DEVELOPMENT AND THE ENVIRONMENT IN THE SENEGAL BASIN UNDER THE OMVS TREATY

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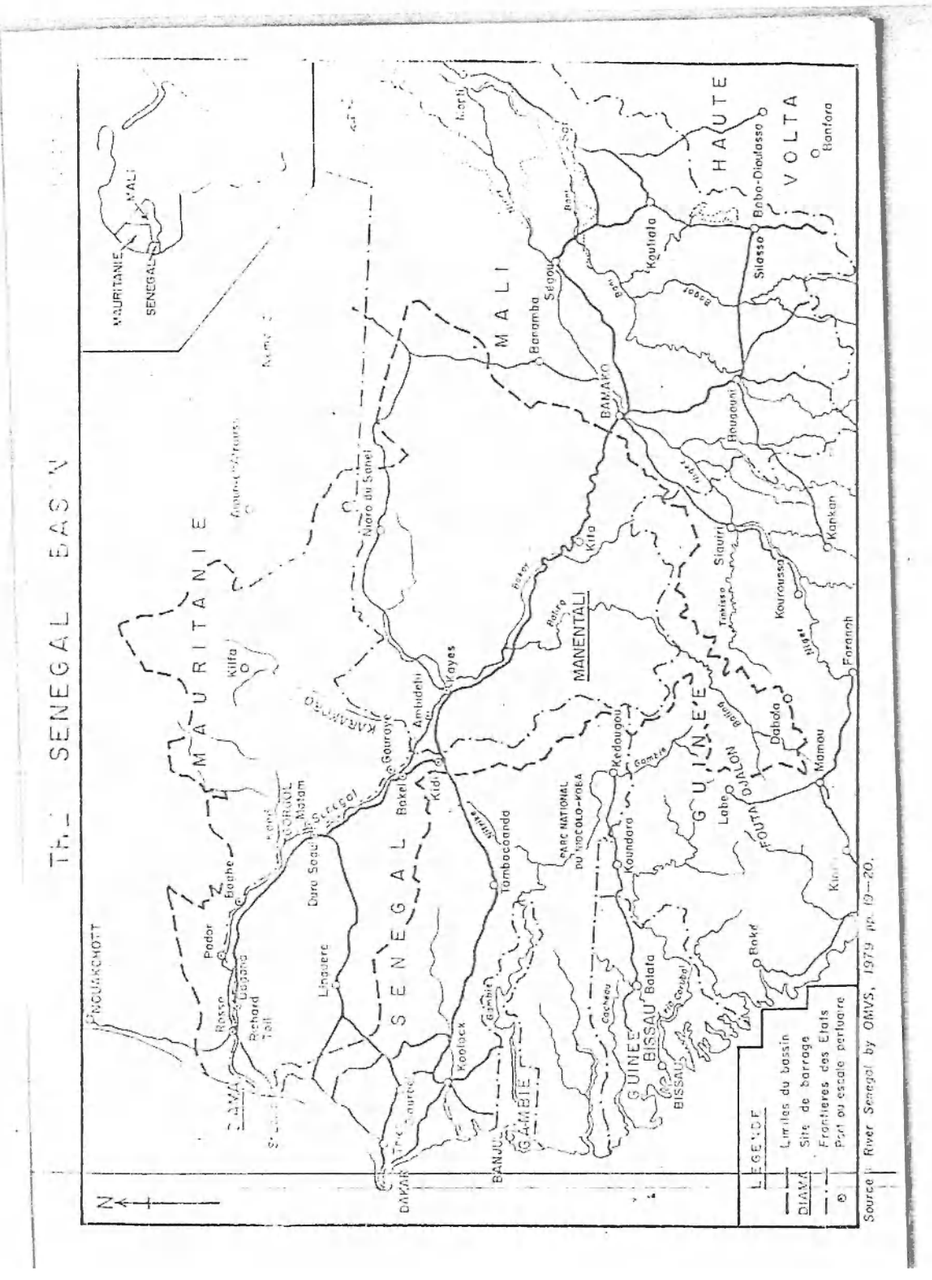

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I. INTRODUCTION+

It may be an interesting point of debate why it is that even though for more than a half of its length the Senegal River flows through a desert, there has not been a successful programme to harness its water and develop irrigation infrastructure of the kind that evolved in Egypt and Sudan. That point is made more curious by the fact that the river attracted considerable interest over the past two centuries, from former colonial powers ruling the area as well as from the post-colonial governments.[1]

The point is that attempts at organization of infrastructure and production system, particularly for irrigated agriculture, have in fact, been made. However, such attempts have been either generally feeble and failed to flourish or were overcome by overwhelming counterveilling political forces. But such attempts and the dynamics which dictated their demise will only be mentioned in this paper in passing. The concern here is primarily with what are the current development programmes under the aegis of the Organization for the Development of Senegal River Basin.

+ The information in this paper was collected as part of broader study on "The Contribution of Drainage Basin Organization to Development in Africa" covering Senegal, Niger, Kagera and Limpopo. The research was done through direct free interviews supported by primary official documents and other publications.

1. A great deal of information on history and planned programmes of the OMVS is condensed in Pierre Platon's article, "The Development of the Senegal River" in Marches Tropicaux No.1649 17 April 1981, 35 pp. For this point see page 4.

   On the other hand, what has been called the dydraulic civilizations evolved in Egypt, Mesopotamia, India and China, where the growth of ancient civilizations were associated with the management of water resources of key rivers for agricultural productivity. In this regard, the irrigation infrastructure and practice in Egypt and Sudan, using the Nile waters, is unmarched anywhere in Africa. See Dante Caponera's "Water Laws in Hydraulic Civilizations" in G.L. Ulmen (Ed.) Society and History (The Hague, Mouton Publishers, 1978) pp 91-106.

The Organization Pour la Mise en valeur du Fleuve Senegal (OMVS) was established by the adoption of two instruments: La Convention Relative au Status du Fleuve Senegal, being the articulation of the legal status of the Senegal River and the basic imperatives for their joint management; and La Convention Portant Creation de l'Organization Pour la Mise en Valeur du Fleuve Senegal, being the actual Corvention establishing the Organization and stipulating its purposes. Both instruments were signed on March 11, 1972 by the Heads of State of Mali, Mauritania and Senegal.

The framework and programme of work established and initiated under the OMVS Convention remain the latest attempts at organizing the management of the waters of the Senegal River. This effort already described as "a unique experiment in international river basin planning"[2] is important for a number of reasons, the most prominent of which are two-fold: First, as observed earlier, the Senegal basin has attracted attention and intentions towards its actual management for productive purposes. Therefore, it should readily have some advanced experience for other international basins in Africa. Secondly, the OMVS treaty was adopted at the beginning of the infamous drought which has imperilled what is called the Sahel Zone for the last decade, and that basin is right at the core of that zone. Besides, that was also the beginning of the problems associated with the spiralling costs of hydrocarbons. Consequently, more attention was being given to alternative sources of energy, of which hydro-electric power is an important option. For these reasons, too, the OMVS's selection of development projects and some of the implications of their implementation should be a matter of interest. But ultimately, indeed, an important lesson to draw from the OMVS programme is that it is an attempt to implement the commitments expressed in a treaty.

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2. See Parnall, Theodore and Albert E. Utton, "The Senegal Valley Authority: A Unique Experiment in International River Basin Planning", Indiana Law Journal, Vol.51 No.2 Winter 1976 pp.235-256.

Africa, with about fifty-four drainage basins with international character, covering about one half of the continent's total area, needs more of the experiments, hopefully to alleviate the widespread food deficits attributed to drought, and poor economic performance often attributed to high price of imported hydrocarbon as a source of energy.

The task for this paper is limited primarily to that of a general expose of the development programmes intended for the implementation of the OMVS treaty.

Accordingly, the next section will give a general physical setting of what is referred to as the Senegal River and its basin. Section III will outline the OMVS treaty, in a nutshell, very particularly to show its place in historical setting as well as to outline the salient purposes and the intended modes of implementation. Section IV will then outline the planned development projects, particularly in irrigated agriculture, hydro-electric power generation and river navigation as a mode of transport. The latter, as well as livestock breeding and fishing, will get rather limited treatment.

The central mode of facilitating these projects is by harnessing the river water through dams, flow control and distribution of the water. The natural consequence is major ecological changes within the basin. In Section V, we shall give a general outline of some of the major environmental implications and, where appropriate, possible remedies.

Section VI will look at some of the financial implications of the implementation of the programmes. Notably, the section shall outline the financial needs, the sources identified so far, the cost of the money and allocation of responsibility for repayment of the loans. The last section will make some general comments on the prospects ahead of the OMVS, drawing on the past experience with implementation of similar development programmes.

II. THE GENERAL PHYSICAL SETTING

The Senegal is generally used in reference to that particular river system, whose total length is variably stated to be anywhere from 1,600 to 1,800 kilometres. Strictly speaking, the Senegal refers to the trunk of that river from Bafoulable in Mali, the confluence of the Bafing and the Bakoye, to its mouth at Saint Louis. Thus, the latter two would ordinarily be considered as the main, but not only, tributaries of the Senegal.

The Bafing, literally meaning "black river" in the local vernacular, is the longest of the tributaries. It originates from an area approximately 800 metres above sea level on the Fouta Djallon mountains in Guinea, and covers a distance of about 750 kilometres by the time it reaches Bafoulabe.[3] It is also estimated that the flow of the Bafing at the confluence averages 430m^3 per second, which is over one half of the average flow of the Senegal River.

The Bekoye, literally the "whate river" in local vernacular, originates largely on the highlands of Mali and Guinea, the highest point of its sources being approximately 650 kilometres, the Bekoye has several tributaries on its right bank, which places such tributaries in the Malian territory. But at Bafoulabe this river releases about 170m^3 of water per second which is less than one half of the volume discharged by the Bafing.

There are five or six other tributaries downstream from Bafoulabe, with the three major ones on the right bank, being intermittent and therefore making only minute contribution to the flow of the Senegal. They are Kolombine, Karakoro and Gorgol with sources in Mauritania. The most important tributary in the downstream category is the Feleme which, like the Bafing, (in fact, similar in altitude too) has its sources in the Fouta Djallon Mountains. Its full length is approximately 650 kilo-

3. Most of the information on the general physical setting is derived from Marches Tropicaux 17 April, 1981, loc. cit.

metres, and contributes an average volume of 200m^3 per second, or the equivalent of 6.3 billion cubic metres per year.

In most of its length, the Feleme forms part of the international boundary between Senegal and Mali, just as part of the length of the Karakoro, on the right bank of the Senegal River, forms part of the territorial boundary between Mauritania and Mali. But from its confluence with the Feleme to its mouth, the Senegal River mostly forms the boundary between Mali and Senegal Republics. The drainage system is, therefore, international, par excellence, covering Guinea, Mali, Mauritania and Senegal.

The total area of the basin is estimated at 289,000 square kilometres of which 155,000 km^2 is in Mali; 27,500 km^2 is in Senegal; 75,000 km^2 is in Mauritania; and 21,000 km^2 is in Guinea. This is equivalent to approximately 10 percent of the total area of the basin states.[4] The population within the basin, of the three members of the OMVS, is about 1.6 million people, or 14 per cent of the population of the three estates. As pointed out already, one of the controlling factors in this region is rainfall which is rather scanty and unevenly distributed. But, on the average, such scanty rains fall from mid-June to the first half of October, totalling four months. The rest of the year is characterized by desert-type drought.[5] In fact, about 90 per cent of Mauritania and of Mali are perfect deserts.[6] This erratic climatic condition also varies the volume of the river flow considerably, with the flow during the eight dry months falling far below 300 cubic metres per second.

Indeed, drought during the eight months from October to June, gets the volume of water sometimes far below that mark.

4. The areas of the three members of OMVS are given as follows: Mali - 1,204,000 km^2; Mauritania - 1,170,000 km^2; Senegal - 197,000 km^2. See ibid p. 14.
5. See these observations in Ronald Bornstein's "The Organization of Senegal River States" The Journal of Modern African Studies. Vol. 10 No.2 (1972) pp. 267, 273.
6. Marches Tropicaux op. cit. p.14.

However, the 300 cubic metres per second is a significant policy matter in planning development of the Senegal basin. During the dry season, the level of the Senegal River is virtually at sea level and the Senegal flow pressure is negligible thereby permitting the incursion of the salt water tide from the Atlantic. Frequently, the salt intrusion at high tide goes as far as Dagana, but it has been known to extend beyond Dagana, as far as Fanaye creek, 200 kilometres from Saint Louis. As a consequence, the agricultural use of the water is impeded and the inhabitants are forced to consume water with that high salinity. In fact, it has been established that a total of between 450,000 and 480,000 hectares is economically irrigated even though initially, a smaller area may be scheduled for cultivation.

The foregoing are development imperatives impeded by qualitative consequences of the low level of Senegal waters. But that level of the waters of the river impede one further development activity, namely, navigation, which should be a cheap means of transportation to the hinterlands. Mali, which is a land-locked state, depends on overland transportation through either Ivory Coast or Senegal with all their limitations. Only a flow regulation of the Senegal River, which maintains the volume at a minimum of 300 cubic metres per second would provide sufficient draft facilitating regular navigation, at least from Saint Louis to Kayes in Mali, which is about 950 kilometres.

The physical condition of the Senegal river also gives it substantial potentials for hydroelectric power generation. Since the river flows from Fouta Djallon highlands the declevity responsible for reasonable dam sites is in Mali, particularly after the confluence of Bafing and Bekoye. But the second highest potential, totalling 800 million Kwh is at Manantali on the Bafing.[8] The others are Galougo 1,520 million Kwh; Gourbassi 104 million KWh; Small Goina 560 million KWh; and Felou 400 million KWh. These, however, are equivalent to two thirds of the total estimated hydro-power potential of the OMVS.

7. ibid p.16.
8. For estimates see River Senegal (OMVS, 1979) p.16.

There are a number of other natural resources to be mentioned in passing, in the physical setting. Notable among these are mineral resources, particularly iron ore in the Feleme valley and between Koulikoro and Kayes in Mali. There are also notable deposits of bauxite in Mali and phosphates in Mauritania. Forestry is particularly abundant in the Upper basin, and there are available a varieties of species of fish in the Senegal River.

The foregoing physical features and the resource potentials constitute the natural resources which would be mobilized for socio-economic development within the cooperation framework created by the OMVS.

