U.S. DEVELOPMENT OBJECTIVES IN THE SENEGAL RIVER BASIN

USAID/SENEGAL

RIVER BASIN DEVELOPMENT OFFICE

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INTRODUCTION

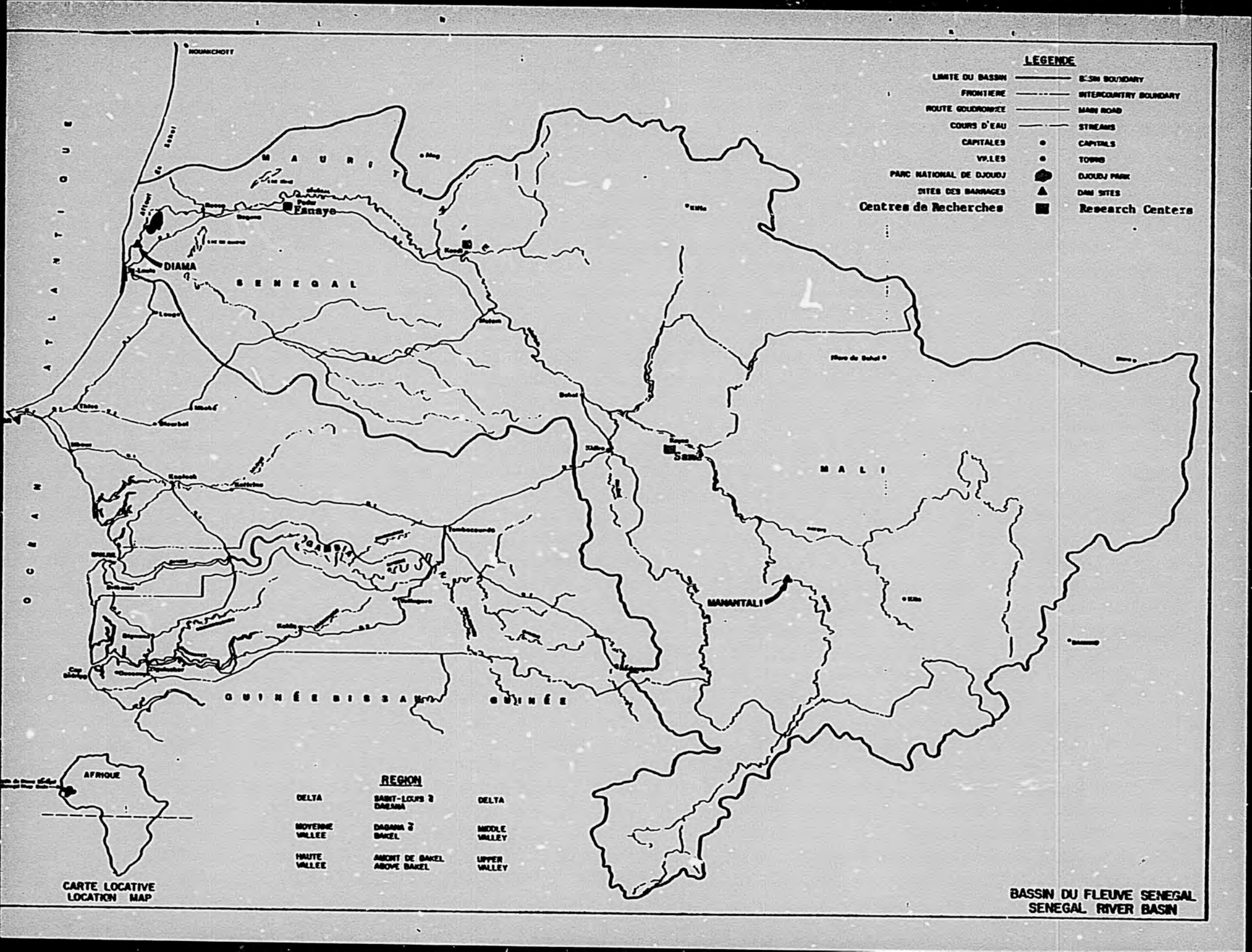
For the Sahel, three river systems- the Senegal, the Niger and the Gambia- represent major development resources. The harnessing of these waters holds the key to protection from the ravages of cyclical droughts, to long-term food self-sufficiency, and to production of agricultural surpluses for export in good years.

The nations of Senegal, Mauritania and Mali, and fourteen OECD and OPEC donor organizations have forged the political will and mobilized the resources necessary to develop the Senegal River Basin (SRB). Over $750 million will be spent in the next eight years to construct the infrastructure that will control the river's regime.

The main objective of what is one of Africa's largest public works project, is to assure a dependable supply of water for agriculture. This will secure food production in a region where people's lives are regularly threatened by climatic vagaries. The two dams now under construction- at Diama in the river Delta, and at Manantali in the Upper Basin- will also ultimately generate electric power, provide land-locked Mali with access to the sea, and furnish water supplies to urban populations.

Whether or not the large investments being made to build the infrastructure will be fully productive is an open question. The United States, which is not involved in infrastructure financing, can play a determinant role in assuring that the answer is yes.

American experience in river basin development, in technology transfer, in mobilization of private initiative, can provide the broadness of vision needed to assure the success of the undertaking. It is the objective of this paper to set forth the rationale for U.S. participation in the development of the Senegal Basin and to propose the manner in which it can be done.


LEGENDE
LIMITE DU BASSIN
BASIN BOUNDARY
FRONTIERE
INTERCOUNTRY BOUNDARY
ROUTE GOUDRONNEE
MAIN ROAD
COURS D'EAU
STREAMS
CAPITALES
CAPITALS
VILLES
TOWNS
PARC NATIONAL DE DJOUDJ
DJOUDJ PARK
SITES DES BARRAGES
DAM SITES
Centres de Recherches
Research Centers
NOUAKCHOTT
MAURITANIE
Fanaye
DIAMA
SENEGAL
MALI
MANANTALI
GAMBIE
GUINÉE BISSAU
GUINÉE
OCEAN ATLANTIQUE
REGION
DELTA
SAINT-LOUIS à DIAMA
DELTA
MOYENNE VALLEE
DAGANA à BAKEL
MIDDLE VALLEY
HAUTE VALLEE
AMONT DE BAKEL
ABOVE BAKEL
UPPER VALLEY
AFRIQUE
CARTE LOCATIVE
LOCATION MAP
BASSIN DU FLEUVE SENEGAL
SENEGAL RIVER BASIN

I. ANALYSIS

A. Sahelian River Basins and Food Production

In its 1976 report to the Congress proposing a long-term Sahel Development Program, AID stated that "the economic viability and independence of the Sahelian states depend ultimately on the development of these basins for irrigated agriculture, reliable river transport, and hydroelectric power available for mining and industry." 1/

The Club du Sahel/CILSS have calculated that the Sahelian population will increase from 30 million in 1980 to over 50 million in 2000. The Sahel countries' annual cereals production in 1970-79 averaged 4.6 million metric tons which were supplemented by annual imports of 1.1 million tons 2/ in order to meet the basic food requirements of the region. By the year 2000 the Sahel will need 11.5 million 3/ tons of grain annually to feed its increased population. Rainfed agriculture can be expected to produce seventy-five to eighty percent of this grain, assuming adequate rainfall patterns. The balance will need to be secured through irrigated agriculture and imports.

1/ AID, Report to the Congress: Proposal for a Long-Term Comprehensive Development Program for the Sahel, Oct. 1976, Part II, p. 29

2/ FAO, National and Regional Security Grain Stocks in the Sahel, Rome 1980, Annex VI, Appendix 613

3/ Club/CILSS, Strategy for Drought Control and Development in the Sahel, Revised Draft, Sept. 1980, pp. 11-12.

As the drought of 1968-73 demonstrated, almost total reliance on rainfed agriculture is in the Sahel too great a political and socioeconomic risk. For that reason, the governments of the region concluded that irrigated agriculture must be introduced on a much wider scale than is currently the case, while recognizing that the Sahel will continue to rely primarily on rainfed production for the foreseable future.

The region contains approximately one million hectares of land that are irrigable under total water control, 300,000 of which lie in the Senegal River Basin (SRB). To date 75,000 hectares have been brought under production in the Sahel, 28,000 of which are in the SRB.

If by the year 2000 twenty to twenty-five percent of grain production must come from irrigation, a minimum 225,000 hectares will need to be developed and brought under intensive double-cropping cultivation with average yields of 10 tons/hectare. This would require a rate of development of 8,500 1/ hectares per year.

The rhythm of development proposed for the SRB is on the order of 3,000 hectares 2/ of newly constructed perimeters per year. USAID's analysis of past trends and current constraints indicates that a rate of 2,000 hectares

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1/ Calculated as follows: 225,000 total needed, minus 75,000 existing, equal 150,000 new construction divided by 18 years (1982-2000).

2/ OMVS, Hydroagricultural Indicative Program, October 1980.

per year is more realistic. This would provide over the next eighteen years, 36,000 hectares of land cultivated in double and triple cropping, in addition to what is currently farmed.

