitment to maintenance and soil conservation. After several seasons' experience, farmers in the river basin have already learned from costly mistakes and natural setbacks. The IDP will reinforce practical experience with improved extension work and basic educational materials in agronomy, management, and marketing. It will directly reach over 57,000 thousand people on more than 5,000 farms, providing them with higher and more stable income and diverse food supplies.

5. **Gaps and Constraints**

Truly integrated development in the river basin will require infrastructural and program assistance in a number of areas that the IDP was not able to address adequately. In some cases bilateral or other donor programs are already
functioning in these areas. For other possible interventions, the high cost of a large-scale program was simply prohibitive. Attention to these areas will be needed in the future if development is to proceed. AID personnel will work with host country governments and other donors to encourage project development in these areas, and examine the need for a change of focus as the IDP reaches its end.

5.1. **Infrastructure**

5.1.1. **Transportation**

Roads were impassible in the rainy season and the railroad was unreliable at the time of the drought in 1968-73. Since then there have been efforts to relieve the transport situation. The road has been paved on the Senegalese side. In Mauritania an improved track has been built to Boghè and there have been some improvements in access to Kaédi. A major project to upgrade the railroad has been undertaken. Many villagers along the river can still be reached by road only in the dry season, complicating pump provisioning and maintenance as well as purchasing and marketing. The roads will have to improve as the economic activity and population density in the river basin justify them economically.

5.1.2. **Telecommunications**

Neither postal nor telegraph nor telephone systems are adequate in the river basin. The telephone system in Senegal extends in principle to Podor and Matam through St. Louis, but rarely works. Projects and RDAs rely mainly on inadequate private radios and handcarried messages. Kayes can be reached from Bamako by telegraph when wind and/or rain do not interfere for days at a time. None of the upriver cities can communicate with one another directly across borders. The telecommunications component of the IDP will provide a full assessment of the situation and the most cost effective strategy for meeting the development needs. If the private sector is to be able to function this will have to address local as well as long distance communications, and provide public access.

5.2. **Reforestation/Soils Conservation**

The IDP provides for reforestation around perimeters, but a major program was beyond its scope. Until water is available year round, there is no ready way to protect the soils on perimeters from wind erosion, much less rainfed areas. Where water is available year round, the extension program includes planting a soil cover crop during the hot dry season and ploughing it under to restore organic matter in the soil.

Secure land tenure is expected to make soil conservation measures more readily accepted. At present the situation is poor. The tradition is slash and burn (swidden) agriculture. Prairie fires are still frequent and sometimes deliberately set to clear fields of rubble and pests. Soil conservation techniques are not taught by extension agents. Clouds of dust now cover the Sahel throughout the dry season, making it resemble the Oklahoma dust bowl.
Before the drought sandy harmattan winds blew for two to four weeks a year, now they last seven to nine months.

5.3. Rural Water Supply

In the river basin as elsewhere in the Sahel, domestic water supply is critically inadequate in villagers' own estimations. Wells, pumps, and water towers are the first priority for most village council's development plans. The IDP villages border directly on the river and now use it as a water supply for people and animals. As the density of activity in population on the river increases, this will be less viable and pure water supplies should be developed.

5.4. Rural Electrification

Except at Kayes and in the Delta where there has long been a urban electrical system, the only electricity along the river is provided by small generators. Electrification, either through the Manantali generators or smaller generating systems, would permit more efficient electrical pumps to be used on the perimeters. Recognizing this, many of the financing agreements for the dams required the government to examine possibilities for rural electrification.

5.5. Small Industry/Off-Farm Employment

Governments are studying the possibilities for development in this direction, and local communities favor it. Even though irrigation will improve incomes and provide some dry season employment, it cannot realistically compete with emigration as a potential source of earnings. Therefore, it is not expected to reduce the rural exodus, even though it attracts some dynamic and experienced returned emigrants. River basin countries cannot become fully viable again without local off-farm employment opportunities.

