

THE STATE AND MANAGEMENT OF INTERNATIONAL  
DRAINAGE BASINS IN AFRICA\*\*

By

C.O. Okidi  
Institute for Development Studies  
University of Nairobi

INTRODUCTION

Rivers or lakes are considered to be international if their surface settings traverse the territories of two or more states. In the case of a river it may form whole or part of the boundary of two or more states; alternatively, it may flow successively, through two or more states; some situations present a combination of both. In the case of a lake, it may actually be shared by two or more states. Thus, rivers or lakes as such are distinguishable from the concept of drainage basin, where the latter is broader, constituting the entire catchment area which contributes both the surface and ground water towards a common terminus.

There are about fifty-four international rivers and lakes in Africa. Out of that total, eleven drain the territories of four or more states, with the largest number of states drained by any one river being ten. Nineteen basins drain an area of more than 100,000 km, and in all, the area drained by these international rivers and lakes is about half of the total area of the continent.<sup>1</sup> This is certainly, a network of water systems of considerable magnitude in this vast continent.

There have been attempts to organize the basin states towards the management of the water systems. The current institutions for such

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purposes include: Niger Basin Authority (NBA), Organization for the Management of Senegal Basin (OMVS), Organization for the Management of Gambia Basin (OMVG), Kagera Basin Organization (KBO), Chad Basin Commission (CBO), and the Permanent Joint Technical Committee (PJTC), between Egypt and Sudan on the Nile Waters. Currently, the United Nations Environment Programme (UNEP), under its programme for environmentally sound management of inland waters (EMINWA) is initiating an integrated regional development programme for the Zambezi River, later to be followed by Lake Tanganyika.

The purpose of the present paper is not to review the management regimes of these organizations. Rather, it will examine some of the macropolicy questions of state involvement in actual management and utilization of the waters of any basin in Africa. The paper will take up selected issues and concepts and point to experiences with the utilization of river waters for the promotion of socio-economic goals at national or regional levels. In other words, the paper takes the position that whether the management and utilization of the water is done within the national or regional framework, the role of the state will evince certain common conditions. Thus the net results are similar when looked at from the perspective of promoting the socio-economic well-being of the human population.

To set the stage for the discussion, the paper will begin with a brief outline of the significance or justification of the management of water resources on a basin-wide basis. Secondly, it will outline some of the justifications for state involvement in the management of such basin waters. In the process, we should see some of the salient activities which the state is to be expected to perform. Thirdly, despite the imperatives of state involvement, there are a number of drawbacks in the state performing these roles. The next part of the paper is intended to outline some of such caveats, posed as criticisms. It is expected that the discussion should automatically suggest the

limitations to state involvement in management. Such caveats should by themselves suggest themes for social science research on improving the efficiency of managing drainage basins.

#### I. THE SIGNIFICANCE OF BASIN-WIDE MANAGEMENT

The area of Africa which is covered by the reticulation of rivers and lake basins, as mentioned above, is about one half of the total area of the continent. But in discussing the rivers and lakes the factor of interest is actually the water which they carry, and what could actually be done with the available volume of water in the pursuit of development goals. That point leads us to some of the most critical socio-economic policy questions which Africa has faced in recent times, particularly since the early 1970's. Some of these policy questions might be alleviated by proper management of water resources.

Ordinarily, supplying water to safeguard public health is considered the most pervasive socio-economic use of water. Some might also mention the use of water in industries and even water transport. All of these can benefit from the availability of bodies of water in Africa.

But in actual fact two of the most critical uses of water that have relevance for the problems of the 1970's and 80's are in agriculture, for food production, and for hydroelectric power generation. These are the two most dreaded problems of African economic development and growth in the last decade and a half. Drought (defined as absence of rainwater) is considered as having led to devastating famines and loss of human and animal life in Africa in the 1980's. No single problem since colonization has ever mobilized an equal amount of international attention towards Africa as the emergency operation to deal with famine. The underlying supposition is that Africa has not had enough water for agricultural food production.<sup>2</sup>

The second critical problem for the majority of African countries during that period was low production of indigenous energy, where most of them have relied heavily on hydrocarbons. It is maintained that the second villain in the poor performance of African economies has been the prices of the hydrocarbons which were increased by members of the Organization of Petroleum Exporting Countries (OPEC) since the so-called oil embargo which commenced in 1973. The basic argument in that context is that the countries relied principally on the expensive imported hydrocarbons to fuel their industries, transportation, and domestic/urban operations.

Surely, the two problems could impede operation of the economies of African countries, if there were no alternatives to evenly distributed rainfall, and no other sources of energy than hydrocarbons. But is that firmly the case? The volume of surface water available is readily suggested by the reticulation of rivers and lakes as discussed above. The estimates of the actual volume cannot be precise. However, K.V. Krishnamurthy, who worked for the U.N. Economic Commission for Africa in water resources matters, has offered the following data:

"Estimates of Africa's total water resources vary from 3,400 billion m<sup>3</sup> of water to 4,600 billion m<sup>3</sup>. An analysis of the measured streamflow in African rivers indicates that the total quantity of surface water in Africa's rivers and lakes is in order of 2,480 billion m<sup>3</sup>, the difference between this and the aforementioned estimates being a measure of ground water resources. More than 50% of the total water resources of the continent are in one single river basin, Congo/Zaire basin (1,325 billion m<sup>3</sup>) and another 25% in seven other river basins such as Niger (200 billion), the Ogooue (149 billion in Gabon), the Zambezi (104 at C. Ana), the Nile (84 billion), the Sanage (Cameroon, 165 billion), the Chari-Logone (Chad, 43 billion) and the Volta (40 billion)"<sup>3</sup>.

The study adds in the same page that the actual total water utilization in Africa was about 90 billion cu m., which represents about only 2% of the surface and ground water resources in the continent. That is to say, about 95 to 98% of the African water resources is at

present flowing only to replenish the ocean waters, but not put to any productive use by Africa. Non-hydrologists might not clearly imagine the magnitude involved, but Krishnamurthy, as a hydrologist, concludes that this is a colossal underutilization of Africa's water resources and calls for immediate redress.<sup>4</sup> One must conclude, that the problem for Africa is not scarcity of water resources. That abundant water may only be said to be unevenly distributed by seasons and locations. To use it in agriculture dependably would seem to require flow control and redistribution.