III. THE OMVS TREATY - IN A NUTSHELL

The OMVS was, indeed, the latest, if not also a culmination, of attempts to study or organize towards a systematic management of the resources of the Senegal basin. In fact, such efforts commenced early in this century, under the aegis of the French colonial administration which governed the basin territories within the framework of French West Africa including French Guinea, Soudan (later to be Mali), Senegal and Mauritania. Although the headquarters of that administration was in Dakar, the actual decision were taken in Paris. And within that context the organization of the utilization of the natural resources, including water for irrigated agriculture were a part of the colonial policy. The attempts at organizing the utilization of the basin's resources were fragmentary and unsystematic, occasionally only sectoral in approach. And this is why the Statute and Convention adopted in March, 1972 are such an important turning point in the evolution of concepts for the development of the basin states through regulation of the flow of the river.

The historical perspective is nevertheless significant in setting the context within which the OMVS and its development plans were to emerge.

The Antecedents

The long series of initiatives taken towards the development of the Senegal basin have been recounted in a number of existing literature.[9] They show that even though the first mission by French emissaries to consider any planned development in the basin was in 1918 the first formal framework was actually

9. The items cited above can all be references on the antecedents to the OMVS, however, the most comprehensive of all is the Marches Tropicaux 17 April 1981 op. cit. from which most of the information in this section is derived.

started in 1935 when the MEFS (Mission d'etudes du Fleuve Senegal) was established. Its terms of reference included to conduct and execute all research and experimental work throughout the length of the Senegal River, aimed at developing it from the triple stand point of agriculture, navigation and power production within the three French territories in the Senegal basin. Although the mission worked for three years producing topological, hydrological and geological studies, no concrete projects directly emanated from that work.

What was expected to be an executive function was later assigned to MAS (Mission d'amenagement du Senegal) which was established in 1938. Its first commitment was to irrigate agriculture, specifically for cotton production, which it started in Podor region, upstream from Dagana. But these efforts were interrupted by the expansion of conflicts during World War II. After the War, MAS did not follow up on these operational works. Instead it resorted to a number of uncoordinated sectoral studies. By 1959, MAS, with its rudimentary functions were treated as a joint endeavour of the three states which were then preparing for independence. However, when Soudan became independent (and changed its name to Mali) it actually withdrew from that organization.

On July 25, 1963, Guinea, Mali, Mauritania and Senegal, the first time as independent states, signed the Agreement concerning the Development of the Senegal River Basin. Under that Agreement, they established the Inter-State Committee whose purpose was to initiate an integrated programme for the development of the basin's resources. The notion of "integrated programme" was actually predicted on the agreed precept that the Senegal River and its tributaries was international in its character. By February 1964, the four states were able to adopt general principles for the management of the resources of the river, particularly flow control so facilitate promotion of irrigation, hydropower generation and navigation.

This set of post-independence developments seem to have stirred the zeal of the basin states which were enthusiastic for closer economic as well as political collaboration among the independent African States. The Inter-State Committee was, on 24 March, 1968, replaced by the OERS (Organization des Etats Riverains du Senegal) adopted by a treaty signed by the Heads of State of the four countries at Labe in Guinea.

It was recognized, as a position of the contracting states, that in addition to the development of the Senegal River, the objectives of this new organization were also the harmonization of the States' national development plans and the implementation of concerted policies for sectorial development.[10] Thus, the mandate of the OERS extended to the overall questions of national development plans and implementation. It was also particularly novel that the Article of the OERS Convention gave the organization a role in the politics and foreign policies of the member states.

Despite the rather lofty intentions, the OERS was dissolved as a treaty framework four years later before it had actually implemented any framework. Amid several political problems which confronted the organization during that period, it managed to consider a number of possible projects and the ideas were to remain beyond the life of OERS itself. Before specifying the proposed projects, we give a brief outline of the political problems, because history is notorious for repeating itself, even where our hopes are to the contrary.

The beginning of the problems was in November 1968, when Madeibo Keita was overthrown as President of Mali and succeeded by Moussa Traore. This shock, seemed like forceful removal of a member of a fraternity, and particularly to Sekou Toure whose

10. The River Senegal (1979) op.cit. p. 8. See these purposes as articulated in Articles 1-5 of the OERS Convention. See also the detailed discussion of the OERS in the exclusive article by Bornstein, op. cit.

other friend, Kwame Nkurumah of Ghana had been overthrown. Apparently, Toure withdrew support from OERS henceforth, a factor which paralysed the OERS for the rest of 1968 and throughout 1969.

At the diplomatic initiative of President Ould Daddah, the four Heads of States met in Conakry on 3 February 1970 and this resuscitated the OERS, at least, throughout 1970. But then the invasion of Guinea, on 22 November 1970, by unidentified forces generated suspicion which was not helped by the bad relation between Guinea and Senegal, especially when Guinea accused Senegal of amassing troops along their border. Attempts to resolve the bilateral conflicts between the two were only briefly eased in March 1971 when, at the invitation of the OERS Executive Secretary, the four Heads of State met for the Round Table on Prospects for the Integrated Development of the Senegal River Basin. The main focus of the meeting was to encourage prospective donors to support the construction of one or more dams for irrigation and for hydropower generation.

It soon became evident, however, that the political problems would not permit the OERS to function. In fact one author reports that by October 1971, Mali, Mauritania and Senegal had formally submitted their instruments denouncing the OERS treaty and resigning their membership, although these had not been made public.[11] Thus, the meeting of the Council of Ministers of the OERS, which met at Nouakchott in December 1971, issued a communique which only indirectly signalled the dissolution of the OERS.

Meanwhile, the OERS secretariat had established pointers to areas of possible collaborative development of the Senegal Basin. The Executive Secretariat presented such studies at the March 1971 Round Table mentioned above.[12] Numerous reports were issued on costs, benefits and alternative approaches to development of the Senegal basin. The studies included mineral resources

11. See Bornstein, op.cit. p. 283.
12. ibid p. 274.

development, agronomy, demography, desalination, hydroelectric power production, industrial development, health and the environment. It was clearly indicated that to implement these objectives, there would be need for two dams, one at the Manantali in Mali and possibly another one near the delta. Participants included UNDP, IBRD, African Development Bank, European Development Fund, FAO, Canada, France, USA, Soviet Union and Yugoslavia.

Very clearly then, by the time OERS was dissolved, the basin states had very definite ideas about the kinds of development projects they should embark on and with what financial needs. Ironically, the collapse of the OERS was actually a result of the detraction from matters of development of the Senegal basin; after all, the basin states had agreed on the necessity to cooperate in such development. That fact should perhaps have made it easy for those states which were still interested in the collaborative development to agree on the treaty framework and the procedure for its implementation.

The OMVS Treaty and the Statute

When the Senegal basin states initiated the move for an organization to succeed the OERS they were to take account of two major antecedent developments. First, they were to base the new framework on the results of studies and deliberations on the possible projects within the basin and ways of initiating them towards prosperity of the needy nation-states. Secondly, they were cognisant of the causes of the political conflicts that led to the collapse of the OERS as a development organization. Therefore, it can be suggested that they started from a position of advantage. In fact, the very announcement of the dissolution of the OERS marked the beginning of the OMVS.[13]

On March 11, 1972, the Heads of State of only three of the basin states: Mali, Mauritania and Senegal, meeting at Nouakchott signed two basic instruments for the legal regime of

13. ibid p. 283

organization for the management and development of the resources of the Senegal Basin. The first one was the Convention Relating to the Legal Status of the Senegal River;[14] the second was the actual Convention Establishing the Organization for the Development of the Senegal River (OMVS). Then two subsidiary, but significant conventions were adopted at a later date: One concerned the Legal Status of the Works of common interest; the other was on the financing of such works. Only their general outline needs to be given here briefly.

The Statute and the Legal Status of the Senegal

The Statute had a precise purpose and that is reflected in the declaration of its principles in the preamble. First, the preamble noted the Charters of the United Nations signed in 1945 and that of the Organization of African Unity signed in 1963. Then it declared the consideration that the rational and coordinated management and exploitation of the natural resources of the Senegal Basin would promote economic cooperation of the basin states. Further, they considered that it was essential to have a concurrence that general management of the Senegal basin required the regulation and utilization of its waters for the three purposes: energy production, irrigation and navigation. Finally, they declared that utilization of the river must permit the principle of free navigation and equal treatment of all users of the river.

Within the scope of the foregoing principles, the Statute declared in Article 1 that Senegal River, including its tributaries, is declared an international river on the territories of the three contracting states. On the basis of this declaration, the Statute proceeded to stipulate the functions that would be influenced by the international personality of the Senegal river.

14. The Convention on the Status of the River has been referred to as the Statute to distinguish it from the Convention establishing the OMVS. That is the general reference in the literature cited above and to avoid confusion, that is maintained here.

The most elaborate set of functions covered in Chapter III, articles 6-10 relates to freedom of navigation and transportation through the river. The contracting parties guarantee equal rights for navigation of the river and use of ports for all citizens, the commercial vessels and goods of the contracting states as well as vessels chartered by one or more of these states. Any taxes levied must be proportionate to the services rendered and should on no account be discriminatory.

It further stipulates that the same freedom and equality of treatment would apply to roads, railways and lateral channels created for the specific purpose of by-passing unnavigable zones or defective reaches of navigation canals in the river or its tributaries. It is also to facilitate common regulations to ensure security and control of navigation. Besides, each contracting party was required to maintain the sectors of the river on their territories in safe and good state of navigability, in accordance with the stated common regulations.

The exploitation of the river for agricultural and industrial purposes are dealt with in Chapter II of the Statute, constituted by Articles 4 and 5. The central and novel provision here is the requirement for prior approval by the contracting states, of any project that is likely to significantly modify the characteristics of the river. A project document is accordingly required to be circulated to other contracting states and in it should be specified the possible impact on: the river regime; the navigability of the river; agricultural and industrial uses of the river and its waters; the water quality; the flora and fauna of the river; and the general water quantity and water table.

By that original Statute, the contracting parties undertook not to denounce the terms of the Statute within less than ten years. But the contracting parties realized very quickly that this was too short a period. The gestation period of most of the projects might last that long. Accordingly, at their

meeting at Nouakchott on 16 December 1975, the Heads of States adopted a resolution amending Article 17 of the Statute so as to extend the period from ten to ninety-nine (99) years.[15]

Where any dispute arose relating to application or interpretation of the Statute, Article 18 provided that resort may be had to the Commission on conciliation and Arbitration of the Organization of African Unity. In the event that no resolution is obtained, then the parties may take the dispute to the International Court of Justice. The parties also opened other options available within the United Nations system by requiring that the Convention be registered with the U.N. Secretariat in accordance with Article 102 of the U.N. Charter.

Thus, the broad legal status of the Senegal was established and general guidelines provided for the management of its natural resources. This sets the scene for the OMVS treaty which sets out the rights and obligations of the contracting states on the management of the resources for development.

The OMVS Treaty Proper

The 1972 Convention which established the OMVS may be examined broadly in six parts: (i) Establishment or constitution of the Organization and its application ratione loci; (ii) General scope of application, ratione materiae; (iii) General structure and principal organs of the Organization and the functions in relation to the responsibilities of the organs; (iv) Legal status of the OMVS projects; (v) The broad legal aspects of funding for the projects; and (vi) Some general provisions.

15. Initially, the amendment was recommended by Recommendation No. 3/75/CM/%ML.B of the Council of Ministers on 12 June 1975. The Heads of State Resolution is No. 5/75/C.C.E.G./MN.N of 16 December 1975.

Establishment and area of application

The organization for the cooperative management and development of the Senegal river basin was formally established by Article 1 of the OMVS Convention.

The area of application of the Convention is implicitly suggested by that reference to the Senegal River Basin. But explicitly, the area of its application is specified in the Statute which specified the legal status of the basin. Therefore, it was sufficient that the third preambular paragraph of the OMVS Convention noted the provision of the Statute which was adopted by the Heads of States and Governments on the same day. Very particularly that preambular paragraph refers to Articles 11 and 12 of the Statute (Title IV) which dealt with "Application" under which the contracting states undertook to coordinate all studies and works as well as the functioning of any of their mutual organization for the general utilization and management of the resources of the basin.

The immediate point to consider is that the main source of the Senegal River is in the Fouta Djallon mountains in Guinea, where sits the water tank of West Africa. But Guinea is not a contracting party to the OMVS. Thus, the Statute and the Convention being res inter alios, would not apply to that portion of the river which is in Guinea. Thus, Mali remains the most critical member of the organization even though, in the long run, it may be ideal to consider the unity of the Fouta Djallon mountains and to get the collaboration of Guinea in the OMVS to secure the source of the Senegal waters.

The reasons why Guinea did not contract to the OMVS are stated in the discussion of the interface of OERS and OMVS, as having resulted, in part from the Guinea-Senegal relations at that time. But then Guinea has joined Senegal, the Gambia and Guinea Bissau in the Organization for the Development and Management of Gambia Basin (OMVG). It is therefore conceived that

Guinea should and might appropriately accept the convention so that the terms of OMVS are applicable to all the four territories. In the process, the conservation and utilization of the resources may be effected on the basin-wide basis as provided for in the Statute on the legal status of the basin. Whenever it wishes to, Guinea may join the OMVS by submitting a written request to that effect, to the depository of the Convention as provided in Article 18. The depository is then required to refer the matter to the Member States who would perhaps gladly approve the request. Perhaps the decision would be easier for Guinea to make now, after the departure of Sekou Toure and Leopold Senghor. In fact, it may be easier to expedite if the present contracting states take the diplomatic initiative in some form of invitation.

It is further presumable that, even though in the strict sense the convention applies to the Senegal basin (that 289,000 square kilometres), the construction of the related regional infrastructure including roads, railways, power lines and telecommunication lines would be done beyond the precise basin but in the territories of the contracting states.

The Subjects to which the convention applies

Paragraph 1 of Article 1 of the Convention gives a catch-all function for the Organization in terms of "The Enforcement of the Convention of 11 March 1972 on the Status of the Senegal River". In fact that implies enforcement of the position legally recognizing the river as one entity in its entirety. But it further requires the organization to promote and coordinate studies as well as development works of the basins resources. And thirdly, to implement any technical and economic duties assigned to it by the contracting states. Finally, by an amendment adopted on 13 April 1973, the organization is empowered to receive grants, raise loans and obtain technical assistance.