5.6. Urban Services

Urban development in the Western Sahel has historically been highly centralized, with Dakar as the prime city and secondary nodes in other national and provincial capitals. Many of the urban services and amenities that would allow people and businesses to stay in the river basin are available only in Dakar or other capitals. For private enterprises to develop, for example, banking facilities, a system of contract law and courts are needed, and secure title to real property.

Many administrative services are either unavailable in the valley or handled on an ad hoc basis. Local rural councils are just being introduced, on an elective basis in Senegal and appointive in Mauritania. The participants would benefit from organizational, accounting, and planning skills and experience. Customs clearance for goods and people exists only at certain fixed points, far distant from one another. Land registries do not exist for the most part. A few towns distribute urban plot titles in theory, but requests
pile up for years. No vital statistics are kept. Visa and passport applications and most kinds of paperwork have to be done in distant capitals.

Health services are also poor, and the IDP surveillance scheme provides only the beginnings of an emergency response system. Health education programs, village pharmacies, and emergency health procedures will have to continue to be developed.

Education above the primary level also generally requires travel outside of the river basin. A Lycée has long been available in St. Louis and the new University there will provide the first post-secondary education in the river area. However, there is room for the development of agricultural/rural technology/industrial arts training throughout the river basin. Short term, local training programs, which do not require travel and admit both youth and adults, would most directly meet the needs of the river basin communities.

6. Summary Project Outputs, Activities, and Financing

6.1. Project Context

The IDP is part of the Agricultural development program developed in each of the three basin countries, principally by the RDAs and with the participation of OMVS. For the period 1981-1989, Senegal intends to develop 16,080 ha of new and upgraded perimeters spread throughout the left bank, and at an estimated costs of $114.0 million. In Mauritania, a less precisely defined program, calls for 9,475 ha to be brought under cultivation in the same period of a cost of $126 million. Mali's preliminary plan for the First Region aims at developing 2,638 ha by 1990.

If this development program is successfully completed, a total of 28,193 hectares will be brought under cultivation in the next decade, of which 5,663 will be attributable to AID interventions. This rhythm of development represents an average of 2,000 hectares/year for Senegal; slightly over 1,000 ha/year for Mauritania; and about 300 ha/year for Mali. This is a reasonable and achievable average.

As a consequence, it can be expected that 60,000 hectares of land will be under cultivation by 1990, 50,000 of which devoted to cereals and vegetables. They will produce under single cropping, an average of 4 tons/hectare, or 200,000 tons per year of cereals. This will represent 10% in 1990 of the projected consumption requirements in the three SRB countries.

6.2. Project Activities

The IDP consists of a regional program managed by the OMVS and three national/bilateral programs managed by the governments of Mauritania, Senegal and Mali. The regional program will concentrate on coordinating and supporting the national programs and on addressing regional constraints. Slower than hoped rates of growth in agricultural production and of irrigation hectarage and yields thus far are due to four major constraints: insufficient capital, organizational and technological inexperience, policies that have minimized production incentives, and poor communications and transport networks.
## AGRICULTURE DEVELOPMENT PROGRAM Right Bank: MAURITANIA (1981-89)