How about hydroelectric power as a source of energy in Africa? Again Krishnamurthy<sup>5</sup> reports that in relative terms, one third of the world's potential hydropower is in Africa and that the per capita potential in Africa is more than three times the world average. He adds that despite that high potential, the installed capacity of hydroelectric power in Africa is only 5.6% of the total, and that the ratio of energy generation to the exploitable potential is only 2%. The relative figures are indicated in the table below:

Table 1: Hydropower Potentials in Africa.

| Item   | Africa  | World   | Africa' share of world total (%) |
|--|---------|---------|----------------------------------|
| 1. Potential hydro capacity (MW)                         | 200,000 | 565,000 | 35.4                             |
| Installed capacity (MW)                                  |         |         |                                  |
| 1974   | 9,050   | 340,000 | 2.7                              |
| 1975   | 11,250  | -       | -                                |
| 2. Percentage of installed to potential hydro capacity   |         |         |                                  |
| 1975   | 5.6     | -       | -                                |
| 3. Hydro-potential (billions of kWh)                     |         |         |                                  |
| Theoretical  | 2,690   | 6,540   | 41                               |
| Exploitable  | 1,630   | 5,000   | 33                               |
| 4. Hydropower generation in 1974 (billions of kWh)       | 34      | 1,433   | 2.4                              |
| 5. Percentage of generation to the exploitable potential | 2       | 30      | 7                                |

Source: UNECA. 1976. Problems of Water Resources Development in Africa E/CN.14/NRD/WR/2/Rev.2 p.28.

Even though the above data are only subject to detailed appreciation by an engineer, the point is made that while Africa has a large share of the world total hydroelectric power it is using very little of it, having installed only 5.6%. And this power, which is indigenous to the continent, might in fact, be less costly than the energy from hydrocarbons. The task for Africa may be to consider hydroelectric power generation as an integral part, if not the incentive, for multipurpose water resources development in Africa. And it is conceivable that hydropower might enhance the use of the water resources in agriculture in order to get Africa towards socio-economic normality.

But back to water and agricultural productivity: It should be clarified that apart from water, land is indispensable for agricultural productivity. The question might be asked whether Africa has sufficient cultivable land, even if it has the water. Not so: Professor Odero-Ogwell,<sup>6</sup> then Secretary to the United Nations World Food Council, wrote in 1982 that Africa's agricultural land potential is immense and that land was certainly not a constraint. That Africa's potential compares favourably with other regions, he says, is suggested by the following table.<sup>7</sup>

Table 2: Comparative Land Potentials

| Region         | Potentially cultivable (m ha) | Presently cultivated arable area (m ha) | Present cultivated (%) | Average period (yrs) |
|----------------|-------------------------------|---|------------------------|----------------------|
| Africa         | 803.7                         | 193.7                                   | 24                     | 3                    |
| Southwest Asia | 46.0                          | 50.9                                    | 110                    | 2                    |
| Southeast Asia | 324.8                         | 270.5                                   | 83                     | 3                    |
| South America  | 814.9                         | 85.2                                    | 10                     | 4                    |

If both water and land are actually available within the continent then the constraint to agricultural productivity (leading, in large

measure, to the crisis) must lie elsewhere. In the paper under reference, Professor Odero-Ogwell points to the failure to adopt technological packages in agriculture as one of the bottlenecks. One instance which he raises is that in Africa in 1977, only 1.8% of the cultivated land was irrigated, compared to 28% in Asia and 6.1% in Latin America.<sup>8</sup>

This, in fact, may point to one of Africa's critical problems in agricultural productivity: There is plenty of water and land but it is all unevenly distributed and the water is not managed, controlled and transferred to the appropriate land for agricultural productivity. Other factors such as trained manpower, implements and fertilizers may also be lacking in the African agriculture, as is discussed later in this paper. However, failure to manage and control water, already demonstrated to be available in large quantities, is clearly a central constraint. Therefore, the necessity for the management and control of water resources in the lakes and rivers in Africa seems well demonstrated, as is also the necessity for adoption of various requisite technological packages.

Reference is made here only to the requisite technological packages because the African farmer does not have to adopt all the packages peddled in the market. The challenge to the researchers is to ascertain the packages most suitable to the African farmer and how the information should appropriately be communicated to the farmers. In fact, the problem may not be that the African farmer is not receptive to the technological packages. Rather it may be that the large number of over-zealous donors and advisors have either over-killed the projects or they have confused rather than advised the farmers. In the process they may destroy the sense of initiative or failed to establish the demonstration effect in the farmers, and therefore leaving behind no compelling incentives for the farmers to engage in such arduous tasks as irrigation.

Both use of water for irrigation and hydroelectric power generation require control of the river water through damming. They require change in the flow regime. But while harnessing the river water for hydropower changes only the flow regime of the river, extraction of the river or lake water for purposes of irrigation reduces the quantity. Indeed, irrigation is the most voracious of all quantitative uses of water resources.

Change of the flow regime alone may mean that the water does not reach the lower riparian users in the quantities and at the same time as under the natural flow regime. However, the same volume of water finally gets there. Thus, this may offer only a limited basis for complaint by a lower riparian against an upper one, provided that it can be demonstrated that the natural flow regime is restored by the point where the river enters the territory of the lower one.<sup>9</sup> Thus, a complaint or a claim may be legitimate if the flow is disrupted to the detriment of existing use of water in the lower riparian.

On the other hand, irrigation will of necessity diminish the quantity of water reaching the lower riparian. For ongoing projects in the lower riparian states, the consequences of a sudden interruption in the quantity of water could be disastrous. It may also be fatal for any projects planned for the future.

In any case, damming of a river usually has consequences even for the upper riparian states. The most notorious problem is the backwater effect, resulting in the displacement and resettlement of the population residing within certain reaches of the river. Examples of this problem are legion, but one of the better known instances was the construction of the High Aswan Dam. This dam with a height of 100 metres, was to extend to nearly 700 kilometers upstream with 250 km out of that being in Sudanese territory and affecting the settlement at Wadi Halfa. Fortunately, there was a longstanding framework of consultation available between the two countries,



within which they could resolve the issue.

More recently the backwater effect of the proposed Rusumo Dam on the Kagera River led to tough negotiations among the members of Kagera Basin Organization (KBO) because of its anticipated impact on the settled areas in the densely populated Rwanda and Burundi. The elevation of the dam would be in direct proportion to possible hydropower production at other sites such as Kakono and Kishanda, apart from the high power production at Rusumo itself. But the point is illustrated by showing the various proposed elevations at Rusumo and the possible power production there, as juxtaposed against the areas of the territories to be submerged by the dam and the population to be displaced, as in Tables 2 to 4 below:<sup>10</sup>

Table 3: Variants of Power Linked to Water Surface Elevation at Rusumo Dam

|                       | Installed Power<br>(MW) | Guaranteed Output<br>(GWh/year) | Inter-annual Output<br>(GWh/year) |
|-----------------------|-------------------------|---------------------------------|-----------------------------------|
| 1. Rusumo 1345 metres | 129                     | 535                             | 597                               |
| Kishanda              | 214                     | 1,026                           | 1,125                             |
| Kakono                | 57                      | 259                             | 301                               |
| Total                 | 400                     | 1,820                           | 2,023                             |
| 2. Rusumo 1335 metres | 105                     | 410                             | 480                               |
| Kishanda              | 210                     | 820                             | 1,102                             |
| Kakono                | 54                      | 207                             | 286                               |
| Total                 | 369                     | 1,437                           | 1,868                             |
| 3. Rusumo 1325        | 80                      | 270                             | 374                               |
| Kishanda              | 207                     | 500                             | 1,082                             |
| Kakono                | 53                      | 126                             | 277                               |
| Total                 | 340                     | 896                             | 1,733                             |