These rather broad functions have been further articulated in a paper by the Legal Council of the

These rather broad functions have been further articulated in a paper by the Legal Counsel of the OMVS as follows:[16] (a) Formulation of management policy on the resources of the Senegal basin. (b) Planning and programming, as well as coordination of exploitation of natural resources of the Senegal basin and setting up of the development priorities in project of common interest to the basin states. (c) To implement studies and projects as well as regional infrastructure. (d) To administer regional infrastructure through the agencies established by the organization and to establish regional standards for regulations, budget and financial administration. (e) To determine the priorities in the utilization of the water of the basin in order. (f) To determine the criteria for sharing or apportionment of the basin waters in accordance with the procedures of the Permanent Water Commission (Commision Permanent des Eaux).

The Structure of the Organization and Function Principle Organs

The OMVS has three principle organs, namely, the Conference of the Heads of State and Governments; the Council of Ministers; and the High Commission. Originally, the third organ was the Secretariat General headed by a corresponding title for the office holder. However, by an amendment adopted on December 17, 1975, the position of the High Commissioner was created as the permanent executive officer of the Organization with a Secretary General as his deputy.

Article 3 of the Convention designates the Conference of the Heads of States and Government as the supreme authority of the Organization, with the powers to define the policies for cooperation and development among and within the contracting states. Theoretically, it is supposed to meet once every year. But for reasons of economy, it meets biennially even though it

16. The paper "Cadre Juridique et Institutionnel de la Cooperation entre les Etats-membre de l'Organization pur la Mise en Valeur du Fleuve Senegal by Sidi Mohamed Boubacar was presented at the Workshop on the Management of River and Lake Basins in West Africa organized by IDEP/ECA and OMVS and held at Dakar June 25/26 1986. See pp. 11-12.

is expected that in future and out of necessity it might meet annually.[17] It would be submitted, though, that unless it is found vital for any specific reasons, the Summit can remain a biennial affair provided that there is a strong Council of Ministers. In that event, its function would amount to ratifying and granting legitimacy to the implementation of the recommendations adopted by the Council of Ministers. Article 4 simply provides that the Summit should meet as often as possible but it is Article 6 which requires its Chairmanship to rotate among the member states, every two years. This would ideally coincide with arrangements for biennial Conferences. Apart from convening and chairing the regular meetings, the Chairman is not expressly assigned any specific powers or responsibilities. In practice, it has been so arranged that the Conference of the Heads of State and Government is to be convened on a date and venue acceptable to all the three members. This facilitates operation of Article 4 which requires that the decisions of the Conference are valid only if they are adopted unanimously. Besides, the requirement in Article 5 that all the decisions have binding effect among all contracting states requires a consensual approach to decision-making.

Thus, the biennial Conferences may, in fact, be an ideal arrangement for the OMVS Summit: A Conference of Heads of State and Government is sensitive in its procedure and decisions and therefore it should not be convened more often than is absolutely necessary.

The Council of Ministers emerges as the organ with the central policy control and direction of the OMVS, as outlined in Articles 8-10 of the convention.

It is composed of at least one Minister representing the contracting states. In practice, two or more ministers from one state may attend, depending on the agenda of the meeting.

17. Elaborations given in ibid pp. 15-16.

Very often the items on agenda might cross the boundaries of more than one ministry. In which case the specific delegation would unilaterally determine the head of the delegation. Article 9 provides that the chairmanship will rotate among the member states every two years, as in the case of the Summit. However, it does not say whether or not the two should coincide for the same state.

The regular sessions of the Council are to be held twice every year. However, extraordinary sessions may be convened on the suggestion of any one member.

The functions of the Council of Ministers are articulated in Article 8 as the formulation and articulation of policy on the utilization of resources and cooperative framework and operation of programmes; setting priorities for regional development; and determination of the budget and financial contribution of member states.[18] Members are enjoined to send representatives to the Council meetings where decisions are determined by unanimity of votes and are subsequently binding on the contracting states.

For its efficient operation, the Council of Ministers works with one "control organ" namely, the Financial Controller which comprises an accountant and an auditor. Besides, the Council works with three "Consultative Organs", namely, the Permanent Water Commission,[19] the Inter-State Committee for

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18. In the original Convention the establishment and functioning of the Council of Ministers was dealt with in Article 8-11. The Amendment of December 11,1975 which also introduced the office of the High Commissioner superimposed on the Secretary General changed this.

19. Since its establishment in 1975 by formal amendment of the Convention, making it Article 20, the Permanent Water Commission has met only three times. Perhaps its operation will be active after completion of the two dams and serious questions of water apportionment will be live.

Research for Agricultural Development (CIERDA);[20] and the Consultative Committee (CC).[21]

Thus through consultation with these three Committees and regular sessions the Council of Ministers is expected to give adequate direction to the Executive Organs of the Organization. In between the sessions the Chairman of the Council of Ministers may, in case of emergency, consult with the member states and take any necessary measures, within the mandate of the Council, to safeguard the interests of the OMVS. In any event, in between sessions of the Council, the Chairman is expected to monitor the implementation of the Council's decisions as well as those of the Conference of the Heads of State and Government as the Council is actually responsible to the latter.

The High Commission is the executive organ of the OMVS. Hierarchically, the High Commission is responsible to the Council of Ministers, even though ultimately it is presumed to implement the directives of the Conference of Heads of States and Government. These functions are elaborated in Articles 11 and 19 of the Convention, adopted through the amendment of the Convention done on December 11, 1979.

The head of the High Commission is the High Commissioner who is appointed by the Conference of Heads of State and Government under Article 11 of the Convention. He is assisted by a Secretary General, designated as his deputy. The latter is also appointed by the Conference of Heads of State and Government. But according to official interpretations of the OMVS, the Secretary General is "head of Administration",[22] presumably to release the attention of the Chief executive towards basic policy and operation of the organization.

20. Le Comite Inter-Etats de la Recherche et du Develcppement Agricoles (CIERDA).

21. Le Comite Consultatif was established by a Council of Ministers Resolution on July 11,1976 to comprise the Council of Ministers and the Representatives of the Donor Agencies or States contributing to the OMVS projects. Its review functions is to facilitate harmonicus relations between the OMVS and its sources of finance.

22. River Seneral (OMVS 1979) op. cit. p. 9.

The range of responsibilities of the High Commission as the chief executive, are immense. In between sessions of the Summit and the Council of Ministers, he is empowered to represent the Organization, including consultations with international aid institutions as well as other matters of bilateral cooperation in the management of the Senegal basin. Accordingly, he may enter into negotiations and sign agreements on financial and technical assistance for the construction of regional infrastructure (Art. 15). Similarly, he coordinates financial and budgetary matters of the Organization, as may be directed by the Council of Ministers, and as chief executive, he is also responsible for overall efficient personnel and general administration of the OMVS (Arts 16 and 17).

Apart from the Secretary General, there are two other principal advisers to the High Commission, the Legal Adviser and the Economic and Financial Adviser both of whom are, under Article 19 appointed by the Council of Ministers, on recommendation of the Chief executive. The administrative Services Department and the Documentation Centre (with its Centre at St. Louis) are the support services to the four operational Directorates. The latter which are central to the success of the OMVS are: Directorate of Investment; Directorate of Promotion/Development of Human Resources; Directorate of Regional Infrastructure; Directorate of Development Coordination. It is presumed that within its mandate, the High Commissioner may delegate any of its powers to these senior officers as might be necessary for efficiency.

Through its experience, the OMVS found that the member states should extend such privileges and immunities to personnel of the organizations as may be necessary for performance of their functions. Such a special accord was adopted on May 4, 1976. Of course, a legitimate question may be raised as to the precise limits of such immunities and privileges given that the organization is to engage in some activities of direct commercial relevance; construction work; deployment of labour

force; and ownership of infrastructure. In the ultimate analysis, operation of such a legal framework depends on the good faith of the contracting states. For instance, the decision by Guinea to arrest Oumar Balde, the Secretary General for Planning and Economic Development of OERS in March 1971, was an action by a Government which had no commitment to the organization or the mission of its secretariat.[23]

To conclude this section, here is a quick look at the possible functional relations among the principle organs. Where an inter-governmental Summit conference is backed by a Council of Ministers, it is often the case that the tenure of chairmanship for the Summit coincides with that of the Council of Ministers. That has been the practice, in OAU, for instance, Therefore, the fact that two years is the tenure of the chairmanship of OMVS Summit Conference and the Council of Ministers makes the coincidence an ideal arrangement. Moreover, given the fact that it is actually the Chairman of the Council of Ministers that has express responsibilities, the arrangement is, perhaps, to be encouraged. Furthermore, if that be the case then there must be the unusual two years when the Chairman of the Summit, the Council as well as the High Commissioner are from the same state.

But there is a more critical question about the status of the High Commissioner and the Secretary General. The latter, in fact may have been introduced to help balance the control of the Executive Organ by more than one state. Thus, it is perhaps no accident that the post was not simply referred to as the "Deputy High Commissioner" along the same lines as in the Niger Basin Authority or the Kagera Basin Organization. In which case, it seems, the OMVS member states intended the Secretary General to be a more operational position and not entirely dependent on the functions occasionally delegated by the chief executive. In point of fact, we have been above that the OMVS formal practice is that the Secretary General is the head of Administration.

23. See Bornstein, op. cit. pp. 267, 273.

Clearly this would guard against the crisis which prevailed at the Niger Basin Authority from the time Ike Enwemriwa was appointed Deputy Executive Secretary in September 1981, to 1984. At the latter stage he walked out in protest because the Executive Secretary refused to allocate him responsibility. In November 1984 when the Summit dismissed D.M. Traore and appointed a new chief executive to the organization.

On the other hand, it does not seem that the chief executive and his deputy being of different nationalities is, ipso facto, a safeguard against abuse of office. During the Summit of CEAO at Bamako in October 1984, the Senegalese, Ivorian and a Malian, all top executives of that organization, were arrested and later convicted for having embezzled the equivalent of US $14 million belonging to CEAO. Indeed we have concluded elsewhere that the only safeguard against that is protection of the organization against over-politicization as well as accent on achievement as a basis of retention of the positions.[24] Therefore, the arrangement at the executive office may, nevertheless, provide a framework that permits initiative from the structural "deputy" in event that the chief executive goes inert as was in the Niger Basin Authority.

The Legal Status of the OMVS Projects

The projects to be undertaken by the OMVS will be discussed in the next chapter of this paper. This section is merely concerned with what the legal instruments of the OMVS say about their legal status. For purposes of perspectives, it is sufficient to mention here that the main regional infrastructure which would be considered are two dams: at Diama near the delta of the Senegal and at Manantali in Mali. Besides, there will be the

24. See details in Okidi, "The Role of the State in the Management of International Rivers and Lakes in Africa" May 1986 presented at the Workshop in Management of Rivers and Lake Basins in West Africa organized by IDEP/ECA and OMVS June 26- 1986 especially pp. 18-30.

sea-port at St. Louis, a river port at Kayes, and ports of call at Dagana, Podor, Baghe, Kaedi, Matam, Bakel and Ambidedi. Finally, one would expect that there will be a variety of infrastructure such as electric power transmission lines, railways and roads, where the investment is jointly undertaken.

In its original form, the OMVS Convention simply provided for establishment of infrastructure to facilitate co-operation development utilizing the resources of the Senegal basin.[25] Clearly, the legal status of the infrastructure would have implication for the critical question of financial responsibility for their construction.

Therefore, in 1974 the Heads of State and Government decided certain works or projects to be declared common works (Ouvrages communs) to be jointly constructed and owned by OMVS member states. To that effect the Conference initiated studies and drafting work which culminated in adoption of the Convention relating to the Legal Status of Common Works on December 21, 1978.[26]

The Convention provides modalities by which each of the contracting state becomes a co-owner or joint owner, and has a right to own shares in the same project - all of the states at the same time. Two criteria are to determine whether a particular work is common. First, it may be through a legal instrument declaring a particular project be a common work. Secondly, such works are materially determined by a list provided in Article 3 of the Convention. There are six projects, viz: Manantali Dam; Diama Dam; Sea-River port a St. Louis; River Port at Kayes; the ports of call and management projects of navigable channels; and projects associated, annexed to or in support of the above.

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25. See for instance Articles 1, 8, 14, and 15.
26. The Convention is discussed in details in Boubacar op. cit. pp. 26-31.

But the rights of the individual states in the common projects are individual rights in indivisible shares as well as a collective right of use and administration. The OMVS may create special administrative agencies, which may be direct inter-state public or mixed enterprises, each governed by a legal instrument relating to the specific project.[27]

In each case, however, the OMVS retains overall supervisory powers leaving the management agencies to exercise only the powers delegated to them. There is danger that the OMVS as the parent organization, may inordinately interfere with the management of the project. We suggest here that the link with this independent but associated management agencies is vital for two main reasons: First, it gives OMVS a perpetual overseer function in enterprises it has actually created and to ensure that they are managed efficiently. Secondly, OMVS will seek finances for the projects and should ensure economic returns as well as to determine appropriate revenues which might accrue therefrom.

It is suggested, conversely, that this semi-autonomy of the enterprises is good for the enterprises themselves. It cushions efficiently run enterprises from the inept ones and reduces parasitic dependency by the inefficient ones which would depend on transfer of subsidies from one agency to another. Thus, it offers the inefficient enterprises an opportunity to collapse alone or for its subsidization to be reasoned and conspicuous. History of parastatal enterprises in Africa is littered with disturbing fiascos, ineptitude and unnecessary subsidization, all of which are easily hidden in overcentralized conglomerates.

In the case of the common projects of the OMVS it is sufficient that technical co-ordination would remain in the Council of Ministers and the High Commission as stipulated in

27. See Articles 15-18 of the 1978 Convention.

Article 19 of the 1978 Convention. Recall, for instance, that matters such as apportionment of water for various programmes is to be overseen by the Permanent Water Commission. It is also important that all matters regarding agricultural research and development must have the prior support of the Inter-State Committee for Agricultural Research and Development (CIERDA), which is a committee of the Council of Ministers. The system of financing the projects is also centralized in the High Commission and the Council of Ministers.

The Legal Aspects of Funding of Common Projects

The legal aspects of the funding of the projects is the third mechanism compelling a management agency for the project to be responsive to the OMVS Council of Ministers and the High Commission. In the original convention the question of funding was glossed over quickly in form of articulated powers of the Council of Ministers and the High Commission. But after the adoption of the Convention on Common Projects in December 1978, the need for a legal framework for guarantee of loans for such projects became apparent and the Council of Ministers adopted a resolution to that effect on March 27, 1981.[28] Then it was also clear that there should be a formula for sharing of the costs of the projects and on May 5, 1981 the Council of Ministers adopted a resolution to that effect.[29]

Eventually, the principles in the two resolutions were included in a broader Convention Relating to Financial Arrangement for Common Projects/Works, adopted on May 12, 1982.[30] Article 2 of the Convention identifies the four sources of funds for the OMVS common projects to be: Contributions made by the member states; Loans contracted by the states, then ceded back

28. OMVS Council of Ministers Resolution No.141/CM/MN.N of 27 March 1981.

29. OMVS Council of Ministers Resolution NO.143/CM/SD of 5 May 1981.

30. This Convention relative aux modalites de financement de Ouvrages communs is also discussed in details in Boubacar, op. cit. pp. 31-36.

to the OMVS; Subventions, grants and payments including technical assistance from external sources; and Loans contracted by the organization with or without guarantee.