Irrigated agriculture is the Sahel's hope for a secure future. Investment costs in irrigation will be high but so too can be the returns if proper care is taken in the design of projects.

The 1976 report to the Congress concluded on the subject of the river basins that "a greatly enlarged program over the next fifteen years is essential to acquire additional data, to experiment with different crop varieties and techniques of irrigated agriculture, and to plan carefully for the ultimate full realization of the region's potential." 1/ In the case of the Senegal River Basin, progress has been made on all three fronts since 1976. The three Sahelian countries involved are poised to move forward into a new phase.

The Basin presents an opportunity for the three nations to make advances on several fronts: mastery of water control, transition from traditional to more modern agriculture, construction of economically viable irrigated perimeters, and protection of river basin environments. The process

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1/ OP-CIT, Part II, p. 30.

has already begun, but success is not yet assured. The SRB may be the Sahel's first, best chance to achieve it, because the resources that have been mobilized are of sufficient magnitude to promote physical transformation of the land, training of people, strengthening of institutions and reform of policies. These are the four basic ingredients of development.

B. The Senegal River Basin

The Senegal River draws its source from Guinea's Fouta Djallon highlands and is fed by several tributaries (the Falémé, the Bafing, the Bakoye, and the Gorgol) in Mali, Mauritania and Senegal, the three riparian nations. Each year, between eight and thirty-four billion cubic feet of water flow through the river basin and out into the Atlantic Ocean.

The river, 1,800 kilometers long, drains an area of 289,000 square kilometers. Its annual flood gathers in the South Eastern plateau and empties at Bakel (see map) into a wide plain in the Middle Valley. The flood recedes gradually from October to February, allowing recession agriculture on 15,000 to 300,000 hectares, depending on the size of the flood. In the hot, dry season (March - June) river flows decrease to an average 10 cubic meters/second from the 10,000 cubic meters/second at flood levels, and occasionally stop entirely.

In the Upper Basin rainfall isohyetes range from 600 to 1,500 mm/year, whereas in the Middle Valley and Delta the range is 200 to 350 mm. Thus, while the Upper Valley, lying largely within the borders of Mali, has considerable

potential for rainfed agriculture, the rest of the basin is suitable principally for irrigated cultivation.

The Basin has been extensively studied. The U.S. Government helped lay a rational basis for its development through AID assistance in key areas. With an investment of $17 million between 1971 and 1981, AID analyzed the hydro-agricultural potential of the Basin, contributed to a major socio-economic study, mapped the Basin from aerial surveys, and determined the environmental effects of proposed developments, including the dams.

These activities, carried out under the direction of the OMVS-Organisation pour la Mise en Valeur du fleuve Sénégal or Senegal River Basin Organization- were influential in the decisions of other donors to contribute to the SRB program. Debated for several years, the program has now been approved and funded with regard to its major items of infrastructure. It entails:

1. Construction of a dam near the mouth of the River at Diama in Senegal, whose purpose is to act as a salt-intrusion barrier, to provide water for irrigation of 45,000 hectares, and to feed two lakes (Guiers and R'Kiz) which provide water to major urban centers in Mauritania and Senegal.

2. Construction of an upstream impoundment dam at Manantali in Mali to serve as the principal controller of river flow. It will eventually allow irrigation of 255,000 hectares and produce 800 million KWh of electric power per year to be used mainly for exploitation of the Basin's mineral resources.

3. Construction of river ports and a navigable channel between St. Louis, Senegal, and Kayes, Mali providing landlocked Mali access to the sea.

4. Construction and development of up to 300,000 hectares of irrigated farms. This is the combined potential of the two dams and a major segment of the Sahel's requirements for irrigated land.

C. The Donors

In a rare confluence of political and economic interests, fourteen countries and international financing organizations had by June 1982 signed grant and loan agreements providing $773 million to finance the construction of the dams. Work on Diama began in September 1981. Manantali construction is beginning in June 1982. Both are expected to be completed by 1988.

The Arab nations of the Gulf constitute the largest block of donors with a contribution of $380 million. This investment is more than a demonstration of Islamic solidarity. It also reveals the Arab countries' desire to promote greater food self-sufficiency in the Third World and less dependency on the West. Value can be realized from this investment, however, largely from agricultural and industrial development. The Arab donors recognize this fully; have been in the vanguard of those who have promoted OMVS downstream planning efforts; and are financing support to agricultural institutions in the SRB.

The European members of the SRB consortium, both individually (France, Italy, West Germany), and collectively (through the European Economic Community) are motivated by historical, economic and foreign policy interests. France, which maintains strong political ties to the region, has for many years been involved in the conceptualization and design of Diama dam, and a French firm was awarded the contract for constructing it. A German firm is constructing Manantali.

In the medium-term, the potential for exploitation of SRB mineral resources is substantial. These resources include over a billion tons of iron ore, 800 million tons of bauxite and at least fifty million tons of high grade phosphates. European firms are expected to play a substantial role in the development of these minerals.

D. United States Interests

The U.S. interests in contributing to the SRB program are political, economic, and humanitarian. On one political level, the program provides the U.S. with a context for collaboration with OECD and OPEC states and with the African Development Bank, in a major endeavor for the benefit of the Third World. The partnership created around the SRB demonstrates that if the issue is specific and if an imaginative consensus is reached that permits each nation to act according to its means and its interests, then extraordinary resources can be mobilized. The SRB program is in fact one of the largest multilateral endeavors to-date in sub-Saharan Africa.

On another level, the political stability of the three SRB nations is important to the U.S. Senegal has since its independence played a constructive role in international crises affecting U.S. interests. It contributed to peace-keeping forces in Chad, Lebanon, Zaire, and the Gambia. Its capital, Dakar, is a vital transfer point for aviation between Europe and South America, as demonstrated most recently in the Falkland crisis, and a valuable site for Space Shuttle emergency landings. Senegal's foreign policy is moderate in nature and congruent with that of the U.S. on major issues. Its future as an independent and democratic nation free of foreign domination will depend upon the soundness of its economy. In this respect the success or failure of the SRB program will be of prime importance.

Mauritania, the second SRB nation, lies between the two pro-Western, pro-American countries of Senegal and Morocco. A significant contribution to Mauritania's economic development will enhance its political stability and by extension that of North West Africa. Since 1979, when it withdrew from the Sahara war, Mauritania has made serious attempts at economic development. Its efforts have been complicated by historical dichotomies between the ethnic groups that inhabit it, and aggravated by war and drought. The importance for Mauritania of the OMVS plan lies in the fact that SRB development efforts are aimed at the agricultural areas having the highest productive potential. Valorization of these areas offers the only possibility for Mauritania to achieve food self-sufficiency.

1/ AID, Mauritania CDSS, FY 83, January 1981.

U.S. interests in Mali, the third SRB nation, are less compelling. The U.S. objective is that Mali's non-aligned status in world affairs be truly neutral. 1/ The nation's commitment to SRB development is linked to the hydroelectric potential of the Manantali dam, the opening up of a remote area of its territory, and the river transport facilities to the sea that the regulated river will afford. Although Mali's agricultural production will come mainly from the Niger basin, the potential exists for cultivating, via rain-fed means, substantial areas of the Kayes region and exporting the output to Mauritania and Senegal.

U.S. economic interests in the SRB are two-fold. The first relates to the question of food aid, the second to the potential for private investment. The U.S. will be progressively less able to supply the food needs of the rest of the world because it will be increasingly more costly to do so, and because food aid tends to act as a disincentive to local production. Instead, those deficit areas that are capable of becoming viable producers should be aided in doing so.

SRB countries will continue to be subject to severe droughts, similar to or worse than the one experienced in the 1970's, which required an investment of $950 million in emergency aid. According to FAO estimates, it would cost $3 to $9 billion to deliver similar amounts of emergency assistance and save lives on an equal scale in the event of another drought in the 1990's.

1/ AID, Mali CDSS, FY 84, January 1982.

To diminish the probability of needing to do so, it is in our interest to encourage investment in agricultural systems that are resistent to drought. There has been long-standing Congressional interest in such an approach, and to the development of Sahelian river basins in particular.

A second U.S. economic interest in the Basin concerns the potential for joint American/African ventures in mining, energy, forestry, agroindustry, and manufacturing. 1/ With regard to agriculture, the South-Western U.S. faces many of the same agro-climatic conditions found in the Basin, requiring innovative irrigation and soil conservation techniques. The transfer of U.S. technology, suitably adapted to local conditions, would significantly advance SRB development. U.S. participation in mining and manufacturing will come later. Competition between U.S., European, and other outside private interests can only benefit the African nations involved.

E. The Recent History of the Basin

The Senegal River was the avenue by which colonial powers established themselves in the Basin in the 19th century. From the River's delta city of Saint-Louis, France administered its protectorates of Senegal and Mauritania until 1958.

1/ See annexed Tables II and III for proposed industrial development and mining activities in the SRB.

With independence in 1960 the river became an international frontier for three nations with distinct national characteristics, policies, currencies and political structures. The frontier cut through the interdependent social and economic system of the seven ethnic groups living on both banks of the river.