Table 4: Land Areas Likely to be Submerged by the Dam at Different Levels<sup>1</sup>

| Water Level | Total surface area submerged <sup>(2)</sup> |           |                      | Usable surface area submerged |          |           |
|-------------|---|-----------|----------------------|-------------------------------|----------|-----------|
|             | Rwanda                                      | Burundi   | Total <sup>(3)</sup> | Rwanda                        | Burundi  | Total     |
| 1,345       | 52,000 ha                                   | 11,000 ha | 63,000 ha            | 17,240 ha                     | 5,600 ha | 22,840 ha |
| 1,335       | 33,000 ha                                   | 9,000 ha  | 42,000 ha            | 8,180 ha                      | 3,210 ha | 11,390 ha |
| 1,325       | 20,500 ha                                   | 6,000 ha  | 26,500 ha            | 2,510 ha                      | 1,220 ha | 3,730 ha  |

- 1) These areas correspond to the normal water levels plus an additional 3m
- 2) Not including permanent areas of water (lakes, ponds..) already existing.
- 3) The area to be submerged is not included in these figures.

Table 5: The Number of People to be Moved and Resettled as a Consequence of Backwater at Different Elevations

| Water Level | Number of Inhabitants Affected |         |        |
|-------------|--------------------------------|---------|--------|
|             | Rwanda                         | Burundi | Total  |
| 1,345       | 22,975                         | 2,975   | 25,950 |
| 1,335       | 10,445                         | 1,610   | 12,055 |
| 1,325       | 2,220                          | 535     | 2,755  |

A number of points are illustrated by the foregoing data: They show that the power output is highest at the highest elevation at Rusumo, which is 1,345 metres, for all the proposed sites. The converse is true at the lowest elevation which is 1,325 metres. Correspondingly, the higher the level of the dam, the larger the backwater effect and therefore, the submerged area of land in Rwanda and Burundi. The additional consequence is the number of people to be displaced and settled where the total is 25,950 and 2,755 for 1,345 metres and 1,325 metres, respectively. That is the balance of opportunity costs for the hydropwer to be produced, plus use of the waters of the dam for irrigation, as against social disruption and relocation.

Given the high population density in the two countries the vehement objection to the higher levels of the dam was understandable. In fact, the controversy threatened the very continuity of the Kagera Basin joint programmes. Fortunately, there was already the framework of consultation set up in KBO for the basin-wide management. On 9th May 1981, the Heads of State of the KBO member states resolved the controversy and opted for the minimum dam which will create a reservoir at a normal operating water level of 1,325 metres.

The Rusumo issue also illustrates the fact that one dam can alter the flow regime and have considerable impact on the power potentials of other possible dam sites within the river basin, and at significant distances, as are Rusumo, Kishanda and Kakono. Thus, the reasons for a basin-wide management are clearly numerous and compelling.

## II. JUSTIFICATION FOR STATE INVOLVEMENT

The discussion of the significance of basin-wide management of rivers and lakes will have suggested some aspects of the justification for state involvement in the operations. In this section, the justification will be discussed in terms of the functional rationale, thereby analysing some of the problems which necessitate state involvement. The role of the state will, therefore, become apparent.

The breakdown of the items justifying state involvement shows considerable analytic overlaps; at the same time, the items are susceptible to different levels of specificity and inter-relationship. Here, six broad items are found distinguishable.

### Treaty Requirements in International Waters

It has been argued above that the regulation of flow regimes within a river, out of a lake or extraction of waters for consumptive uses are likely to have substantial physical and socio-economic consequences for both the upper and lower riparians. Yet, the data shows the

unused water resources and their potentials in Africa to be enormous. In fact, it is manifestly wasteful that African states have not taken measures towards complete utilization of the waters for, inter alia, irrigated agriculture, hydroelectric power production and navigation through flow regulation and management.

Therefore, it is clear that the African States should undertake regulations and management of the waters of national and international rivers and lakes. It is also evident that the management should be done basin-wide.

The foregoing two attributes require regional inter-state collaboration, coinciding with the scope of the basin. In that context, a regional agreement setting out the precise framework of reciprocal expectations and the protocol for implementation as accepted among the basin states, is a prerequisite. It is only the states that would adopt such treaties in accordance with the national constitutions, and as a function of the sovereign.<sup>11</sup>

There are instances where the appropriateness of a formal treaty becomes an acute problem even if international cooperation is unquestionably necessary. For instance, if the Gaborone dam, which feeds the capital of Botswana, was to carry so much water that it caused a back-water effect, flooding the territory of South Africa. In addition, suppose that the latter was to argue that the flooded territory is actually part of Bophuthatswana, a bantustan not recognized as a foreign state by Botswana. The City of Gaborone, as a legal personality, might find it appropriate to discuss the matter with anyone. But the Government of Botswana might find that discourse to be politically embarrassing and unacceptable considering that the so-called independent homeland concept is unacceptable to the UN and OAU. Yet for reasons of viability of the city, its inhabitants and industries, a solution would have to be found. Clearly, only the state can resolve the problem as a fundamental national issue.

The treaty framework is easier to create before there is a dispute, and disputes are likely to arise once utilization of the waters begin. Once a dispute arises over water uses it is possible for it to end on a war footing, as was suggested by the late President Sadat with respect to the proposed use of waters of the Blue Nile by Ethiopia. In May 1978, the late Egyptian President was reported to have said that his country would not accept any interference with the flow of the water of the Blue Nile, particularly if in its view Ethiopia took such a measure for political reasons.<sup>12</sup> Yet, it is very difficult to ascertain that the motives for any Ethiopian construction were political and not based on vital socio-economic necessity. Hopes for peaceful negotiation between Egypt and Ethiopia were raised only when the heads of the two states issued a Joint Communique in Cairo on April 9, 1987. They accepted that as the Nile basin countries, they would promote cooperation, in particular, in the field of rational utilization of the waters of the Nile to the benefit of their two peoples and all peoples of the area. Creating a treaty framework is, therefore, a central role of the state and, given the necessity for water management one which should probably be done for every international river or lake in Africa today.

#### The Nature of Water Laws in Different States

As pointed out already, the central factor in river and lake management is water. Whether the river or lake is national or international in character, the issue is utilization of the waters by public or private entities within the nation states. Such would necessarily be governed by the national laws, which laws may be prescribed and enforced only by the national authorities, according to their respective constitutions.

There is considerable diversity in the water laws of various African countries, as determined by their juridico-political histories.<sup>13</sup> Countries in Africa include those following civil law or common law and

associated jurisprudence. But there are also those countries whose laws are influenced by Islamic jurisprudence. Yet a further category is where the original tribal laws, existing prior to colonization, have co-existed with the European-derived legal systems. All these legal systems exist in Africa today; at times more than one variant in the same country.