As stated earlier, only the Council of Ministers may approve contract of loans to the OMVS, even where such negotiations have been conducted by the High Commissioner. However, where the financier requires a guarantor, that must be stipulated in the loan agreement. Invariably, the loan will include the priicipal sum, interest, and where applicable, commission or service charges.[31]

In practice, all the financiers insist on direct member-state guarantee of the loans rather than block guarantees in the name of the OMVS. In fact, only the West German international co-operative agency KFW has extended loans directly to the OMVS with collective guarantee by the member states. The new OMVS formulation under the 1982 Convention requires the states to guarantee the loans in direct proportion to a general formula of their benefits from the common projects (Article 8) unless the entire loan is specifically designated as guaranteed by a specific state. Thus, it is possible for a given guarantor to negotiate terms of repayment of a loan, resecheduling or modification of the original terms so as to ease the service burdens.

Consequently, where a guarantor becomes delinquent on fulfillment of the loan obligations, it is generally presumed that the particular state suffers the penalties. In actual fact, however, some of the financiers have at times solicited pressure from other OMVS members by withholding other funds for other OMVS projects in event that one member fails in its obligations.

The official position in OMVS is that, although the individual member state guarantees the loan the loan servicing is to be done from revenues derived from common projects. In

31. Both provisions are reflected in Articles 4 and 6 of the May 1982 Convention.

event that such revenues are either unavailable or insufficient, then the member states make the payment with the understanding that they receive reimbursement when the revenues become available.

The determination of the criteria for cost sharing in the construction of the common projects or infrastructure became a matter of controversy within the OMVS. Eventually, the Council of Ministers adopted a formular worked out by University of Utah, which apportioned the costs thus: Mali: 36.95% Mauritania: 16.69% and Senegal: 46.36%.[32] This formula, based on a computer model, was still a subject of refinement and discussion at the time of this research in 1984-85. Whether this formula is based on perceived ability of the state to absorb and utilize opporttunities made available by the infrastructure or on the direct benefits to be derived from the infrastructure is not clear. But a member may request the Council of Ministers to adjust the formula, for any specific case; where the Council fails to resolve the matter, it will be referred to the Summit, whose decision must be final and binding.

Some General Provisions

The two conventions (or sub-conventions) discussed above are self contained but operating within the parent OMVS Convention whose final clauses are referred to here in brief. Specifically, mention is made of procedure for settlement of disputes, amendments, withdrawal and dissolution of the organization.

Where disputes arise on interpretation or application of the Convention recourse may be had to the conciliation and mediation procedures. Should that fail, the member states may

32. Council of Ministers Resolution No.143/CM/SN/D was adopted on May 6,1981. At its 25th Session held in Dakar (Dec.15-18, 1986) the Council of Ministers decided that the formula will be changed to one that takes into account the benefits derived by Mauritania from power produced at Manantali. In addition, the High Commission was requested to study a possible amendment to the May 1982 Convention to include implication of retroactivity of any modification of the formula.

refer the dispute to the formal procedures of the Organization of African Unity. But it is provided that as a last resort recourse may be had to the International Court of Justice, which then brings the matter to the organs of the United Nations. The latter procedure is made possible by the final article of the Convention which requires that the Convention be registered with the U.N. Secretary General in accordance with Article 102 of the U.N. Charter.

Any member of the OMVS may propose an amendment to the Convention, by submitting the written request to the incumbent Chairman of the Conference of Heads of State and Government. Should there be a total disagreement and a member decides to withdraw it should submit a notice to that effect to the Chairman of the Summit, who will determine a date for notification to all members. Then the notice is to be effective six months from the date of that notice, without prejudice to all prior financial and other obligations. It seems that there is an anomally here since the status relating to the Legal Status of the Senegal River actually prohibit renunciation in a period not less than 99 years.

The Convention provides, however, that the Organization and its Convention may be dissolved upon request of two member states. It seems that here the unanimity of decision which is required in other matters, is not the rule as it was in the OERS. By the majority of votes the Summit may declare the organization dissolved and then determine the settlement of assets and liabilities of the OMVS.

IV: A PROFILE OF OMVS DEVELOPMENT PROJECTS

Preliminary Considerations.

After the overview of the legal and institutional framework of the OMVS, this section will set out a profile of the main projects planned for the operation of the organization. It should be expected that the projects should properly correspond to the basic objectives of the organization. Moreover, in the present case the objectives should relate to the critical problem areas of the region. It is well-known, for instance, that this being the Sahel Region, the critical problems relate to the general poverty of the population, which is exacerbated by scanty rainfall; environmental degradation arising from the prevailing desert-like condition; lack of energy resources to support industrialization and social amenities; the limited natural resources and the national markets for the enhancement of economies of scale; and the limited transportation infrastructure, particularly for the land-locked states.[33] Essentially, the core of the objectives of the OMVS is to control the flow of the waters of the Senegal River, through damming and therefore, where appropriate, transform the potential energy created by the head, into hydro-electric power by using it to turn turbines to operate generators. In the process, the water at the constructed reservoirs may be transferred to other areas of the basin for irrigated agriculture. Concurrently, the controlled flow of the river would facilitate navigation of the river to provide transportation for the land-locked partner in the organization.

To date, the development infrastructure for the OMVS have been identified as follows:

(1) The construction of the Manantali regulation and hydro-electric dam;
(2) The construction of the Diama anti-salt and irrigation dam;
(3) The development of the river for perennial navigation on the 950 km stretch between St. Louis at the mouth, and Kayes in Mali;

33. See the four general but lofty objectives of the organization in River Senegal (OMVS, 1985) p.1.
34. ibid.

(4) The construction of the river port in St. Louis, of a terminal river port in Kayes and of ten places of call along the river.

These are the infrastructures to achieve given development programmes. Thus, the development programmes under the OMVS may be discussed under the following broad headings:

(A) Irrigated agriculture
(B) Hydro-electric power
(C) Navigation
(D) Others, to include forestry, fisheries and stock-breeding.

Irrigated Agriculture

Hydro-agricultural programmes under the OMVS is to depend on regulated flow of the Senegal and based on the basin-wide control of the river. This is to be distinctly different from the pre-OMVS practice.

The history of irrigated agriculture in the Senegal basin is beyond the scope of this paper,[35] concerned as it is only with the programmes planned under the OMVS. It is sufficient to point out, though, that the past practice has been a combination based on flood recession and limited embarkment. With these practices it was found that the maximum area which could be irrigated was 28,805 hectares, of which 23,230 hectares were in Senegal, 5,305 hectares in Mauritania, and 270 hectares in Mali.[36] With the planned control of the flow of the river the area to be under irrigation is expected to increase significantly.

River flow regulation is to be realized by the construction of two dams. Manantali Dam, to be constructed on the Bafing, one of the tributaries of the Senegal, is located in Mali.

35. For a brief and concise account see OMVS, Social Economic Study on the Senegal River Basin: General Report. Part C. Introduction of Irrigated Agriculture in the Senegal River Basin. (OMVS. High Commission, Planning and Co-ordination Directorate April, 1980).
36. Platon, "The Development of the Senegal River" in Marches Tropicaux et Mediterraneens (No 1849, 17 April 1981) p.15.

With a maximum height above the foundations, the dam is expected to store a volume of 11 billion cubic metres of water. During the transition phase it is expected to release 200 cubic metres per second artificial flood for one month in August/September. The latter arrangement is designed to maintain the traditional flood crops, pending generalization of irrigated agriculture throughout the basin.[37]

On its own, the Manantali is expected to facilitate irrigation of 255,000 hectares of land in the basin.

Diama dam, is being built near St. Louis, at the mouth of the Senegal. Better known as an anti-salt dam, the Diama is basically conceived to prevent salty sea water from intrusion upstream. During the low rains period upstream, and therefore low river current, the sea water pushes its way up the Senegal, sometimes as far as 300 kilometres upstream from St. Louis. Naturally, the salinity of the water would prevent a number of beneficial uses of the river, notably, irrigation and domestic uses of the Senegal river waters.

A number of people have observed that the dam was in fact unnecessary if salt water intrusion was its purpose because by controlling the flow the Manantali would control the draught at the mouth of the river and therefore prevent the salt water intrusion upstream. Thus, with a tinge of cynicism, the observers argue that the Diama was calculated to satisfy the political ego of the Senegalese polity where, they argue, the perception that Mali and not Senegal would have a dam was unacceptable. The conclusion, therefore was that the construction of the Diama was for political prestige only.[38]

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37. More particulars of the dam are given in River Senegal (OMVS 1985) op. cit. p. 2. Obviously they mean very little to a non-Engineer.

38. These views obtained in personal interview in Dakar are elaborated in Okidi "The Role of the State in the Management of Rivers and Lakes in Africa" op. cit. especially pp. 22-24.

But the position is dismissed by the plan that the Diama alone will actually facilitate irrigation of some 42,000 hectares. Moreover, the combined action of the two dams would facilitate the irrigation of an additional 78,000 hectares, or an increase of a 26 percent over the total of what the two dams contribute separately.

Therefore, the two dams are, in fact, complementary, a fact which was symbolized by the presence of Presidents Senghor of Senegal, Traore of Mali and Haidalla of Mauritania at the laying of foundation stone for the Diama on December 12, 1979. The combined action of both dams brings the total irrigable area of the basin to 375,000 hectares of which 240,000 hectares in Senegal, 126,000 hectares in Mauritania and 9,000 hectares in Mali.[39]

The scope of actual irrigation realizable will be assessed with time. As of July 1982 only a total of 32,000 hectares was developed and under cultivation, of which 26,000 hectares were on Senegalese bank, 5,500 hectares on Mauritania bank and 350 hectares in Mali. Yet it is estimated that for them to realize cereal self-sufficiency Senegal and Mauritania would have to develop 180,000 hectares and 71,000 hectares by the year 1990 and 248,000 hectares and 94,000 hectares by the year 2000 respectively.[40]

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39. See OMVS, Indicative Programme for Hydroagricultural Development (1981-1990) and Progress of Agricultural Development Projects (Dakar, OMVS High Commission, Development and Coordination Directorate. September 1983) p. 4.

40. Diop, "Objectives of and Orientation for the Regional Integrated Development of the Senegal Basin" (OMVS, Dakar, June 1986) p.5.

A great deal still remain to be determined in the conditions for complete irrigation of this area of the basin. Generally, it is assumed that technical feasibility is sound,[41] which leaves a greater degree of uncertainty in the development of the competent institutional capability and efficiency. But depending on those assumptions the irrigation of the 375,000 hectares would be completed in anything from 30 years to 76 years.

Past observation have held that the most serious bottleneck to the intensified irrigation in the Senegal basin is the institutions for the management of the farmers' programmes. Each of the three basin states has had its own parastatal body managing irrigation. In Senegal it is the Societe d'Amenagement et d'Exploitation du Delta (SAED) or the Delta Development and Exploitation Corporation; the Malian counterpart is Operation Vallee du Senegal, Terekole, Magui (O.V.S.T.M.); and in Mauritania the body is called Societe Nationale de Developpement Rural (SONADER).

In their respective instances these institutions have formulated and enforced policies on irrigation in the Senegal basin. The farms have been in three different categories, better known as parameters: Small parameters, medium parameters and large parameters. In each case, the institutions have determined the farming methods including the appropriate farm inputs. But the experience between the institutions and the farmers has been less than satisfactory. In its efforts to realign the system, the OMVS initiated socio-economic studies which concluded that with the slight exception of SONADER, the institutions had been inefficient and ineffective in dealing with the farmers.[42] The study found that the OVSTM had been

41. Some of the critical questions in the institutional capacity are outlined below and in the final section of this paper. For general observation see Okidi "The Role of the State in the Management of River and Lake Basins in Africa" op. cit. and Adrian Adams, "The Senegal River Valley: What Kind of Change?" in Review of African Political Economy Number 10, September-December 1977, pp. 33-59.

42. OMVS, Introduction of Irrigated Agriculture in the Senegal River Basin (1980) p. C.VI.8.

rather authoritarian and farmers were urging for the system to move self-supervision, but the worst case was SAED where in the first place, the extension workers were, generally, aliens in the local farming milieu. It adds that the extension workers sometimes had antagonistic and authoritarian image. While they had been relatively efficient on large irrigation schemes, the results were poor in the small schemes. Furthermore, OVSTM was found to be particularly deficient on trained manpower and management capabilities.

The faults of the institutions may be summarized as follows: They were over-centralized, to the extent that they lost functional contact with the farmers. Perhaps as a result of the distance, the agents of the institutions became insensitive to the needs and wishes of the farmers. Consequently, they were unable to transmit the research findings or general technology to the farmers for the improvement of productivity of irrigated agriculture.

The Council of Ministers has reviewed this record, and accepted the study. Consequently, the Council has adopted new general principles to guide a new approach for irrigated agriculture under OMVS schemes. Its principal components include: 1l continuous planning and evaluating of the perimetres at the sub-regional and nationallevel; measures to lighten the workload of the development institutions and to decentralize them; institution and economic measures in order to reactivate the development agencies and organisms; and continuation of research work on the most fundamental aspects which affect the introduction of irrigated crops in the sub-region.[43] Within that context considerable emphasis is placed on restructuring the agencies and enhancing their sensitivity towards reduction of costs and

43. OMVS, Indicative Programme for the Senegal River Basin Hydro-agricultural Development (1981-1990) and Progress of Agricultural Development Projects. (High Commission, Development and Coordination Directorate, Dakar, September 1983) p. 18.

financial charges as well as "decentralization of the tasks at farmers' level and progressive increase of the farmers' responsibilities in the management of their perimetres".[44]

The Indicative Programme prepared in 1983 has urged the agencies to sustain efforts which recently yielded encouraging results. For instance, 1982/83 season, SAED rainfed paddy production reached 50,000 tons from 12,000 hectares or an average of 4.5 tons per hectares. SONADER's performance during the same period, from 2,500 hectares was 10,000 tons of paddy, or 4 tons per hectare.[45] Beside the paddy rice, other major crops expected to be grown in the valley are sugar, wheat, sorghum, corn and vegetables.