As the newly independent governments turned their attention primarily to other areas of their respective countries, the SRB in the 1960's and 1970's became a fringe area in all three. Senegal concentrated on developing its Peanut Basin, Mali its southern cotton zone, and Mauritania the minerals in its northern sector. The SRB, which had been a self-sufficient economic zone in the colonial period, became an area from which labor migrated to France and to West African urban centers.

It was the drought of the 1970's that once again focused attention on the Valley, as it did on all other Sahelian areas which contained reliable sources of water. It was the drought experience, as well, which provided the impetus to the three SRB national governments to agree on fundamental development objectives and to forge common institutions to carry them out.

F. The People of the Basin

The peoples of the river valley have complex socio-economic systems and mercantile experience dating from the medieval period when they built three major empires in the area, Tekrur, Ghana and Jolof. Even under the century of colonial rule they demonstrated the entrepreneurial and political

capacity to choose their own paths to improvement and to resist imposed schemes.

As far back as 1819 they defeated a French attempt at plantation agriculture in Richard Toll by refusing to give up their land to work as laborers. In the years immediately before and after independence when the first state development corporation tried to organize large, highly mechanized rice production schemes, the participants were quickly disillusioned with the rigid production calendar and tiny plots allocated. With little work to do, absence of land-ownership incentives, no subsistence crops to sustain them, and sudden heavy debts, farmers left the Delta in increasing numbers after a disastrous harvest in 1968. 1/

In recent years they have found better ways to adapt irrigation to their needs, through small village perimeters. Motivation and technical capacity have been spreading at a rate that augurs continued rapid growth in irrigation.

Two social issues that could constrain this growth have been identified, labor supply and land tenure. Outmigration of adult men has swelled in the last two decades to the point where in the up-river Soninke area an average of 30% are absent at any given time. 2/ Researchers have

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1/ Adrian Adams, "The Senegal River Valley: What Kind of Change?"

2/ Colvin et al, "The Uprooted of the Western Sahel", 1981; Lericollais, 1975a, 1975b.

in the past considered this to be a net loss for the region even though the migrants send home sizeable cash remittances. There are growing indications, however, that migrants do return to the Valley and bring back skills, experience and a motivation necessary to develop the Basin. 1/ The successful creation of small irrigated perimeters near Matam, Senegal, at the height of the drought in 1972 sparked over three hundred similar efforts within a decade, demonstrating the capacity of returned migrants for self-motivation and for absorption of modern technology. The locally organized and labor-intensive efforts they pioneered soon became a model for other villagers, and even for the State sponsored Regional Development Agencies (RDAs).

Despite continuing out-migration, human resources in the Basin appear adequate to permit the spread of irrigated agriculture. The migration experience itself has generated a relatively skilled managerial group, and in-migration from nearby isolated provinces, along with population growth, assure a supplementary agricultural labor supply. Outmigration is now so culturally rooted that it will not be eradicated solely by higher incomes and increased economic activity, but it may be reduced and should not be considered a major constraint to further development.

1/ Lucie G. Colvin, "Outmigration and Rural Development in the Senegal River Bain", 1982.

Land tenure will require continuing attention, as the traditional systems are not adapted to the land transfers and intense land use irrigation requires. USAID/Mauritania considers that "problems involving land ownership are indeed a major stumbling block to rural development in Mauritania" 1/ though this concern is not limited to the SRB. In all three countries rights for access to land generally and to flood recession (walo) lands specifically are part of a highly complex socioeconomic system. The changes to be introduced by altering the regime of the Senegal River will have a large impact on land distribution, ownership and, consequently, on production incentives.

G. The Basin's Institutions

1. Village and Rural Councils

The basic, though far from most powerful, institution in the Basin is the village. It is the village, acting through administrative or traditional councils, that determines whether or not social commitments are made to development processes. Since independence, the villagers of the SRB have found themselves unable to seize development initiatives. They have instead reacted to outside forces beyond their control and to initiatives rarely of their own choosing. In the Senegalese part of the Basin, the government is attempting to decentralize some power to the local level by

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1/ AID/Mauritania CDSS, 1981.

creating rural councils that cover groups of villages. The councils have authority to spend a portion of local tax revenues, but the amounts are insignificant. The true power of the village resides in nearly exclusive local control of land tenure and labor mobilization.

2. The Regional Development Agencies

Since independence, the architects of SRB development have been national governments acting through Regional Development Agencies (RDAs). 1/ The RDAs are state and or parastatal entities authorized to oversee most aspects of development planning and execution in the SRB. They have focused their attention on large perimeters where village structures are generally not included in project conceptualization, design and management. Village perimeters receive little help beyond construction guidance and credit for pumps and inputs.

The RDAs have been, nevertheless, instruments for dissemination of irrigation techniques at local levels. On the larger, more mechanized perimeters, the villagers who contract for plots have no choice in the factors of production. On the smaller ones in the Middle and Upper Valley, they run their own operations. In most cases, all agricultural inputs -- pumps, seeds, fertilizers, fuel, spare parts-- are provided (albeit inconsistently) by the RDAs on credit repayable after each harvest. Marketing

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1/ SAED in Senegal (Société d'Aménagement et d'Exploitation des Terres du Delta du fleuve Sénégal et des Vallées du fleuve Sénégal et de la Falémé); SONADER in Mauritania (Société Nationale de Développement Rural); and OVSTM in Mali (Opération Vallée du Sénégal, Térékolé, Magui).

of agricultural products at controlled prices has been the responsibility of RDAs, as well.

The results of the RDA efforts have been disappointing. Recent World Bank and AID analyses 1/ indicate that in 1981 only 66% of the perimeters that had been constructed were cultivated and less than 50% were harvested. For the small, privately run perimeters the figures are better, with 73% cultivated and 61% harvested.

Rice yields on large perimeters have averaged between 2.5 and 4 metric tons per hectare, while on small perimeters they have been between 4 and 5 tons/hectare. Fifteen percent of all perimeters in the SAB have produced in excess of 6 tons/hectare, and these have been mostly the private ones. 2/ In order to provide a farmer an income roughly equivalent to the local wage, it is calculated, using the example of the current situation in Mauritania, that a yield of 3 tons of rice per hectare would be adequate if it is sold on the parallel market, while 4 tons would be necessary if it is sold at the official price. 3/

1/ -Design of the Integrated Development Project (AID)-1981/1982
-Design of the Irrigation IV Project (IBRD)-1981/1982

2/ OMVS Socioeconomic Study, Vol. E.II.

3/ Geoffrey Metzel, AID/OMVS PP design Team, data and calculations, June 1982.

Both RDAs and farmers have moved into increasingly heavy debt as a result of price structures and the organizational problems of the early years of irrigation. By 1980 farmers in the SRB owed the Government of Senegal over $1 million. With no possibility of repayment, the government forgave the debt. Performance was slightly better in Mauritania because SONADER's presence at farm level was less pervasive than SAED's, and because farm management remained mostly in farmers' hands. OVSTM in Mali, for lack of an operating budget, performed best by doing least. It provided extension services only, on an as-requested-basis, to privately organized farmer cooperatives.

SAED is being reformed in the wake of large losses in its productive operations and of a substantial overhead. In 1981 the agency signed a three-year "lettre de mission" 1/ with the Government, redefining its objectives, and becoming autonomous, with greater control over budget and personnel. Most significantly under this agreement, SAED is expected to disengage, progressively but carefully, from its direct farm management responsibilities. In short, SAED plans to reinforce its capacities to: (a) manage the primary irrigation infrastructure of large perimeters; (b) guarantee to the farmers the delivery of water for irrigation; and (c) provide advisory extension services. It is to reduce its role in provisioning, credit, and marketing.

1/ Contract Operating Plan.

What these operating principles imply is that farmers will henceforth be the managers of new perimeters; that the private sector will assume increasing responsibility for delivery to the farmers of agricultural inputs; that the farmers will have a choice as to what they produce and when and how they market their production; and that agricultural credit will be made available directly to the farmer.

These principles represent a drastic change in the approach that Senegal has taken since independence. They are still a subject of intense debate within the Government. But the costly performance of the parastatals and the unwillingness of the donor community to continue underwriting the system's shortcomings have led the GOS to test them seriously. For the new approach to succeed, there must be strong donor coordination, and both donors and governments must be prepared to insist on a far less interventionist state role in the design of agricultural development projects in the SRB.

Such winds of change are less noticeable in the Mauritanian and Malian sectors of the Basin. Mauritania's SONADER has a significant structural deficit of its own and an organizational structure which requires much reform. With the help of its three major donors, the World Bank, USAID and the Kuwaiti Fund, it has begun the process of re-examining the efficiency of its system and of redefining its relationship with farmers. Internal reorganization, strong donor coordination and consistent government support are the keys to SONADER's future success.

Mali's OVSTM was recently created with a broad mandate but no resources to carry it out. New investments by donor countries will provide an opportunity to define OVSTM's most appropriate role. The donor community is in general agreement that OVSTM should not be given means consonant with its sweeping mandate. Instead its scope of work should be narrowly defined and its level of intervention limited. The Government of Mali is quite willing to restrict OVSTM's role if farmer and private initiatives can assume the organizational, provisioning, credit and marketing functions.