It is sufficient only to point out here that the various legal systems make distinction in matters of ownership and right to use water. For instance, the common law doctrines arising from the English tradition acknowledge only usufructuary right in running water and they generally adhere to the rule of prior appropriation as the governing principle among users. Ownership of riparian lands only permits a right to use public water and to allow it to flow continuously, but not ownership of the water which actually rests in the state. Under civil law traditions, water which comes under the public domain, belongs to the public and may not be privately appropriated. But the governing principle is the doctrine of riparian rights which requires interests of all riparians to be protected. Thus, while the doctrine of prior appropriation vests priority in terms of "first in time, first in right", the riparian rights principle requires equitable consideration of the rights of all the riparians.

In any event, it seems evident that because of the differences which might arise from the basic doctrines on water ownership or user rights, the state would have a role in the harmonization of the intensified consumptive usage, such as for irrigation or flow regulation, so as to facilitate hydropower production, navigation and use in industries. It seems, moreover, that in each of these legal systems the state has a central role in the regulation and control of use of water as a public resource. Only the state through its laws would properly provide the framework for regulation and apportionment of water among the various contending public and private users.

### Regulation Necessitated by Broad Base of Water Projects

Water by its very nature is a pervasive substance; projects involving its utilization such as community consumption, irrigation, navigation, and hydropower production tend to have multiple socio-economic implications. Very often, those affected might not individually have enough political or economic power to alter the course of events affecting them. For instance, damming for hydropower production, to facilitate gravitational transfer of water for irrigation or to facilitate navigation may each present an opportunity for the other socio-economic activities. Concurrently, as seen in the case of Rusumo Dam, it may lead to loss of agricultural land and the displacement of population, sometimes in countries with high population density as Rwanda.

These become socially or economically sensitive affairs which must require the intervention of the political arm of the state. Moreover, even if no detrimental effect is anticipated or created, the very decision to dam a river, for instance, creates opportunities for other positive socio-economic purposes which an individual might not cherish but which a state might not want to waste. For instance, a decision by a private individual (actual or juridical) to dam a river and use the water for irrigation may create an opportunity for hydropower generation which only the national energy planners may appreciate and for which only the state can be in a position to co-ordinate the opportunities.

### The Magnitude of Resource Involved

The necessity for a comprehensive and basin-wide management of the waters of a basin seems evident from the foregoing analysis. At the very least, the management should be planned on a basin-wide basis even if the actual implementation is taken in stages. That entails meeting the cost of the studies, and eventually, of the projects. These

costs can be enormous, and considering the nature of the river or lake basin plans, such costs must fall on the state.

The magnitude of the resources may be illustrated by a couple of instances. The member states of the Kagera Basin Organization have attempted the ideal comprehensive planning to include studies and implementation of projects in energy, agriculture, transportation, afforestation and health. The total cost is summarized in Table 6.

Table 6: Summary of the Total Costs of the KBO Programmes

STUDIES

|                       |                     |
|-----------------------|---------------------|
| Energy                | \$19,107,000        |
| Railway               | 8,586,000           |
| Roads: Primary        | 28,525,200          |
| Secondary             | 12,979,200          |
| Industries            | 180,000             |
| Sub-total for Studies | <u>\$69,377,400</u> |

PROJECTS

|                                  |                        |
|----------------------------------|------------------------|
| Agriculture: Rainfed             | \$21,200,000           |
| Irrigated                        | 53,361,000             |
| Energy: Dams                     | 575,200,000            |
| Transmission lines               | 93,240,000             |
| Railway: Construction of network | 1,395,663,000          |
| Rolling stock                    | 556,704,000            |
| Roads: Primary                   | 327,792,000            |
| Secondary                        | 81,120,000             |
| Afforestation                    | 17,207,700             |
| Tse-tse fly                      | 2,511,735              |
| Sub-total for projects:          | <u>\$3,120,999,435</u> |
| TOTAL COST OF THE PROGRAMME      | <u>\$3,190,376,835</u> |

Source: Kagera Basin Organization and UNDP, 1982. Development Programme of the Kagera Basin: Final Report, Executive Summary (February), p.73.



The total amount, nearly US \$3.2 billion, is evidently an enormous amount. One might, of course, suggest that it could be reduced by less involvement of the state in the implementation of some of the sectors under the drainage basin programme such as agriculture, particularly the rainfed variation.

Nevertheless the amount is bound to remain large even in instances where the primary focus is in the construction of the dams, before the infrastructure for hydroelectric power or irrigation are included. In the case of the Organization for the Management of Senegal Basin (OMVS), the primary plans are for the construction of the Diama and Manantali Dams. By mid-1982, the OMVS was able to raise a total of US \$821,816,000, of which US \$156,362,000 was for Diama and US \$572,319,000 for Manantali while US \$93,135,000 was earmarked as reserve.

The above total amount actually represented only 99% of the cost of the two dams and the immediately related works. Clearly, then, the total amount is just over one billion dollars. Add to that the interest on the loans and the total amount in 1988 could be considerably higher.

The point is that the investment requirements can be enormous if integrated and basin-wide management is to be undertaken. And since most of the investment includes studies and basic infrastructure on which subsequent diverse investments would rely, only the state is in a position to undertake them. That applies to international and, basically, national management programmes.

#### Establishment and Development of Basin Institutions

Management of water resources as described above requires institutional bases far in excess of what a nation's private sector or non-governmental organizations can provide. It requires high level and diversified management capabilities backed by research and

institutional infrastructure - to ensure adoption and diffusion of appropriate technology and improved husbandry. A keen observer of the African scene, Professor Odera-Ogwell, has submitted that of all the regions of the world, Africa has the lowest rate of adoption of technological packages in agriculture.<sup>14</sup>

At the very foundation of institutional development is training of manpower, defined as the cadre of human beings capable of performing certain productive functions. This is a costly and long undertaking which is to be seen as promotion of the productive value of human resources whether they are later to be deployed in governmental or non-governmental capacities. Very often, attempts to enhance the performance of a river or lake basin development is hampered by lack of qualified manpower, including agronomic researchers, engineers, managers or extensionists. In a study done by USAID and OMVS for the Integrated Development Project, it was observed from the outset that there were institutional and implementation problems which must be resolved first, before positive results can be achieved, as follows:

- "1. The lack of resources and qualified personnel to carry out extension activities;
2. The lack of logistical support for field agents;
3. A government-directed approach to agricultural production encouraging the cultivation of specific crops (i.e. rice) at the expense of diversification;
4. The absence of monitoring systems for training and production activities;
5. A lack of understanding of farmers' needs and their participatory role in decision-making;
6. A lack of integration of farming activities, such as cattle-breeding or herding".<sup>15</sup>

These could arguably be called basin institutional questions which can be properly dealt with by the concerted role of the state,

individually or within a joint framework, as was discussed with OMVS in 1983.<sup>16</sup> But in fact, that is one of the basic problems for the Niger Basin Authority or Kagera Basin Organization, as has been ascertained in the direct interviews with senior officials of those organizations. And we can submit here that however vast the financial resources available may be, there will be no success with the development programme unless a competent and stable institutional framework is established and in place.