Hydro-electric power

Given the physical setting of the Senegal River, the dam sites which have power production potential are in Guinea and Mali. It has been estimated that the total production potential amounts to 4,733 million KWh, of which 3,384 KWh could be produced in Mali alone, at the following sites: Manantali 600 million KWh. Galongo 1,520 million KWh; Gourbassi 104 million KWh; Small Goiana 560 million KWh; and Felou 400 million KWh.[46] There are already small power plants built at Galongo and Felou both of which are slightly upstream from Kayes and both supply some of that city's electricity needs.

Gourbassi[47] which is on the Feleme, is located about 240 kilometres upstream from Bekel. Its retention capacity is about 1.5 billion cubic metres of water and, thus, could add 100 cubic metres per second to a regularized flow of the river. Its installed capacity of power is 20 megawatts, which gives the guaranteed power production of 104 GWh.

44. ibid p. 19. 45. ibid pp. 19-
46. OMVS, The River Senegal. (Dakar, 1979) p. 16.
47. Marches Tropicaux op. cit. p. 8.

The preinvestment studies found, however, that the maximum yield on these dams depend on the construction of the dam at Manantali which will give the regulating effect. As stated earlier, the site at Manantali has a storage capacity of upto 11 billion cubic metres of water. The planned installed capacity of power is 200 megawatts which is capable of the guaranteed annual production of 800 giga-watthours,[48] although the actual production capacity per year is 1,000 giga-watt hours, from the dam whose net head will be 46 metres.[49] It is expected that the artificial lake created by the dam will cover an area approximatel 50,000 hectares whose consequence will be displacement of about 12,000 people.[50] In order to avoid pollution, complete deforestation has had to be undertaken in the area to be inundated before the reservoir is filled.

Electricity produced at the dam is expected to have major industrial impact on the contracting states, and the states must, indeed, consider industrial use of the power since domestic power consumption alone would not be a viable option for that magnitude of power production. In the OMVS plans the leading consumer of the electricity is to be the mining industry including iron, bauxite and phosphates.[51] In Senegal, the Kanieba and other reserves in the Feleme region is estimated at 600 million tons, with a content of 60-68 percent of iron oxide have been identifie Between Kayes and Kalikouro in Mali, there is an iron deposit exceeding 2 billion tons out of which 500 billion is easily exploitable and is good quality ore, concentrated within the Senega basin. Besides, Mali has identified approximately 800 million tons of easily exploitable bauxite deposites with aluminium content, estimated to exceed 40 percent. Furthermore, in Mauritania exploratory surveys have indicated deposits of over 4 million tons of phosphates, over 4 million tons with a tricalcic phosphat content between 50 and 70 percent at Cive, near Kaedi.[52] It is

48. ibid. Note that it will be equipped with five 40 megawatt generators each of which yields the 200 MW.
49. OMVS. The River Senegal (Dakar, 1985) p. 7.
50. ibid. p.2. 51. See Marches Tropicaux op. cit. p.8.
52. OMVS, River Senegal (Dakar, 1979) op. cit. p. 16

imperative that both the construction of the power lines and the mining operations should be in place by the time the dam fills.

The construction of the dam commenced in September 1981. As of the end of January 1985 the work was already more than 50 percent completed with the filling of the reservoir scheduled for August 1987. With that, one of the first most expensive commonly owned project or regional infrastructure in Africa, will have been constructed. This paves the way for other infrastructure, notably, navigation infrastructure, irrigation infrastructure and power transmission infrastructure.

The foregoing arrangements, for the possible users of the power, need to be constructed immediately given the original caveats that supply may be far in excess of the possible demand for electricity in the region. One commentator notes:

> "In view of the high cost of installing and maintaining power lines and transportation losses of 13 to 14%, a distance of 300 km may be the limit for competitiveness for hydro-electric power in an African context though most experts think that supplying the two cities (Kayes and Bamako) .. with electricity can be profitable. Nevertheless, even by 1990 .. their demand will be no greater than 350 GWh, equivalent to about 44% of the Manantali project's total production".[53]

In fact, given the scenario where the two cities alone consume 44 per cent, the power may all be easily consumed, with extra demand unsatisfied if the mining operations were to be commenced. Moreover, it is already established that both, the Government of Senegal and Mauritania are keen to construct transmission lines to their respective capitals, with Mauritania particularly determined to use the power for mining of phosphates in Kaedi.

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53. Marches Tropicaux, op. cit. p. 8.

But here may also be a major test for the concept of common infrastructure. Senegal already has good indications that it would obtain finances to construct a transmission line, unilaterally and taking the shortest and most direct line from Manantali to Dakar. Mauritania for its part prefers that they both construct a common transmission line along the valley up to a location close to Kaedi or St. Louis, whence, separate national lines to the mining locations or national capitals respectively. The main reason is that Mauritania has not obtained the requisite finances, and in any case, she would find it more economical if they so jointly shared the cost of the infrastructure. Whatever is the resolution to the differences, the demand for the electricity produced at Manantali seems established and there may in fact be a need to construct the other potential sites as well.

River Navigation

To date, the land-locked Mali had to depend on favourable relations with Ivory Coast and Senegal to facilitate its international trade by overland railroad transportation. This is not only a precarious arrangement given the potential political conflicts in the region, as has been recently witnessed between Burkina Faso and Mali, but it is also expensive. Thus, Senegal River navigation is a particularly attractive option for Mali, and that can be facilitated by regulation of the river flow by the Manantali dam.

It has been determined that with a flow rate not less than 100 metres per second at Bakel, a permanent navigation between St. Louis and Kayes, a distance of 950 kilometres is guaranteed. But in fact, the design of the dam is such as to maintain the flow rate at 300 cubic metres per second, at Bakel, so as to fulfill irrigation target of 375,000 hectares, as well as to ensure the power generation at the required level.

The flow requirements for the navigation of the river are therefore amply protected. For efficient navigation it will be necessary to clear the silts as well as to construct ports of call as supplements to the main terminal ports at St. Louis and Kayes. Besides, the optimal flow rate will permit the use of vessels of increasing capacity, in order to realize increasingly reduced kilometre-ton unit costs and therefore, ensure economical transport costs.

Apart from the sea-link for Mali, the river navigation would also open up development opportunities for the resources of the region particularly in agriculture and mining. This would provide an additional linkage in integrated regional development of the basin and the contracting states.

To facilitate the sea-river approach, a navigation lock of 13x175 meter will be built alongside the left bank of the Diama dam. But arrangements for a second lock with larger dimensions is possible, should the needs expand.

Other Resource Sectors

Regulation of the flow of the Senegal, especially the very dam construction, opens up an opportunity for development in a number of resource sectors, notably fisheries, forestry and livestock productions.

Fisheries: The present flow regime of the Senegal offers significant fishing opportunities for the inhabitants. But according to the Development Coordination and Evaluation Directorate, the dams and consequent regulation of the flow, is expected to significantly change the ecology of the river and lead to a fall in the fish catch by approximately 13,000 tons per year from the normal catch average of 40,000-50,000 tons per year.[54]

54. For these see OMVS, River Senegal (Dakar, 1979) op. cit. p. 20.

The plan, however, is to compensate for that reduction by concerted effort in inland pisciculture activities in the river itself, in the Manantali reservoir, and in other lakes such as Guiers and R'kiz. Within that context, the OMVS has planned the following four components in their activities:

"- An extension of experimental pisciculture activities in irrigated parameters;

- establishment of research-development services with, in particular, a network of demonstration basins covering the entire Senegal river basin;

- strengthening of the cooperative structure through a training programme for fishermen's organizations and of support by relevant financial institutions which would facilitate access to credit for the development of fishing or conservation equipment;

- support to marketing with the opening up of lines of credit to traders in order to improve their transport and storage capacities".[55]

Thus, the fishing activities anticipated under the OMVS programmes is not confined to the Manantali dam which, it will be recalled, covers approximately 50,000 hectares. But this is nevertheless, expected to play a major role. It is also expected that in organizing the fishermen's cooperatives and the credit schemes, some priority would be placed on the 12,000 people displaced by the dam and whom, in any case, will have been settled elsewhere. In any event, the fish is expected to contribute to the nutritional needs of the region, as a development goal.

Forestry: One of the characteristics of the Sahel zone is the absence of trees and general vegetation cover, which in turn exposes the soil to the vagaries of weather and thus, cause further deterioration. Besides, forestry is required for fuel wood as well as for building purposes. To date, these uses of wood as well as severe drought have destroyed old forests.

The OMVS programme intends to undertake afforestation as a measure in environmental restoration and the focus is on sensitization to such needs. Where possible, greater emphasis will be placed on encouraging agro-forestry.

Various zones of the basin have been surveyed for their potentials.[56] The upper basin, bordering Guinea and Mali and within Mali, offer the highest forestry potentials with "wood parks" (a bush or forest type savannah), which could produce several cubic metres of wood per year. The valley and the delta zones have forest potentials consisting mainly of firewood and Gonakie fruits, as well as bark for tanning. Even though about 30,000 hectares of the areas with Gonakie would be enundated by the dams, the remaining area could actually yield 300,000 cubic metres of firewood per year, given proper husbandry. A further 20,000 hectares could be replanted with Gonakie trees and produce 200,000 cubic metres of wood per year. At any rate, it has been seen that in all, the total area of the basin suitable for intensive forestry activities is 60,000 hectares.[57]

Livestock: Stock raising is frequently combined with agriculture and in the pre-construction situation there were upto 1.2 million sedentary and nomadic cattle (about equivalent to the human population) in the basin, but in initial stages of the post-construction the stock keeping will not be encouraged by the OMVS irrigation programme because the watering will be hindered by the dikes and food supply reduced. The OMVS studies point out that with the operation towards the 375,000 hectares irrigation a number of advantages conducive to stock rearing will develop. For instance, the processing of sugar and cereals will yield by-products used as feeds; crop rotation will facilitate production of abundant forage crops; and the filling of natural depressions such as Aftout-es-Sahel, Lake R'Kiz and Lake Guiers will have positive impact on neighbouring pastures. With the encouragement of stock rearing, there would be development opportunities for the establishment of beef or leather industry. Besides,

56. Marches Tropicaux, op. cit. p. 28-29.
57. ibid

the existence of livestock also opens an avenue for use of animal manure in agriculture, which would be cheaper than the artificial fertilizers.

Some Questions of Strategy and Logistics

The OMVS has experienced several logistical problems during the organization's short but intensive operation. In this sub-section it will be sufficient to mention only three illustrative instances, with brief explanations of the nature of the problems.

Contract and Sub-contracts

The contract for the construction of the Manantali dam had been granted to a group of firms from West Germany, while a group of French firms were assigned the construction of the Diama dam. In fact, the consulting engineers also came from the same countries, for the respective dams. Thus, the top level of the construction work was given to the foreign firms, with all the financial implications.

At the 15th Meeting of the Consultative Committee it was reported that: "Concern was expressed at the highest level of OMVS at the fact that the volume of work sub-contracted to the economic operators of the OMVS member states did not exceed 2% of the amount of the Diama and Manantali contracts. Even contracts of minimum value are entrusted to foreign firms whereas the work could be well carried out by local enterprises"[58]. Presumably, the OMVS bemoaned the practice for two main reasons. First, if the contractors, earning the bulk of the cost of construction belong to a foreign firm and so too are the sub-contractors, then the money for the construction benefits the foreign country and not the recipient country, except via the dam built. This may have repugnant implications. Secondly, the local firms would be presumed to obtain a sub-contract on the basis of competence. But at the same time the sub-contract would enable a local company to gain experience in the major works, thus, promote the strengthening of local institutions for future works.

58. OMVS High Commission, "15th Meeting of the Consultative Committee: Diama and Manantali Progress Report: Introductory Note" (Dakar, October 1983) p.3. Hereinafter, "15th Consult- ... Introductory Note".

It was found, however, that even though several co-financiers actually accepted the preference that sub-contracts go to the local rather than foreign firms, such a provision was not included in the tender dossiers and therefore not taken into account. They agreed that member state economic operators should be favoured in the consideration of the sub-contracts.

It was also found that the Consulting Engineer who should protect the interests of the OMVS - the owner, actually habitually endorsed the proposals of the contractors. This mistake may have arisen from in the choice of a consulting engineer who is fundamentally "closer" to the contractor than to the owner. Finally, the Consultative Committee recommended that the consultant would consult the OMVS before giving approval to any sub-contract proposed by the contractors.

Worker benefits and Industrial Questions

A number of incidents relating to the living conditions of the workers, as well as balanced deployment from the contracting states, emerged during the construction stage. The location of the construction work is, by definition, not a settled area even if it had been settled before. Therefore, proper accommodation for the workers must be provided at the site. Moreover, it is understood that because the dam construction is a common work the contracting states should be equitably represented in the labour force thus, adding to the necessity for a workers' camp at the site for those from the various states.

Yet at the beginning of the construction of Diama dam the General Administrative Agreement was not explicit on who would be responsible for the construction of accommodation for the labourers. The Owner (OMVS) had assumed that the Contractor was responsible while the latter believed the reverse, maintaining that he was responsible only for the senior staff and foremen.

Dissatisfied with their living conditions, the labourers staged a strike during September and October 1982. And on September 19, they held a demonstration as they saw a Council of Ministers delegation visit the site.

Negotiations involving the interpretation of the Senegalese labour and urban law which were applicable to the contract did not resolve the problem before it was referred by the Contractor to the International Chamber of Commerce as was provided for in the General Administrative Agreement. After about three years of intense negotiations the matter was, however, settled out of court when the contructor accepted his obligations.

In the case of the Manantali, it was the Malian labour laws that applied. Thus, when in December 1983 the Contractor dismissed 250 Malian workers in order to allow for recruitment of workers from Mauritania and Senegal, he was required to negotiate with Malian labour officials to ensure that the relevant regulations on termination of service were adhered to.

Land Tenure Questions.

The land tenure questions in the areas of potential irrigation in the Senegal basin are too complex and broad for this paper.[59] It is sufficient to point out that in many respects, the actual tenure is inextricably tied to productivity since many farmers will see the nature of ownership and duration as providing incentive to work hard. Those who may be engaged only on temporary basis may be pre-occupied with the question of security for themselves and their descendants.

In the Senegal Valley the system for appropriation and exploitation of land is an integral part of the region's agro-pastoral system which has become destabilized by the combined effect of drought, emigration and depletion of resources. Besides the very introduction of large scale irrigation will perforce change the nature of settlement in the valley if the farmers are to transform their lifestyles and engage in intensive and commercialized agriculture.