3. Agricultural Research Stations

Three agricultural experiment stations are found in the SRB: one for each member country and one for each part of the Basin. They are: Lower Basin --Guédé/Fanaye, Senegal; Middle Basin --Kaédi, Mauritania; and Upper Basin --Samé, Mali.

Agricultural research has been conducted in the Basin since 1967, initially under the aegis of IRAT, the French research institute for tropical agronomy, and since 1970 under that of FAO, funded by UNDP. Beginning with FAO's involvement the emphasis was placed on irrigated agriculture.

After OMVS, described in the following section, came on the scene ten years ago, it assumed responsibility for overseeing research coordination in the Basin. An interstate committee for agronomic research and development (CIERDA) was created in 1976 as an organ to the OMVS Council of Ministers.

CIERDA establishes the Basin's research priorities, allocates funds, and evaluates programs. Actual research is carried out at stations under the supervision of national research institutes. The OMVS role is thus one of harmonization and guidance rather than of implementation. At the station level, help is provided by international organizations such as the West African Rice Development Association (WARDA) and the International Center for Maize and Wheat Improvement (CIMMYT).

The short-term objectives of the OMVS research program, as defined in the UNDP/FAO project document, are summarized as follows: 1/

(a) Rational choice of cropping and farming systems stressing the intensification of, and positive returns from, irrigated cereal and forage crop production.

(b) Selection, choice and introduction of varieties and cultural practices to improve productivity and make crop diversification profitable.

(c) Improvement of techniques for establishing and farming small village perimeters, harmonizing manual labor and mechanization.

(d) Improvement of techniques for integrating livestock production, intensive fish culture and reforestation with irrigated agriculture in order to stabilize the region's fragile environment.

1/ UNDP/FAO, Interim Report, p.3.

There is little disagreement with these objectives. Investments in the SRB research centers are well coordinated at both donor and beneficiary levels. The principal areas of weakness are the still tenuous linkages existing between research and extension system, and the absence of direct contact between farmer and researcher. Plans are, however, well underway to strengthen these functional relationships.

4. The OMVS - Organisation pour la Mise en Valeur du fleuve Sénégal

The Chiefs of State of Mali, Mauritania and Senegal created the OMVS in March 1972 as a successor to the OERS [1/] and charged it with the development of the hydro-agricultural potential of the Senegal River. Table III shows its organizational structure. To date the OMVS has concentrated its efforts on the mobilization of resources needed for dam construction. That task only recently accomplished, the organization must now prepare itself to handle the long-term requirements of program implementation.

By 1981 the OMVS executive branch, the High Commission, had successfully commissioned engineering, environmental, mapping and socioeconomic studies of the SRB. It did so by means of a variety of external contracts. As a consequence, the Commission is endowed with limited managerial and technical capabilities of its own. With construction of the Diama and Manantali dams underway, the organization is turning its attention to its own institutional development.

1/ The Organisation des Etats Riverains du Sénégal, established in 1968, included Guinea as a member.

The OMVS is supported in this effort by the donors who contribute to SRB development and who are formally represented [1/] in the OMVS Consultative (Donor Coordination) Committee. The Committee recommended, and OMVS agreed, in December 1981 that an institutional development plan be developed by the High Commissioner. The plan will aim at strengthening OMVS internal capabilities to operate the two dams, manage the ports and waterway, and oversee the integrated development of the Basin.

The institutional reform of OMVS must eventually include resolution of the following issues:

(a) Adoption of a clear division of authority between the OMVS policy-making structure --Conference of Heads of State and Council of Ministers-- and its executive branch, the High Commission.

(b) Establishment of a functional office of Legal Counsel to advise the organization on rights and obligations established by the Convention linking the three member states, and on the multiplicity of contracts which bind the OMVS to governmental and private institutions.

(c) Development of professional staffs to assist the three [2/] OMVS consultative bodies in their deliberations.

1/ Development Agencies of France, Germany, Canada, USA, Kuwait, Abu Dhabi, Saudi Arabia, Irak, Iran, Italy, The European Economic Community; and multilateral organizations: Islamic Development Bank, African Development Bank, and UNDP.

2/ The Consultative Committee; the Agricultural Research Committee (CIERDA) previously described; and the Permanent Water Commission.

(d) Formulation of new personnel policies that are consonant with the needs of a permanent operational organization. These policies will need to eliminate the practice of appointments to OMVS managerial staff on the basis of member state quotas, subject to recall at any time to national civil services.

(e) Development of a capability to evaluate the impact of development actions on the SRB environment. This implies a corollary ability to stop projects that are injurious to the natural resource base.

The donor community has already expressed its commitment to strengthening the OMVS. Germany, the Arab Funds and France will concentrate their resources on developing the engineering competence of the organization; the United Nations will assist in socio-economic planning; and AID will concentrate its efforts in the rural development offices.

II. STRATEGY

A. Planning and Programming

The ambitious effort to transform the Senegal River Basin into a highly productive plain is underway. The United States, which to date has contributed constructively to the planning for this undertaking, can now help to ensure that maximum value is derived from the development process to come.

U.S. development assistance will be concentrated on supporting self-sustaining agricultural growth, and having as a goal a measurable contribution to the achievement of food self-sufficiency for the SRB's riparian states.

To help achieve that goal, and in concert with the three USAID Missions and other major donors working in the region, three objectives are proposed:

1. Increase food production in the SRB to keep pace with population growth.

2. Promote policy reforms that remove constraints to agricultural production.

3. Improve the capability or private and public institutions in the SRB to manage the transition from traditional to irrigated agriculture.

For each of the three objectives cited, the current situation, obstacles, and proposed solutions are discussed below:

a. Increase Food Production

Current situation/obstacles

National food deficits, increasing with rapid urbanization in OMVS countries, make the move to irrigated agriculture urgent. In the 1970-1979 decade the three countries' total annual cereals production averaged 677,000 metric tons. To meet basic food requirements of their populations, the countries purchased an additional 572,000 tons per year and received an average 161,000 tons in grain aid. (See Tables V and VI). The food needs of the SRB population alone are estimated at 302,000 tons of cereals now and at 435,000 tons in 1995 (See Table VII).

The traditional system of double cropping on rainfed and flood recession plots became inadequate for the growing population about two decades ago, even in average years, and imports have had to fill the gap. Moreover, both rainfed and flood recession harvests are susceptible to dramatic fluctuations due to erratic rainfall. Averaging harvests both geographically and over time, the two types of traditional cultivation produce about equal portions of the Basin's cereals, perhaps 25 to 100,000 tons/year. 1/

1/ Basin-specific production figures are not kept. This is a rough estimate based on known variations in flooded hectarage plus consumption and trade flows.

Irrigation, even with only 13,400 hectares (1980) [1], produces nearly as much [2] as either of the traditional cultivation methods, and does it more reliably.

There is room for growth in rainfed agriculture in the upper basin, but none in flood recession where lands have been fully utilized since the 1930's. The real room for expansion, intensification and crop diversification is in irrigation.

With a conservative estimate of 50,000 hectares under irrigation by the year 2000, yielding 9 tons/hectare of grain --without mechanization-- from two crops, irrigated agriculture in the SRB would provide 450,000 tons of cereals each year. With animal traction and some triple cropping the yields can be reasonably expected to rise to 11 tons/hectare. At that horizon, and factoring in rainfed production, the SRB can anticipate a surplus.

The slower-than-hoped rates of growth of irrigation hectarage and yields thus far are due to three main constraints: insufficient capital, organizational and technological inexperience, and policies which have tended to minimize production incentives.

1/ OMVS, Results of the 1980-1981 SRB Agricultural Camping, May 1982, page 6. This is hectarage actually cultivated, excluding agro-industrial irrigation and about 6,000 hectares developed but not producing due to salinity problems in Delta perimeters, pump and dike breakdowns, improper land preparation, problems of input deliveries, and pests.

2/ IBID, p. 3.

Proposed Solutions

The mobilization of capital investments will be pursued via the OMVS Consultative Committe --a new and effective donor financing and coordination mechanism in the SRB. Among the members of the Committee, there are organizations who possess financial resources but no technical capacity to allocate them. Among these are the Arab and OPEC funds and the African and Islamic Banks.

USAID/RBDO intends to (a) strengthen the capabilities of OMVS to manage the preparation of project feasibility studies and (b) to directly finance such studies for up to 15,000 hectares of new perimeters, by 1987. The completed dossiers will be presented to donors at regularly scheduled, bi-annual Consultative Committee meetings.

Inexperience with irrigation technology and organizational requirements can be overcome by (a) increasing participation of farmers in project conceptualization; (b) provision of extensive organizational advice prior to the start of perimeter construction and during early development phase; (c) dissemination of results from successful small perimeter experience; and (d) strong linkages between researchers, extension agents and farmers.

Proposed USAID projects in the SRB, described in the next section of this paper, will be aimed at these constraints. The three Basin agricultural research stations are being strengthened by the combined interventions of USAID and the World Bank. Institutional cooperative agreements

between research and extension agencies, based on Senegal's Casamance experience, have been accepted by all three Basin countries and will be carried out as part of projects implementation.