<table>
<thead>
<tr>
<th>Projects Description</th>
<th>Area (ha)</th>
<th>Period Implementation</th>
<th>Financing (million$)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) BOGHE Perimeter</td>
<td>975</td>
<td>1982-84</td>
<td>Germany KFW</td>
<td>Financing shown includes the construction of embankment for 4,000 additional ha, electrification of Boghé, and administrative buildings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AFDB</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Saudi Arabia</td>
<td></td>
</tr>
<tr>
<td>(2) BLACK GORGOL Perimeter</td>
<td>3,600</td>
<td>1961-87</td>
<td>FED</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Germany KFW</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IFAD, WFP</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IDB, AFDB</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FAC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>66.0</td>
</tr>
<tr>
<td>(3) SMALL VILLAGE Perimeters and medium perimeters in Boghe, Kaedi and Gouraye sectors</td>
<td>3,900</td>
<td>1983-89</td>
<td>FED</td>
<td>719ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FAC</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IBRD</td>
<td>1,570ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Netherlands</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>USAID</td>
<td>870 ha</td>
</tr>
<tr>
<td>(4) M'POURIE Perimeter</td>
<td>1,000</td>
<td>1981-86</td>
<td>China</td>
<td>Operating since 1970 (1,800ha already developed) 1,000 ha additional are planned by 1986</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9,475</td>
<td></td>
<td>126.09</td>
<td></td>
</tr>
<tr>
<td>PROJECTS</td>
<td>Area (ha)</td>
<td>Impl. Period</td>
<td>Costs (Million)</td>
<td>Financing Source</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------</td>
<td>--------------</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>N'DILRBA</td>
<td>1,576</td>
<td>83-86</td>
<td>14.47</td>
<td>SAUDI FUND</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ABU DHABI</td>
</tr>
<tr>
<td>DAGANA C</td>
<td>2,250</td>
<td>86-87</td>
<td>3.79</td>
<td>IBRD / CCCE</td>
</tr>
<tr>
<td>GUEDE</td>
<td>625</td>
<td>83-85</td>
<td>5.50</td>
<td></td>
</tr>
<tr>
<td>BOUDOUM (Rehab)</td>
<td>935</td>
<td>83-87</td>
<td>7.10</td>
<td>IBRD / CCCE</td>
</tr>
<tr>
<td>DAGANA A+B(Rehab)</td>
<td>-</td>
<td>83-86</td>
<td>11.49</td>
<td>SAUDI FUND</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ABU DHABI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IBRD</td>
</tr>
<tr>
<td>XIANGA C</td>
<td>700</td>
<td>83-88</td>
<td>5.75</td>
<td>KFW Germany</td>
</tr>
<tr>
<td>XIANGA Pilotu</td>
<td>750</td>
<td>83-84</td>
<td>0.91</td>
<td>KFW Germany</td>
</tr>
<tr>
<td>SALDE-VALLA</td>
<td>1,000</td>
<td>84-86</td>
<td>7.46</td>
<td>AFD 1</td>
</tr>
<tr>
<td>KASSACK Nord</td>
<td>500</td>
<td>84-85</td>
<td>2.77</td>
<td>KUWAET</td>
</tr>
<tr>
<td>DRAIN of X'DAEL</td>
<td>-</td>
<td>84</td>
<td>0.66</td>
<td>ADF</td>
</tr>
<tr>
<td>MATAM III</td>
<td>3,100</td>
<td>83-88</td>
<td>22.60</td>
<td>CCCE France</td>
</tr>
<tr>
<td>PUDOR-AREE LAO</td>
<td>1,405</td>
<td>82-88</td>
<td>5.86</td>
<td>FID/KEWET/AFDB</td>
</tr>
<tr>
<td>PUDOR-ILF 4 Harph-1</td>
<td>470</td>
<td>82-84</td>
<td>2.48</td>
<td>NETHERLANDS</td>
</tr>
<tr>
<td>THIACAR(Rehab)</td>
<td>870</td>
<td>83-84</td>
<td>5.42</td>
<td>USAID</td>
</tr>
<tr>
<td>PODOR PERIMETER</td>
<td>980</td>
<td>83-88</td>
<td>7.33</td>
<td>USAID</td>
</tr>
<tr>
<td>BAKEL</td>
<td>3,75</td>
<td>83-86</td>
<td>1.0</td>
<td>USAID</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>16,080</strong></td>
<td></td>
<td><strong>$104.73</strong></td>
<td></td>
</tr>
</tbody>
</table>

Construction to begin in early 1983 on 350 ha.

Feasibility study being prepared by FAO/AFDB.

Feasibility study for 100 ha prepared by FAO.

Study underway by CCCE.