### Meeting the Requirements for Basin Infrastructure

Basic infrastructure to support the management of river or lake basins includes roads, railways, telecommunication facilities, laboratories, navigational support equipment, among others. They are generally akin to the institutional requirements and their construction and establishment is a proper domain of the state.

The state may, in fact, plan to establish the basic infrastructure and later, to use various devices of rent and taxation to recover part of its investments from non-governmental or public commercial entities which may enjoy the use of the infrastructure. In fact, the state should consider that as a serious option, exempting only the essential social service institutions, such as hospitals and community water supply points.

### III. SOME CRITICISMS OF STATE PERFORMANCE

This section's principal purpose is to raise a number of caveats to state involvement in the management of river or lake basins. In the process, it may point out other roles of the state not discussed above. Moreover, most of the points raised below are inter-related; the breakdown is designed for emphasis and analytic purposes. The criticisms are being posed as research questions, in order to ascertain ways of ameliorating them and promote the effective management of

African drainage basins.

Five illustrative points are raised as follows:

Over-politicization of Institutions and Programmes

Involvement of the state in any matters is, ipso facto, a political matter. Therefore, by actually accepting the state role in the management of river or lake basins, the political role is automatically implied. In fact, the political element will be present in most of the points that can be raised in this section.

The problem, however, arises when political considerations supercede all else in institutional and programme matters. Very particularly, the over-politicization of the institutions commences with the determination of personnel to be employed on the basis of political patronage to the exclusion of merits and expertise. It is also possible that those with expertise in the relevant areas may be made to understand that it is not the professional qualifications that have earned them the jobs but that they are proper clients of the patronizing politicians, or in the alternative, plain nepotism\*.

The critical question here is one of a politicized appointment which is subsequently backed by political protection of the employees. Its consequence is that the appointee is aware that it is the political, consanguineous or affinal loyalties and protection, and not excellence in professional performance that will insure the job. Such are the persons who courageously resort to misuse of office, unfair enrichment, misappropriation of resources, and negligence of the assigned responsibilities. Very often the resources of the institution are squandered on unnecessary or unofficial travels, including maintaining tight contract with, or even performing political duties for, the patron politicians at home to the neglect of the assigned headquarter duties. It may not be a surprise that in such cases executives of this

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\* In this case, the employee would be required to belong to FBI Friends, Brothers or In-laws.

kind will ignore or frustrate any assigned deputy, knowing only too well that a deputy might be informed and able to reveal the irregular practices if he has access to the official correspondence. This leads to collapse of morale and apathy in the professional and support staff, with fatal implications for the organization.

These characteristics often emerge in regional organizations, whether they be drainage basin organizations or simply trade and service organizations where states are parties. Similarly, they are found in parastatals at national level. The executive officers act with impunity because they understand it that even if pressure resulted in their removal, they often suffer no penalties for their offences against the community. To this, the exceptions are extremely rare.

In the case of the Niger Basin Authority (ABN) a great deal seems to be concealed behind the reported criticism of its Executive Secretary by the Council of Ministers meeting, held at Niamey on 10 and 11 August 1984<sup>17</sup>. The eloquent understatement reported that the meeting decided to create an ad hoc commission to evaluate the performance of "the Executive Secretary not having fulfilled the expectations of the member countries." It was nearly unanimously agreed that the poor performance of the Executive Secretariat had undermined credibility of ABN vis-a-vis the member states and the international financial institutions. As a consequence, financial contributions and donations were not forthcoming. Perhaps a decisive and instructive action will be taken at the end of the review, but again, this depends on the role which the states, particularly that of the nationality of the Executive Secretary, decide to play in the matter. It may, in fact, vindicate the thesis stated here by protecting the official concerned.

The member governments of the Preferential Trade Area for Eastern and Southern African States (PTA) seems to have evinced firmness and prudent action on what may be called the "Spendthrift Affair". The

man who was appointed first Secretary-General of the organization worked for only eleven weeks by which time a meeting of the Council of Ministers was able to conclude that he "lacked the highest standards of integrity, efficiency and technical competence expected of him..."<sup>18</sup> Audit reports of the finances were also ordered, because part of the accusations raised were that the Secretary-General had conducted himself contrary to the required standards of frugality, thriftiness and prudence. The actions that might be taken in event of confirmed impropriety were not stated, but he was summarily dismissed. The pertinent question must be, how was a person who evinces these characteristics appointed to the job, in the first place?

A more interesting and unusual course of action seem to have been taken by three states, members of the West African Economic Community (CEAO). Three former officials were reportedly taken to court on trial on charges of embezzlement of funds while they were in office.<sup>19</sup> They were no political dwarfs: the main accused, Mohammed Diawara, a former Ivorian Planning Minister, is supposed to have stolen the equivalent of US \$14 million belonging to CEAO. This he allegedly shared with a Senegalese who was the organization's Secretary-General, and a Malian. The three were arrested in an exceptional event during the October 1984 summit at Bamako and sent to be kept in custody at the Burkinabe capital, which houses CEAO headquarters, until the trials were to begin on March 25, 1986.

It is often expected that embezzlement of that magnitude was actually encouraged by the kind of political patronage the officials enjoyed. Lessons from the CEAO experience can be elucidated only by the knowledge of what happened to the old patronage, in each case.

One national-level instance of a decidedly disastrous programme in river basin management is the Bura Irrigation Scheme in Kenya. The small programme was conceived in the early 1970's to settle 60,000 people

(5,000 families) over an area of 6,700 ha. It was to be implemented with a consortium loan of US \$91.7 million from the World Bank, the Dutch Government and the EEC.<sup>20</sup>

On a surprise visit to the scheme on January 21, 1986 the President of Kenya was riled by the scheme which he called a disgrace. He found eroded irrigation canals, abandoned plots, poor crops, tumbled down and insanitary housing, zebras grazing on irrigated land, and a general air of desolation and decay. Some of the problems seem to have originated from the inception of the programme. And the President ordered for the dismissal of the General Manager, who was a political appointee. It took nearly fifteen years before that could be done and perhaps it is to be expected that some punitive action will be taken against the top executives concerned. In any case, if some of the problems were recognizable at the inception of the programme, what happened to the purportedly rigorous World Bank pre-investment appraisal machinery? Why did the Bank ride along with the disaster for so long? Is it conceivable that a commercial or other form of non-governmental institution could have continued to pump the money in a venture of that kind for nearly fifteen years?

#### Tendency Toward Proliferation of Institutions

State activities tend to encourage proliferation of institutions, even where such institutions are parasitic on the resources of others. One functional line which could be accomplished by an existing institution would often be to have another institution set up for it. This happens at national and international levels alike.