The production incentives will be the most difficult to achieve, especially in the area of price policy where political considerations have usually greater weight than economic ones. At the farmer level, the minimum acceptable crop yield to maintain motivation is 3,5 tons of cereals per hectare. 1/ Model yields already exceed that level and dissemination of basic irrigation technology will generalize it. Every improvement in producer price, input delivery, farming technique and marketing efficiency increases the success rate. Each of these issues is treated in the proposed Integrated Development Project.

Over the long term, however, land tenure issues which are only now beginning to receive attention in the SRB, will be an important factor of production. At present tenure on irrigated plots is collective and not legally secure. To secure farmers commitments to their lands, to soil conservation and works maintenance, and to assure their vested interest in irrigated lands, USAID will fund OMVS and national governments initiatives to elaborate necessary land tenure laws in the next five years.

1/ OMVS Socioeconomic Study, Vol. II.

Finally, diversification of production is planned by both donors and RDAs --notably the U.S., Canada, France, and SAED-- in the context of the generation of projects to be implemented in the next decade. Fruit and vegetable production (and consumption) has been stimulated by the proliferation of irrigation and is being expanded in the Middle Valley. Fish farming has been introduced and will contine to be supported by USAID.

b. Promotion of Policy Reforms

Obstacles/Current Situation

To become a cohesive development unit, the SRB will need to reduce barriers to the free movement of goods and services. The barriers due to three distinct national systems include lack of a common currency, exchange controls, restrictions on the movement of agricultural inputs and produce, livestock, and people, banking regulations, and price controls. National circuits are used to deliver agricultural inputs from each capital to remoter parts of the SRB and to bring out produce. These routes are often inefficient and hence costly. Distortions caused by government price controls and subsidies also lead to uneconomic allocation of resources. In Mali, for example, low producer prices for rice that existed until recently contributed to a decline in production despite relatively low costs. Restrictions on rice imports into Mali in turn raised free market retail prices to the highest level among the three countries. Artificially low retail prices in Senegal, in turn, led to illegal flows of imported rice from Senegal into Mali. If free market prices prevailed, Mali as a basically low cost producer would probably export to Senegal.

For the most part the existing barriers can be removed by the national governments, but the advantages of doing so must first be demonstrated The governments have to some extent recognized the need to apply market-oriented agricultural policies at the national level. This is particularly true with regard to prices for food grains. Mauritania's new development plan states that a liberalization of price controls must be envisaged. 1/ Senegal has made similar commitments to the World Bank and the IMF in the context of its "Plan de redressement". Mali has accepted a multi-donor proposal for a liberalized market system, although rice was exempted from decontrol. 2/ Lack of a common currency is an even more formidable obstacle, and is complicated by lack of banking facilities in the River Basin. The other barriers are ones whose harmful effects will be appreciated by national governments only as the momentum of basin development quickens.

The most pressing policy issue in the Basin is that of fertilizer subsidies. While a concensus exists among governments and donors that these subsidies must be reduced and ultimately eliminated, disappointingly little progress has been made on tactics. The World Bank has made the a priori elimination of all subsidies on fertilizer a condition to financing two important projects 3/ - one in Mauritania, the other in Senegal. The two governments have responded cautiously, proposing instead a phased elimination of the subsidies. Donors, while accepting the Bank's economic reasoning, have

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1/ Mauritania, "Esquisse du IVème Plan", Intro, p. 12.

2/ Mali CDSS, Jan. 1982, p. 24.

3/ These projects are the Senegal Irrigation IV project and the Mauritania Gouraye-Kaédi Irrigation project.

tended to be sympathetic to the governments political sensitivities.

Proposed Solutions

The OMVS is a vehicle for putting the economic integration case to its member governments. The negative effects of restrictive policies are increasingly recognized by the governments, and donors agree that the distortions caused by the present system should not be subsidized by external aid.

USAID, in concert with other donors proposes to strengthen OMVS ability to define policy issues and develop options backed by rigorous analysis, for consideration by its member states. OMVS, perhaps better than any single donor, can engage its members to view development from a regional perspective; to examine the consequences of one member's policy upon the other.

The OMVS' demonstrated ability to mobilize external resources for development of the Basin can be a powerful tool for persuasion, if wisely used. The benefits of change must, however, be demonstrable and coordinated donor support reliable.

USAID proposes to utilize the OMVS Consultative Committee as the principal forum for pursuit of policy reform actions. The membership of the Committee, made up of senior representatives from both donor and recepient governments, is especially suited to policy level debate and decision-making.

The agenda is in any case clear and it contains the following items:

1. Harmonization of producer and consumer prices and input subsidies;
2. Elimination of distortions in marketing and input delivery, resulting from existing official channels of distributions;
3. Incentives to the private sector to play a substantive role in SRB development --with immediate attention given to indigenous entrepreneurs;
4. Elimination of taxes and controls on the movement of goods, services, currencies, livestock, and people between the three countries.

c. Improvement of Institutional Capabilities

Obstacles/Current Situation

Adaption to fundamental changes in the traditional way of life would be greatly facilitated by the creation of multiple options for farmers, herders, and fishermen. Irrigated agriculture as introduced to date has been rigid in its approach for technical and organizational reasons. The larger and more mechanized the perimeter, the more the farmer has been constrained. The RD s have reduced options still further by imposing inflexible farming methods, crop selections, marketing systems. The creation of the dams and the regularization of river flow will by themselves create new choices.

For example, second and third crops will become possible over the whole stretch of the river. This in itself will be a major change for the better.

As more perimeters are created, labor efficiency will become more crucial, choices of technology more critical, risks to the farmer greater. As the highest risk-takers, farmers must become the most important decision-makers in the development of the basin. This implies promotion of farmer organizations capable of making intelligent choices, and of institutions capable of providing reliable technical information and support services.

The agencies that can provide technical options are the extension services and the research institutions. Much remains to be learned about such matters as water management, weed and pest control, soil fertility under intensive cropping patterns, crop rotation, etc. Options can be created only as solutions are found through intensive research and demonstration efforts. These efforts in turn will need to be linked from the beginning to the problems that farmers will face as they irrigate; and solutions will have to be made available as readily as needed.

Support services to irrigation farmers in the SRB have been traditionally supplied by the RDAs. The State has sold and repaired pumps, delivered fuel, distributed seeds and fertilizer, extended credit, kept accounts, purchased outputs. The inefficiencies and costs of this system have been already discussed. The challenge is now to promote and secure change.

The reduction or dismantling of bureaucracies in Sahelian countries is at least as difficult as it is in the rest of the world. It can be said that Senegal has on occasion faced up to the need, for example, by closing down ONCAD [1/] in 1980, but the entrenched power of such organizations is formidable. By changing the statutes of SAED and by entering into a contract-plan with it, the Senegalese Government has taken the first steps to reducing costs and inefficiency. For its part, Mauritania has stated, at least indirectly, that the government will give priority to projects which strongly promote the participation of the population and which generate the lowest possible recurrent costs [2/]. Mali's position on state intervention in the Basin remains unclear. In all cases much remains to be done. In particular there has to be a significant change in mentality on the part of state agents most regularly in contact with local farmers.

Reduction of state intervention in the Basin will open the door for the participation of the indigenous private sector, at least in the provision of agricultural inputs. What is essential is to provide local entrepreneurs with access to technical advice and to affordable credit. Whether a productive partnership can be forged between farmers, the State and the private sector remains to be seen. Donor organizations, acting in concert with one another and with host governments, can facilitate and encourage the dialogue, and can insist via project financing limits on a less interventionist government role.

1/ Office National pour la Coopération et l'Assistance au Développement.
2/ Government of Mauritania Five Year Plan, 1981, p. 4.

The OMVS High Commission, as the organization charged with overseeing the integrated development of the SRB, will require continuing assistance in several key areas. It must be able to more closely correlate the agricultural and infrastructure rhythm of development; establish systems to evaluate the impact of irrigation on the river regime; and coordinate the actions of the multiple national ministries which intervene in the Basin.

Finally, the OMVS will need to play an increasingly important role in agricultural and trade policy harmonization among its three member countries. These issues have been raised by the majority of donors, including those financing the Manantali Dam.

Proposed Solutions

USAID/RBDO has in the past year conducted several studies of the institutions likely to play a major role in SRB agricultural development. The first concerns the current status of formal and informal farmer organizations in the Basin and their legal standings. The results will be incorporated in the design of the Integrated Development Project (IDP) and will complement the recommendations of the project's design team as to the approaches that will be proposed for training and strengthening these groups. The approach selected is, in short, that organizational support to and training of farmer groups will precede --for a period of a year if necessary-- actual construction activities at irrigation sites.

A second study has defined the role that the private sector can be expected to play in the SRB. These findings were translated into specific project actions, also in the IDP, that include credit and technical support to local entrepreneurs for services to farmers that will no longer be provided by the State. The IDP will also propose strengthening the Investment Directorate of OMVS so that it may provide advisory services to private investors seeking business opportunities in the SRB.