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59. For a reasonable discussion of the question of land rights and social relationship in the valley, see OMVS, Introduction of Irrigated Agriculture in the Senegal River Basin, op. cit. pp. C.VIII. 1-33 and Diop op. cit. pp. 27-36.

V: ENVIRONMENTAL IMPLICATIONS OF THE PROJECTS

Drastic transformation of the natural environment within the Senegal drainage basin is at the core of the objectives of the OMVS. Primarily, the organization seeks to control the flow of the Senegal river to facilitate, among other things, the transfer of its water to the arid and desert-like lands and to render such lands productive. Besides, the organization seeks to create new hydro-electric power opportunities in order to activate new economic opportunities and, hopefully, to ease pressure on some of the existing energy resources. Thus, environmental implication of the projects is obviously expected.

With the foregoing postulates in mind, the questions for this section of the paper are as follows: (1) What are the salient environmental consequences which will arise from the projects? (2) Did the constituent instruments of the OMVS anticipate the adverse aspect of the changes? (3) If it did, what are the provisions for legal and institutional arrangements, in those constituent instruments for ameliorating such changes? Are there any desirable legal and institutional provisions which should have been included in the constituent instruments?

The Range of Environmental Consequences

It is suggested above, that the environmental consequences of the OMVS projects would be either positive or negative. For purposes of this discussion, it is efficient to give first, a synoptic profile of the positive impacts.

The first positive impact, which is intended, is a response to the poor and deteriorating condition of the land within the basin. The whole area is popularly known as Sahelian Africa, which is now a self-explanatory concept but the depletion of the vegetation cover has worsened in the past decade and a half as the decreasing vegetation has in turn led to the overgrazing by livestock and destruction of forests by man for fuel wood. Other climatic trends especially from early 1970's have worsened the trend, which in turn, impoverishes the soil and diminishing agricultural opportunities.

As pointed out in the projects section, it is expected that the flow control should ultimately facilitate irrigation of 375,000 hectares in the basin. The plan is that proper management should bring 255,000 hectares under irrigation by the year 2028 and thereafter save the land from further desertification.[60] This is a drastic agro-ecological change which would be expected to change settlement in the region. Besides, the agricultural activities would create new food production opportunities and therefore meet the nutritional needs of the people.

If we accept that malnutrition is a fundamental environmental problem (or a serious consequence of environmental degradation) then we should note that the OMVS studies[61] point out that the gross production from the planned agriculture by the year 2000 will result in a surplus of 112,870,000,000 calories with a possibility of the residents getting the minimum requirement of 2,300 calories per person per day. In terms of proteins production the basin developments should yield 35,940,000,000 grams per year by the year 2000. It is estimated though that if the rate of population increase is 2.3 per annum then there might be a deficit of 608,360,000,000 calories per year, which would reduce the daily average to 2034 calories per capita. In that case, the protein requirement will still be met, but the surplus would drop to about 21,240,000,000 grams per year. It is to be noted that the protein production would be expected from agriculture, livestock and fisheries.

Fodder production opportunities are expected to improve and stabilize the livestock production. In general terms, it is expected that approximately 14 percent[62] of the land scheduled for irrigation, as above, will in fact be set aside for fodder production. Thus, with the proper management and paying attention to the carrying capacity the land should maintain the livestock production without dangers of overgrazing.

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60. OMVS, Assessment of Environmental Effects of the Proposed Developments in the Senegal river Basin: Synthesis. Final Report done by Gannet Flemming Corddry and Carpenter, Inc. Harrisburg, Pa, USA in association with ORGATEC Societe Africaine d'Etudes Techniques, Dakar, Senegal, undated. (OMVS, Dakar) p. 173.
61. ibid p. 189.
62. ibid p. 174.

Forestry is also expected to expand within the basin. The OMVS estimates that the Upper Basin offers the highest forestry potentials, possibly several million cubic metres of wood per year[63], provided there is sound management practices. The study adds that although about 50 percent of the land area in the middle basin will be inundated as a result of the flow regulation, the other half, estimated at 30,000 hectares will yield equivalent of 300,000 cubic metres of firewood annually.[65] Diversified silvicultural practices could yield much more than this.

It is expected that the irrigated parameters should simply provide the nucleus for reforestration, with new forests possibly placed around or in the vicinity of the irrigated areas. Needless to say, forests have many functions of which timber for building and fuelwood are only two. Forests have the prominent environmental role in catchment conservation and as windbreak that inhibit soil erosion.

The OMVS also expects, as "fortunate symbiosis" in its development work where the forage crops is grown for the livestock, that the latter would not only produce manure to be used in production of staple foods but also to ease the demand for chemical fertilizers. Plantation of forage crops can also be alternated withthe staple crops in order to maintain soil fertility. The plans are that the forage production would average 100 to 150 tons per hectare.[66] Moreover, the needs could be balanced with those for afforestation and other competing uses of irrigated land.

Water for domestic and industrial consumption would also be increased by the dams, especially since the intrusion of salinity from the sea would be halted by Diama impoundment. Additional storage of the clean water would be enhanced by the recharge of Lac de Guiers, Lac R'Kiz and the Aftout es Sahel.

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63. OMVS, River Senegal (Dakar, OMVS, 1979) p. 16.
64. ibid.
65. Marches Tropicaux, op. cit. p.16 where the notion of "fortunate symbiosis" is used. Additionally, see OMVS, Social and economic Study of the Senegal River Basin. E.IV. op. cit. pp. 9-10.
66. OMVS, The River Senegal (Dakar, 1985). Note, however, that Marches Tropicaux op.cit. gives the estimate of population as 9-10,000 people.

The energy options will be deversified by hydro-electric power from Manantali. The possible negative environmental impacts of this power, compared to hydro-carbons, for instance, is much lower. And if it is priced reasonably, it may ease the pressure on fuel wood and therefore assist the conservation of vegetation cover.

In all, the positive environmental impacts of the OMVS projects are vast enough to have justified the investments.

The negative impacts are diverse: Some are rather obvious while others are subtle, and might even be debatable, with highly technical interpretations. Therefore, for purpose of this paper broad problems are highlighted under the following categories: (a) Land and Settlement; (b) Wildlife Displacement; (c) Public Health; (d) Coastal Erosion and Sedimentation; (e) Municipal and Industrial Pollution (including transportation).

Land and Settlement

By its definition, dam construction on a river entails backwater and inundation of land area upstream. The Manantali dam is expected to cover a total area of approximately 50,000 hectares, settled in about 15 villages with a total population estimated at 12,000[67]. The resettlement, already to be underwritten by the USAID, may be seen by some as a problem only overweighed by the fact that the new environment be the more economically productive. It is reported that to mitigate the possible adverse public health in the new settlement areas, two public health operations accompany the resettlement plans.

There will also be inundation of the land between St. Louis and Kayes where enough water is expected to facilitate navigation over the 950 kilometres distance. Approximately, 5,000 hectares of land, previously used for flood recession agriculture along the banks, will be permanently lost to inundation.[68] And more, by the year 2020 when most of the presently planned projects are to be accomplished, it is expected that a total of 359,000 hectares are expected to be lost in the Middle Valley.[69] With that will also be loss of biomass of plants and related fauna.

67. OMVS, Assessment of Environmental Effects, op. cit. p. 72.
68. ibid. p.147; 69. ibid p. 179.

Wildlife Displacement

The inundation of the land of the magnitude outlined above often entails large scale displacement of wildlife ordinarily inhabiting the areas. Studies[70] confirm that most of the wildlife in the Senegal River Belt region have been decimated over the past two centuries, largely through the destruction of the habitats by man and his livestock. That has affected the larger animals such as gazelles, antelopes and monkeys, all of which have almost disappeared from the area. Smaller animals such as jackals, rodents and cats have scarcely managed to adapt to the meagre pre-project conditions.

The inundation caused by the Diama dam is expected to lead to loss of terrestrial habitats, even though with a gain in the acquatic habitats. The total actual terrestrial habitat to be lost in the Diama zone is approximately 130-310 square kilometres hitherto designated as a habitat for terrestrial species such as warthogs, jackals, rodents and small carnivores - such as gervals, civettes and genets.[71] On the other hand, the main beneficiaries from the additional acquatic habitats are the Nile Crocodiles and the Senegal River Mantees. Of these animals, the fate of the mantees has raised international concern and studies about it is still under way.

The Manantali impoundment will affect 42,900 hectares of terrestrial habitats, which has been the home for small game ungulates such as orin, bushback and red-flanked duikers. Others which may be affected include roan antelopes, water-bucks and bohor reedbucks. The impact statements assert firmly that "most of the animals displaced by the waters of the Manantali reservoir have only a small chance of survival in the surrounding habitat...[72]

Fish species are also expected to be affected by the construction works. The impact studies[73] estimate that the estuarine species which are dependent on salinity could decrease with the harvest falling by as much as 4,000 metric tons in the Lower Delta and 7,500 metric tons in the Upper Delta. The annual fresh water harvest projected upstream is only 4,500 metric tones, leaving a net loss approximated at 7,000 metric tons.

70. ibid p. 179; 71. ibid p. 159; 72. ibid p. 181;
73. ibid.

Public Health Aspects

As pointed out already, several public health indicators will be improved by the projects of the OMVS as nutrition is improved and available public water supply enhances sanitation among the inhabitants. That notwithstanding a number of public health problems associated with disease vectors which thrive in stagnant waters will inevitably increase.[74]

It is not possible to quantify the diseases that might arise from the constructions with any accuracy. But it is expected that the vector mosquitoes will increase and consequently, malaria transmission, especially around the irrigation parameters where year-round water stagnation will be a requirement.

Similarly, schistosomiasis infection will also increase with the abundance of favourable breeding conditions in the Manantali and Middle Valley areas. Onchocerciasis, already a menace in the region will also become a serious health threat.

Finally, there is likely to be high prevalence of endemic goitre in the upper basin caused by iodine deficiency. But the impact studies point out that all the foregoing diseases are controllable and do not pose serious health problems to the inhabitants if health care programmes and health education are instituted by appropriate public agencies.

Sedimentation and Coastal Erosion

Loads of sediments arising from soil erosion on land, and carried by rivers to be deposited at sea has been recognized as the most critical marine pollution problem in Eastern Africa.[75] In the present case, the discussion surveys the situation on sediment loads carried by the Senegal River, especially in view of the intensified development activities within the basin. Thereafter, we shall turn to the question of coastal erosion.

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74. For the public health impact of the OMVS projects see ibid pp. 117-129, 191-192.

75. For discussions see Okidi, C.O. "Nairobi Convention: Conservation and Development Imperatives" in Environmental Policy and Law Vol.15, November, 1985 pp. 39-51 and Okidi, "Waste on Land -pollution at the Sea: Priorities for Action in the Eastern African Region", in The Siren (News from UNEP's Regional Seas Programme) February 1986 pp. 22-26.

The studies assessing environmental effects of the projects submit that it is almost impossible to quantitatively predict changes in sedimentation and erosion regime of a water-course like the Senegal River.[76] They add that, insufficiency of the relevant data complicates such a task and therefore only some general statements can be made on the subject.

In the Bafing River, upstream from Manantali, very little sediment load is expected, because of the low gradient of the bed. As a consequence, the bed sediment transport and deposition into the Manantali reservoir will be approximately 530,000 metric tons per year. At that rate, it is estimated that the dead storage of the Manantali reservoir would take a minimum of 450 years to fill.

But studies expect that between Bafoulabe and Bakel the increased sediment loads would be contributed by the tributaries, especially Ketion-Ko, Kolimbine, Parpara, Bekoye and Feleme rivers. On the other hand, between Bakel and Boghe, where there are no major tributaries, no major sediment loads are expected. Instead sediment deposition in the channel and sand bar development will become more pronounced as the river flow will be unable to carry the sediments supplied from upstream and from the minor tributaries.

Between Boghe and Diama the impact of the Diama dam will enhance the rate of deposition and lead to the gradual filling of the reservoir. Moreover, the flow regulation at Manantali reservoir is expected to accelerate the sedimentation in the Diama reservoir. But little change is expected in the sedimentation and erosion between Diama and St. Louis where the regulation at Diama and Manantali dams is expected to reduce the erosional and scouring activities.

Coastal erosion is raised as a question here because of the experience already obtained in the Volta river. It has been established that the construction of the Akasombo Dam, completed in 1965, reduced the flow rate into the sea thereby

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76. See OMVS, Assessment of Environmental Effects, op. cit. pp. 39-42 where the ensuing information is obtained.

allowing the force of waves and current to cause serious coastal erosion which has destroyed the town of Keta in Ghana, displacing 10,000 people; twice displaced a road; destroyed 30 to 40 hectares of palm oil plantations; and threatened the old town of Aneho with its 10,000 inhabitants.[77] In fact, commentators think that the final result of the erosion might send the whole of Togo along the road to the fabled continent of Atlantis.[78]

There are reasons for concern about possible impact of Diama Dam on the Coast. The impact studies submit that "coastal erosion and sedimentation are too complex to be predicted adequately by analytical techniques". Some preliminary estimates predict strong coastal erosion will affect upto five kilometres of the beach front south of the entry channel at an erosion rate of 200 cubic metres per metre of shoreline. Within ten to twenty years the erosion zone is expected to expand as far away as 20 kilometres from entry or the channel.

The OMVS only recognizes the lack of sufficient in-depth study of the estuarine problem and has solicited funds to facilitate the study and to identify the alternative mitigation measures. The problem exists and it has serious implications. Perhaps, this should have been anticipated.

Municipal and Industrial Wastes

Environmental problems under these categories are likely to arise from four specific sources, namely: Urban population increase; Emissions from agro-based industries; Emissions from Mining activities; and Discharges from River transportation.

Although intensified agricultural activity is expected to mitigate the rate of rural-urban migration, the populations in the Senegal basin are expected to increase dramatically over the next fifty years due to natural growth as well as population required to operate infrastructures and industries of OMVS. Urban population is expected to increase from 241,000 people in 1980 to 1,490,000 people by the year 2028.[79] This increase will automatically present the basin states with problems of waste disposal,

77. See a summary of the story in New Africa, August, 1985 p. 27.
78. ibid. 79. OMVS, Assessment of Environmental Effect, op.cit. p. 21.

water supply and housing. The easy temptation is to dump or drain the wastes into the river if no firm commitment is undertaken by the basin states. The planning for municipal development is currently the responsibility of the member states.