FED financed 1,245 ha. Second phase financed by KUWAET/AFDB.

USAOID will prepare feasibility study only.
### AGRICULTURE DEVELOPMENT PROGRAM  MALI-FIRST REGION  (1981-89)

<table>
<thead>
<tr>
<th>PROJECTS</th>
<th>Area (net ha)</th>
<th>Implementation Period</th>
<th>Financing (mil. $)</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SAME</td>
<td>150</td>
<td>83-86</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Seeding station expansion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. MALOUM-KOUTA</td>
<td>75</td>
<td>83-86</td>
<td>$7.723</td>
<td>USAID will finance 933 ha of new perimeters, upstream and downstream of Kayes.</td>
</tr>
<tr>
<td>a. Gumbaye I</td>
<td>115</td>
<td>83-86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Gumbaye II</td>
<td>66</td>
<td>84-86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Downstream from Kayes</td>
<td>2,000</td>
<td>83-86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Upgrading of existing perimeters</td>
<td>232</td>
<td>84-86</td>
<td>$.193</td>
<td>USAID</td>
</tr>
<tr>
<td>e. Feasibility Studies</td>
<td>(5,000)</td>
<td></td>
<td>0.170</td>
<td>USAID</td>
</tr>
</tbody>
</table>

**Total** 2,638  $8.086
The OMVS Consultative Committee, a new and proven donor financing and coordination mechanism in the SRB, will be the institution through which resources will be mobilized for capital investments and bridging finance for the risks inherent in policy reform.

The IDP in turn, will strengthen the capabilities of OMVS and its member states to manage the preparation of project feasibility studies and directly finance such studies for up to 15,000 hectares of new perimeters, by 1987.

The project will address the issues of inexperience with irrigation technology and organizational requirements through a regionally coordinated development process that includes the following elements:

(a) increasing participation of farmers in project conceptualization;
(b) providing extensive organizational advice prior to the start of perimeter construction and during early development phase;
(c) disseminating results from successful perimeter experience;
(d) promoting strong links between researchers, extension agents, and farmers;
(e) developing alternative private systems for input supply and produce marketing.

Improving production incentives will be the most difficult objective to achieve, especially in the area of price policy where political considerations have to be weighed against economic ones. The project, in concert with other donors and the OMVS consultative committee, will strengthen OMVS ability to define policy issues and develop options backed by rigorous analysis for consideration by the member states. The agenda for policy issues includes the following items:

(a) harmonizing producer and consumer prices and input subsidies among the three SRB countries;
(b) eliminating distortions in marketing and input delivery resulting from existing official channels of distribution;
(c) working towards continuing structural reform of the parastatal organizations charged with irrigated agriculture development;
(d) offering incentives to the private sector - particularly national entrepreneurs - to play a substantive role in SRB development;
(e) aiming for a progressive reduction of controls on the movement of goods, services, currencies, livestock, and people between the three countries;
(f) establishing a system for resolving land-tenure issues.

The national programs will concentrate on improving productivity and expanding irrigated agricultural production in five geographic areas: Podor and Bakel in Senegal; Kaedi and Gouraye in Mauritania; and Kayes in Mali. Map 3 shows the location of the sectors and of perimeters in each sector. Each national program contains:

(1) an agricultural development program aimed at improving productivity on existing and new irrigated perimeters and rainfed fields; reha-
bilitating existing perimeters; financing the construction of new perimeters; improving input as well as marketing systems, and establishing a monitoring and evaluation system for agricultural development in the area;

(2) a health surveillance program to provide data on the incidence of endemic diseases in the area, and to increase the capability of the local health services to monitor and control these diseases.

(3) a feeder roads program. In Mauritania 136 km of feeder roads will be built in the project zones. In Mali a pre-feasibility study will be financed for the main road into the zone. In Senegal feeder roads will be financed under a separate bilateral program.

In addition to these elements, the Senegal program includes a pilot telecommunications project to examine the performance and costs of a thin-route satellite communication system for possible use throughout the SRB.