On the question of irrigation, for instance, Kenya has about eight public agencies involved. In many provinces there are National Irrigation Boards, a Development Authority, and Provincial Irrigation Unit, all at work. Eventually, considerable resources are dissipated

in administrative overhead costs rather than operational activities.

This is a general syndrome which is manifested with different intensities in different regions. In central, eastern and southern Africa, there is the Preferential Trade Area (PTA) which perhaps coincides, in part, with Lusaka-MULPOC, SADCC, Gisenyi-MULPOC, Kagera Basin Organization, the Great Lakes Community, and the East African Development Bank. Recently there have been arrangements to create a PTA "bank". It is highly questionable here if all the MULPOC are necessary for the development objectives. Similarly, the developmental value of the Great Lakes Community is questionable within the regional context. Having Rwanda and Burundi keep Zaire company within the geo-political arrangement in the region might not make much sense. But, evidently, Kagera Basin Organization is a vital institution. Within the PTA context, one might suggest the use of East African Development Bank, in an expanded form, as being more appropriate and efficient than setting up a new PTA Bank in Bujumbura. Further considerations could be given to use of existing institutions in the region because expanding such institutions should be economically cheaper and efficient than setting up new ones.

In West Africa, a 1982 study mandated by the United Nations Economic Commission for Africa (UNECA) found that the major obstacle to integration in the ECOWAS region was the existence and varying objectives of a multiplicity of intergovernmental organizations in the area.<sup>21</sup> The study found that there were more than thirty such organizations with some of the countries belonging to more than twenty: Senegal - 20; Burkina Faso (Upper Volta, at that time) - 22; Niger - 25. And there were 16 organizations on the subject of natural resources management alone.

The effect is that the large share of the available resources goes to servicing the permanent secretariats of organizations, which



have no resources left for developmental programmes. Very soon, the states are unable to justify continued use of taxpayers' money to service institutions which have no development work to justify their existence.

Only states with taxation powers and limited accountability can proceed with international institutions to that extent, especially if some of the institutions are used only to reward political proteges, friends and relatives of those in power, with lucrative salaries and benefits. African governments will want to be deliberate in keeping down the number of institutions and hopefully, the number of employees, to assure cost-effectiveness in development matters.

#### Mix-up of Economic Exigencies with Political Prestige in Projects

All governments would wish to be powerful and carry some prestige and ostentation around and within the state. It has been argued that in a number of aid programmes, the goal has been for showy projects which are conspicuous to the public, even if they are not the most socio-economically logical ventures. The United States posed such an argument at the time of the construction of the Aswan Dam in Egypt and the Tanzania-Zambia railroad. The precise line is difficult to draw and the argument is often dismissed as blatant prejudice. But perhaps in some cases the argument may be verifiable and only caution should be raised here.

In the case of OMVS some commentators have argued that it was not necessary to construct two dams:<sup>22</sup> the Manantali could have regulated the flow of the water permitting year-round navigation, irrigation, hydropower production as well as to prevent salt water intrusion upstream. They conclude that it was perhaps for the prestige of Senegal, vis-a-vis Mali, that the Diama was to be constructed: the Manantali Dam is on the territory of Mali; Senegal was to have some one too, at Diama,

for the prestige of the respective states.

It is also argued that in its haste to construct the showy projects, the states tend to overlook such socially vital matters as rigorous environmental impact assessment and the human aspects of the projects with the clear consequence that the projects fail.<sup>23</sup>

An economic exigency which is often overlooked in the haste to construct the project is the cost of the capital borrowed for the project and how it can be repaid. The Bura Irrigation Scheme is classical in this regard. The total loan was US \$91.7 million. But the President officially declared the project "a disgrace, a failure and the height of mismanagement". He then concluded that the real losers are "the future generation of Kenyans, who will go on paying the World Bank interest on the loan". The haste is partly verified by the fact that even the soil quality was not assessed at the beginning. Somehow the haste overwhelmed the World Bank too, a fact which confirms that this problem could arise anywhere. But it is not excusable.

The financial requirements for the OMVS and KBO are clear from Section III (4) above. If some aspects of the projects be for political image, rather than meeting economic requirements (with the investment in social services being clearly distinguished), the implications can be far reaching. Perhaps only a state, oblivious to canons of accountability, could proceed so recklessly.

#### Over-Centralization of Institutions

Over-centralization seems to be the folly of state involvement in drainage basin development with the most serious and far reaching implications. Horror stories seem to recur in most of the instances that have been surveyed in Africa. The KBO, as a recent beginner, still awaits the stage of implementation and reviews to show if it departs from the existing trends.<sup>24</sup>

The OMVS as a development authority is going through the latest attempt at implementation. But the earlier record of management of the Senegal Basin underscores the folly with distinction. Accounts have been given of the work by SAED, the parastatal authority in Senegal responsible for organizing farmers and irrigation programmes in the Senegal Valley. As recently as April 1975, there were meetings held with the villagers' Association for Collective Agriculture and visitors from the SAED, accompanied by French agricultural technicians.<sup>25</sup>

The evidence from the account is that the "experts" from SAED and the villagers were strangers to one another; they were not effectively communicating and evidently the villagers did not fully understand what SAED officials wanted. Nor were the villagers interested in joining SAED because the role of SAED had not been clearly explained to them. The management was found to be totally inefficient, to say the least. While the original estimated cost was about US \$13-14,000 per irrigated hectare, the eventual cost averaged between US \$40,000 and US \$50,000 per irrigated hectare.<sup>26</sup> This is in stark contrast to the reported cost in Mali, where a World Bank project costs around US \$26,000 per hectare, under Sahelian conditions.

The condition at the Bura Irrigation Scheme in Kenya was permitted to continue for about a decade. The pertinent question is whether it had to take a surprise helicopter visit by the Head of State to change the trend. A summary of one of the findings of the President was that:

"The project managerial control was over centralized in Nairobi which resulted in major weaknesses in the procurement of materials, delayed reaction to the crises on site, poor financial and budgetary controls, and misapplication of project funds."<sup>27</sup>

The President order that the project would, henceforth, be managed from Bura.

These findings are important because the record of the National Irrigation Board (NIB) suggests that very often the management was totally insensitive to the woes of the farmers. Accounts from their West Kano project evinces perils and helplessness for the farmers. A settler at the scheme wrote to the press<sup>28</sup> complaining against the NIB which increased the costs to the farmers, paid less for the farmer's output and charged inflated prices for farm inputs. In one paragraph the farmers submits as follows:

"Productivity has dropped. Morale is killed. The families affected cannot dress. No education. The farmer no longer believes the scheme was intended for his good. The NIB has become a reject, and it is suspected to be more of a marketing agency for farm inputs and equipment than a development agency. The NIB has impressed us with its devotion to negligence and the skill to frustrate and demoralize farmers".

That is a farmer's description of the performance of a parastatal agency involved in a river basin development scheme at national level.