The use of fertilizers and pesticides seem to be another aspect of agricultural industry which carries potential problems. Fertilizers pose potential problems for both the surface and ground water resources, because of possible contamination and eutrophication. Pesticides are also potential contaminants but they pose the additional problem that since they are administered through aerial spraying they are often carried by air well beyond their target areas. An example in point is the contention by scientist Edward Wenk, that DDT residues detected in the Bay of Bengal had actually drifted from East Africa.[80]

A wide array of agriculture related industries are anticipated within the basin, for some of the industries construction and implementation have actually commenced.[81] They include rice processing and flour production which commenced in 1985 and tomato canning which commenced in 1979 and sugar cane processing which commenced in 1983. Breweries, cotton mills, edible oil refineries, fertilizer production and meat processing are yet to commence. These industries are bound to have vast loads of wastes for disposal.

Mining industries are a central consideration in the OMVS development programmes. They include copper and iron in Senegal; magnetite, iron and bauxite in Mali and copper and phosphates in Mauritania.[82] Various techniques of mining have their adverse environmental consequences to be considered. Then the disposal of tailings and other mineral wastes always presents problems, particularly for internal waters as has been the experience of Reserve Mining Company of Duluth, Minnesota which persistently released large loads, at one time 67,000 tons of taconite rocks into Lake Superior, daily, even though there was

80. See Wenk, "The physical resources of the Oceans" in Scietific American No. 221 (Sept. 1969) pp. 168-169.
81. OMVS, Assessment of Environmental Effects, op.cit.
82. See Table B.6-2 pp. 24-25 ibid.

established evidence that the rocks have carcinogenic properties.[83] Total disregard of the health implication of such discharges at national level, for lower riparians and for the ocean, could have disastrous consequences even for the OMVS itself.[84]

Apart from the solid and liquid loads mining and its related industries such as smelting often emit large gaseous wastes with significant polluting effects. Invariably the gaseous wastes, in form of sulpher and nitrogen compounds are transported by air to be deposited beyond the limits of the territory of origin. It is such problems which brought forth the celebrated Trail Smelter Arbitration[85] between Canada and the United States early in this century and the current controversy over acid rain in North America and Europe. The makings of these problems seem to prevail in the OMVS development plans and some form of express obligations by the member states seem appropriate.

River transportation as an OMVS project poses two categories of environmental problems. The first category relates to the preparation and maintenance of the navigation channels. The second category relates to the actual operation of navigation.

Preparation of the channels, particularly port development and dredging, generates wastes, especially sediments which must be disposed of properly. This could be a fairly localized problem but if released downstream such sediments would hasten the filling up of the Diama dam. Besides, the actual dredging or the sediments themselves would interfere with the living resources of the river especially fisheries and their spawning grounds.

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83. See details in Okidi, C.O. Regional Control of Ocean Pollution: Legal and Institutional Problems and Prospects (Sijthoff and Nordhoff, The Netherlands, 1978) p. 73.

84. These industries will be for the benefit of the respective states. If the wastes were to cause the Minamata kinds of problems to the citizens of a lower riparian or other coastal states the situation would be intolerable. Recall that the residents of Minamata and Nagiita in Japan suffered debilitating neurological diseases caused through eating fish contaminated with methyl mercury from Japanese industries in 1950's. The matter caused a major stire in industry-government relations and the industries were compelled to pay large compensation to the victims. For background, see ibid pp. 14, 16 and accompanying footnotes.

85. "Trail Smelter" Case is reported in United Nations, Report of International Arbitral Awards Vol.III pp. 1905-1982.

Actual navigation usually generates two major types of pollution: deliberate and accidental pollution. Deliberate pollution arises largely from discharge of bilge water or deballasting both of which have been recognised in the existing impact studies.[86] On the other hand accidental pollution may occur when the cargo-carrying vessels collapse, get into a collusion or other forms of destructive accidents. Considering that one of the central purposes of the OMVS is to provide transportation to meet all needs of the land-locked Mali as well as Upper Senegal and Mauritania, the range of substances which may be carried by the vessels is potentially very vast. Any possible spills would have serious effects on the living resources of the river, particularly fish. Additionally, the studies recognize that the pollutants would adversely affect marine birds associated with Langue de Barbaric National Park.

In summary it is emphasized that in view of the planned development work of the OMVS the potential pollution of the Senegal River is a serious problem. The experience of the Rhine in Europe is a clear example as the industries in riparian states have often found it attractive to dump waste into the river. Very often it is the massive death of fish in the river alert the riparian to pollution. Water of the river is rendered totally unusable and the Netherlands, as the lowest riparian suffering the heaviest nuisance from upstream states. Here the need for clear obligation as to the normative standards and institutional procedures for prevention of adverse environmental effects seem imperative.

The constituent Instruments and the adverse changes

By the constituent instruments of the OMVS we should refer to the two conventions signed on the 11 March 1972. One is the Convention Relative to the status of the river Senegal; the other is the Convention Establishing the Organization for the Development of the Senegal River.

The Convention establishing the OMVS did not explicitly make any provisions for the above range of environmental problems with national and international implication. On the other hand

86. OMVS, Assessment of Environmental Effects op.cit. pp.168,177.

the convention relating to the status of the Senegal River explicitly recognized the necessity to ascertain possible adverse environmental effects of the projects.

Legal and institutional provisions on environmental matters

Both of the constituent instruments were concerned primarily with utilization of the waters of the Senegal River for irrigation, navigation and hydro-electric power generation. Therefore, a concern with the adverse environmental matters discussed above, if they are there should be completely explicit and not to be confused with other provisions on water utilization.

The convention establishing the OMVS did not have such an explicit provision. The nearest it came to that is in the first paragraph of Article 15 which requires the Secretariat General to prepare and submit to the Council of Ministers, "joint programmes of study and works for coordinating development and rational exploitation of the Senegal River resources" (emphasis added). The supposition is that rational exploitation implies prevention of wastes and deleterous effects. This is in fact, tantamount to requiring the Secretariat General to conduct an impact assessment. It does not imply any obligation on the part of the OMVS or its member states to prevent adverse environmental consequences of the projects.

The same provision comes out in modified form under Article 14 in the amendments to the convention adopted on the 11 December 1979. The modification is requiring the High Commission (newly created in place of the Secretariat General) as the executive arm to collaborate with the Permanent Water Commission (la Commission Permanente des Eaux) of the Council of Ministers, to ensure that hydro-agricultural projects (or irrigation) get fair shares of the water resources. Again that does not express any rights or obligations on any of the environmental matters as discussed above.

The Convention Relating to the status of the Senegal River is relatively more explicit on environmental matters. What is true is that the central theme of the convention is uninhibited to use the river for navigation, a point which finds forceful expression in the entire convention. But Article 4 provides that:

"No project likely to sensibly change the characteristics of the river, its state and navigability, its state with regard to agricultural or industrial exploitation, quality of its waters, biological characteristics of its fauna or flora, its water level, may be executed without prior approval of the contracting states and actual justification of the consequences"[87].

The critical obligation here is the requirement for prior approval before a project is undertaken, which goes beyond the popular prior consultation. The latter is the general practice in international water law. The general understanding is that the consultations would lead to an acceptable modality in the proposed project, but it also implies the right of the proposing state to proceed with the project without express approval.

Thus, the requirement for prior approval means that a state which considers its economic or environmental interests likely to be injured by a project can actually veto the proposed project. The implication, of course, is that that once a state approves a project then it is stopped from legally complaining should it suffer economic or environmental injuries. That should then be the significant package of environmental rights and obligation in the constituent instruments of the OMVS.

Juxtaposed against the environmental problems discussed above, this provision still leaves considerable room to promote rights and obligations in environmental matters. In the first place, as it is, the provision does not provide specific machinery for assessment of the project document or to redress any disagreements in the studies. Presumably, this is left for resolution by the council of Ministers or the regular machinery for settlement of disputes under article 20 of the convention both of which are too general and politicized to deal with the technical questions. A technical machinery for the processing environmental impact assessment should be located within the OMVS and properly provided for in the constituent instruments.

87. See Boubacar op. cit., p. 8 and OMVS, River Senegal op.cit. (1979) p.9.

There are several ways of strengthening the legal obligation under the OMVS conventions on Environmental matters to ensure complete, coverage of the environmental problems discussed above. In a summary form, one may suggest the following additional provisions:

(a) It could help a complete appreciation of the rights and obligations in environmental matters if the constituent instruments had explicitly provided that the purpose of the OMVS is to ensure rational and integrated basin wide development to imply rational management of the natural resources, prevention of environmental injuries and protection of native flora and fauna, protection of public health and to ensure husbandry of the resources to ensure present development needs and the future development interests.

(b) The constituent instruments should provide that in its common work the OMVS is under obligation to ensure that its activities do not cause adverse environmental effects within the project area. Secondly, that such projects do not cause injuries in any other areas beyond the jurisdiction of the member states.

(c) There should have been an obligation to the effect that all projects conducted within the plans of the OMVS shall ensure protection of health and well-being of individuals resident within the contracting states.((Perhaps the provisions should cover individuals resident in contiguous states too).

(d) There should be provisions for administrative and judicial remedies in each of the basin states, for individuals or groups who are victims of environmental injuries arising from the OMVS projects.

(e) OMVS member states should adopt the standards for the prevention of pollution from ships as well as for dumping of wastes to the navigation of the Senegal River. Respectively, there are standards under the 1973 international convention for the prevention of pollution from ships together with its 1978 Protocol, and the 1972 London Convention on Dumping of Wastes and other matter, both of which provide basic global standards.

These provisions could strengthen the work of the OMVS and promote rational and integrated management of the natural resources of the basin. As it is the OMVS has definitely, shown consciousness to environmental imperatives in its work by conducting assessment of environmental effects of the development projects - which are cited in the present discussion. These studies have, moreover, shown the mitigating measures against every one of the environmental problems indicated. In fact, it was learned during this study that the Republic of Senegal at one point stopped the use of Taiba Flintstone as concrete and aggregate for the Diama impoundment because of the environmental impacts of that excavation. They show an acute sensitivity to environmental exigencies regardless of the implications for the rate of dam construction. But that kind of policy consciousness should have been backed by broader obligations for environmental protection in the constituent instruments or later in a protocol or additional convention.

(f) One further critical environmental question relates to insurance of the main source of the water for the Senegal in Fouta Dhallon mountains. The critical Manantali project relies on the waters from the greater water tank of West Africa in Fouta Djallon highlands located largely in Guinea. Yet the concern of the OMVS seems to end with Manantali, neglecting the question of conservation of the catchment area of the Fouta Djallon.

Granted that Guinea is not a member of the OMVS and therefore the conservation of that source of water cannot be an entirely OMVS affair. But in fact, that should be the more important reason why officially, the OMVS should adopt specific procedures for negotiating the security of that water and even participating with costs, in the conservation of the source of the resource, without which conceptions of OMVS projects would be totally altered.

A project for the integrated development of the Fouta Djallon Highlands was initiated in 1979 as a collaborative effort of the OAU, UNDP, UNSO, UNESCO, FAO, WMO and the government of Guinea. It is the unique environmental problem in Africa

where the OAU has assumed the role of coordinator.[88]

During discussions with the officials of the OMVS and OMVG in Dakar it was revealed that only the OMVG has initiated some consultations with the Fouta Djallon project towards substantive collaboration, possibly with a budgetary input. In fact the Fouta Djallon project has taken into account the work of the OMVG cover about 12,000 square kilometres of the Fouta Djallon massif and that this describes the area of possible collaboration between two projects to avoid duplication.

It seems imperative that the OMVS should formally enter into an agreement with the Fouta Djallon project, and perhaps the Government of Guinea over modalities for OMVS contribution to the conservation measures and integrated development of the source of water for the OMVS project.

(g) The machinery for the settlement of disputes should be more clearly articulated. The questions of integrated management of drainage basins for development will be a unique subject requiring examination by a uniquely selected set of experts. Such a panel should be made up of persons who are versed in the intricate management questions of drainage basins and to adopt more of the consensual rather than adversary approach in their deliberations.

(h) As a back up to the foregoing procedure for settlement of disputes there should be a provision for ultimate resort to an Arbitral or Judicial machineries if the consensual machinery fails. Most polities would prefer an arbitral procedure rather than the International Court of Justice because of the flexibility offered by the former in selection of the jurists as well as procedural and substantive provisions which might be stipulated in the compromise.

The very fact that there is provision for possible resort to this procedure entailing binding decisions might, in fact, induce the states concerned to make the first consensual procedure

88. The involvement of the OAU in the Fouta Djallon project started with the Council of Ministers' Resolution CM/Res 756 (XXXIIIO Rev.1 on the Biological Development of the Fouta Djallon Mountain adopted in Monrovia in July 1979 and Council of Ministers' Resolution CM/Res.811 (XXXV) on Integrated Development Project for the Fouta Djallon Highlands adopted at Freetown in June 1980.

effective.

(i) The package as above should clearly stipulate the duration within which, if the consensual procedure fails then one or both of the parties may take the matter to the arbitral or judicial machinery. The shorter that duration the better. Environmental problems, by their nature, may reach irriversible or highly detrimental proportions if the problems are not resolved quickly. There is no magical number, but a maximum of twenty-four months should be reasonable.

VI. FINANCIAL RESOURCES FOR THE OMVS PROJECTS

The financial requirements for the integrated Management and development in the drainage basins is invariably enormous and the return to the investments have long gestation periods. These factors account for the scantiness of the resources for these projects and the fact that government guarantees are essential for the procurement of such funds.[89] In fact this well accounts in part, for the fact that African states have not commenced active management of the vast energy and water resource potentials in the continent.

The OMVS has gone the farthest in all African attempts at drainage basin management. This section will briefly discuss the arrangement for financing common works as adopted under the OMVS subsidiary convention adopted for the purpose in May 1982. Secondly, we shall briefly look at the sources and amounts of money already committed to the OMVS. Thirdly, some intractable investment sectors will be outlined. Finally, a few points of conditions for easing problems of development will be highlighted.

One of the central problems inhibiting integrated drainage basin management within the framework of a regional authority is that most prospective donors are unwilling to put money into actual investment by the authority. This position held forcefully by the United States prefers bilateral financial arrangements with individual states rather than organization. Yet in most cases, the key projects such as dams or navigational channels

89. See more discussion in Okidi, C.O. "The role of the State in the Management of International River and Lake Basins in Africa" May 1986, 30 pages being a manuscript prepared in this study series.

and ports are projects of regional character often for common benefit by all the basin states.