Reduction of the RDA's role in farm management has been pursued via closely coordinated new project design activities undertaken by the USAID, IBRD, and the Caisse Centrale of France. Coordinated donor follow-up actions --at project implementation time-- will assure that the commitments obtained in principle will be carried out in practice.

OMVS is being supported by USAID, UNDP, FAO, and Germany in developing its planning and evaluation capabilities. A well-staffed, multi-disciplinary "Cellule de Suivi et d'Evaluation"[1/] now exists in the Development and Coordination Directorate. USAID will assist it in defining its objectives and in putting in place the analytical systems required.

The policy formulation role envisaged for OMVS will take time to define and will involve pursuit of a dialogue with OMVS, its member states (in Ministries having currently no formal relations with OMVS), and the donor members of the Consultative Committee. The IDP will propose a number of policy issues requiring priority attention and thereby set the stage for the upcoming debate.

1/ Evaluation and Monitoring Unit.

B. Management

The division of management responsiblity for implementation of USAID's Senegal Basin Program is predicated upon the nature and level of authority delegated to host country institutions by their governments. The assignment of project execution tasks to national and regional host-country agencies, in turn, determines AID's bilateral and regional management oversight.

The three governments of the SRB have delegated to OMVS direct responsibility for managing the Basin's infrastructure. They have retained, and assigned to national agencies, authority to manage the "downstream" development of the Valley, while assigning to OMVS regional planning, monitoring, and evaluation functions in this area.

AID projects for the SRB have consequently been designed accordingly and contain clearly defined national and regional components. The national components, moreover, have been defined in close consultations with USAID Missions in order to assure harmonization of objectives with current and projected bilateral programs.

In specific terms, AID-Host Institutions management interaction will be the following:

1. The River Basin Development Office (RBDO) will be the principal interlocutor for OMVS which will implement regional project components including planning, policy development studies, monitoring and evaluation, and

management integration. The OMVS will be assisted by a management consulting team working under the supervision of the Director of Development and Coordination. Two direct hire project managers on the AID side will assure oversight.

2. The bilateral USAID Missions in Senegal, Mauritania and Mali will exercise management oversight at the national level with government organizations which include: RDAs, Research Institutions, Forestry Departments, Ministries of Public Works, of Hydraulics, Agriculture, Health, and Planning. These agencies will be provided technical assistance (to be based principally at project sites) via contracts negotiated by the USAIDs.

Bilateral Missions' workloads will increase as a result of SRB projects. Best estimates indicate that three direct hire project managers will be needed, one at each of the Missions and under their supervision, to oversee the Basin program. At least one assistant (local hire) for each of the managers will also be necessary, and financing of these has been included in projects budgets.

The Missions will exercise control over national project component budgets and will be assigned sub-allotments for direct disbursement of funds. Financial oversight of local accounts will also be under Missions' control.

Coordination of national and regional management will be assured by common reporting systems, a computerized management information system, and eventually a telecommunication system linking project sites in the basin to headquarters offices of AID and host countries. Regularly scheduled quarterly meetings among project managers will further assure close monitoring of project implementation. Formal semi-annual reviews will be scheduled and include as participants, the three Mission Directors, the RBDO Coordinator and host country officials of equal rank.

At field level, management responsibility will be entrusted to existing or newly hired national personnel supported by U.S. or third country counterparts. The selection of counterparts will depend upon the nature of the task. To promote the development of the indigenous private sector, for example, what is envisioned is an institutional contract with a non-governmental organization (NGO) having proven, field tested competence in this area. Collaboration with the U.S. Peace Corps is foreseen in the areas of credit and of fisheries extension work. Indigenous private, voluntary organizations (PVO), with the support of similar U.S. organizations, are expected to play a substantial role in the formalization and training of farmers cooperatives.

In conclusion, the SRB program is intended to assist in meeting both regional and national development objectives and thereby reduce the potential competition between bilateral and regional resources.

III. PROJECT INITIATIVES

To achieve the strategic objectives cited in section II, five projects are planned whose component elements are aimed at different levels of constraints. The development of the SRB is and will remain an effort involving many institutions, each acting according to its interests. No single agency has the means unilaterally to carry out comprehensive development actions in the SRB. Hence it will be necessary continually to refine and strengthen the structures that permit donors and recipients to act in concert with one another.

1. The Integrated Development Project (IDP).

The IDP is designed to enhance production, and address institutional and policy constraints. Treatment of the three elements simultaneously represents the integrated aspect of the project.

Production:

On the production end, project focus will be on the farmer and increased productivity will be the criterion for success. The IDP will promote farmer organization and training, multiple cropping patterns and reduction of costs by strengthening cooperatives, maximizing local decision-making authority, providing credit to farmers and local entrepreneurs, linking farmers to researchers, introducing animal traction and encouraging self-help actions. To facilitate marketing, the IDP will assist in construction of rural roads. The medium term objective will be to produce and market

agricultural outputs at a cost equal to or lower than imported products, while providing the farmer an income equal to or better than the prevailing cash wage.

The immediate production phase of the IDP provides for construction of 3,800 new hectares, and rehabilitation of about 500 hectares of perimeters with technical problems. The new designs improve pump efficiency, and allow water measurement so that farmers can better manage distribution and accounting.

Training is a major component in improving production. It includes farmer literacy, pump and equipment maintenance, a mobile extension unit, and management skills for cooperatives and RDAs.

Credit will be provided independently of RDAs for the first time, through banks which have agreed to open branches in sector headquarters.

Since farmer well-being and productivity are substantially linked to health, the IDP will propose two health sector interventions. The first will assist national health agencies to establish a monitoring and surveillance system to track incidence of (especially) water-borne diseases, and signal danger levels. These diseases are expected to increase as SRB farmers make the transition from rainfed to irrigated agriculture. The second initiative is to mobilize donors to support the development of a comprehensive primary health care system for the SRB. The IDP will financially

support a process begun by OMVS and its member states to define the magnitude of the problem and to plan development actions.

To mitigate the impact of the dams on fish resources, the IDP will propose two interventions. The first will be to construct fish ponds in the same areas where perimeters will be constructed. The second will finance a study of the feasibility of constructing an artificial estuary at the mouth of the river in order to counteract the effects of Diama dam on coastal spawning grounds.

Finally, the IDP-financed perimeters will include modest reforestation actions in the form of windbreaks. This is expected to reduce soil erosion, and provide a modest amount of fuelwood.

Institutional Issues:

The IDP will support concerted donor efforts to reduce the role and liberalize the approach of RDAs in production management. This transformation will necessarily mean a reduction in size of existing bureaucracies (with corresponding reduction in their current costs), an increase in private sector involvement and a devolution of state participation in the market place. The IDP will in turn support acquisition by RDAs of greater skills in planning, evaluation, and provision of extension services to farmers. The IDP will also strengthen OMVS and national capacities to produce feasibility level project studies and engage donors in their financing. To this end, the IDP will finance feasibility studies for up to 15,000 hectares of irrigated perimeters with the

objective of obtaining from donors by 1987 commitments for execution of these projects. Finally, the public institutions of the basin will need to develop an implementation plan for enhancing participation of the private sector in a manner which serves the interests of both. To that end, the IDP will assist the OMVS to provide to private entrepreneurs investment advice and counsel, including market studies, risk analyses and credit availability.

Policy Constraints:

The IDP will initiate policy studies at the regional level with OMVS, where structures to conduct them are already in place. These structures, staffed by representatives of SRB member states, provide both the institutional forum and the level of authority needed to address common problems. Implementation of reforms remains, however, within the purview of national governments. Study of implementation options will be financed for relevant national ministries. Incentives to carry out reforms will be discussed during negotiations of the national components of the IDP. Policy reforms will take place when both donors and beneficiaries reach the conclusion that without them development will not take place, and when the risks inherent in carrying them out are shared. The IDP proposes to pursue agricultural policy analyses and debate in the forum of the OMVS Interstate Committee for Agricultural Research and Development (CIERDA), and to seek a consensus for action in the OMVS Consultative Committee. Both of these structures are appropriate to the task, and their membership includes all active partners in SRB development.

2. The Agronomic Research Project (ARP)

Research is essential to improving agricultural productivity. The ARP will strengthen the capacities of three existing research stations in the SRB. Extensive field trial programs will be carried out by the stations in conjunction with extension agents and farmers. This, and access to worldwide applied research results, will provide to the farmers of the basin the technological package needed to improve their performance.

While research activities, as national components of the project, will be carried out through the research institutions of the SRB states, OMVS will coordinate technical and professional collaboration at the regional level. Functional relationships between OMVS and member institutions and between researchers and extension agents will be formalized via protocol agreements.

Improved on-farm technologies, crop varieties, farming practices and cropping systems developed by the research centers will be systematically transferred to the farmers participating in the IDP project.

3. The Groundwater Monitoring Project (GMP)

This project will be an essential element in safeguarding the considerable investments planned for the Basin. It will establish within OMVS and its Member States a system to define, analyze and monitor the regime of the Senegal river and the Basin's subterranean water resources.