6.3. 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 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 in the Middle Valley, and policy recommendations concerning women, pastoralists, fishermen, land tenures, 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 package on pilot rural credit and artisan development activities in five project zones;

(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 and marketing outputs;

(7) approximately 1,500 villagers trained as perimeter technicians for pump operation, 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, fish ponds, selected agricultural equipment, improved crop storage and processing techniques, plus effective use of a joint research/extension program for field demonstrations;

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

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

(11) improved technical support for and continuous monitoring and evaluation of irrigated agriculture by the RDAs;

(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; baseline and follow-up epidemiological surveys in the five project zones.

Project Financing

Table 2 shows AID life-of-project financing for the regional and three national components of the project which will be funded under a grant to the OMVS. The River Basin Development Office of USAID/Senegal will have overall project management responsibility including direct oversight of the regional program and budget and coordination of the national programs and budgets. The USAID's for Mauritania, Senegal, and Mali will have management responsibility for the respective national programs. Sub-project agreements will be executed between each USAID and member state government to establish the bilateral authority and mechanisms for implementation of the national programs.

9/ Cuvettes are former river beds or depressions lying parallel to the river. They are agricultural alluvial areas with heavy loam soils.
Table 2
Summary Cost Estimate and Resources Flow by Country ($ 000's)

<table>
<thead>
<tr>
<th></th>
<th>OMVS</th>
<th>Mauritania</th>
<th>Senegal</th>
<th>Mali</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Agriculture</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical Assistance</td>
<td>-</td>
<td>3,260</td>
<td>2,995</td>
<td>2,958</td>
<td>9,213</td>
</tr>
<tr>
<td>Construction</td>
<td>-</td>
<td>3,457</td>
<td>8,435</td>
<td>3,492</td>
<td>15,384</td>
</tr>
<tr>
<td>Commodities</td>
<td>-</td>
<td>1,765</td>
<td>2,189</td>
<td>642</td>
<td>4,596</td>
</tr>
<tr>
<td>Rural Credit</td>
<td>-</td>
<td>1,500</td>
<td>1,200</td>
<td>800</td>
<td>3,500</td>
</tr>
<tr>
<td>Operating Costs</td>
<td>-</td>
<td>2,842</td>
<td>2,185</td>
<td>817</td>
<td>5,844</td>
</tr>
<tr>
<td>Training</td>
<td>-</td>
<td>292</td>
<td>292</td>
<td>292</td>
<td>876</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td>-</td>
<td>13,116</td>
<td>17,296</td>
<td>9,001</td>
<td>39,413</td>
</tr>
<tr>
<td><strong>B. Health</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical Assistance</td>
<td>945</td>
<td>275</td>
<td>275</td>
<td>275</td>
<td>1,770</td>
</tr>
<tr>
<td>Training</td>
<td>-</td>
<td>260</td>
<td>150</td>
<td>170</td>
<td>580</td>
</tr>
<tr>
<td>Commodities</td>
<td>-</td>
<td>30</td>
<td>565</td>
<td>390</td>
<td>1,385</td>
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<tr>
<td>Renovation</td>
<td>-</td>
<td>10</td>
<td>10</td>
<td>50</td>
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<tr>
<td>Operating Costs</td>
<td>125</td>
<td>590</td>
<td>275</td>
<td>205</td>
<td>1,195</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td>1,100</td>
<td>1,700</td>
<td>1,100</td>
<td>1,100</td>
<td>5,000</td>
</tr>
<tr>
<td><strong>C. Feeder Roads</strong></td>
<td></td>
<td>5,022</td>
<td></td>
<td>300</td>
<td>5,322</td>
</tr>
<tr>
<td><strong>D. Telecommunications</strong></td>
<td>-</td>
<td>-</td>
<td>1,500</td>
<td>-</td>
<td>1,500</td>
</tr>
<tr>
<td><strong>E. Regional Coordination and Planning</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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