As sub-Saharan Africa goes into river and lake basin development schemes, there is need for close assessment of what is happening with the schemes at national level. Nigeria is one of the countries which should offer lessons because it has eleven river basin authorities. The record of Nigeria's National Electric Power Authority (NEPA) can give an indication. NEPA, gets its power from, among others, Kainji Dam. Although Kainji has a capacity of 760 megawatts, the production level is less than half of that. Besides, indecisiveness kept the 700 megawatt gas-fired station at Sapele from commissioning for over one year.<sup>29</sup> In the end, NEPA became associated with rather unflattering full titles as "Never Expect Power Always" or "Not Even Properly Administered".

It seems difficult to find a river or lake basin authority which has effectively decentralized and devolved authority to the local

level of its regions in order to ensure effective implementation of projects through involving the supervisors in the actual work and building sensitivity and responsiveness to the needs of the farmers. The Lake Basin Development Authority (LBDA) in Kenya accepts, in principle, that it should decentralize its project supervision and administration. In actual fact, the practice is far from being realized. By now, the LBDA has had just over two years of actual and serious project implementation. It is expected that its decentralization programme should commence in practice during the third year.

Apart from the follies of over-centralization outlined above, over-centralization also tends to assume that the local farmers are ignorant, irresponsible and passive entities who should simply be directed by the imported "experts", like machines. Very little attempt is placed on the encouragement of local initiatives and inventiveness by the local farmers. Nor do the over-centralized systems bother to mobilize local farmer organizations, such as cooperatives, as the actual agents of development. These points come out particularly in the 1975 SAED encounter discussed above. The specific Senegal situation on the matter is elaborated by Thayer Scudder who says that devolution to local levels is often correlated with higher yields and that it increases the effectiveness of the responsible agencies.<sup>30</sup>

But devolution to the local levels and mobilization of producer organizations must, of necessity, be accompanied by a rigorous government role in institution building (including training of experts and farmers) and the provision of basic infrastructure. Granted, experience with co-operative organizations in Africa does not have many success stories to offer. However, its history is short and so long as specific follies of state involvement such as politicization and low level of accountability can be remedied, there is some determination in Africa and examples from abroad which suggest positive prospects.<sup>31</sup>

#### IV. FINAL REMARKS

The functional justification for state involvement in the management of river and lake basins development in Africa are inherent in the socio-economic reasons for the drainage basin focus on development. It is further underscored by the established necessity for a comprehensive and integrated approach to the management of the utilization of the water of the basin for, inter alia, irrigated agriculture, hydroelectric power generation, navigation, and community and industrial uses of water. It is also a component of integrated development planning that the state should ensure measures to prevent negative environmental impact of the activities within individual basin states or in terms of trans-territorial environment injuries.

The study has outlined some negative practices associated with state involvement in river and lake basin development. It is possible to indicate factors that are most forcefully inimical to development: Politicization of the institutions and failure by the government to ensure accountability by those who are in responsible positions. People who know of their political protection tend to retain that as the focus of commitment and to ignore pursuit of excellence in their work. Consequently, they resort to abuse of office, misappropriation, neglect of duties and plain pursuit of comfort. In Africa where a head of the judiciary has been honest enough to accept that corruption in his department "threatens to reach a point of disgrace and uncontrollable destruction to the system"<sup>32</sup>, political clientelism and lack of accountability in the management of the national and international drainage basins can prove fatal to the organizations. The capacity of tax payers to keep subsidizing the inefficient, wasteful, negligent and corrupt system is obviously finite.

In fact, every drainage basin development authority should work on the basis of achievement targets set by their governing boards.

Thereafter, individual executives should retain jobs only on proof of achievement. This rigorous ethic could be an effective part of accountability, and examples exist elsewhere, even though not in drainage basin authorities. For example, on Monday, April 7, 1986, Wei Yung-Wing, the chairman of the state-run China Ship Building Corporation resigned following his company's failure to complete on schedule two container ships ordered by a local firm. Financial resources which African states often seek from donor agencies will hardly insure development unless there is also impeccable commitment to achieve public goals, honesty and integrity in the management of public resources, and generally, a community-oriented entrepreneurship.

The point is that in order to succeed, African states must act firmly and ensure accountability from their highest levels before they can expect performance at the farmers' level. In the end, most of the productive work should be done at the local level by the small-scale farmers, collaborating through their organizations or through the local commercial enterprises.

Over-centralization of institutions and management tends to lead to inefficiency, neglect and insensitivity to the farmers, destruction of the morale and initiative of the actual producers, failure to stimulate the participation of the producers and their organizations in procedural and substantive ways, and eventually, the collapse of the programmes in situations where accountability was already scanty.

The state operations may also devolve to the local level in the form of autonomous but associated enterprises working as subsidiaries of the parent institutions. The autonomy of the subsidiaries would cushion the subsidiaries from the financial failures of the parent or sister enterprises and, at the same time, permit the weak enterprises to collapse, alone.

The decentralization and devolution of management to the local levels should be accompanied by a systematic institution building to include high level training of experts, training of extensionists, mobilization and education of the farmers as individuals and within their organizations, and the provision as well as maintenance of the basic infrastructure.

There is no substitute to institution building if the development programmes are to succeed. But as a requirement, the organization must be able to train, attract and retain the managerial staff. It is not sufficient simply to train: under the aegis of the Niger Basin Authority six persons had been sent for training with assistance from USAID; four of them had received master of science degrees by mid-1984 but none of them was employed by the Authority. That was also the Authority where the head of one of the four operational departments<sup>33</sup> expressed frustration at the fact that since his appointment in July 1981, the chief executive had not assigned him even a single project by mid-1984. In fact, he stated that the chief executive had frustrated every initiative he had taken to build up and execute a project.

It is submitted here that efficient and effective management of the demonstrably abundant resources of the African drainage basins holds a key to the resolution of the current African economic problems. This is the case because it would make available two factors critical to solving Africa's crises: indigenous energy resources and dependable agricultural production. It is also certain that once agricultural production and energy resources are available, a number of avenues for the transformation of the economic structure is possible beginning with agro-based industries.

For these reasons researchers and policy-makers, particularly from Africa, have the challenge of finding the formula for the eradication



of the problems of management, and the promotion of a rigorous social ethic of accountability. This is not a sufficient condition, but it is an absolutely necessary condition if development is to be realized.