In addition, the project will address problems of: (a) water-logging and soil salinity in existing and proposed irrigated farms; (b) deterioration of water-quality in domestic and livestock wells; (c) discharge-recharge relationships of the Senegal River Valley aquifers; (d) changes in the groundwater regime caused by the construction of the two dams and the resulting alterations of the river flow; and, (e) irrigation development potential of groundwater in the Middle and Upper Valley (Matam-Boghé and Kayes) sectors. Data collected from the project will make possible better drainage, reduce salinity hazards for irrigated lands, define river recharge relationships and groundwater changes in the river basin.

4. The Fiscal Allocation/Responsibility Project (FAP)

This project, which is scheduled for completion in 1983, is developing within the OMVS a capacity to analyse the costs and benefits attributable to each of its Member States from SRB development. A computer formula has been developed by a U.S. University that will permit OMVS analysts to continually factor in new indicators and maintain a scientific basis for partitioning responsibility. Two computer programmers are being trained to operate the micro-computer which has been purchased and which will be installed at the OMVS High Commission.

5. The Manantali Resettlement Project (MRP)

This project will finance the resettlement of 12,000 people displaced by the construction of Manantali dam. Villagers inhabiting areas upstream of the dam will be relocated to new, agriculturally productive areas that will

permit a net betterment of their standard of living. Resources will be mobilized to assure --for the first time in the lives of most of these people-- delivery of basic health, education, water and rural development services. To assure their well-being during the transition villagers will be assisted through the second agricultural season after the move.

The project, though part of the overall SRB planning and development effort, will be implemented bilaterally through the Mali Government and the USAID/Mali Mission.

PROJECT ASSISTANCE PLANNING LEVELS

PROJECTS	FISCAL YEARS ($ 000)								
	1982	1983	1984	1985	1986	1987	1988	1989	LOP
Integrated Development Project	-0-	7,600	7,600	8,500	13,000	13,000	6,300	6,000	62,000
Agronomic Research Project	1,000	2,700	2,340	2,000	3,560	1,900	-0-	-0-	13,500
Groundwater Monitoring Project	1,000	900	1,000	500	600	-0-	-0-	-0-	4,000
Manantali * Resettlement Project	-0-	1,900	1,900	1,500	2,000	2,700	-0-	-0-	10,000
Fiscal Allocation Project	76	-0-	-0-	-0-	-0-	-0-	-0-	-0-	76
TOTALS	2,076	13,100	12,840	12,500	19,160	17,600	6,300	6,000	89,576

* Project will be designed and implemented by USAID/Mali and represents a special AID Commitment,

ANNEXES

TABLE I

OMVS ORGANIZATIONAL STRUCTURE

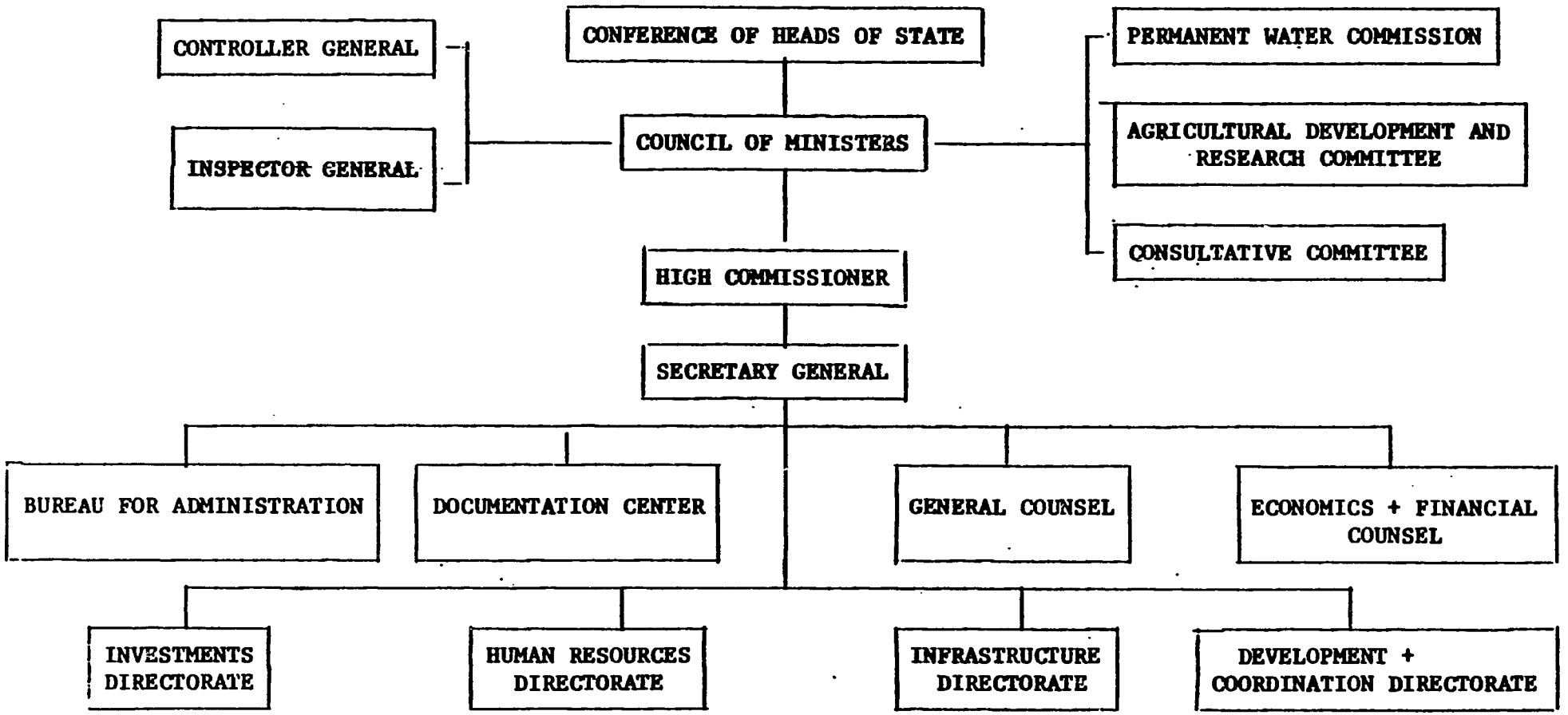

TABLE II

SUMMARY OF PROPOSED INDUSTRIAL DEVELOPMENT IN THE SENEGAL RIVER BASIN

Industry (listed alphabetically)	Proposed Plant Location(s)	Projected Time Schedule
Bauxite Processing	Manantali, Mali	After 1990
	Moussali, Mali	After 1990
	Kayes, Mali	After 1990
Brewery	Kayes, Mali	N/A
Brick Manufacturing	Rosso, Maur.	N/A
Cotton Mill	Kayes, Mali	N/A
	Bogue, Maur.	N/A
	Maghama, Maur.	N/A
	Leggah, Maur.	N/A
Dairy	Rosso, Maur.	N/A
Edible Oil Refinery	Rosso, Maur.	N/A
Fertilizer Factory	Kaedi, Maur.	N/A
Flour Production	Matam, Sen.	Project Implementation 1985-1989
Lime Processing	Diamou, Mali	Commence construction in 1978-1979
Peanut Oil Refining	Kita, Mali	Included in present 5-yr. plan for Kayes Region
Refrigerated Abattoir	Rosso, Maur.	N/A
Rice Processing	Kayes, Mali	
	Matam, Sen.	
	Thilogne, Sen.	Processing by 1985
	Aere Lao, Sen.	
	Podor, Sen.	

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TABLE II (Cont'd)

Summary of Proposed Industrial Development in the Senegal River Basin

Industry (listed alphabetically)	Proposed Plant Location(s)	Projected Time Schedule
Shoe Factory	Kayes, Mali	N/A
Sugar Cane Processing	Same, Mali	Commence construction 1984-1985
	Gorgol Valley, Maur.	Processing by 1983
	Matam, Sen. or Richard Toll, Sen.	N/A
Tanning	Trapoma, Mali	First Production in 1979
	Kayes, Mali	N/A
	Kaedi, Maur.	Enlargement of existing tannery: first state to be in production by 1983
Textile	Kayes, Mali	N/A
	Rosso, Maur.	N/A
	Saint-Louis, Sen.	N/A
Tomato Canning	Rosso, Maur.	Commence construction in 1979
	Matam, Sen.	First stage to be in production by 1983.

TABLE III

SUMMARY OF PROJECTED MINING ACTIVITIES IN THE SENEGAL RIVER BASIN

Mineral	Country	Location	Est. Quantity	Comments
Bauxite	Mali	Bamako-West	175 million tons	Highest quality with an $Al_2 O_3$ content of 40-44%
Bauxite	Mali	Kenieba-South	165 million tons	Deposits do not appear to be rich enouth for extraction at this time.
Copper	Mauritania	Diaguili	---	No exploitable strata have been found as yet.
Copper	Mauritania	Massif de l'Affole	---	No exploitable strata have been found as yet.
Phosphate	Mauritania	Cive	4 million tons	High quality but exploitation is not feasible at this time.
Phosphate	Mauritania	Aleg	30 millions tons	Other explorations began in mid-1977. If results are favorable, exploitation could start in 1983.
Phosphate	Senegal	Matam	25 million tons	Exploration completed in 1982, feasibility studies could begin in 1983.
Copper	Senegal	Bakel Region	Unknown	In this same region, there are indices of chrome.