For these reasons the OMVS member states concluded on the one hand the Convention Relating to the Legal status of Common Works on December 12, 1978. That convention was discussed in Section III above. It will be recalled that under Article 3 that convention identified the common works or projects to include: The Manantali Dam; the Diama Dam, the Sea-River Port at Saint Louis; the River Port at Kayes; the ports of call and management of the navigable channels; and assessories or annex to the foregoing projects.

Thereafter, the contracting parties adopted a new convention on Financial Arrangements for common projects on 12th May 1982. By Title II, Article 2 of the convention sources of finance for common projects were identified as follows:

(a) Contributions made by member states
(b) Loans contracted by the states but ceded to the OMVS
(c) Subventions, grants and payments, including technical assistance
(d) Loans contracted by the OMVS with or without guarantee by the member states.

Even though the High Commissioner is recognised by the convention as the principal administrator of the projects, and also empowered to negotiate and contract loans on behalf of the OMVS, Article 4 of the 1982 convention requires that all the loan contracts must be submitted to the Council of Ministers for vetting and approval. Where the financier requires guarantees by one or more member states such a condition must be stipulated in the memorandum to the council of Ministers. In any case, the member state would be expected to give its guarantee in direct proportion to its participation in the project. (Article 8) In each case, the guarantors are individually responsible for all appropriate measures to repay the principal sum, interest or service charges.

Where the money raised is insufficient to meet the cost of the respective common project then the co-guarantors are required to make up for the difference, but only in direct

proportion to their participation in the project. The money paid is considered simply as an advance payment to the organization, to be reimbursed to the respective co-guarantors when the funds become available.

It should be noted that, in actual practice only the West German Agency, KFW, has extended loan directly to the OMVS, with the guarantee by the member states. The other financiers have opted to deal directly with the member states.

The critical question of cost sharing for the common works was resolved through a study financed by the United States Agency for International Development (USAID) and conducted by Utah State University through a grant of US$ 640,000.[90] The complex study based on computer model of indeces of benefit from OMVS projects came up with ratios which were adopted by the council of Ministers on May 6, 1981 as follows:[91]

Mali	36.95%
Mauritania	16.69%
Senegal	46.36%

The share of responsibility of each state may be adjusted by the council of Ministers, on request by any state. But each amount assessed before such an agreement remains valid and binding on the respective states. On the other hand, if the Council of Ministers is unable to agree on the scope of adjustment, then the matter is forwarded to the Assembly of Heads of State for resolution. The OMVS advises the financiers of the changes accordingly.

The financial needs of the OMVS cannot be determined with any precision because of the changing costs and evolution of projects and their follow up constructions. For Diama and Manantali Dams alone, the UNDP was able to compile the following commitments by the beginning of 1984 (reflecting situation by mid 1982):

90. USAID, OMVS Fiscal Allocation Responsibility, Data and Institutional Development (Dakar: USAID/Senegal Project No.625-0620A 1982).

91. Resolution No.143/CM/SN/D of 6th 1981 is cited by Boubacar op.cit. p. 35. It is understood that the model was to undergo additional refinement.

Source	Total in 000s of US$	Diama	Reserve	Manantali
Saudi Arabia	150,000	28,478	-	121,522
Kuwait	100,000	15,000	1,000	84,000
West Germany	87,268	-	-	87,268
France	69,972	63,987	-	5,985
ADB/ADF	61,480	22,040	7,060	32,390
Abu Dhabi	70,000	14,167	-	55,833
Italy	38,000	-	-	38,000
European Dev. Fund	88,725	11,540	3,072	74,113
Islamic Dev. Bank	20,000	-	-	20,000
Canada	21,158	-	-	21,000
USAID (Resettlement only)	10,000	-	-	10,000
Iraq[+]	40,000	-	20,000	20,000
Iran	4,000	-	4,000	-
UNDP[++]	10,000	1,150	6,790	2,060
Member States	51,213	-	51,213	-
	821,816	156,362	93,135	572,319

[+] Note, however, that implementation of the contribution of Iraq was suspended in 1983 because of the war situation at home.

[++] UNDP amounts include regional as well as national IPF contributions.

In all, the above amount equalled 99 percent of the needs for the two dams. Obviously, then the actual amount is slightly over one billion dollars for the two dams and immediately related works.

Except for the USAID and the UNDP the other contributions are in form of loans with periods of grace, maturity and interest rates not reflected above.

The construction of Diama Dam was done by French firms while that of Manantali was by German firms. As will be recalled from the discussions on projects above, these firms tended to sub-contract, where necessary to firms from their homes of origin. This implies that most of the funds raised for the projects were immediately paid outside of the contracting states,

particularly to France and the Federal Republic of Germany. (Perhaps France and Germany should have made higher contributions to the two projects!) This fact might have significant implications for attitudes of the other states contributing to the projects. But in fact, it has far-reaching implications for the OMVS states who have to repay the loans since the money does not get a chance to circulate in their national economies, yet the gestation of the investment in the dams will take a long time before economic returns are realized. The consequence is that the states have to seek funds from elsewhere to repay the loan, a matter which means heavy burdens for the economy.

It is for this reason that some observers have mentioned that large scale river and lake basin development actually lead to economic disasters for the states involved.[92] They argue that it is not possible in a situation like Senegal to speak of agricultural output as a source of the financial requirements for loan repayment.

For hydro-electric power observers from the energy industry submit that the necessarily huge per capita investments for the large dams make their economy rationality doubtful. According to Olorunfemi and Ogunsola,[93] the unit cost factor for large dams is US$ 1,100 per KW, while the figure may reach US$ 3,000 per KW for small dams. They add that although hydro-power schemes have the advantage of serving multiple objectives, to include irrigation and flood control, its development is often hampered by costs.

Be that as it may, it seems imperative in the OMVS context that the members must move fast towards intensified agricultural productivity as well as use of hydro-power in industry and mining if they are to avoid being overwhelmed by the loan repayments.

92. See extensive arguments by Tetteh A. Kofi, "Economics of Capital Intensive River and Lake Basin Development projects and Underdevelopment in West Africa" a paper presented at a Seminar on river and Lake Basins Development in West Africa, organized by IDEP/ECA (in collaboration with OMVS) in Dakar, Senegal 25-26 June 1986.
93. Olorunfemi, M.A. and O.O. Ogunsola both of Nigerian National Petroleum Corporation, Lagos, presented a paper entitled "Prospectives and Prospects for Self Reliance in Energy" at the International Economic Association Conference in Addis Ababa, Ethiopia 26-30 July 1983. see p. 6.

In concluding this section, here below are some intractable considerations which need attention in the budget preparations.

First, the two dams have now been completed. Very soon the operational and maintenance costs will emerge. Presumably these could initially be funded from that amount held as "Reserve". But that can only be a short term measure. Resources for this problem must be sought urgently, just as resources for hydropower production and transportation system will have to be found.

Secondly, training and manpower development for the OMVS administrative and productive institutions will be done in earnest. This is not reflected in the above amounts. Building of local institutions is a prerequisite as well as an indicator of development and these African countries should not build the massive infrastructure and expect to depend on expatriates to operate it. These countries must, in fact, try to avoid such dependency because no country has ever realized development while wholly depending on foreign manpower. The interviews with officials of OMVS in June 1984 revealed that very little was actually being done in the area of manpower development even though institutionally their awareness of the need is evidenced by creation of a division for human resources development.

Thirdly, it is often the case that when financial resources are scarce environmental concerns tend to be relegated. The section on environmental implications highlighted some of the possible environmental problems for which mitigating measures require full budgetary considerations. If these steps are not taken, then development goals in plan might be totally undermined by the adverse environmental factors. Just see the problems discussed above.

Finally, research and development require major budgetary allocations. With research in agronomy, acquaculture, silviculture, energy options and public health, most of the development programmes will fail. But research and development is expensive and it requires impeccable commitment.

VII. CONCLUSIONS

The tottering conditions of the economies of most of the African countries has forcefully justified concerted efforts at integrated management of the African drainage basins in an effort to boost the performance in the agricultural and industrial sectors.[94] The assumption in this respect is that persistent and widespread drought as well as the high cost of imported conventional energy resources have exacerbated the already underdeveloped economies. Therefore, integrated management must entail, fundamentally, the regulation of the flow of the rivers to facilitate, on the one hand, irrigated agriculture, and on the other, production of hydro-electric power as a reliable source of energy. It is presumed that with the cheap indigenous source of energy and agricultural output the countries would have basic resources to prop up their socio-economic development through food self-sufficiency and industrialization.

The study of the OMVS development programmes show a remarkable level of programming for irrigated agriculture, hydro-electric power production, navigation for transportation, livestock production, fisheries, mining, forestry and general industrialization. But the history of the evolution of the OMVS also shows a great deal of learning experience which started during the last century, both for national level initiatives and attempts at international co-operation. In fact, one cannot help wondering why despite repeated history of drought in this Sahelian zone the culture of irrigated agriculture never caught on here the way it did in Egypt, Sudan and Madagascar in Africa. Somehow the efforts to cultivate public and private initiatives in irrigated agriculture show a rather dismal record of performance. The irrigation development institutions such as SAED in Senegal, SONADER in Mauritania and OVSTM in Mali have in the past performed poorly as they remain remote from the farmers and insensitive to the needs

94. That the economies of the majority of African countries are tottering is evidenced by distressing decision to convene the special session of the U.N. General Assembly in May 1986 to discuss Africa's Economic crisis. A summary of the relevant resource and development potentials of the international drainage basins in Africa is given by Okidi, "The Role of the State in the Management of International River and Lake Basins in Africa" op. cit.

and exigencies of the farming communities. Their staff members have apparently heeded the political support behind their appointments rather than commitment to excellence in their field work. The recent OMVS studies of social and economic requirements for organization of the system of production have recognized the past weaknesses. And here seems to lie the strongest challenge to the OMVS under the present programmes.

The challenge in the area of hydro-electric energy production and utilization depends largely in the preparedness in the areas of industrialization and mining. Several critical observers suggest that OMVS kind of energy plans are bound to plunge the economies of the member states into a disaster because the unit cost of the investment is so high that repayment of the loans is prohibitive. It is hypothesized though, that if mining and industrial utilization of the energy are intensified from the start of power production then the users are likely to pay the loans at accessible rates. The tragedy might only arise if the range of consumers is limited, with a heavy reliance on the domestic or municipal power supplies. Then the tariffs would be so high that it would be non-developmental. Additionally, the mining or industrial power consumers are only well off if the tariffs are accessible and therefore developmental. This is the reason why such users should be diverse and all ready by the time production commences so that they take advantage of the grace periods allowed before loan repayment. Whatever is the case, all these arrangements require professional discipline and commitment among the employees of the OMVS. Whether these qualities will exist is still to be seen.,

The evolution of the legal and institutional arrangements upto the creation of the OMVS offers a vast lesson for other African basins. It is clear that despite the long history in the arrangements for the Senegal basin, the member states still had several after-thoughts following the adoption of the OMVS Convention in March 1972. This is evidenced by the number of amendments adopted thereafter. It is also evidenced by the realization that they needed a convention on the legal status of their common projects and later, a convention on the financial arrangements for such works. For purposes of actual development projects

future drainage basin organizations in Africa have a great deal to learn from the evolution of the legal and institutional regime developed by the OMVS states.

Of course, within that context there are such anomalies as the absence of Guinea from the organization. Guinea would be a significant partner partly, because it would give effect to the aspiration of the OMVS statesto deal with the entire Senegal basin as a Unit, and partly because the Fouta Djallon highlands as a catchment area, is the source of water on which most of the OMVS projects rely. In fact, non-participation of Guinea might have led OMVS to ignore the question of conservation of Fouta Djallon highlands even though OAU - coordinated project for integrated development of the range has actually been in process since 1979. On the whole it seems that failure to either include the Fouta Djallon conservation in its constituent instruments as an imperative, or to include it in their subsequent development programmes is simply part of the broader consideration of vital environmental matters in the constituent instruments of the OMVS.

To their credit, the OMVS states took into account the necessity to do an assessment of the environmental impact of the development projects. That is expressed in practice. But constituent instruments never provided any obligations of the states to prevent environmental injuries that might result from agricultural, industrial or mining activities. Nor yet did the instruments provide for institutional machineries for determining the completeness or resolution of any negative impacts which might be assessed. This situation suggests that even the impact assessment required by the Convention Relating to the Legal Status of the Senegal River is more of a gesture than a matter of seriousness. The discussions above have suggested some of the necessary principles which would be desirable in international river basin conventions. These include, inter alia, an expressed principle that an integrated management of a drainage basin for development entails sustainable utilization of the resources; that the organization and the contracting states shall undertake to prevent their activities from causing deleterious environmental effects anywhere; and provision for administrative and legal remedies for states and citizens to obtain redress for any

environmental injuries. At the international level the machinery for settlement of disputes should combine a technical panel taking the consensual approach in conciliation with an arbitral or judicial machinery should the former fail after a stipulated duration.

It is argued here that failure to include those restraints in the convention and in practice might lead to negation of some fundamental development goals.

Promotion of development includes provision of safe drinking water, safe food resources for nutrition; conservation of soil with its fertility to support agriculture; protection of public health ensuring productive population; and protection of the diversity of natural resources which support social and industrial development.

Only the experience with actual implementation will confirm if the legal instruments are themselves complete enough for development purposes of the OMVS. The history of efforts by the OMVS states already suggest that it is important that in these formative stages, African countries should as far as possible confine themselves to the technical problems of socio-economic development in drainage basin management. Attempts to include broader questions of political integration as was included in the OERS seem rather treacherous. The experience of the OERS also confirms that programmes on drainage basin management are susceptible to interruption by totally extreneous issues: The coup d'etat against Madeibo Keita in Mali did upset Sekou Toure to the total detriment of the development programmes of the OERS.[95]

95. African countries do not seem to run out of such political problems especially those relating to irridentist movements. On the one hand, the African states condemn colonialists for having artificially parcelled out the continet to suit their needs - almost as if the leaders would like to reunite Africa On the other hand they legally adhere to the doctrine of uti possidetis which means that the boundaries must remain where they were at the time of independence. The recent open conflicts between Mali and Burkina Faso do not augur well for the future of technical and development cooperation in the region. Fortunately, both States have accepted the solution given in the ICJ decision in December 1986.

In the case of the OMVS, the member states need a clear resolve to deploy personnel on the basis of competence, allocate sufficient resources and to insist that employees retain positions only on the basis of proven record of productivity, acccuntability, commitment and integrity. It would be a rather expensive mockery now if the programmes were to fail.

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