Footnotes

1. These data have been gleaned from the records at the United Nations Economic Commission for Africa. For a summary see UNECA. 1976. Problems of Water Resources in Africa. Doc. No. E/CN.13/NRD/WR/1/Rev.2 October 21, 1976. Addis Ababa: UNECA. p.49.
2. This is eloquently expressed by Professor Adebayo Adedeji, the Executive Secretary of UN Economic Commission for Africa and Special Representative of the United Nations Secretary-General on the African Economic Crisis in his "End-of-the-Year Conference on Africa's Current Economic Crisis and the Prospects for 1985" issued at his Addis Ababa Office on 28 December 1984. On this occasion he singled out "Drought and Emergency Situation" as the dominant problems, in a list which also include unfavourable global economic environment and the dramatic increase in Africa's external debt.
3. See Krishnamurthy, K.V. 1977. "The Challenge of Africa's Water Development" in Natural Resources Forum 1 pp. 369, 371.
4. Note, however, that more than three quarters of the total rainfall in Africa is immediately lost through evaporation, a fact which might be significant in designing water conservation projects. See Doc. No.E/CN.14/NRD/WR/1/Rev.2 (1976) op. cit. p.6. Note further that the knowledge of Africa's groundwater reserves is not complete, as directed by some recent discoveries. Perhaps the most dramatic discovery is that of the lake under the Sahara Desert, which Libya is planning to exploit at the rate of 6 million cu.m. per day. See a feature story in The Sunday Times (Nairobi) December 22, 1985. At the same time, Egypt under the late President Sadat already embarked on plans to expand desert agriculture by 500,000 acres, using waters of the underground lake. See "Egypt's Desert of Promise" in National Geographic Vol.161 No.2 February, 1982 pp.190 et seq. If there are any connections between the two aquifers then the two states might one day want to talk about jointly planned utilization of the water from the reservoir.
5. Supra note 3 p.370.
6. Odero-Ogwell, L.A. 1982. The African Food Problem and the Challenge to the International Community, mimeo.
7. Ibid, Table 3 page 7. Explanatory notes offered say that the average fallow periods are a very general estimate for fallow period required for one year cultivation (low inputs). The figures for South America were only provisional. Where the percentage for the presently cultivated period is higher than 100 it implies that land which is not suitable for cultivation has already been encroached upon.

8. Op. cit. p. 6.

9. In "Lake Lanoux" Arbitration, the Tribunal rejected the claim by Spain that the French's mere diversion of the Carol River water and restoring it without consumption, constituted a breach of the Spanish interests. See "Lake Lanoux" Arbitration in 12 UNRIAA 218, also reprinted in 53 American Journal of Int'l Law 156 (1959).

10. Data are derived from Tractionel-Electrobel. 1979. Hydropower Development of Rusumo Falls: G-Economic Summary and Conclusions. Tractionel-Electrobel Studies (June), pp. 6-8; and Kagera Basin Organization and UNDP. 1982. Development Programme of the Kagera Basin: Final Report, Volume 3 (February), p. 38.

11. Note that some national constitutions permit constituent provinces/states, of the sovereign state, to enter into treaties in the specified subject areas. An example in point is the Convention on the Protection of Lake Constance against Pollution, signed by the Land of Baden-Wurtttemberg, the Free State of Bavaria, the Republic of Austria and the Swiss Confederation, on October 27 1960, where the first two are constituent states of the Federal Republic of Germany. The text is reproduced in the United Nations Legislative Series, 1963. ST/LEG/SER. B/12 p.438. The Convention entered into force in November 10, 1961.

12. For further discussions see Okidi, C.O. 1980. "Legal and Policy Regime of Lake Victoria and Nile Basins", Indian Journal of International Law Vol. 20 July-September 1980, pp. 394, 440.

13. D.A. Caponera. (Ed.) 1979. Water Law in Selected African Countries. Rome: FAO; Caponera, D.A. 1973. Water Law in Moslem Countries. Rome: FAO. See a detailed treatment of this subject by Okoth-Ogendo in this Volume, pp 177-193 infra.

14. See supra note 6 p.6. There are only a few exceptions to this tendency and an example is the diffusion of hybrid maize seed in Kenya which moved with amazing speed.

15. USAID/OMVS Integrated Development Project. 1982. Volume III Analysis of the IDP Training Component (Project No. 685-0621, October) p. 4.

16. See, for instance, an outline in OMVS, High Commission. 1983. Training and Human Promotion Directorate. Dakar: OMVS.

17. International Rivers and Lakes (A Newsletter by the DTCD, United Nations, New York, No.5 June 1985) p.12 has only a brief report on a Meeting of the Council of Ministers held at Niamey, Niger 10-11 August, 1984. But these problems were evident for more than a year.

18. Report of the First Extraordinary Meeting of the PTA Council of Ministers, PTA/CM/XT. 2 Nov. 1983.
19. The matter is attracting wide international publicity. See The Kenya Times March 17, 1986 p.8 and March 25, 1986 p.8.
20. See an overview by Barbara Gunnell, "The Great Bura Irrigation Disaster", in African Business April 1986 pp. 18-20. For the specific views of the President see coverage in The Kenya Times January 22, 1986 p.1 and 28, January 28, 1986 p.9; February 18, 1986 p.4.
21. UNECA. 1984. Proposals for Strengthening Economic Integration in West Africa. Addis Ababa: UNECA.
22. See "Dangers of haste on River Senegal Projects", West Africa 23 October, 1978, pp. 2083-2084.
23. See comments by Sophie Bassis, "Recalculating river development costs: the case of the Senegal" in Ceres Sept.-Oct., 1982 pp. 21-26, and Adrian Adams, "The Senegal River Valley: What kind of Change?" in Review of African Political Economy, No.10 Sept.-Dec. 1977, pp. 33-59.
24. Egypt and Sudan have not been covered in this study. They have the most extensive experience in irrigation in Africa. On the other hand, experience in sub-Saharan Africa is just beginning.
25. A. Adams, "The Senegal River Valley: What kind of Change" in Review of African Political Economy No. 10. Sept.-Dec. 1977, pp. 33-35.
26. These are figures given by Barbara Gunnell, Supra Note 20. They might be on the higher side but they do, nevertheless, underscore the point. Estimates given in interviews with some NIB Officials put the figure between \$33,000 and \$40,000.
27. The Kenya Times, February 18, 1986.
28. See Sunday Nation (Nairobi) November 28, 1982. For additional comments on the Fiasco in the West Kano Scheme of the National Irrigation Board, see Sunday Nation, November 14, 1982 Editorial.
29. See the letter from Lagos by Eddie Iron in African Business, June 1984.

30. Scudder. 1981. African River Basins. Binghamton, N.Y.:  
Institute for Development Anthropology (July), pp. 37-38.

31. See a brief account by Francois Huot, "Co-operatives in  
Burkina Faso: A spirit of Self-Development" and David Creighton.  
1986. "Lessons from India: Success, the Co-operative Way" in The  
IDRC Reports, Volume 15 No. 1 (January), pp. 22-24.

32. Comments by Acting Chief Justice Madan of Kenya on 21 January,  
1986 in an address to the Coast Province Branch of the Law Society of  
Kenya. See report in Daily Nation (Nairobi) January 23, 1986, p.4.

33. The 1980 Act by which the contracting states established  
the Niger Basin Authority established from Departments: Water Re-  
sources; Navigation; Transportation and Telecommunication; Agriculture;  
Fisheries and Livestock; Administration; Economy and Personnels; Plus  
the Documentation Centre.