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TABLE III (Cont'd)

Summary of Proposed Mining Activities in the Senegal River Basin

Mineral	Country	Location	Est. Quantity	Comments
Iron	Senegal	Farangalia	105 million tons	These four areas are located within the region of Kedougou. In the same region there are marble deposits which are presently being exploited and also small quantities of gold.
Iron	Senegal	Goto	175 million tons	
Iron	Senegal	Kouroudiako	22 million tons	
Iron	Senegal	Koudekourou	75 million tons	
Iron	Mali	Bafing-Bakoye (Bale)	500-600 million tons	Exploitation is envisioned for 1985-1990 if energy is available and extraction is found to be economically feasible.
Magnetite	Mali	Djidian-Keniba	10 million tons	Exploitation feasibility studies are underway.
Iron	Mali	Diamou-Baufoulabe	150 million tons	Both of these sites are considered to be of less importance than Bale.
Iron	Mali	Nioro	10 million tons	
Bauxite	Mali	Balea	400 million tons	Deposits do not appear to be rich enough for extraction at this time.

TABLE IV

POPULATION 1/

(x 10^6 Inhabitants)

Year / Country	1970	1975	1980	1985	1990	1995	2000
Mali	5.143	5.807	6.646	7.648	8.825	10.160	11.697
Mauritania	1.245	1.421	1.634	1.890	2.192	2.538	2.939
Senegal	4.267	4.587	5.305	6.176	7.208	8.391	9.768
Senegal River Basin 2/	1.4	1.6	1.9	2.2	2.5	2.9	3.4

1/ Source: UNO, 1978. "World Population Trends and Prospects by Country".

2/ Extrapolated from the 1976-1977 census data for the riverine regions, cercles, and departments, assuming a 3% annual growth rate for the river basin as a whole.

TABLE V

AVERAGE PRODUCTION, IMPORTS AND MARKETING (1970-1979) 1/

Country	Production x 10^3 t	Portion of local production marketed 2/ x 10^3 t	LOCAL PURCHASES BY GRAIN BOARDS			PURCHASED IMPORTS 3/		
			x 10^3 t	in % of production	in % of part marketed	x 10^3 t	ration to production	ration to local purchases by boards
Mali	974	195	29.7	3	16	86	0.09	3
Mauritania	46	9	0.3	2	9	112	2.43	370
Senegal	657	131	21.3	3	16	374	0.57	18
TOTAL	677	335	51.3	3	15	572	0.34	11

1/ Source: FAO, 1980, "National and Regional Security Grain Stocks in the Sahel", Project GCPS/RAF/159/MUL, annex VI: Marketing, Appendix 6b.

2/ Estimated at 20% of production.

3/ Total imports include these plus gain aid (See Table 6).

TABLE VI

GRAIN AID (1973-1980) 1/

Country \ Year	1973	1974	1975	1976	1977	1978	1979 2/	1980 3/	Average
Mali	129	200	74	-	-	58	10	20	61
Mauritania	63	107	26	29	31	69	16	67	51
Senegal	63	93	17	-	6	160	20	35	49
TOTAL	255	400	117	29	37	287	46	122	161

1/ Source: FAO, World Food Projections, 8/8/1980.

2/ Incomplete.

3/ Commitments.

TABLE VII

PROJECTIONS OF TOTAL CONSUMPTION 1/

(grain x 10^3 t)

Country \ Year	1970	1975	1980	1985	1990	1995	2000
Mali	771	871	997	1,147	1,324	1,524	1,755
Mauritania	186	213	245	284	329	380	441
Senegal	690	688	795	926	1,081	1,259	1,465
TOTAL OMVS COUNTRIES	1,597	1,772	2,037	2,357	2,734	3,163	3,681
Senegal River Basin 2/	210	240	285	330	375	435	510

1/ Calculated from Table IV, assuming a typical Sahelian cereals consumption of 150 kg/person/year.

TABLE VIII

OMVS - Diama and Manantali dams current status of financial commitments by donors

		$ (000)	
Saudia Arabia		150,000	
Kuwait		100,000	
Abu Dhabi		40,000	
Irak		40,000	
Islamic Development Bank		20,000	
Federal Republic of Germany		89,333	
France	Caisse Centrale de Coopération Economique	46,786	69,972
	Fonds d'Aide et de Coopération	23,186	
Italy		35,000	
European Development Fund		92,700	
African Development Bank		33,400	61,480
African Development Fund		28,080	
Canada (25,106 Can. $)		21,158	
US-AID (For Manantali Resettlement Only)		10,000	
United Nations Development Programme		10,000	
Iran		4,000	
TOTAL		773,643	

ANNEX B

LIST OF REFERENCES

Adrian Adams. "The Senegal River Valley: What Kind of Change?" in Review of African Political Economy (10), Sept/Dec. 1977, pp. 33-59.

"The Development of the Senegal River", Marchés Tropicaux et Méditerranéens, 17 April 1981.

"L'OMVS et le Développement Agricole", Afrique Agri., Janv. 1982, pp. 16-28.

OMVS/High Commission/Dept. of Planning and Coordination. Social Economic Study of the Senegal River Basin: General Report: Part E: Interpretation of Results and Recommendations in the Field of Rural Development. Provisional Edition, April 1980.

OMVS/HC. Indicative Programme for Hydro-Agricultural Development of the Senegal River Basin, 1981-1990. Sahel D(80)112. Oct. 1980.

A.I.D. CDSS, FY 1984, Mali. Jan. 1982

A.I.D. Sahel Development Program: Regional Development Strategy Statement. Revised Draft, Nov. 1981.

A.I.D. Mauritania, CDSS, FY 83. Jan. 1981.

Club du Sahel/CILSS. Strategy for Drought Control and Development in the Sahel. Sahel D(80)102. Revised draft (Sept. 1980).

A.I.D. Report to the United States Congress.
Proposal for a Long-Term Comprehensive Development Program for the Sahel.
Part II: Technical Background Papers.
Oct. 1976.

Ph. Bonnefond et al. "La Vallée du Fleuve Sénégal et Ses Aménagements." Etudes Scientifiques, Dec. 1981.

OMVS. Assessment of Environmental Effects of Proposed Developments in the Senegal River Basin.* Prepared by Gannett-Fleming, Corddry & Carpenter Inc. in association with ORGATEC. n.d.
* SYNTHESIS. Final Report.

Adrian Adams. Le Long Voyage des Gens du Fleuve. Paris, François Maspero, 1977.

Colvin, Lucie G. "Outmigration and Rural Dev. in the Senegal River Basin." Consultant Report. Not for reproduction or quotation. Draft. n.d.

A.I.D. Sahel Development Program. Annual Report to the Congress. Feb. 1982.

Vakil, Firouz. "Macro-Economic Issues & AID Assistance. Balance of Payments & Agricultural Pricing Reforms in Senegal: An analysis." Dec. 1981.

PNUD/FAO. Organisation pour la mise en valeur du fleuve Sénégal. Mali, Mauritania, Senegal. Rapport Intérimaire. Rome 1981. AG: DP/RAF/78/030

Keita, Rokiatou N'Diaye. Kayes et le Haut Sénégal. Bamako, Editions Populaires, 1972. 3 tomes.

Colvin et al. The Uprooted of the Western Sahel, Praeger 1981.

Government of Mauritania: IVth Social and Economic Development Plan (1981-1985). Dec. 1981.

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MEMORANDUM

DATE : November 17, 1982

FROM : AFR/SWA, Frederick E. Gilbert

TO : SEE DISTRIBUTION

SUBJECT: U.S. Development Objectives in the Senegal River Basin - Issues Meeting

A meeting for the purpose of discussing and raising issues regarding subject paper (attached) is scheduled for Tuesday, November 23, 1982 at 10:00 a.m. in Room 1107 NS, which I will chair. The review of the paper will be held on December 7, 1982 and a memo announcing that meeting will be sent shortly.

FYI, I have listed below a sample of topics/issues that we could start the discussion but I will leave it up to you to raise more. If you cannot attend this meeting, please submit, in writing, any issues that you wish to raise to J. Procopis, Room 3491 NS by November 22, 1982.

Discussion Topics:

1. Importance of OMVS Program (pp. 1-13, 26-30)

   a) U.S. Objectives
   b) Senegal/Mauritania/Mali Government Commitment
   c) AID and other Donor Complementarity
   d) Food Production Objectives (p. 11)

2. Magnitude of Resource Transfer and Anticipated Results (pp. 31-34, 45)

   a) Policy Influence
   b) Resolution of Agriculture Production Problems
   c) AID Mortgage (p. 49)

3. Regional vs. Bilateral Channeling of AID Funds

   a) Institution Development (pp. 16-25, 34-38, 44-45)
   b) USAID Management (pp. 39-41)

4. Development Alternatives (Tables II - VIII)

   a) IRR
   b) Alternative Investments
   c) State of National Economies & Magnitude of Commitment

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